The Rise and Decline of Sikh Anti-State Terrorism in India: An Economic Based Explanation

by

Charanjit Singh Kang

M.A. (Criminology), Simon Fraser University, 2005
B.A (Hons.), Simon Fraser University, 2001

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Name: **Charanjit Singh Kang**

Degree: **Doctor of Philosophy (Criminology)**

Title of Thesis: ***The Rise and Decline of Sikh Anti-State Terrorism in India: An Economic Based Explanation***

Examining Committee: **Chair:** Dr. Martin Bouchard
Assistant Professor

Dr. Garth Davies
Senior Supervisor
Associate Professor

Dr. Raymond Corrado
Supervisor
Professor

Dr. William Glackman
Supervisor
Associate Professor

Dr. Stephen Hart
Internal Examiner
Professor
Department of Psychology

Dr. Michael Stohl
External Examiner
Professor
Department of Communication
University of California, Santa Barbara

Date Defended/Approved: July 30, 2013

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Abstract

A majority of the predominant theoretical explanations of terrorism focus primarily on the historical, ideological, and political reasons for individuals' or groups' participation in terrorist violence. There is an overall critical absence in these theories about the role of broader structural causes of terrorism such as economic conditions. The limited number of theories/models examining the link between economic conditions and terrorism are relatively underdeveloped. Many economic theories or models concentrate largely on identifying broad macro-level theoretical constructs to indicate when individuals or groups within society are willing to participate in terrorist movements. A large number of these perspectives emphasize the central role of relative deprivation and highlight various economic indicators to measure this construct, but fail to provide an associated explanation about the process by which individuals become deprived and the exact factors that lead to this economic deprivation.

The present thesis adapts the economic hypotheses of Corrado's anti-state terrorism model in order to explain the rise and the decline of Sikh anti-state terrorism in Punjab. The thesis incorporates quantitative empirical data to show economic conditions in Punjab and examines trends in Sikh violence. This thesis also modifies Corrado's economic anti-state terrorism model in order to improve its comprehensiveness and direct applicability to the Punjab conflict. The revised model has been directly shaped by economic conditions specific to Punjab that contributed to the economic deprivation of the Sikh population. The new model is unique in that it provides a detailed account and theoretical link as to how specific economic conditions in Punjab contributed directly to feelings of relative deprivation amongst the Sikh population, which led to the rise of Sikh terrorism. This thesis explains how the amelioration of these economic conditions led to the decline of the violent Sikh anti-state terrorism movement. This new economic anti-state terrorism model provides a new and vibrant perspective on how nations can prevent the rise of anti-state terrorism movements, or reduce active terrorist violence within their borders.

Keywords: Punjab; Sikh; Terrorism; Economics; Khalistan; Green Revolution

To my father, mother, sister, brother in-law, nephew,
extended family, and friends, especially,
Harp, Ranj, Lloyd, Harj, Devinder, Reena, Sharon,
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List of Acronyms

ADC	American Development Council
AEO	Agricultural Extension Officers
AISSF	All India Sikh Student Federation
APC	Agricultural Price Commission
ASR	Anandpur Sahib Resolution
BHP	Base Horse Power
BJP	Bhartiya Janata Party
BRIC	Brazil Russia India China
BTF	Bhindranwale Tiger Force
I-Indra	Congress Indra Party
DA	Deprived Actor Theory
FARC	Revolutionary Armed Forces of Columbia
FCI	Fixed Capital Investment
FCI	Food Corporation of India
GDP	Gross Domestic Product
GMF	Grow More Food Program
HYV	High Yielding Variety
IARI	Indian Agricultural Research Institute
IADP	Intensive Agricultural Development Program
ICAR	Indian Council of Agricultural Research
IDBI	Industrial Development Bank of India
CIMMYT	International Maize and Wheat Improvement Centre
IRRI	International Rice Research Institute
HA	Hectares
KCF	Khalistan Commando Force
KLA	Khalistan Liberation Army
KG	Kilograms
KWH	Kilowatt Hours
M.W.	Mega Watts
MARKFED	Marketing Federation Limited
NAP	New Agricultural Program
NSA	Net Sown Area
N	Nitrogenous

OPEC	Organization of the Petroleum Exporting Countries
PH	Phosphate
PO	Potassic
PAU	Punjab Agricultural University
PSSIC	Punjab Small Industries and Export Corporation Ltd.
PSIDC	Punjab State Industrial Development Corporation
R&D	Research and Development
Rs.	Rupees
USAID	United States Agency for International Development
WTO	World Trade Organization

1. Introduction and Theoretical Background

In Punjab between 1978 and 1995, the Indian state experienced one of the most violent and prolonged terrorist conflicts in its post-independence history. The Sikh anti-state terrorism movement is officially believed to have led to the death of 18,000 civilians and government personnel (Singh, 1996). However, unofficial statistics estimate that approximately 20,000 to 45,000 additional Sikh civilians may have been kidnapped and killed as a result of counterterrorism operations conducted by the Indian military, paramilitary units, and the Punjab police (Singh, 1996).

The primary goal of this thesis is to examine the economic conditions primarily, but not exclusively, that led to the rise and eventual decline of Sikh terrorism in the Punjab as they relate to Corrado's anti-state terrorism model. Punjab's terrorist movement offered a particularly interesting opportunity to explore Corrado's model: economic conditions were distinctive and the conflict particularly intense. The conflict was unique economically because Punjab was consistently the most advanced agricultural state in India, in both agricultural output and infrastructure (Wallace, 1986). Residents of Punjab had the highest per capita income in the country, and Punjab consistently ranked at the top of all key social and economic indices (Wallace, 1986). Nonetheless, for reasons that will be explored in this thesis, the Punjab's Sikh population harboured profound distrust and enmity for the central government, a condition that led, finally, to intense violence.

Punjab is also a distinct case study because of limited theorizing as to how economic factors or conditions may have contributed to the rise of the Sikh anti-state terrorism movement, and, correspondingly, how the resolution of economic conditions may have assisted in its decline. Most theories explaining the cause of Sikh terrorism have tended to focus solely on single historical events, with limited credence being given to economic factors. Another factor that makes the conflict distinct is the intensity of the violence perpetrated by Sikh militants over the length of the conflict. The Sikh terrorist campaign was distinct because the intensity of terrorist violence rose rapidly initially and continued to grow in strength and frequency over several years, and then declined abruptly within a year (Kang, 2005). It is of interest to obtain a better understanding of what initial factors propelled the Sikh terrorist movement so rapidly and what

factors contributed to its equally rapid decline. The next section provides, a general overview of the literature examining the general link between economic variables and terrorism.

1.1. Economic Theories of Terrorism

Historically, most of the research in terrorism has concentrated on the historical events, ideologies, and political factors that lead individuals or groups to participate in terrorist violence. Examination of broader structural causes of terrorism, such as economic conditions, has been perceived to play an inconsequential or tertiary role. Academic research examining the possible link between economic conditions and terrorism is relatively limited and theoretically underdeveloped (Ehrlich & Liu, 2002). Thus far, most research in this area has been exploratory in nature, concentrating on identifying broad, macro-level theoretical constructs indicating when individuals or groups within a society become more willing to participate in acts of terrorism. A majority of the economic theories explaining terrorism emphasize the central role, in various forms, of the social construct of *relative deprivation,* its impact on producing increased social discontent within a society, and how this discontent leads to acts of anti-state terrorist violence. There is no standard definition of *relative deprivation* in the literature; each theory defines the term based on its own set of conceptual standards.

Although the various theoretical perspectives emphasize the role of relative deprivation, there has only been limited theorizing as to what specific political, economic, ideological, and social factors directly lead to conditions of relative deprivation. Most of the economic theories on terrorism focus almost exclusively on various economic indicators that can be used to measure the construct of relative deprivation, but they lack an associated explanation or discussion as to the exact process by which individuals become deprived and the specific events or factors leading to this downward trend. The lack of critical analysis and discussion about what events lead to conditions of economic relative deprivation prevents the development of measures that can be taken to reduce the likelihood of terrorist violence. Scholars have proposed a limited number of general theories explaining the relationship between economic variables and terrorism.

1.1.1. Gurr - "Why Men Rebel"- Relative Deprivation Theory

An examination of the theoretical literature on economic explanations of terrorism reveals a gradual evolution in these theories from broad general explanations to more rigorous approaches that examine the role of specific economic indicators-that contribute to various forms of terrorist violence. In his book *Why Men Rebel*, Ted Robert Gurr (1971) put forward a

psychological causal model to explain the underlying conditions that lead people to participate in acts of political violence (including terrorism). Gurr proposed his theory at a time when there was significant global unrest, conflict, and turmoil. Nations were going through a period of remarkable change, as conflicting political, economic, and social ideologies competed with one another to establish dominance. It is within this social context that various theoretical perspectives evolved to explain the increasing conflict plaguing the nations. The central tenet in Gurr's theory is that relative deprivation and the associated discontent that occurs is the underlying motivation for an individual's participation in collective political violence. *Relative deprivation* is defined by Gurr as the discrepancy individuals perceive between their "value expectations" and their "value capabilities" (Gurr, 1971, p. 13). *Value expectations* refers to material items and conditions of "life to which people believe they are justifiably entitled", and *value capabilities* refers to the level of "goods and conditions they think they are capable of attaining or maintaining, given the social means available to them" (p. 13). Gurr reasons that if individuals or groups perceive themselves to be excessively deprived, an innate response of frustration will result. This frustration will initiate a number of violent and non-violent responses, including anger and aggression. If individuals or groups are exposed to persistent and intense frustration, and non-aggressive alternatives are unable to alleviate this stress, they are likely to channel their anger into political violence aimed at an identifiable external object perceived to be the source of their frustration (Gurr, 1971). The purpose of this violence is not purely to alleviate pent up aggression; it also becomes a mechanism by which attention is brought to social conditions that require transformation.

Gurr's theory is relevant to the present discussion because it recognizes that general economic conditions have a direct influence on individuals' or groups' decisions to use political violence. More specifically, Gurr's theory understands that negative economic conditions and the relative deprivation they produce may influence or spur individuals to use terrorism to procure change. Gurr's theory, applied to economic conditions, would argue that society has established a general set of value expectations to the set of economic goods (e.g., property, jewellery, vehicles) and conditions to which an individual is entitled. Society also has identified the corresponding social method (i.e., value capabilities) by which to attain (e.g., employment, education, skills training) or maintain those goods and conditions. Economic discontent can occur as a result of numerous conditions: (1) when individuals have a general set of stable economic (value) expectations but are unable to obtain those goals due to a lack of means; (2) when individuals' value expectations rise with no corresponding change in their ability or means to achieve their economic goals (e.g., to purchase larger homes with no corresponding increase in income); and (3) when individuals' economic positions within society deteriorate regardless of their present value capability (Gurr, 1972). All of these economic conditions, if not addressed

through conventional, non-violent mechanisms, are likely to produce wide-ranging deprivation and social discontent within a society. This deprivation and discontent will potentially lead individuals or groups to adopt terrorist violence to ameliorate these negative conditions.

Gurr's theoretical contribution is considerable in that he provides a psychological causal model explaining the underlying conditions that led individuals or groups to participate in political violence and developed the key concept of relative deprivation. This central concept of relative deprivation is the foundation upon which most subsequent economic theories of terrorism would be based. Although Gurr's theory provides a strong theoretical perspective, it has a number of deficiencies. It does not explain terrorism exclusively but, rather, has been designed to explain a range of political acts of violence (i.e., strikes, riots, rebelling, guerilla warfare, terrorism, civil war, and revolution) depending on their complexity, number of participants, and level of violence. However, most importantly, Gurr fails to indicate specifically which factors directly lead to political violence, as violence could be the result of a range of social, political, and economic conditions.

1.1.2. Lichbach - Deprived Actor Theory

Lichbach's Deprived Actor (DA) Theory is based on a premise similar to Gurr's, but is quite specific in its focus as to the cause of relative deprivation. The premise upon which DA Theory is based is relatively simple. Lichbach states that deprivation causes discontent, which, in turn, leads to political dissent in its various forms. DA Theory suggests that a range of special "psychological processes (cognitive and emotional)" intercede and transform grievances into political dissent. In the DA approach, a number of specific assumptions exist, which psychologically link economic inequality and political conflict (Lichbach, 1989). Lichbach advances the theoretical body of knowledge by making the direct link between economic inequalities leading to feelings of relative deprivation and the outbreak of political conflict.

In particular, the concept of relative deprivation is important in that it outlines the discrepancy between what people have and what they believe they are entitled to (Lichbach, 1989). The relative deprivation concept proposes that each individual has a formulated set of private expectations or standards regarding what they should have economically, and they evaluate the success of the economic system based on what they actually have and are able to achieve or obtain. Their economic expectations and standards are influenced by a variety of cultural forces that form standards of justice and equality, which directly influence their social interaction, and, more significantly, individual expectations of themselves and what they want from society in general. In forming their economic expectations, individuals will make "equality-inequality comparisons" between themselves and others in order to determine their relative

position within society (Lichbach, 1989, p. 456). That is, individuals economic expectations are not formed on ideal standards, but, rather, on concrete comparisons within their immediate environment or upon known historical standards. If, based on their own subjective standards, individuals believe that they are being economically deprived in comparison to others, then they will formulate economic grievances and feelings of "anger, frustration, and/or other non-rational motivations" (Lichbach, 1989, p. 459). The emotional build-up of frustration and anger resulting from these initial psychological processes can lead some individuals toward behavioural dissent (e.g., terrorism). It should be understood that, in the aforementioned explanation of DA Theory, economic inequality is highlighted, but this perspective also emphasizes the importance of political and social inequalities which, in conjunction with economic variables, may also influence terrorist violence (Lichbach, 1989). DA Theory is important in that it advances the theoretical body of knowledge examining the link between economic inequality and relative deprivation but it does not concentrate exclusively on terrorism.

1.1.3. Blomberg, Hess, and Weerapana – Economic Model of Terrorism

A relatively new general theory has been proposed by Blomberg, Hess, and Weerapana (2004). It examines how the overall state of economic conditions within a nation has a causal link to the form of conflict a state is exposed to. Blomberg, Hess, and Weerpana's theoretical model is noteworthy in that rather than addressing multiple forms of political violence in general, it makes a direct link between inequitable distribution of economic resources and the use of terrorist violence by dissident groups whose economic grievances have not been addressed. The theory also continues to advance theoretical knowledge by outlining specific variables, particularly, how the strength of the government and the economy increases or decreases the probability of terrorist violence. The authors argue that there are primarily two major organized parties in the economy: government and dissidents. The government extracts a large portion of monetary resources needed to perform its duties and obligations from the economy. Dissident groups are left to extract resources from the remaining shares of the economy for their own gain and personal consumption. The authors argue that during periods of economic slowdown, when the resource base contracts or when government attempts to increase the proportion of resources they are extracting from the economy, there is an increased likelihood of conflict.

Conflict is the by-product of marginalized dissident groups unwilling to accept the smaller portion of economic resources allotted to them and wanting to carry out appropriate actions to remedy the problem. Dissident groups can adopt non-violent methods such as negotiation to have their economic grievances identified and possibly addressed through proper economic

channels. If political negotiations are not successful, dissident groups are then likely to adopt either two forms of violence: rebellion or terrorism. The objective of rebellion is to overthrow the government to gain power and access to a substantially greater proportion of the nation's resources. Rebellion also allows dissident groups to restructure and implement fundamental changes to the rules and agenda of the nation's economy to suit their own preferences (Blomberg, 2004). The objective of terrorist attacks is to indicate opposition to the economic status quo and obtain greater power and control in influencing the economic agenda and rules of the nation's economy (Blomberg, 2004). The type of violence used by a dissident group is primarily influenced by the strength of the government and its economy. Those nations with strong political institutions, well-equipped defense forces, and strong economies that allow access to financial resources to combat violent opposition are more likely to face acts of terrorism successfully. In such cases, dissident groups are unable to engage and defeat the state because they lack the financial and tactical capabilities to sustain continuous opposition. Nations with weak political institutions, poorly equipped defense forces, and weak economies are more likely to experience rebellion because dissident groups have the physical and financial capabilities to overthrow the state (Blomberg, 2004).

1.1.4. Burgoon - Social Welfare Policies of a Nation

In 2006, Burgoon proposed that the social welfare policies of a country may influence the likelihood of acts of terrorism being carried out domestically and by its citizens in foreign states. Burgoon's theory further advances the body of knowledge examining not only how economic conditions influence domestic acts of terrorism but also how these conditions can lead individuals to perpetrate acts of transnational terrorism, thus expanding understanding of the geographical extension of terrorist violence. Burgoon reasons that social policies, including social security, unemployment benefits, sickness benefits, disability insurance, health, education spending, and other well-intentioned social policies that further social rights are key inhibitors in preventing individuals from participating in terrorist-related activities. He argues that poor social conditions and negative economic conditions (e.g., poverty, inequality, low economic development, socio-economic insecurity) directly limit individuals opportunities and capacities to achieve. Once an individual's aspirations and abilities to achieve are inhibited, physical suffering, feelings of discontent, injustice, and deprivation can result. The emotional and physical suffering produced when social conditions are so bad and create widespread hardship and suffering with no end in sight, may induce individuals to turn to terrorist activity and engage in terrorist violence in order to express discontent and to bring about fundamental changes. Burgoon argues that in order to prevent terrorism, social welfare policies need to reduce "horizontal inequality, poverty, and

economic insecurity" (Burgoon, 2006, p. 197). Nations also need to develop and maintain a strong social net that sustains individuals' standards of living and facilitates their ability to improve their social status, thereby reducing the likelihood of their participation in domestic or transnational terrorism. However, the author fails to clarify and clearly articulate the mechanism by which social welfare policies diminish terrorist violence.

In order to substantiate his theoretical perspective, Burgoon (2006) conducted a study analyzing the correlation between states that have or have not implemented social welfare policy measures and the number of terrorist incidents. Burgoon hypothesized that "social policy diminishes the incidence of international as well as domestic terrorism, taking place in as well as perpetrated by those from more generous welfare settings" (2006, p. 185). Both cross-sectional and pooled time-series cross-estimation was used, with variables being exposed to negative binomial regression analysis to determine how social policy correlates with terrorism. The dependent variable of terrorist incidents was measured in three ways: (1) transnational terror incidents occurring in a country, (2) total terrorist incidents occurring in a country, and (3) "significant transnational incidents by the country where the terrorist came from" (Burgoon, 2006, p. 185). The independent variable of social policy used three measures of social spending: (1) "total spending/revenue as a percentage of GDP", (2) "total transfers (social security and health spending) as percentage of GDP", and (3) "total welfare spending (total social security and health, plus education spending) as a percentage of GDP" (p. 187). The findings of the study indicate that social welfare spending correlates "significantly and negatively" with all measures of domestic and transnational terrorism (p. 191). Thus, Burgoon concludes that countries with strong social welfare provisions in place are less likely to suffer from acts of domestic and transnational terrorism. These nations are also less likely to produce citizens who perpetrate acts of terrorism abroad. Burgoon's model continues to examine the significance of poor economic conditions and/or deprivation as factors in the outbreak of terrorist violence. Although the theory outlines the importance of specific social welfare policies and variables in reducing the likelihood of terrorist violence, Burgoon fails to outline the specific mechanism by which this occurs.

1.1.5. Li & Schaub - Transnational Terrorism

Li and Schaub (2004) recently examined the unique relationship between economic globalization and transnational terrorism. These authors more specifically were interested in determining whether nations whose economies are more interconnected to the global economy have an increased risk for elevated levels of transnational terrorism within their borders. *Transnational terrorism* was defined by these writers as terrorist acts perpetrated by foreign nationals against domestic targets or citizens of a nation targeting foreign interests within their

own domestic border (Li & Schaub, 2004). Li and Schaub's model is noteworthy in that it outlines how integration into the global economy can facilitate economic development, reducing economic grievances in a society and reducing the likelihood of transnational terrorism, however, it fails to explain in detail how this occurs.

A number of scholars and government policy makers have recently argued that globalization and the subsequent increase in trade between nations leads to a higher likelihood of transnational terrorism (Li & Schaub, 2004). It is reasoned that increased commerce between nations allows terrorist organizations to develop the capability to successfully traffic individuals or weapons into a nation undetected. The sheer volume of individuals and goods entering a nation to facilitate global trade makes it difficult for security personnel to detect all illegal terrorism-related activities. This argument also extends to international financial markets which, with globalization, are highly dependent upon the unimpeded flow and access of monetary funds between nations. Terrorist organizations also actively use global financial markets to transfer funds to sustain their organizations and to sponsor their operations. The momentous increase in the volume of financial transactions internationally has made it increasingly difficult for security agencies to detect illegal financial transactions used for terrorist purposes. Also, increased privacy and ambiguity offered by the international banking sector has made it easier for terrorist organizations to transfer funds without detection. Finally, increased international globalization is perceived to facilitate transnational terrorism as it provides terrorist organizations operating legal businesses with a means by which to sell, trade, and "market goods or services" around the world through established distribution networks (Li & Schaub, 2004, p. 235). These terrorist organizations then utilize profits made from the legal trade of goods to finance terrorist operations. A host of explanations have been put forward by opponents of economic globalization highlighting the detrimental consequences that trade openness can have on a nation's domestic security. The authors, however, fail to explain how economic globalization per se contributes to an individual's participation in terrorist violence.

In contrast, proponents of economic globalization argue that a nation's integration into the global economy reduces transnational terrorism. Advocates of economic globalization propose that underdevelopment and associated poverty are key factors that propel individuals to participate in terrorism (Li & Schaub, 2004). Negative economic conditions are believed to foster feelings of hopelessness and inferiority within these populations. This feeling of hopelessness and inferiority leads individuals to adopt and participate in acts of violence (i.e., terrorism) against the perceived source of their suffering in an attempt to bring about a fundamental change in the prevailing, unjust economic conditions where they reside (Li & Schaub, 2004). Economic globalization is believed to reduce transnational terrorism by stimulating economic development

and removing the negative economic conditions that foster grievances. If the negative economic conditions that foster discontent and provide the impetus for individuals to justify the use of violence do not exist, then individuals' justification to participate in transnational terrorism disappears (Li & Schaub, 2004).

In order to examine the link between economic globalization and transnational terrorism, Li and Schaub (2004) proposed and empirically tested three hypotheses. The research design involved pooled times-series and cross-sectional designs with data being analyzed using negative binomial regression. The empirical analysis examined 112 countries from 1975 and 1997. Their hypotheses were "(1) a country's economic integration in terms of trade, foreign direct investment (FDI); and financial capital has a positive effect on the number of transnational terrorist incidents within its borders; (2) economic development of a country decreased the number of transnational terrorist incidents within the country; (3) economic development of a countries' economic partner countries reduces the number of transnational terrorist incidents within the country" (Li & Schaub, 2004, p. 239). The study found that generally nations with high levels of trade, foreign direct investment (FDI) and financial capital do not experience higher levels of transnational terrorism. Thus, a nation's integration into the global economy via increased trade and capital market access does not lead to it being exposed to higher levels of transnational terrorist incidents. The study also found that as the level of development of a nation and its trading partners increased, as measured by their average GDP per capita, there was a corresponding reduction in the number of transnational terrorist incidents within the country.

The authors fail to clearly articulate the means by which increased economic globalization leads to decreased terrorism within a nation and by its nationals in foreign nations. However, the general assumption is that the economic well-being of members in a society reduces the justifiable reasons that would encourage individuals to participate in transnational terrorism.

1.2. Economic Explanations of Political Unrest, Humanitarian Emergencies, and Civil War

The body of theories examining the relationship between economic conditions and terrorism is underdeveloped and relatively limited, but a more established body of literature examines the relationship between economic conditions and other forms of social unrest (i.e., political unrest, civil war, and humanitarian emergencies). It is beneficial to draw parallels between explanations of social unrest and terrorism because they both involve the use of

violence against the state for specific reasons. Social unrest research also facilitates an understanding of the underlying processes by which certain economic conditions can promote or motivate individuals to use violence to ameliorate negative social and political conditions. Understanding these processes may also help explain the use of anti-state terrorism by segments of society in specific global conflicts where individuals are trying to bring about fundamental changes in society for specified ideological reasons. Research in this area also acknowledges that not only economic factors but also other political, social, ideological, and religious factors are instrumental in social unrest, as is the case in many terrorist conflicts. Examining this body of literature is crucial to obtaining a better understanding of how the interconnection between various factors or variables beyond economic conditions contributes to the rise of social unrest and to determining its applicability in explaining the outbreak of terrorist violence in a nation. The first perspective to be discussed examines the relationship between political unrest and economic determinants.

1.2.1. Parvin – Economic Determinants of Political Unrest

Manoucher Parvin (1973) constructed a theoretical framework emphasizing the significance of economic factors in explaining the rise of political violence. According to Parvin, society is stratified according to economic classes that are determined by income levels and by a set of broadly shared general social characteristics (e.g., employment type, education level, skills and abilities). Parvin argues that all humans, regardless of economic class, have "biological necessities" (i.e., materials or services) which they require to exist. Beyond these biological necessities, however, are particular sets of commodities for "socio-economic needs" members of different income classes require in order to obtain and maintain their status within their own income groups. Biological necessities and socio-economic needs are what drive the flow of commodities within a society to ensure the maintenance of ongoing consumption and requirements of each economic class (Parvin, 1973).

Beyond biological necessities and sociological needs, members of a particular class or group within a class may construct "expectations" in relation to the flow of commodities (Parvin, 1973). *Expectations* refer to the commodities members of a particular social class or group believe they are entitled to have. These expectations become "demands" when members of a group, through verbal or physical action, pursue change in order to realize their expectations. To realize these demands, individuals seek fundamental change, "qualitative or quantitative", in the dominant method of production or "distribution of commodities" (Parvin, 1973, p. 274). Demands for change can be subdivided into two categories: (1) "specific interest demand by an individual or group, and (2) general interest demand for change" (Parvin, 1973, p. 274). *Special interest*

demand refers to changes requested purely for selfish reasons by individuals or groups wanting to increase their own levels of consumption in comparison to individuals in their own economic class. This demand can only be fulfilled when they have access to means by which to achieve upward economic mobility. *General interest demand* for change refers to individuals wanting to modify the dominant economic system in a manner that affects all group members equally and beneficially (Parvin, 1973).

Parvin argues that if a nation's economic system is able to ensure the economic well-being of its citizens by fulfilling their basic biological necessities, needs, and demands, then political violence is unlikely to occur (1973). However, if individuals or groups perceive a real or imagined change in terms of their access to commodities that fulfill their basic biological necessities, needs, and demands, then political violence is likely to occur. The necessities, needs, and demands are presumed by all members of society to be indicators of their economic well-being, and their lack of fulfillment leads to biological, psychological, or social frustration (Parvin, 1973). Parvin emphasizes that "these experienced forms of frustration are frequently interdependent - i.e., one form may cause the other" (1973, p. 276). Political violence occurs when individuals or groups within a society become so frustrated that they come to believe they are being economically deprived and their economic well-being is threatened. This notion of deprivation compels and motivates individuals to participate in various legal and illegal forms of political unrest.

In conjunction with formulating a theoretical framework to explain how economic factors contribute to political violence, Parvin also attempts to identify key economic indicators that can be used to measure individuals' notions of economic well-being and determine the indicators "relevance and significance" as explanatory variables of political unrest (1973). Parvin examines the significance of four general economic indicators (independent variables) on political unrest (dependent variable). The first economic indicator is per capita income, which is assumed to be a measure of the economic well-being of citizens in a nation and their ability to obtain the basic necessities and needs of life. Per capita income also denotes an individual's ability to obtain material items beyond the basic necessities of life. Individuals with a lower per capita income are assumed to be more likely to engage in violence if they feel deprived due to an inability to have their basic necessities, needs, and demands met. Also, these individuals have less to lose economically during periods of deprivation by participating in political unrest because the possible rewards far outweigh possible losses (Parvin, 1973). The second economic indicator examined is income distribution. Parvin hypothesizes that if there is substantial inequality in income distribution between economic classes, those occupying the lowest rung of the economic ladder will become frustrated and angry. This frustration and anger will lead to demands to change the

economic structure that perpetuates income inequality, and the use of political violence may be deemed necessary to bring about economic change (Parvin, 1973).

Income growth is also an indicator for the individual as to which strategic short- and long-term economic objectives are achievable. Parvin hypothesizes that income growth and political unrest are inversely related. That is, as income increases the likelihood of political violence will decrease (1973). Political unrest is less likely to occur when income levels increase because individuals are unwilling to participate in activities that may threaten the loss of possible future income, whereas during periods of income stagnation, members of society are more likely to participate in political unrest because they do not have future income growth to look forward to. Socio-economic mobility is the fourth economic indicator and refers to the ability of people achieve their economic aspirations. In order to achieve these aspirations, individuals or groups in society must have the freedom to improve their socio-economic status and have access to the various social means necessary for upward advancement. Parvin perceives education as the best measure of socio-economic mobility. Parvin highlights the significance of educational attainment as the primary factor in determining individuals' socio-economic positions and also their ability to advance economically. Parvin proposes that when individuals have access to education, the likelihood of political unrest decreases because they have the means needed to advance. When educational opportunities are blocked, preventing individuals from furthering their socio-economic status, frustration and demands to change the status quo will result, leading to political violence (Parvin, 1973).

In order to test this hypothesis, Parvin conducted an empirical analysis examining the relationship between his four economic indicators (per capita income, inequality in income distribution, rate of income growth, and economic mobility) and levels of political unrest within a nation. The relationships between the independent and dependent variables were determined by using regression analysis. Cross-sectional and cross-national data from 26 countries were utilized (Parvin, 1973). The empirical analysis found that a substantial amount of "variation in the level of political unrest" could be explained using the aforementioned economic indicators (Parvin, 1973, p. 291).

1.2.2. Auvinen and Nafziger – Humanitarian Emergencies

Another perspective to be examined is that of Auvinen and Nafziger (1999), who examined the possible sources of humanitarian emergencies. A *humanitarian emergency* is defined as a "human-made crisis in which large numbers of people die and suffer from war, physical violence (often by the state), or displacement, and is usually accompanied by

widespread disease and hunger" (p. 267). Auvinen and Nafziger identify a number of economic, political, and social variables perceived to be the source of humanitarian emergencies. The central tenet of this perspective is that negative economic conditions such as economic stagnation, decline in income, and income inequality lead to feelings of relative deprivation that can spur violence (1999). *Relative deprivation* occurs when individuals perceive a discrepancy between what they expect economically and what they are able to achieve. It can also occur when individuals lose items of social stature the once had or when others around them continue to advance in comparison to them (Auvinen & Nafziger, 1999). Once these feelings of relative deprivation set in, they fuel social discontent and frustration which provide "motivation for potential collective violence" (p. 268). In addition to poor economic performance leading to frustration amongst individuals, feelings of relative deprivation may also undermine the level of confidence the public has in the state. Once confidence in state institutions is eroded, the use of collective violence may be deemed necessary to facilitate a regime change.

In addition to negative economic conditions, Nafziger and Auvinen highlight the influence of the military and a history of conflict as contributing factors to humanitarian emergencies. In particular, developing nations with militaries that are well-financed, that have effective organizational structures, and that are able to access resources more effectively than civilian governments are more prone to humanitarian emergencies (Nafziger & Auvinen, 1999). The presence of strong militaries in these countries contributes to humanitarian emergencies because authoritarian regimes can use them to repress opposition in order to maintain power and entrench their ideological belief system. Such ongoing repression can lead to feelings that the government is unjust and deprives people of fundamental rights, and these reactions are likely to promote social conflict that results in humanitarian emergencies. In less developed countries, too, strong militaries can have the capability of overthrowing democratic or authoritarian regimes, plunging their nations into possible humanitarian crises. Nafziger and Auvinen argue that nations where members of society have come to accept conflict or violence as an acceptable and normal component of everyday social or political life are also more susceptible to humanitarian emergencies (1999). The willingness of members of these societies to use violence to achieve objectives keeps these countries in a constant state of flux.

Nafziger and Auvinen conducted an econometric analysis examining the influence of the aforementioned variables as sources of humanitarian emergencies. Annual data from 124 countries from 1980 to 1995 was analyzed. The results of the research showed that humanitarian emergencies are associated with slow economic growth, income inequality, inflation, low levels of economic development, tradition of violent conflict, and military centrality. Humanitarian emergencies have an "inverse relationship" with gross domestic (GDP) product

increase, rise in per capita income, and food output growth (Nafziger & Auvinen, 1999, p. 287). The findings of this study suggest that, positive economic conditions, as measured by economic growth, income equality, and upward social mobility, are imperative for maintaining the security and stability of a nation. Once economic conditions conducive to promoting economic stability are present, the likelihood of humanitarian emergencies decreases rapidly.

1.2.3. Fearon and Laitin – Poverty and Civil War

Fearon and Laitin (2003) attempt to better understand the factors that lead a country to violent civil war. These scholars state that historically, the dominant explanations for violent civil war have primarily emphasized the belief that nations with diverse ethnic and religious populations are more prone to violent conflict due to constant tension between diverse populations. It was also thought that many cases of civil war that arose in the 1990s in various nations was the direct result of the end of the Cold War and the fundamental changes this brought to the broader international system (Fearon & Laitin, 2003). In order to gauge a better understanding of violent civil conflict, Fearon and Laitin conducted a multi-variate logit analysis examining the relationship between multiple independent variables believed to influence the onset of civil war.

The independent variables examined included per capita income, ethnic and religious composition, democracy and civil liberties measures, linguistic and religious discrimination, income inequality, mountains and non-contiguous territory, population, new states and political instability, and foreign support. The analysis involved the examination of data from 1945 to 1991 from 161 countries with a minimum population of at least half a million people. The findings of their analysis suggest that nations with a low per capita income (i.e., $1000 U.S. or less), large populations, recently obtained independence (2 years or less), history of central government instability, and characterized by mountainous and non-contiguous territory had a higher likelihood of civil war onset (Fearon & Laitin, 2003). Conversely, conditions such as ethnic and religious diversity, economic inequality, lack of democracy or civil liberties, and state discrimination were found not to be good indicators for predicting civil war onset (Fearon & Laitin, 2003).

Based on their findings and observations, Fearon and Laitin formulated a broad multi-variable explanation as to what factors contribute to the outbreak of violent civil conflict in a nation. For the purpose of this discussion, emphasis will be given to the role of economic factors. Fearon and Laitin (2003) argue that financially weak central governments, as measured by per capita income, are more prone to civil conflict because they do not possess the monetary resources required to adequately combat opposition forces. The lack of financial resources

inhibits these nations from adequately constructing counterterrorism agencies and defense forces (e.g., police, intelligence agencies, paramilitary) that are adequately trained, equipped, and numerically sufficient to combat rebel forces. They propose that lower per capita nations are more likely to face violent civil conflict because rebel groups are more easily able to recruit individuals into their ranks through monetary incentive. Individuals facing bleak economic situations will participate in civil conflict or join a rebel organization to escape their calamitous economic situations. Economic conditions can play an important role in influencing people's life choices (Schnellenbach, 2006, Willett, 2005). In summary, Fearon and Laitin propose that the economic strength of the central government and the economy, in conjunction with other social variables, play considerable roles in determining the likelihood of violent civil conflict.

1.2.4. Niall Ferguson – The War of the World

Niall Ferguson (2006) provides a relatively new perspective on the intense levels of violence that characterized the 20th century in regions such as Asia and continental Europe. Ferguson sees violence during this time as emanating primarily from three distinct causes: "ethnic conflict, economic volatility, and empires in decline" (2006, p. xi). Regarding ethnic conflict, Ferguson emphasizes the breakdown of well-established relationships between ethnic groups which in his opinion is an outcome of growing acceptance of racist theories regarding presumed genetic differences between racial groups. These differences are used to justify violence against some groups and to validate other groups' establishing dominance. He also highlights the surge of violence resulting from political divisions amongst ethnic minority groups on the peripheral borders of a nation with the ethnic majority in the nation. Ferguson also discusses the role of economic volatility plays in enhancing social conflict among groups in a society. During periods of economic contraction or expansion, he says, changes in social conditions can affect some groups more acutely than others, with some groups benefitting and some being impacted negatively. It's during periods of economic downturn that the politically dominant groups may prohibit the extension of economic social benefits to minority populations in order to preserve their status in society. Also, minority groups that have benefitted economically during periods of rapid economic expansion may become targets of violence when economic conditions deteriorate. During periods of economic volatility "socio-political stresses and strains" are believed to increase and influence the rise of violence (Ferguson, 2006, p. ix).

The final factor Ferguson sees as influencing the rise of violence in the 20th century is the decline of traditional European empires (e.g., British, Dutch, Spanish, and French) and their global influence. Concurrently, the rise of new "Empire States" during the waning influence of European empires during the 20th century was accompanied by colonized peoples, turning to

violence to end centuries of European colonizers' repression and persistent attempts to assimilate them. At the same time, some nations attempted to create new forms of empire states (e.g., Hitler's Third Reich Germany, the Bolshevik Revolution in the Soviet Union, the Peoples Republic of China) to establish political control and governance. These states believed in the use of extreme violence to exterminate political dissent, to establish absolute political and economic control, and to maintain "social homogeneity" in their societies which they deemed compulsory (2006, p. xvii). The political leaders of these Empire States were willing to engage in violent conflict against specific populations armed or defenceless in order to achieve their specific political and social objectives. Ferguson's perspective is unique in explaining the rise of violence in general, during a specific time, but his model is not constructed to explain anti-state terrorism movements specifically, and its applicability to specific terrorist conflicts is unclear. However, he does highlight the importance of economic volatility in influencing conditions that can lead to the outbreak of violence against specific segments of society which is useful.

1.3. Critique of Economic Theories of Terrorism

At the same time that a new body of research is evolving examining the link between economic conditions and terrorism, there are academics and policy makers who are critical of the claim that economic conditions play a role in terrorism (Atwood, 2003). Among these, Kreuger and Maleckova (2003) are highly critical of the argument that economic conditions, specifically, poverty and levels of educational attainment, are factors that contribute to an individual's participation in terrorism. They contend that conditions that lead to repression, humiliation, and frustration are the primary factors that lead to terrorist violence. In order to substantiate their claims, the authors provide evidence from three studies that there is no association between poverty and low educational attainment and terrorism (Li & Schaub, 2004).

Kreuger and Maleckova (2003) initially discuss the link between economic conditions and hate crimes, behaviour they perceive to be similar to terrorism. Upon analysis of various studies examining the link between economic determinants and hate crimes, they conclude that these two variables are unrelated. They cite Jefferson and Pryor's (1999) study which found that the existence of hate groups in a given area was unrelated to the "unemployment rate, divorce rate, gap per capita income between blacks and whites" and the educational attainment of the local adult population (Kreuger & Maleckova, 2003, p. 124). These authors also cite a 1997 study by Pishke and Kreuger (1997) conducted in Germany that examined the relationship between the unemployment rates, level of education, and average income of workers in relation to the level of violence perpetrated against foreigners. Pishke and Kreuger found no relationship between the

number of violent attacks against foreigners and the unemployment rate in a country, the educational achievement of residents, or the average income of workers (Kreuger & Maleckova, 2003).

Kreuger and Maleckova (2003) also examined evidence from public opinion polls conducted in 2001 in the West Bank and Gaza strip by the Palestinian Center for Policy and Survey Research. The public opinion survey was used to determine whether the educational attainment and employment status of Palestinians influenced their support for the use of terrorist violence against Israel. The public opinion survey polled 1,357 Palestinians aged 18 or older. The survey results show that there is no evidence indicating that more highly educated Palestinians are less likely to support violent attacks against Israel (Kreuger & Maleckova, 2003). The survey also found that employed individuals were more likely to support armed violence against Israel than unemployed Palestinians. These findings counter the notion put forth by previous authors that poverty and education are major contributors to an individual's willingness to participate in terrorism.

The final statistical analysis by Krueger and Maleckova examined the economic and educational background of 129 deceased members of the Hezbollah military wing (i.e., Al-Muqawama Al-Islamiya). The analysis demonstrated that Hezbollah militants were not significantly more likely to come from an impoverished background than the general population, nor were they more likely to have a lower level of education than the general Lebanese population (Kreuger & Maleckova, 2007). The study found that Hezbollah fighters were actually more likely to have a higher level of education than the general Lebanese population and that the rate of poverty amongst militants was on par with the general poverty level in the general Lebanese population. Thus, individuals' economic and educational backgrounds do not appear to influence their participation in terrorism (Kreuger & Maleckova, 2003). It must be noted, however, that a number of methodological weaknesses were present amongst these studies including incomplete data, inconsistent measurement tools, and possibly non-representative sampling.

Clearly, within the academic literature there is an absence of theorizing on the direct relationship between economic conditions and the rise of anti-state terrorism. The few theoretical explanations that do exist are primarily underdeveloped, with conceptual links not fully developed and the range of explanation being limited (Ross, 1993). There are six fundamental weaknesses in the existing economic theoretical explanations of anti-state terrorism. First, most economic explanations of anti-state terrorism are too simplistic, examining only a limited number of economic conditions and indicators. The simplicity of these explanations limits their explanatory

power by failing to identify a spectrum of economic predictors of terrorism. It would be more beneficial to develop a broad range and rigorous approach that is able to examine societies in various stages of economic development (i.e., agrarian, industrial, and post-industrial) and identify key economic conditions or indicators that would predict when anti-state terrorist violence is more likely to occur.

Second, the simplicity of many theories is compounded by the inability of theorists to fully develop key concepts and fully explain how negative economic conditions lead individuals to participate in terrorist movements. It is imperative that theorists explain how economic conditions influence individual decision making and what aspect of negative economic conditions motivates or drives individuals who participate in terrorism movements.

Third, a majority of the theories fail to examine how inherent weaknesses in the dominant economic system in the form of economic policies, political decisions, and social/cultural factors contribute to the rise of terrorism. The focus tends to be solely on the end result of this process and how dire economic conditions contributed to terrorist violence. However, it is important to examine the factors and events that contributed to negative economic conditions from their inception. Such an analysis of historical context is imperative in order to identify specific economic policy decisions that were implemented and the negative consequences these decisions had on the people's economic well-being.

Fourth, a majority of the economic theories or perspectives on terrorism concentrate exclusively on factors that lead to the rise of anti-state terrorism violence, but little attention is given to examining the economic factors that contribute to its decline. An understanding of the economic factors or conditions that facilitate the reduction of anti-state terrorism is important for preserving lives, re-establishing security, and restoring peace.

The fifth major limitation of present economic theories is the failure to acknowledge that anti-state terrorism is the result of a number of interrelated (e.g., political factors, ideology, historical events, and rational motives) variables; the significance of economic variables must be understood within this context.

The sixth weakness of present economic theories of terrorism is their attempt to make their explanations generalizable to all terrorist conflicts and the presumption that the presence or absence of specific economic conditions will always result in a predictable result. It must be understood that each conflict is unique, and economic conditions may not impact each terrorist conflict in a similar manner. Thus, it is imperative to recognize that each anti-state terrorism

conflict must be examined individually and that flexibility must exist to incorporate within a theoretical perspective economic explanations or sub-theories unique to a specific conflict.

1.4. Research Objective and Hypothesis

In order to explain the rise and decline of anti-state terrorism in the Punjab, this research will partially adopt Corrado's anti-state terrorism model. Corrado's model is composed of 10 inter-linked propositions encompassing a complete range of variables, including economic, political, ideological, rational motivation, and historical events. In applying this model to the Punjab conflict, this study will focus on the economic hypotheses which have been formulated from studies of numerous international terrorist movements in regions and in stages in various stages of development ranging from agrarian to post-industrial.

An advantage of Corrado's model is its generality, which is essential for explaining the unique economic conditions from which each anti-state terrorism conflict arises; in particular, it can explain the agrarian conditions that contributed to Sikh terrorism in the Punjab. A secondary strength of Corrado's anti-state terrorism model is that it incorporates sub-hypotheses to include other possible economic factors that contribute to terrorist violence. This capacity to incorporate sub-hypotheses demonstrates a fundamental understanding that each terrorist conflict is unique and may be influenced by distinct and separate economic conditions. This capability facilitates an explanation of the agrarian factors that contributed to the Punjab terrorist conflict. An additional strength is its appreciation that fully understanding a terrorist conflict requires a comprehensive understanding not only of the economic factors and events that contributed to a conflicts rise, but also of the factors that facilitated its decline. This appreciation is essential for analysis and explanation in order to obtain a thorough understanding of a conflict and to attain insight into which effective counterterrorism measures might be implemented to curtail the violence. It will be argued that Corrado's model adequately explains the rise and fall of anti-state terrorism in the Punjab: when the economic conditions fostered widespread hardship and loss, terrorist activity appeared and became intense; when prosperity returned, it declined and disappeared.

1.4.1. Corrado's Anti-State Terrorism Model - Economic Hypotheses

Corrado's anti-state terrorism model is relevant to the Punjab conflict not only because it is broad in its overall explanatory ability but also because all the major economic factors were

evident in this anti-state terrorism case. A brief overview of the economic components of the model will illustrate its theoretical comprehensiveness.

The first three hypotheses of Corrado's model highlight the economic conditions likely to lead individuals or groups to resort to anti-state terrorism.

> **Corrado's Hypothesis I:** The likelihood of anti-state terrorism is greater when there is greater discrepancy between the economic goals of a given society and the means by which to achieve these goals.
>
> (Corrado, 2001, p. 51)

Corrado's first hypothesis highlights the notion that as a nation's economy matures, a gap between what people desire from their society and what society is capable of providing them may develop. If the state and its institutions are perceived as the cause of this economic disjuncture, some "individuals or groups may resort to violence" in order to force change (p. 50). This disjuncture between economic goals and the means by which to achieve these goals may become more pronounced during periods of rapid economic development when new knowledge and skills are essential to compete in the economic marketplace (Corrado, 2001).

> **Corrado's Hypothesis II:** Anti-state terrorism is less likely to occur in countries with a more equitable distribution of wealth.
>
> (Corrado, 2001, p. 51)

The second economic hypothesis in Corrado's model emphasizes the significance of equitable distribution of wealth within a nation (2001). If there is a pronounced financial discrepancy between the upper and lower segments of society or if the monetary capital of a nation is perceived to be controlled by an elite economic group to the detriment of others, the likelihood of anti-state terrorism increases. Disenfranchised segments of society may perceive the use of violence as justified in order to re-configure society and redistribute wealth more equitably (Corrado, 2001).

> **Corrado's Hypothesis III:** Anti-state terrorism is less likely to occur in relation to the degree of economic dependency experienced by the state.
>
> (Corrado, 2001, p. 51)

The third economic hypothesis examines the role of the state and the level of control exerted by powerful economic entities to maintain control over the broader economy (Corrado, 2001). Many nations' powerful elites, through their control of and influence over governments, manipulate the power of the state to repress the general population and thereby maintain "their control on the modes of production and the economy" (Corrado, 2001, p. 51). The state's

continuous repression of the economically disenfranchised populations may create conditions conducive to believe in the use of terrorist violence in order to restructure and re-establish economic equilibrium. It will be maintained that the negative economic conditions described in hypothesis III of Corrado's anti-state terrorism model were not present in the Punjab conflict. In the Punjab, there was no single powerful economic elite that controlled the modes of production and the economy. Most of the Sikh population worked in agriculture; most of the Hindus were industrial business owners; and most Muslims were small business owners. There was no one economically dominant ethnic group controlling the economy or using the power of the state to repress another economically disenfranchised part of the population within the state. Each ethnic group had different but equal shares of the economy and did not exert their influence on each other's sphere of influence. Therefore, it has been concluded this particular hypothesis is not applicable to the Punjab conflict and will not be examined in this thesis.

1.4.2. Elaborations of Corrado's Anti-State Terrorism Economic Model

Although Corrado's economic hypotheses, except one, are applicable to the Punjab conflict, modifications are needed to improve its comprehensiveness when applied to the Punjab conflict specifically. To this end, the original hypothesis will be replaced and supplemented with two additional economic hypotheses specifically applicable to the Punjab conflict. Corrado's hypothesis pertaining to the degree of economic dependency experienced by the state is not applicable to the Punjab conflict and therefore will not be examined. The present thesis will be groundbreaking in that it will, for the first time, provide a theoretical explanation of how specific economic conditions directly influenced the rise and decline of anti-state terrorist violence using Punjab, India, as a case study. The present model will examine how specific economic conditions and political decisions in the Punjab during the late 1970s and early 1980s contributed to increased feelings of relative deprivation amongst the Sikh population, leading individuals to use terrorist violence in order to ameliorate their negative economic conditions. The present theoretical discussion will also examine in detail how the reversal of specific economic conditions and particular political decisions by the early 1990s facilitated the reduction in feelings of relative deprivation amongst the Sikh population, assisting in the decline of the Sikh anti-state terrorism movement.

Kang's Elaboration on Corrado's Economic Anti-State Terrorism Model for Punjab

Hypothesis I has been adopted from Corrado's anti-state terrorism model in its entirety. However, hypothesis I has been placed first in this model as this writer believes the other three

hypotheses interact to produce a cumulative impact on the distribution of wealth within society. Thus, the distribution of wealth within society is seen as outcome of the other hypotheses and plays an instrumental role in the rise and decline of anti-state terrorism violence.

> **Hypothesis I (Corrado Hypothesis 2):** Anti-state terrorism is more likely to occur in countries with a more inequitable distribution of wealth.
> (Corrado, 2001, p. 51)

The expansion of Corrado's initial model and specific economic hypotheses was deemed necessary as the original propositions were too specific, preventing the application of general economic indicators from the Punjab region to assist in determining its validity. Adding two general hypotheses specific to the Punjab conflict to Corrado's hypothesis facilitates an exploration of specific economic indicators, demonstrating how a decline in the primary agricultural sector and inherent weaknesses in the secondary and tertiary sectors of the Punjab economy contributed to the rise of the Sikh anti-state terrorism movement. These hypotheses incorporate the general underlying principle of economic desires of a given society and what society is capable of providing economically. In the case of Punjab, the financial well-being of farmers was dependent upon their ability to maintain profitability.

> **Hypothesis II (New):** The likelihood of anti-state terrorism in Punjab is greater when landowners in the primary agricultural sector are unable to maintain financial stability.
>
> i. Anti-state terrorism in Punjab is more likely to occur when farmers do not have access to substantial financial capital in order to invest in agricultural production and efficiency.
> ii. The likelihood of anti-state terrorism is more when agricultural crop yields and cropping intensity fail to increase over time ensuring food grain harvests provide sufficient return over cost to Punjab farmers.
> iii. Anti-state terrorism in Punjab is more likely to occur when input costs into agricultural production do not remain relatively stable over time.
> iv. Anti-state terrorism is more likely to occur when agricultural producers in Punjab are unable to sell agricultural products into free markets to highest bidder/purchaser without restrictions.
> v. Anti-state terrorism in Punjab is more likely to occur when procurement prices for food grain yields are not sufficient to offset input costs of farming and ensure sufficient profit for farmers.

The overall financial stability of the agricultural sector in the Punjab is dependent upon a number of interlinked variables. However, for the purposes of this research, the above five agricultural variables have been selected, as they have been deemed to have had a substantial impact on the financial stability of the agricultural sector in the Punjab.

The first variable critical to ensuring agricultural Punjab farmers' profitability is their ability to access and obtain financial capital to invest in agricultural inputs required for initial sowing and ongoing maintenance of crops and for obtaining the mechanized equipment needed to improve production capabilities, thus ensuring productive agricultural operations and competitiveness. Access to financial capital by Punjab farmers will be illustrated through an examination of the level of financial credit provided by Punjab cooperative and commercial banks to the Punjab agricultural sector.

The second key variable involves agricultural crop yields and cropping intensity. The level of food grains produced by farmers needed to increase over time, as increasing yields provided opportunities to obtain higher financial returns, decreasing cost of production, and thus ensuring a reasonable profit. The following agricultural indicators will be examined to demonstrate this hypothesis: principal crop yields (wheat and rice) kilograms per hectare, agricultural index numbers (net area sown, cropping intensity, and productivity per hectare), and total area sown more than once.

The third variable that is important for the financial stability of the Punjab agricultural sector is the stability, over time, of food grain production input costs. The stability of input prices is imperative because dramatic rises in the cost of seeds, fertilizer, fuel, electricity rates, labour costs, and mechanical equipment reduce profit margins. Reduced profits also prevent capital re-investments into the farms to increase agricultural efficiency or production. This hypothesis will be analyzed through an examination of quantitative data pertaining to world oil prices, Punjab agricultural labour costs, and transformation in the Punjab agriculture towards a purchased input system. The impact of fuel and fertilizer shortages prevalent in the Punjab during the 1970s and early 1980s, which impeded agricultural operations, will also be discussed.

The fourth variable of significance to Punjabi farmers' maintaining financial stability is the ability of farmers to sell their products in free markets, without restrictions on sales or the selling prices. Restrictions on buyers to whom producers can sell their products and the price farmers can ask for their products prevents them from receiving maximum returns and also affects the profitability of their farm operations. In order to address these hypotheses, the following agricultural indicators of procurement prices crop-wise (per quintal) and percentage contribution to the central pool will be examined. The central Indian government’s purchase policy, which required Punjab farmers to sell their produce to the centrally operated wheat and rice pools, will also be discussed.

The final major variable is that procurement prices farmers receive for their food grain yields must be sufficient to offset input costs and prevent the onset of bankruptcy. Farmers must

be able to receive sufficient monetary returns that allow them to maintain an adequate standard of living and also to sustain their farming operations. Procurement prices of the major crops received by Punjab farmers for their harvest yields annually will be illustrated, showing a considerable increase over time.

> **Hypothesis III (New):** Anti-state terrorism in Punjab is more likely to occur when the secondary and tertiary sectors of the Punjab economy are unable to absorb unemployed skilled and non-skilled workers providing them meaningful employment.

In conjunction with the importance of financial stability in the primary sector of the Punjab economy, the secondary and tertiary sectors also played major roles. The addition of Hypothesis III (New) is necessary because of the critical role the secondary (i.e., industrial) and tertiary (i.e., service) sectors of Punjab's economy played in the prevention of anti-state terrorism. In general, robust secondary and tertiary sectors are essential for political stability. The ability of the secondary and tertiary sectors to absorb non-skilled and skilled unemployed workers and provide meaningful employment was necessary to ensure residents were able to maintain a basic standard of living and achieve their economic goals. Secondary and tertiary sectors of the Punjab economy also played an important role as the Punjab economy was heavily reliant on the success of the primary agricultural sector. Any prolonged negative economic downturns in the agricultural sector would lead to unemployment and/or farmers losing their land and being forced to join the working class population. Any periods of prolonged unemployment by segments of the Punjab population may lead to an increased likelihood of social unrest and influence participation in anti-state terrorism movements. The strength of the secondary and tertiary sectors of the economy will be reviewed through an analysis of economic indicators examining the structure of the workforce in the Punjab, sector rates of economic growth, status of small-, medium-, and large-scale industries, and the levels of service sector employment.

The ability of the general public, including farmers, to maintain a basic standard of living was dependent upon obtaining and/or maintaining employment. If an economic discrepancy existed between what the Punjab people desire from their society and what the society was capable of providing, and the state or its institutions were seen as being the cause of this economic disjuncture, then some individuals or groups might resort to the use of violence in order to force change. These two new economic hypotheses accept Corrado's previous underlying notion that a disjuncture between economic goals and the means by which to achieve these goals may become more pronounced during periods of rapid economic development when new knowledge, skills, and technology are needed to compete in the economic marketplace. This includes during periods of rapid technological innovation or changes within a particular sector of

the economy within a country, as witnessed by the adoption of the Green Revolution farming in the Punjab region (Corrado, 2001).

> **Hypothesis IV (New)**: The likelihood of anti-state terrorism in Punjab is greater when there are substantial variations in the demographic trends of the population.

In addition to the inclusion of the aforementioned hypotheses into the anti-state terrorism model, a distinct fourth hypothesis has also been included. The inclusion of this hypothesis is deemed necessary because Corrado's model fails to take into account the role of demographic trends in influencing the likelihood of anti-state terrorism violence. The demographic trends to be examined within the context of the Punjab conflict relate to levels of literacy and the number of adults of working age. The exploration of literacy rates is necessary as increasing levels of literacy have an impact on individuals' expectations pertaining to employment and economic goals from society. In conjunction with this, the number of working adults in Punjab will be explored: A population boom in the 1950s and 1960s led to a considerable increase in the number of working adults entering the employment market in the Punjab during a period of economic instability in the 1970s and early 1980s, which may have contributed to the propensity for anti-state terrorism violence due to unemployment.

> **Corrado Hypothesis 3:** Anti-state terrorism is less likely to occur in relation to the degree of economic dependency experienced by the state.
>
> (Corrado, 2001, p. 51)

In the case of Corrado Hypothesis 3, it is not relevant in the Punjab conflict as the level of economic dependency experienced by the state did not play a role in leading to the rise and decline of the Sikh anti-state terrorism movement and thus this specific hypothesis will not be examined in this thesis

In summary, Hypotheses I has been adopted from Corrado's anti-state terrorism model in its entirety. Hypotheses II (New) and III (New) have replaced Corrado's original economic anti-state terrorism hypotheses but have maintained the underlying principal of the original statement related to the necessity of their being balance between the economic goals of Punjab society and the capacity to achieve them. Hypotheses IV (New), which examines demographic trends in the Punjab, has been added to address a possible weakness in the previous model.

1.5. Methodology

To address the aforementioned hypotheses outlined in Kang's elaboration of Corrado's economic anti-state terrorism model in relation to Punjab, I will examine quantitative data relevant to the four Hypotheses I, II, III and IV. To examine the level of anti-state terrorism violence in the Punjab during the conflict, I will utilize quantitative data to outline the number of acts or incidences of Sikh terrorist violence over the history of the conflict.

1.5.1. Source of Data

Hypothesis I, II, and III of Corrado's model identify economic conditions related to the development of anti-state terrorism: distribution of wealth within Punjab, stability of the agricultural sector, and strength of secondary and tertiary sectors of the economy, and. Statistical data bearing on these conditions was taken from a data series, "Statistical Abstracts of Punjab", published annually and compiled by the Economic and Statistical Organization in Punjab, an economic advisor to the state government. The abstracts provide, annual statistical summaries of a number of socio-economic indicators that are helpful for making comparative analyses (Kang, 2005).

An examination of levels and types of anti-state terrorist violence in the Punjab was made possible by information found in a public data set compiled by the South Asia Terrorism Portal, a statistical database on terrorist activities in that region of the world. The director of this organization was once a police chief in the Punjab who oversaw the efforts to repress anti-state terrorism movement in Punjab, and the organization's data on Punjab came from official security agencies there responsible for gathering information on terrorist incidents throughout the Sikh terrorism period (Kang, 2005).

The economic data collected from both sources (Statistical Abstracts of Punjab and South Asia Terrorism Portal) are archival measures, taken from "hard copy" records (Palys, 1997, p. 218). They are thus considered secondary forms of data because both the original purpose and target audience for which they were first gathered were different from the purpose of this dissertation (Palys, 1997). One of the primary disadvantages is that the original intention for gathering the statistical data was very different than the present purpose of explaining the rise and decline of Sikh anti-state terrorism in Punjab (Palys, 1997). Another problem with archival data is that there could be variations in how the data were assembled, recorded and defined (Palys, 1997). The use of archival data has two primary advantages: it provides unobtrusive

measures that are not affected by reactivity and it allows for the kind of longitudinal graphical trend analysis crucial to the analytical purposes of this present study (Kang, 2005; Palys, 1997).

1.5.2. Data Analysis

To test aspects of the first three hypotheses and levels of violence during the terrorism period, selected economic data series from the Statistical Abstracts of Punjab and violence-related data series from the South Asia Terrorism Portal were subjected to longitudinal graphical trend analysis, which was used because of its usefulness in identifying substantial variations in trends and "patterns of change" (Griffiths, 1998, p. 74). In this study, a continuous longitudinal trend analysis was applied because most of the relevant economic and terrorist violence indicators were measured annually at regular fixed time intervals (Kang, 2005). The use of a longitudinal graphical display provides a visual demonstration of drastic variations in economic variables over time, making possible inferences about their possible impact on anti-state terrorist violence. The use of time series analysis was not deemed appropriate for this study as there are insufficient numbers of time points available. Also, the level of change in the economic indicators/variables being substantial, the use of time series statistical analysis was not deemed necessary.

1.5.3. Conceptual and Operational Definitions

The first component of the quantitative analysis will demonstrate the expansion and implementation of Green Revolution (HYV) farming and techniques into the Punjab region. The initial focus examines broad economic indicators highlighting the Punjab government's expenditures on the physical infrastructure needed to effectively implement HYV farming. The indicators to be examined include the level of financial expenditures and percentage of budget outlays allotted by the Punjab government to finance capital infrastructure projects in agricultural production, irrigation, flood control, water-logging prevention, electricity transmission and power generation, and on roads and bridges. The levels of investment dedicated to those infrastructure projects demonstrate the Punjab state's commitment to Green Revolution farming and developing the physical infrastructure to ensure its success. In addition to the financial outlays for capital projects, a host of other indicators demonstrate the evolution in infrastructure undertaken to implement Green Revolution farming. The indicators include the length of roads built, installed electrical plant capacity, percentage of Punjab households using electricity, state-owned storage capacity for agricultural products, and the number of regulated markets and sub yards operated by the state to facilitate the sale of food grains. Through investment in infrastructure, the Punjab

state laid the foundation needed for successful implementation of a new, advanced farming method.

In addition to the role of the public sector in the implementation of Green Revolution farming, the overall expansion and acceptance of Green Revolution farming by Punjab farmers will also be summarized. In order to demonstrate the expansion, implementation, and acceptance of Green Revolution farming by Punjab farmers, the following indicators will be discussed: classification of area in the Punjab showing the farmers' transition to increase the overall net area sown and cropping intensity which was facilitated by implementation of HYV farming techniques, area under high yielding (HYV) showing the transition to application of HYV seeds, consumption of chemical fertilizer necessary for ensuring proper growth of HYV seeds, number of tube wells in Punjab, net area irrigated and gross irrigated area as percentage of total cropped area demonstrating investment in irrigation to facilitate proper growth and development of HYV crop varieties, increase in wheat and rice yields, and area and production of principal crops to demonstrate transition of farming to primarily HYV wheat and rice production. In addition to these economic indicators, trends in farm investment (per Ha and per farm), share of components in farm investment, and mechanization in Punjab agriculture will be examined to demonstrate the level of investment made by Punjabi farmers to implement the more capital-intensive and mechanized farming techniques. The summary of these agricultural and economic indicators will demonstrate the transformation of farming methods in the Punjab region to Green Revolution technology and also the initially-successful expansion of production it produced.

The second component of the quantitative discussion will focus on the "inequitable distribution of wealth", the first economic hypothesis of Corrado's model. The inequitable distribution of wealth will be demonstrated by the following economic indicators: distribution of landholdings in Punjab by size, average size of landholdings, per capita income, and levels of unemployment. It is expected that, these economic indicators will show that Green Revolution farming led to an inequitable distribution of wealth, particularly affecting one segment of farmers, and that the inability of the unemployed to obtain employment in the secondary and tertiary sectors of the economy only deepened the economic struggles of the Punjab population leading, in turn, to a propensity to participate in the Sikh anti-state terrorism movement. This link between economically disenfranchised segments of the Punjab population participating in terrorist violence will be made through an examination of multiple studies outlining the demographic characteristics of Sikh terrorists during the Khalistan (Land of the Pure) movement in Punjab.

The third component of the quantitative discussion will examine the levels of Sikh terrorist violence in Punjab in conjunction with deteriorating economic conditions. Corrado defines anti-

state terrorism as an act against the state that involves “systematic violence that is politically motivated, intention of the violence is to cause extreme fear in an audience that is distinct from the immediate victim of the violence, and perpetrators act in a clandestine manner” (Corrado, 2001, p. 4). Anti-state terrorism violence will be operationalized utilizing the following indicators: annual civilian fatalities of terrorist violence, police/paramilitary forces injured by terrorists, and levels of terrorist crime.

The fourth component of the quantitative discussion will involve a critical analysis of the success of the Punjab agrarian sectors with the implementation of Green Revolution farming methods over a decade-long period. The focus on the agricultural sector is necessary as the success of the Punjab economy was, at that time, based on this sector. In Hypothesis II, the key independent variable to be examined is Punjab farmers’ ability to "maintain financial viability" through agricultural production. *Financial viability* refers to the farmers’ ability to make profit and thereby sustain their farming operations. The *financial viability* of Punjab farms will be measured through the use of various interlinked and multi-faceted economic indicators. The success of a farm operation is, to an extent, based on the level of crop production. Thus, the following agricultural indicators will be examined: principle crop yields (wheat and rice) kilograms per hectare, agricultural index number (examining net area sown, cropping intensity, and productivity per hectare), and total area sown more than once. The impact of input expenses is instrumental in determining the sustainability of farm operations. The following indicators of this variable and its impact will be examined: input structure in Punjab agriculture (demonstrates reliance of Punjab farmers on purchased inputs), index number of selected inputs in Indian agriculture, wages paid to agricultural labourers, cost of wheat and rice production, and oil price averages (most tube well pumps and mechanized equipment were operated on petroleum products and thus were susceptible to hikes in energy prices). The next necessary component of financially viable farms is the ability of farmers to sell their produce at a reasonable return without restrictions on markets or purchasers. In order to address this component, the following agricultural indicators will be explored: procurement prices crop-wise (per quintal), rate of return over costs, farm owners’ household savings, and percentage share of crops to the central pools that were operated by the central government which implemented purchasing policies forcing Punjab producers to sell food grains to the central pool at a regulated price. The final component is the ability of Punjabi farmers to access financial capital for investment in mechanization and to purchase inputs. Banking sector indicators such as access of agricultural credit, primary agriculture credit society loan advances and membership numbers, Primary Land Mortgage Bank (selected statistics), flow of agricultural credit in Punjab (cooperative and commercial banks), and number of commercial banks will be used to demonstrate accessibility of capital for Punjabi farmers.

The final set of economic indicators to be examined in order to determine the financial viability of the Punjab agricultural sector over time will be the Indices of parity, which demonstrate the average annual profitability of Punjab farm operations, and the return over operation cost of major crops (Per Ha) over 10-year intervals. This latter indicator will provide a snapshot as to the true financial viability of farm operations over a defined period of time. The Indices of Parity is not available after the year 1980-1981, thus a comparable measure of trends in farm household income will be utilized to determine the financial viability of farm operations during the 1990s. It is expected that the analyses of these agricultural indicators will indicate that the adoption of Green Revolution farming methods resulted in financial instability for some Punjab farmers during certain periods.

The fifth component of the quantitative discussion will be a thorough examination of Hypotheses III, which analyzes the functioning of the secondary and tertiary structures of the Punjab economy and their roles in contributing to the rise of the Sikh terrorism movement. The key independent variable in this hypothesis is "secondary and tertiary sectors of the Punjab economy are able to absorb unemployed skilled and non-skilled workers". The definition of *secondary and tertiary sectors of the Punjab economy to absorb unemployed skilled and non skilled workers* to be used is the ability of the manufacturing (secondary) and service (tertiary) sectors of the Punjab economy to provide employment for unemployed skilled and non-skilled individuals. To examine the growth of the secondary and tertiary sectors of the economy, the following measures will be used: investment by central government in Punjab industry (percentage and gross amount), Punjab state government's expenditure on industrial development, distribution of net state domestic product by sectors of the economy. The strength of the secondary and tertiary sectors of the Punjab economy in relation to employment will be measured by the economic indicators examining the structure of the workforce in Punjab, total main workers by nine categories, sector rates of economic growth, status of small-, medium-, and large-scale industries, and number of shops, commercial establishments, hotels and restaurants, and persons employed therein. The overall goal in examining these economic indicators is to demonstrate a gradual growth in the secondary and tertiary sectors of the Punjab economy that contributed to reducing the numbers of disgruntled, unemployed peoples who were potential Sikh anti-state terrorism recruits.

The sixth component of the quantitative discussion will be an examination of demographic trends in Punjab. The two trends to be examined in depth are rates of literacy and number of adults of working age entering the labour force. These trends are of interest because increased literacy led to higher expectations of employment, and an increase in the number of working adults increased the number of individuals possibly unemployed. Both of these

demographic characteristics can impact individuals' economic expectations of society and also influence the sheer number of individuals actively seeking employment and/or remaining unemployed.

The final component of the quantitative discussion will re-examine the key economic indicators utilized to determine the financial viability of the agricultural sector, ability of the secondary and tertiary sectors of the Punjab economy to absorb skilled and non-skilled workers, and "inequitable distribution of wealth" and "economic goals of a given society and the means to achieve those goals". In this analysis, an examination of economic variables will be carried out to determine whether positive improvements in these economic variables over time, in particular, in the agricultural sector and secondary or tertiary sectors of the Punjab economy, facilitated the decline of anti-state terrorism in the Punjab region.

This thesis will provide, for the first time, a theoretical explanation for the rise and fall of Sikh anti-state terrorism in Punjab, India, within the context of Corrado's elaborated Punjab economic anti-state terrorism model. The thesis is divided into 14 chapters. Chapter 2 will provide a brief historical overview of the Sikh faith and a history of the Sikh community in Punjab until 1995. Chapter 3 provides an explanation of Green Revolution (HYV) farming technology and components required to make this capital-intensive agricultural technology effective. Chapter 4 discusses the introduction of Green Revolution farming to India and its diffusion across the nation. Chapter 5 discusses in detail, the introduction and rapid adoption of Green Revolution farming in Punjab, and the exponential growth of agricultural sector there by the early 1990s. Chapter 6 explains, as per hypothesis I, how the cumulative impact of economic conditions led to the inequitable distribution of wealth in Punjab, intense feelings, of relative deprivation amongst the Sikh population, the attraction of some disenfranchised Sikhs to Bhindranwale's Khalistani appeal, and the ensuing rapid rise in the Sikh anti-state terrorism movement. A brief overview of the level of Sikh terrorist violence and the tactics used is also provided. Chapter 7 discusses Hypothesis II of the model, examining the financial viability of Punjab farming operations during the period of 1970s to the early 1980s, and their role in contributing to the rise of the Sikh anti-state terrorism movement. Chapter 8 discusses Hypothesis III of the model, examining the development and functioning of the secondary and tertiary sectors of the economy in Punjab and their role in contributing to the rise of the Sikh anti-state terrorism movement. Chapter 9 examines Hypothesis IV and how considerable variations in demographic trends in Punjab contributed to the rise of the Sikh anti-state terrorism movement. Chapter 10 provides a re-explanation of Hypothesis I and examines how improving economic conditions led to the redistribution of wealth and the reduction of the relative deprivation perceptions amongst the Sikh population, leading to the decline in the Sikh anti-state terrorism movement. A discussion

demonstrating the reduction of Sikh anti-state terrorist violence by 1995 and the role of other factors that contributed to the decline of terrorist violence is included. Chapter 11 examines Hypothesis II and how the restoration of financial viability in Punjab farming operations contributed to the decline of the Sikh anti-state terrorism movement. Chapter 12 discusses Hypothesis III and how economic growth in the secondary and tertiary sectors of the economy led to increased employment and contributed to the decline of the terrorism movement. Chapter 13 re-examines Hypothesis IV and how the stabilization in demographic trends facilitated the decline of the Sikh anti-state terrorism movement. Finally, Chapter 14 provides an overview of what can be learned from the Punjab conflict and why Kang's elaboration of Corrado's economic terrorism model is theoretically the most advanced explanation of Sikh anti-state terrorism in Punjab.

2. Sikh History

The rise of the Sikh anti-state terrorism movement in Punjab, India, during the 1980s cannot be fully explained or understood without some knowledge of the origins of the Sikh religion and the consequent development of the Sikh community. The Sikh faith was founded in the 15th century by Guru Nanak (1469-1539) during a tumultuous period of religious intolerance that had beset the Punjab region under Muslim rule (Mohan, 1991; Wheelock, 1988). Guru Nanak was critical of the ritualism, routinization, and intolerance practiced in Hinduism and Islam, the dominant faiths of that time. He perceived "God" as formless, divine, almighty, as *Sat* or *only truth* (Pettigrew, 1997). He preached that salvation and inner peace would come through living a simple, pure lifestyle and through "inner contemplation" (Mahmood, 1989, p. 27). Guru Nanak saw himself as a mediator between the "divine and human" and did not believe in a human representative of the Almighty (Mahmood, 1989, p. 327). In essence, God's teachings or divine words were found in *gurbani* (Holy Scriptures) which had been compiled by His mediators, and His presence was found in the collective soul of the Sikh people, who, through worship in the form of meditation on the Holy Scriptures, could connect with the divine (Mohan, 1991; Pettigrew, 1997).

As the core tenets of these teachings became established and entrenched, followers of the Sikh religion steadily increased among the Punjab population, attracting converts from Hinduism and Islam over the centuries. A large portion of Sikh converts were from Jat tribes who, when they initially settled in the Punjab, were pagan but were later forcefully converted to Islam. Sikhism provided residents of Punjab with a viable religious alternative in which followers of the faith were perceived as equals (Sikhism opposed the caste system) and the religion was devoid of the idol worship and the ceremonial routinization that was so predominant in Hinduism and Islam. Over the next century, the Sikh religion, under the guidance of a series of gurus, continued to grow and develop a more clearly defined religious identity through the compilation of Holy Scriptures and erection of places of worship (Mohan, 1991). However, the Sikh faith was always perceived by the two dominant religious denominations as a breakaway sect of their own faiths (Kang, 2005).

As the Sikh religious population continued to grow, it was increasingly perceived as an organized militant threat by the other two faiths. Both Hinduism and Islam believed that Sikhs

had to be reintegrated into their religions of origin; that, in this way, the threatening sect would be extinguished (Kang, 2005). In order promote reconversion, both Hinduism and, in particular, Islam, authorized the use of violence to intimidate and forcefully convert Sikhs into their original faiths. Thus, from the late 1400s to 1799, Moghul emperors, the "Muslim governors of Lahore", and various "Afghan invaders" persecuted the Sikh people (Kang, 2005, p. 23; Mohan, 1991). The objective of these groups was to neutralize the perceived political threat the Sikh population now purportedly posed to their governance in the Punjab region.

The effect of these centuries of persecution was to affect a drastic change in the way the Sikh religious community envisioned its long-term preservation. A belief in a passive response to religious persecution was transformed into a belief that religious repression was unjust and that the use of violent armed defence to preserve the faith was necessary (Kang, 2005; Wheelock, 1988). Over time, Sikh gurus incorporated a militaristic characteristic into the religion to ensure its survival and strength. However, the most critical doctrine the Sikh gurus instilled in the followers of the faith was the concept of *Miri Piri*, which entrenched the notion that temporal and spiritual authority was indivisible (Mahmood, 1989; Mohan, 1991). It became a tenet of the Faith that only Sikh governance could ensure the protection and preservation of the faith, and religious oversight of political governance was necessary to ensure an equitable and just society (Kang, 2005; Pettigrew, 1987).

The Sikh population in Punjab would continue to face persistent repression throughout the 17th century, and Sikh religious doctrine would continue to evolve as major tenets of the Faith were established and entrenched in the Holy Scripture. The 10th and final guru, Gobind Singh, had a momentous impact on the character and nature of the Sikh community. Under Guru Gobind's stewardship, the Sikh faith established a militant warrior fraternity called the *Khalsa* (*pure ones*) brotherhood. Members of the Khalsa took the surname of Singh (*Lion)* or Kaur (*Lioness)* and would adopt the five outwardly distinguishable features of the Sikh identity (5 *Ks*): turban (*Kes*), comb (*Kanga*), steel bangle (*Kara*), dagger (*Kirpan*), and briefs (*Katcha*) (Mahmood, 1989; Wheelock, 1988). The establishment of the Khalsa by Guru Gobind established a unique, outwardly visible identity that distinguished the Sikh population from followers of Islam and Hinduism. More importantly, by pledging their allegiance to the Khalsa, followers promised to sacrifice their lives in defense of the Sikh faith and the Sikh community (Wheelock, 1988). Guru Gobind instilled the notion among Sikh followers that violence was justified under two conditions: to defend the faith and, when other means of defence were not viable, to obtain a resolution (Mahmood, 1989). The notion of violence being deemed necessary by religious doctrine under particular circumstances would in the future provide the Sikh anti-state terrorism movement the

theological justification to use violent armed resistance against the Hindu-dominated government (Kang, 2005).

Guru Gobind Singh, prior to his passing, instructed the Sikh congregation that the line of living gurus would cease and that the spiritual and temporal powers afforded to him would be disseminated. He designated the *Guru Granth Sahib* (Sikh Holy Scripture) as the supreme authority or inspiration on spiritual matters and the *Khalsa panth* (i.e., the Sikh community as a whole) as the "final authority in temporal concerns" (Mohan, 1991, p. 133). Upon the passing of the 10th and final guru, the Sikh community continued to grow rapidly, with many new converts being inducted into the faith. The Sikh congregation's political fortunes in the centuries following the 10th guru's passing fluctuated as a number of temporary territorial gains were lost when the Sikh population was being periodically subjected to significant atrocities (Wheelock, 1988).

Finally, from 1799 to 1849, Maharaja Ranjit Singh established the first independent Sikh Kingdom (Punjab) with the assistance of the Khalsa soldiers. Under the rule of Ranjit Singh, the Punjab kingdom was secular in nature but was guided by Sikh principles of equitable governance and social justice. Under Maharaja Ranjit Singh's rule, the followers of Islam and Hinduism were not persecuted and had the right to practise their faiths without direct state influence or discrimination (Wheelock, 1988). All religions and their spiritual leaders were afforded respect and shown tolerance. The Sikh population in this kingdom finally ushered in a period of stability, where, with freedom from fear of religious persecution and just governance, the faith was able to clearly define its distinctiveness. The creation of Punjab, a Sikh-governed state, would have historical significance because this was the ideal the Sikh population -- particularly the Khalistan anti-state terrorism movement -- would attempt to achieve in the latter half of the 20th century (Kang, 2005).

After the arrival of the British in India, conditions changed. In 1850, Punjab was brought under the rule of the Queen's Commonwealth. For the Sikhs of Punjab, this marked the beginning of a period of instability (Kang, 2005; Wheelock, 1988). Along with British governance in the region came, missionaries from various Christian sects who attempted to convert the Sikh population. Although the British administration did not pursue an overtly forceful Sikh assimilation strategy, they did not impede missionary efforts to convert Sikhs to their religion (Mohan, 1991).

In addition to Christian proselytising, the Sikh population was, during this period, also facing intense pressure from Arya Samaj, a "Hindu revivalist movement" that aimed to bring them back into the Hindu faith (Kang, 2005, p. 24; Malik, 1986). The Arya Samaj movement was an attempt to create a united front of the entire Indian population under the religious and cultural banner of Hinduism as a means of opposing British colonial rule. The Sikh religion, which was

perceived to be a sub-sect of Hinduism, and its followers were exposed to intense pressure from the Arya Samaj movement to participate in rituals to purify (*Shuddhi-purification*). These purification rituals involved individuals denouncing pursuits of non-Hindu religious practices and returning to the fold of Hinduism (Mahmood, 1989).

In response to continual assimilation attempts by Christian missionaries and the Hindu revivalist movement, new Sikh movements were born including the Singh Sabha and, later, the Tat Khalsa (the true Khalsa) movements (Kang, 2005; Mohan, 1991). The Singh Sabha and Tat Khalsa were Sikh revivalist movements whose sole purpose was to reinvigorate followers of the Sikh faith with a passion for and commitment to their religion. These movements went to great lengths to re-educate Sikh followers about the pure tenets of their faith: "*upadeshaks"* (*preachers*) were sent to the rural countryside to preach the essence of the gurus' teachings, religious educational schools were established, and other social measures were taken to protect and maintain a distinct Sikh identity in an effort to ward off assimilation (Kang, 2005; Mohan, 1986, p. 136). Tat Khalsa would play a major role in the 1920s, through violent agitations aimed at persuading the British to implement legislation (the Sikh Gurdwaras and Shrine Bill of 1925) to return to the Sikh community control over all Sikh religious institutions (Kang, 2005; Mohan, 1991). Under British rule, control of Sikh temples had gradually fallen into the hands of non-Sikhs, who were deviating from religious traditions and practices. Re-establishing control of Sikh institutions -- in particular the *Gurdwaras* (temples) -- was deemed necessary in order to remove corrupt religious officials and to prevent the continual physical and moral decay of Sikh religious institutions. Most significantly, under the new legislation, the Sikh community regained control of the central institutions used for disseminating Sikh religious doctrine and practice (Kang, 2005).

During the early 1940s, global geo-political events (in particular, World War II) were having an extensive impact on the British Commonwealth, including the ability of the British to retain political power in India. In India there was a massive increase in political dissent against British rule, which was followed by intense campaigns of peaceful civil disobedience led by Ghandi to obtain constitutional reforms. In 1947, the British, bowing to continual political pressure, partitioned the Indian Territory into the modern nations of India and Pakistan. The state of Punjab, the historical homeland of the Sikh population, was now divided between these two new geographically constructed nations (Kang, 2005). As a result of partition, a massive exchange of religious populations, with Sikhs and Hindus fleeing Western Punjab to India, the predominately Hindu state, and Muslims were emigrating from East Punjab to Pakistan, the predominately Muslim state (Mohan, 1991). The partition of the historical Sikh homeland infuriated the Sikh population when their territorial demands for their religious minority population were ignored. The Sikh population's animosity in post-independence India translated into direct

political support for the Akali Dal (Army of God), a Sikh political party, led by Tara Singh, that advocated for an autonomous Sikh state (Wheelock, 1988).

The social, political, economic, and religious events in the post-independence period between 1950 and 1980 would lay the foundation for the violent Sikh fundamentalist movement that would arise in the early 1980s. In post-independence India, a deep-seated fear existed among the Sikh population and the Akali Dal that a modern secular Indian state would lead to an erosion of Sikh culture, traditions, and religious orthodoxy (Kang, 2005). The Akali Dal reasoned that in a secular polite, the communal nature of their political platform would not be tolerated and would become irrelevant (Pettigrew, 1987). They thus changed their means of communicating their political demands from one of reserved diplomatic approach to one of vocal political protest and party members' "courting arrest" in pursuit of an independent Sikh state (Kang, 2005, p. 29).

One source of Sikh distrust of the Indian National Congress party was its failure to act on its promise that once independence was won, the government would be open to re-organizing internal state boundaries along linguistics lines (Kang, 2005). In 1953, the States Reorganization Commission initiated the process of holding hearings in which submissions were accepted from various interest groups, including the Akali Dal, providing the grounds as to why state borders should be reconfigured or modified based on language (Mohan, 1991). The Akali Dal submission demanded the formation of an autonomous Punjab Suba or state where all Punjab-speaking areas would unified, thus constructing a "unilingual", Punjabi-speaking state (Mohan, 1991, p. 142).

The Akali Dal believed that the formation of a unilingual Punjabi-speaking state would provide the means by which Punjabi "culture, language, and the Sikh religion" would be protected and afforded the opportunity to prosper (Kang, 2005, p. 30). In 1955, the States Reorganization Commission rejected the Akali Dal's proposal for the creation of a "unilingual" Punjabi-speaking state but approved the changing the borders of some other states according to linguistic characteristics (Kang, 2005). The reasoning given for denial of the Akali Dal request was that the proposal was not based on linguistic grounds but, rather, was driven by theological and sectarian interests. These grounds, the commission argued, contradicted the principles of a secular state. Nonetheless, over the next decade, the Akali Dal would continue to agitate through the use of non-violent protests for the formation of unilingual state, and, as a result of changes in the government during that period, the Punjab State Reorganization Bill was passed in 1966, splitting up Punjab for a second time and creating a Sikh majority state (Kang, 2005; Mohan, 1991).

The Akali Dal had finally achieved their objective in constructing a "Sikh majority state", with Sikhs composing 54% of the population and Hindus, 44% (Mohan, 1991, p. 143). Their

success in achieving this objective was in part a result of a change in Akali leadership, with Sant Fateh Singh advocating for a new Punjab state based on secular reasoning that emphasized solely the linguistic and cultural perspective (Teleford, 1992). The Akali Dal had succeeded in founding a state where "religious, cultural, and language rights would be preserved and flourish" (Kang, 2005, p. 31).

After this period, the Akali Dal drastically altered its objectives and goals, transforming itself from a political party whose primary objective was the preservation of the unique Sikh religious and cultural identity into a party whose leadership now solely focused on keeping its power in the new Punjab state (Kang, 2005; Mohan, 1991). The Akali Dal leadership and many of its supporters were individuals from the Jat Sikh class, who were largely rural agricultural landowners and contributed to the largest sector of the Punjab economy. Many Jat, who were well-off land owners, understood that political power would enable them to promote their "agricultural interests" and increase their private wealth (Kang, 2005, p. 31).

Over the next decade, the Akali Dal's primary objective was not protecting Sikh interests but rather obtaining and maintaining political power. They failed to implement policies that would further the objectives they had espoused: protection of the Sikh faith and preservation of the Sikh community's culture and identity (Kang, 2005; Malik, 1986). Because the Sikh population tended not to vote exclusively along communal lines, the Akali Dal were unable to form majority governments in the Punjab legislature (Teleford, 1992). Thus, the Akali Dal was forced to form coalition governments with Hindu-based political parties and, fearing the alienation of non-Sikh citizens and political adversaries, they refrained from implementing policies to protect the Sikh religion and culture exclusively. Once in power, however, they alienated the Hindu minority, comprised primarily of urban business owners or manual labourers, by providing limited "direct or indirect economic benefits" to that population (Kang, 2005, p. 34). They failed to support allotments of substantial amounts of government funds to the industrial sector or to implement economic policies that would benefit this stratum of society. In addition, they also alienated segments of the Sikh population, in particular, small-scale Sikh farmers, by implementing agricultural policies that directly benefitted the medium-to-large-scale landowners, but placed small peasant Sikh farmers in economic hardship. To maintain support, the party continued to use fear of cultural assimilation and discrimination as a political platform from which to achieve political objectives or obtain political concessions from the Indian government, especially when they were out of power in Punjab (Kang, 2005).

In the early 1970s, party elites within the Akali Dal created the Anandpur Sahib Resolution (ASR), which comprised a detailed list of socio-economic, religious, political, and

territorial complaints (Kang, 2005). In this document, they clearly discussed specific central government policies directed at the Sikh population which they believed were repressive, and they put forward specific solutions which they believed would assist in addressing these concerns (Teleford, 1992). The true intention in constructing the ASR was to foster a level of anxiety amongst the Sikh population about their standing in Indian society and to promote the notion that assimilation into the Hindu faith and community was the government's objective. The Akali Dal portrayed themselves as the only political entity that could safeguard the rights of the Sikh population and would work diligently to address the Sikh grievances if they were elected (Kang, 2005).

The Akali Dal's consistent use of communal politics placed a significant strain on its relationship with the central Hindu government, particularly with the governing Congress (I-Indra) party. The government's apparent resistance to measures designed to protect the Sikh's unique culture and religion, combined with the constant political struggles between the Akali Dal and the central government, confirmed a perception amongst supporters of the Akali Dal that Sikhs were treated unequally, whether the issue was political, economic, territorial, or social (Kang, 2005). These conditions created not only a sense in the Sikh community of being a beleaguered minority, but also, among some segments, intense hatred and vengeful inclination. Throughout the 1970s, dramatic economic reversals and changing cultural values, coupled with historical and political events, produced considerable social discontent, destined to culminate in a violent Sikh fundamentalist movement (Kang, 2005). One of the main catalysts for rising discontent in Punjab was the implementation of Green Revolution farming and its negative impact on Sikh cultivators.

The capital-intensive Green Revolution farming that was vigorously implemented in Punjab by the Indian government to increase food grain yields and to ensure the Indian subcontinent's food security pushed a large portion of small Jat Sikh landholders into unemployment and poverty. Green Revolution farming involved the introduction of advanced farming techniques and technology into the agricultural sector. In comparison to subsistence farming, it could be more easily adopted by farmers with larger landholdings and greater financial resources (Kang, 2005). It involved planting a high-yield variety (HYV) of seeds, the growth and maintenance of which depended upon the application of products such as chemical fertilizers and pesticides. It also required ample water and the mechanized equipment. The Punjab farmer went from being self-sufficient and requiring few supplementary products to being dependent on the federal government, which controlled "agricultural policy, finance, credit, inputs, and prices of agricultural commodities" (Shiva, 1991, p. 23). During the 1970s and early 1980s, there was a dramatic increase in the prices of inputs required by the Green Revolution farming methods, and a substantial decrease in the prices paid for the resulting agricultural products. Smaller returns

on their harvests led to many farmers' being unable to repay loans, maintain decent living standards, and, subsequently, having to forfeit or sell their land. Largely unheard and ignored by both the Akali Dal, whose allegiance was large agricultural landholders, and the central Indian government, whose power base was primarily urban industrialists, poor and disenfranchised Jat Sikh farmers became progressively discontented and agitated (Kang, 2005).

In the early 1980s, the Akali Dal lost their political power in Punjab when the Congress (I) central Indian government, led by Indira Gandhi won the state election. Once again out of power, the Akali Dal reconstructed its party rhetoric that focused on the discriminatory social policies of the Indian government and proposed a revamped Anandpur Sahib Resolution (ASR), which outlined 45 Sikh demands and grievances. The Akali Dal launched an agitational strategy, "*Dharam Yudh*" (Holy War) designed to unite the Sikh population against the perceived repressive tactics of the Hindu-led government (Singh, 1984, p. 43). The party organized escalating protests, including *nahar roko* (stop canal digging, 1982), *rasta roko* (Block road traffic, 1983), *rail roko* (strop train traffic, 1983), and *kam roko* (stop government administration work, 1983) designed to put pressure on the Indian government to address Sikh grievances. The Akali Dal also enlisted the services of a young Sikh preacher named Sant Bhindranwale, who was included in the Dharam Yudh movement in 1981 due to his willingness to use physical violence against the Indian state to bring about social change. The Akali Dal and Congress (I) government would continue to hold negotiations off and on over the next two years regarding the demands in the ASR (Mohan, 1991).

In addition to economic changes, rapid social and cultural changes were also affecting the Sikh population during this period. Western values and beliefs were beginning to permeate their culture, influencing lifestyles, attitudes, and social outlooks (Kang, 2005). The influences of more modern Western values adopted by members of the Sikh population directly challenged traditional Sikh belief systems. Negative Western social values pertaining to smoking, alcohol consumption, and drug addiction were impacting large segments of the Sikh population and at levels never seen in the Punjab region (Oberoi, 1990). Change was happening so quickly, both economically and socially, and its effect was so widespread, that the community could neither adjust nor comprehend its nature and impact (Kang, 2005). The widespread political, social, and economic instability during this time afforded the Sikh fundamentalist movement the opportunity to exploit and gather support for their theologically based movement. A large portion of the Sikh population, in particular, poor and middle class Jat Sikhs, angry and disgruntled with their dire economic situation, were receptive to supporting the Sikh fundamentalist movement in hopes that it would bring a resolution to their problems. Sant Jarnail Singh Bhindranwale and his Sikh fundamentalist movement provided this disenfranchised Sikh population with an explanation for

their grim circumstances, as well as an apparent means by which to bring about social change through the use of violence (Kang, 2005).

Sant Jarnail Singh Bhindranwale was born into a peasant family in Punjab and at an early age attended the religious institution Dam Dami Taksal (Mohan, 1991). During his formal religious training, he learned about Sikh history and developed a general philosophy as to how individual Sikh's should go about living a righteous life and what constituted a just and equitable Punjab society. Bhindranwale would become the religious leader of the Dam Dami Taksal and, during the 1970s, would gain a large following amongst the rural population with his controversial sermons in the Punjab countryside. According to Sant Bhindranwale's explanations, the Sikhs' dire social, political, and economic situation was directly attributed to two key factors: the moral decline of the Sikh population and the Hindu government's repression (Teleford, 1992). The moral decline of the Sikh population was attributed to failure of the Sikhs to follow the orthodox tenets of their faith and to practise their faith with devotion (Pettigrew, 1987). Sant Bhindranwale was also very critical of the Nirankari sect who worshipped a living guru in opposition to the Orthodox Sikh teaching that the line of gurus ended with the Guru Granth Sahib (Sikh Holy Book) (Kang, 2005; Mohan, 1991). The Sikh fundamentalist movement's violence initially targeted this Sikh sect, leading to the murder of its leaders and followers of its beliefs. It was most critical, however, of the central Hindu government which, it believed, was repressing, persecuting, and attempting to assimilate the Sikh population with its social, economic, and political policies (Teleford, 1992). In order to bring about change, Sant Bhindranwale implored his followers to accept that the use of violence and the right of the Sikh population to bear arms was justified in order to protect the Khalsa, for peaceful methods had proven to be unsuccessful (Mohan, 1992). Sant Bhindranwale's final solution to the ominous circumstances of the Sikh population was an independent Sikh state known as *Khalistan*.

In Punjab between 1978 and 1995, the Indian state experienced one of the most violent and prolonged terrorist conflicts in its post-independence history. The conflict lasted over a decade and an estimated 18,000 innocent people, Indian security forces, and terrorist died (Chima, 2002, Kang, 2005). In additional, unofficial statistics claim that approximately 20,000 to 45,000 additional Sikh civilians may have been kidnapped and killed as a result of counterterrorism operations conducted by the Indian military, paramilitary units and the Punjab police (Singh, 1996).

In the early 1980s, Sant Bhindranwale's terrorist organization expanded its reach, from assassinations of members of the Nirankari sect to murder of moderate Sikh politicians, Hindu politicians, and newspaper editors who were perceived as a threat to the Khalistan movement

(Kang, 2005). Sikh terrorist organizations also targeted Punjab security personnel and bureaucrats who were seen as extensions of the Indian state and as enforcers of its repressive policies against the Sikh population. They also indiscriminately targeted members of the Punjab Hindu population, not only to promote fear, but also to encourage the mass emigration of Hindus from Punjab and further the objective of, the creation of a "Sikh-dominated state of Khalistan" (Kang, 2005, p. 51). The tactics used by Sikh terrorists over the length of the conflict evolved, but targeted murders via assailants on motorcycles were common, as were hijackings of commuter buses, grenade attacks, railway station and post office bombings, and commuter train derailments (Kang, 2005).

The level of Sikh terrorist violence gradually intensified in the early 1980s, evoking from the government "Operation Bluestar", the Indian security forces armed raid on the Golden Temple in 1984. The purpose of the raid was to dislodge Sant Bhindranwale and his followers, and it was successful in eliminating Bhindranwale and key members of his Sikh terrorist network. The level of Sikh terrorism dropped for a brief time after this until new spin-off organizations could be formed, and then Sikh terrorist violence increased exponentially from 1986 to 1992 (Kang, 2005). The violence would not end until 1995.

After Operation Bluestar, the Indian government believed they had brought the Sikh anti-state terrorism movement under control. In October 1984, Indira Gandhi was assassinated by her two Sikh bodyguards as an act of revenge for defacing the Golden Temple, the Sikhs' holiest shrine (Kang, 2005). After Gandhi's assassination, Rajiv Gandhi succeeded his mother as prime minister. To address the Punjab conflict, R. Gandhi opted to find a political solution, directly engaging the Akali Dal in political negotiations. In 1985, the Akali Dal, led by Longowal, came to terms with Gandhi with the Rajiv-Longowal Accord, an agreement on 11 crucial points that the Akali Dal had outlined in the ASR and that were seen as a welcome compromise to resolving the Punjab conflict (Kang, 2005). Following the signing of this agreement, Sikh terrorists assassinated Longowal for compromising with the Hindu government, and the Akali Dal immediately lost legitimacy amongst Sikh terrorist organizations, who saw the accord as a betrayal of the Khalistan movement and the Sikh population (Malik, 1986). In addition, the government failed to implement any of the major components of the accord, and as Sikh terrorist violence escalated in Punjab, the Indian government became convinced that the use of security forces was the only viable solution.

The state of Punjab collapsed into chaos as Sikh terrorist organizations committed acts of violence with impunity, while security forces were in disarray. In 1989, the Congress (I) government was defeated (Kang, 2005). The new Janata government attempted to resolve the

Punjab terrorist conflict through a conciliatory approach, and by implementing a non-violent counterterrorism strategy. This approach was ineffective as Sikh terrorist organizations used the opportunity to reinvigorate their terrorist cells through recruitment and to reacquire weaponry to perpetuate violence. In 1990, the Janata-Congress minority government came to power in India and attempted to diffuse the Punjab conflict through formal treaty negotiations. But Sikh terrorist organizations were too splintered and the government was unable to initiate dialogue and take part in formal negotiations (Gill, 1995).

In 1991, the Rao-led Congress party was elected and formed the new central Indian government. Rao immediately moved away from the notion of finding a political solution to the Punjab problem and instead pursued a full law-and-order counterterrorism agenda. In order to bring Sikh terrorism under control, wide-ranging powers were granted to security officials, security forces were bolstered, and political forces were not allowed to impede counterterrorism operations. A coherent and effective counterterrorism strategy was implemented that repressed the Sikh anti-state terrorism movement by 1995 (Kang, 2005; Teleford, 1992).

3. The Green Revolution

To understand the rise and decline of anti-state terrorism in Punjab, it is necessary to have a thorough grasp of the Green Revolution and its impact on rural, third-world agricultural economies. In general terms, the Green Revolution can be described as a transformation of agricultural farming from a model predicated upon subsistence farming using organic farming methods to a capital-intensive model dependent upon bio-technology (Shiva, 1991). The Green Revolution was ushered in by Western capitalist democracies as a viable political and technological solution to the social unrest prevalent in developing nations in the mid-20th century. In practise, however, it may have compounded already widespread social discontent.

The objective of this chapter is to articulate the social, political, and economic ideologies that influenced the promotion and adoption of Green Revolution technology in developing nations. This chapter will also illustrate how Green Revolution farming differs from earlier modes of subsistence farming and highlight the perceived social and economic benefits the Green Revolution promised to produce. The final section of this chapter will concentrate on the negative ramifications of the Green Revolution on rural agricultural societies, particularly on the destabilization of traditional social structures.

3.1. Social, Economic, and Political Ideologies Influencing the Green Revolution

The Green Revolution arose in the 1950s during a period of globally heightened social, economic, and political instability. Many advanced capitalist democracies in particular the United States of America, were becoming increasingly concerned about the volatility in developing countries in Asia and Latin America. The United States feared that the increasing levels of conflict among rural peasants in these nations would fuel the spread and adoption of communism (Deol, 2000; Shiva, 1991). American politicians and bureaucrats were concerned about communist ideology because it directly contradicted the political (i.e., democratic) and economic (i.e., capitalist) principles upon which Western systems were based (Cleaver, 1972). Communist ideology was appealing to agrarian peasants because it offered them hope of relief from the oppressive social and economic conditions they faced, and it advanced the ideal of equality for

the average citizen (Shiva, 1991). Hunger and poverty were perceived by the American administration as the motivating force driving peasants to support the communist movement. The main challenge many newly formed developing nation governments in Asia and Latin America faced was addressing the issue of widespread hunger and poverty (Cleaver, 1972).

During the 1950s and 1960s, many Asian and Latin American nations were experiencing unprecedented population growth (Cleaver, 1972; Lele, 1972; Scoones, 2002; Thiesenhusen, 1974). The agricultural sector of these nations was expected to keep pace with population growth and produce sufficient food grains to feed this ever-growing population, and the government was expected to provide financial investment to facilitate the growth of agricultural production. However, farmers were already having difficulty producing enough food grains to feed their families and thus, their producing surplus food grains for general consumption was considered unachievable (Chakravarti, 1973). The ability of farmers in these nations to increase food grain production was hampered by a host of natural physical limitations, man-made social problems, and a lack of public investment.

The first barrier to farmers' increasing food grain production was their inability to increase yields per acre naturally. Farmers using traditional farming methods and inputs could no longer manipulate plant varieties to increase their yields. A majority of crop plants in these nations had achieved their natural production capabilities. Because of this, alternative means of increasing yields were pursued by developing nations. Many of these nations examined the possibility of increasing food grain production by attempting to increase the amount of land allotted for crop production (Chakravarti, 1973; Scoones, 2002; Thiesenhusen, 1974). However, many soon realized that a majority of the land suitable for agriculture was already under the plough and fully inhabited (Parayil, 1992). Nations also explored the possibility of converting frontier land to farming, but they lacked the technological capability to convert land in these regions into cultivable and grain-producing land (Lele, 1972; Thiesenhusen, 1974).

In conjunction with peasant farmers in Asia and Latin America being unable to increase food grain yields, there were a host of social issues compounding the dire circumstances many peasant farmers faced in these nations. The first major issue affecting them was that landholdings were becoming successively smaller with each generation as male landowners divided their land amongst their male heirs. The owners of these properties now had to provide for and support their families on reduced food grain yields from their smaller landholdings, and thus many were unable to provide the nutritional requirements for their families or the basic necessities of life.

The second major challenge many was that unfair land rights both favoured society's economic elite and entrenched their power. In many developing nations, a small group of economic elite controlled a considerable portion of cultivable land, and strict land ownership rights prevented land redistribution to the suffering and starving landless peasants or small landowners. Legislation pertaining to tenants on agricultural land also tended to favour large landowners who were allowed to charge high rent to tenant cultivators, with little recourse available to them. In many cases, landlords were extracting 50% to 70% of tenants' harvest for rent, thus ensuring peasant farmers were left in abject poverty and hunger and incapable of improving their social situation (Shiva, 1991). Even in cases where developing nations redistributed land amongst the poor peasant populations, implemented landholding ceilings, and fixed rent levels for farmers, the dire conditions of peasant farmers failed to improve. The changes were never great enough to alleviate the hardship of the masses, and, in many cases, the superficial changes continued to favour the landed elite.

The final economic problem exacerbating the plight of the rural agrarian population was their inability to find employment outside of the agricultural sector (Lele, 1972). Many developing countries' economies during this period were primarily dependent upon the agricultural sector for employment and economic growth. During periods of economic stagnation in the primary sector of an economy, other sectors must be capable of absorbing the unemployed or underemployed individuals in order to maintain economic equilibrium and to ensure appropriate standards of living. In the 1950s, farmers were unable to escape their economic circumstances. Unable to maintain a decent standard of living through conventional farming, and they were unable to find other employment to supplement their incomes. Growing numbers of people were continually added to this army of unemployed, but their nations were unable to meet their economic needs. Such conditions contributed to a feeling of hopelessness and sparked frustration in farming communities.

Marred by poverty and hunger, farmers in many countries began to question whether the dominant political and social structures were equitable. Many began to perceive the landed and emerging capitalist elites as abusing their political and economic powers in a coordinated manner to repress all other segments of society and to ensure their own physical, economic, and political well-being. Many farmers, frustrated by the status quo, began to use violence against the state and its representatives in order to bring attention to their dire circumstances and demand fundamental changes in the dominant systems of governance.

Many Asian and Latin American countries saw a rise in the number of peasant movements inspired by communist ideology during the 1950s. Briefly, communist ideology

argued for a complete re-configuration of society with large portions of property and wealth being converted from private ownership and redistributed among all citizens. With this dramatic redistribution of resources, it was believed all individuals would have equitable access to resources to meet their needs (Corrado, 2001). During this period, the Communist Party in China came to power and "encouraged local peasant associations to seize land, cancel debts and redistribute wealth" (Shiva, 1991, p. 50). The success of the communist movement in China inspired local peasant movements in the region, in countries like the Koreas, India, Vietnam, Malaysia, the Philippines, Indonesia, and a host of Latin American nations. Developing nations mired in agrarian conflict of various intensities begin to search for viable solutions to address the issues of hunger and poverty that appeared to be directly fuelling rural violence (Cleaver, 1972; Shiva, 1991).

During the 1950s and 1960s, many developing nations, riddled with ever increasing agricultural conflict and violence, came to the stark realization that they needed to implement concrete measures to address widespread hunger and poverty amongst the rural populations and to achieve agricultural self-sufficiency in grain production (Chakravarti, 1973; Parayil, 1992; Pearse, 1980). Many of these countries, as mentioned earlier, had attempted to increase food grain production through natural farming techniques with limited success. A significant portion of these nations addressing food grain scarcity also examined other short-term solutions such as accepting food aid from Western nations, in particular, from the United States, to fill the gap between "production and demand" (Postgate, 1974, p. 734). However, as agrarian conflict continued to increase, despite implementation of various strategies and food aid from Western nations, many donor countries, such as the United States, began to question the "cost, size, and effectiveness of its aid program" (Postgate, 1974, p. 734). The United States was growing increasingly concerned that even with continuous food aid contributions, developing nations were still incapable of addressing food grain shortages and, more specifically, they were unable to address the single major variable inspiring individuals to participate in the rural communist movements and agrarian violence. This concern led Western nations to doubt whether food aid should be provided to developing Asian and Latin American countries, simultaneously creating doubt in the minds of receiving nations about whether they could rely on Western countries to provide food aid, in future times of crisis (Biasucci, 1997; Cleaver, 1972; Shiva, 1991).

In the early 1960s, a small group of Western capitalist nations, led by the United States, approached these developing countries that were reeling from poverty, hunger, and conflict and offered a viable solution to their problems. The fundamental understanding was that conventional methods of farming to increase yields in countries with limited agricultural land was no longer a viable option. The solution proposed by these capitalist nations involved a radical transformation

in conventional farming methods through the adoption of new, intensive agricultural technology. This new method of farming, known as the "Green Revolution", involved farmers using scientifically constructed, high-yielding seeds dependent upon the application of chemical fertilizers, controlled irrigation, and mechanization to produce increased food grain yields. Thus, the solution to developing countries' problems revolved around the implementation of this new agricultural technology that was believed could drastically increase food grain yields per acre, eliminating food shortages and hunger (Deol, 2001; Hindmarsh, 2003; Parayil, 1992; Shiva, 1991). The implementation of this new technology was promoted as the most effective means for developing nations to resolve issues of hunger or famine with few or no negative consequences or risk.

In addition to supporting Green Revolution farming technology as a viable solution for obtaining food independence and eliminating hunger in developing nations, proponents of the Green Revolution also hoped to achieve a number of strategic, self-serving political and economic objectives. The political objective of Western capitalist nations was to pacify rural conflict in these regions in order to stem the rise of communist movements (Deol, 2000; Shiva, 1991). Western nations reasoned that, in the face of food scarcity and poverty, all large rural peasant populations were capable of revolutionary violence. The Green Revolution was strategically constructed in hopes of both increasing material abundance in the form of excess food grain production and also of elevating the financial well-being of peasants by creating a new and stable middle class of farmers (Cleaver, 1972; Hindmarsh, 2000). Under these conditions, it was thought, the likelihood of rural peasants participating in revolutionary violence (i.e., communist movements) against the politically and economically powerful groups in society would decrease. Social stability would make it possible for these newly formed nations to counter the threat of the communist movement, but, more importantly, it would allow Western countries to entrench the capitalist ideology upon which many of these emerging national economies were based (Shiva, 1991).

Western capitalist governments, particularly the United States, influenced by powerful business elites within their countries, also wanted to ensure that developing nations adopted economic systems that would preserve access to sales and investment markets for their multi-national corporations. Multi-national corporations and large investment agencies -- the creators of Green Revolution farming -- were acutely aware that if developing nation farmers adopted this agricultural technology, the corporations could establish new and continuing buyers for their manufactured products and increase their profits. Just to get started with this method of farming, farmers would be forced to purchase their manufactured inputs and mechanized equipment from the U.S. and other manufacturing countries. In addition, peasant producers would be dependent

on ongoing purchases of manufactured inputs (e.g., seeds, fertilizers, herbicides) and mechanized equipment (e.g., tractors, water pumps, threshers). Ultimately, this is why stability in developing nations was imperative: Stable markets would promote economic growth and investment. The largest beneficiaries in the adoption of Green Revolution farming by developing nation farmers were the creators of these large agricultural-technology, multi-national corporations. These corporations now had access to large developing markets for their agricultural products, with the promise of ever-increasing profits (Cleaver, 1972; Hindmarsh, 2003; Shiva, 1991).

3.2. Green Revolution Technology Creators: Private Enterprise

The American Rockefeller Foundation was the main catalyst for the development of Green Revolution technology; specifically, it was the "core developer of agricultural genetics and monoculture high yielding plant varieties" (Hindmarsh, 2003, p. 12). This foundation was created in 1913 with a board of trustees comprised of American economic elites, scientists, and leading corporate managers. The objective of the foundation, through its various business interests, was to utilize science to create efficient technological products that not only benefited individuals, but also ensured maximum profit for the foundation through the sale of its products.

The Rockefeller Foundation began investing in agricultural research in the 1920s, with the development of a vast research network comprising numerous private and university-associated agricultural research labs across the United States. The objective of these agricultural research labs was to develop, through scientific engineering and breeding, stable plant varieties capable of more frequent and increased yields (Pearse, 1980). However, these plant varieties were also engineered to ensure that their growth and harvest was highly dependent upon industrially produced inputs (e.g., fertilizer, herbicides, and pesticides) and the use of mechanized equipment. Developing these new varieties of high-yielding plants dependent upon purchased inputs and mechanized equipment allowed the Rockefeller foundation to create an avenue by which to develop consumers for products that other companies within their business empire produced and sold. For example, the Rockefeller Foundation had subsidiary companies that produced seeds, agro-chemicals, petroleum products, and mechanized farm equipment, all of which benefited economically from the development of high-yield plants. The first success for the Rockefeller Foundation came in the mid-1930s with the development of high-yield hybrid corn seeds for industrial agricultural producers in the United States. The success of the new seed led

to increased sales in subsequent years and later expansion into the commercial sector (Hindmarsh, 2003; Parayil, 1992).

In 1943, the Rockefeller Foundation expanded its agricultural research into Mexico. This expansion was facilitated by the United States government, which was attempting to assist the Mexican state to develop its agricultural technology (Pearse, 1980; Shiva, 1991). Mexico was facing chronic food shortages, and harvests were being destroyed by plant disease. An Office of Special studies was created within the agricultural ministry to facilitate research between Mexican and Rockefeller Foundation scientists. In 1944, the Rockefeller Foundation was able to lure prominent agricultural scientist Norman Borlaug from his classified laboratory position at Dupont to their plant breeding program in Mexico (Shiva, 1991). Through the 1940s and 1950s, Borlaug and his associates at the Special Studies lab continually produced and developed a host of high yielding wheat and corn varieties capable of providing increased yields with an increased application of agricultural chemicals. In conjunction with developing higher yielding varieties of seeds, the Special Studies Office also developed seed varieties capable of resisting many common forms of plant disease, thus increasing the success of scientifically engineered plant varieties (Hindmarsh, 2003; Pearse, 1980).

The Special Studies Office, led by the Rockefeller Foundation scientists, revolutionized the Mexican agricultural sector. By the 1950s, the office, through constant research and development, was able to produce a stable high yielding seed variety (wheat and corn) suited for the Mexican agricultural environment. It was also highly influential in persuading the Mexican government to invest capital in the infrastructure needed to adequately implement Green Revolution farming. The Mexican government committed substantial funds to large-scale capital projects to improve the irrigation system, transportation infrastructure, and electrical grid. They also assisted by providing easy access to the funds needed to assist farmers in acquiring agricultural inputs and mechanized equipment and by guaranteed price supports for crops needed to ensure profitability. Mexico, by the 1960s, was no longer an agricultural food-grain-deficit state, but a wheat-surplus-exporting state (Cleaver, 1972; Pearse, 1980).

The Rockefeller Foundation's success in Mexico demonstrated that its capital-intensive agricultural model could be implemented in developing nations and result in relative success. More importantly, it demonstrated the ability of the Rockefeller Foundation to manipulate nations into believing that the new agricultural farming methods' sole purpose was to increase food yields, whereas, in reality, the objective was to force states to adopt a capital-intensive farming method that reaped financial rewards for producers of the technology. In 1956, the Rockefeller foundation severed ties with the Mexican agricultural ministry and created the International Maize

and Wheat Improvement Centre (CIMMYT) (Cleaver, 1972). This new private entity shifted its focus from the application of Green Revolution technology in Mexico to a broader focus of research, development, and training of individuals in wheat and corn technology (Pearse, 1980).

The success of the Rockefeller Foundation's research and development in Mexico is important because it laid the foundation for the expansion of the Green Revolution agricultural program globally. The research done in the Special Studies Office/laboratory, later renamed the International Maize and Wheat Improvement Centre (CIMMYT), was essential in the development of a stable, high yielding plant variety capable of increased yields in response to agricultural chemicals. In the mid-1960s, the ability to create a stable high yielding plant seed allowed the Rockefeller Foundation/ CIMMYT to export its agricultural products and the associated technology to many developing countries that hoped to benefit from its promised increased food grain productivity. By the mid-1960s, CIMMYT became an epicentre for exporting tonnes of high yielding wheat variety seeds globally to newly implemented Green Revolution programs in developing nations. Success of the CIMMYT research centre in Mexico also acted as a catalyst for expansion of research operations into Asia (Cleaver, 1972; Shiva, 1991). In 1960, the Rockefeller Foundation, in conjunction with the Ford foundation, opened the International Rice Research Institute (IRRI) in Manila, Philippines. This new institute's focus was to produce rice varieties capable of increased yields, and, by 1964, the new variety was leading to increased rice yields in the Philippines. The IRRI became an exporter of high yielding rice seeds which flourished across Asia (Parayil, 1992).

The success of the Green Revolution technology program in Mexico also gave the technology and its developer instant credibility. In its efforts to persuade other nations to adopt its new farming technology, the Rockefeller Foundation now had demonstrable scientific proof that it's farming techniques and methods were effective. In many cases, politicians and leading policy developers from developing nations were flown into Mexico and provided access to the Special Study/CIMMYT laboratories to demonstrate the viability and success of the technology.

The final benefit of the Special Studies Office/CIMMYT, and later IRRI, to the Rockefeller Foundation was as a learning institute for agricultural scientists from developing nations. These scientists were brought to the institute and instructed on how to effectively implement Green Revolution farming, including its technical aspects, to ensure its appropriate implementation in their home countries. The research conducted by the Rockefeller Foundation in the Special Studies Office/CIMMYT and IRRI by the mid-1960s helped spread Green Revolution farming across the developing world.

3.3. Western Countries Control of Agricultural Universities in Developing Nations

In addition to developing its agricultural technology for the Green Revolution, the Rockefeller Foundation, throughout the late 1940s and early 1950s, worked in cooperation with the United States government, United States agency for International Development (US-AID), and other private foundations (e.g., Ford) to develop strategic, diplomatic, and economic ties in developing nations. The United States government and private business interests understood from the onset that in order to successfully implement capital-intensive agriculture, they needed to convince developing nations that the country's farming methods were inefficient and that they possessed superior agricultural knowledge and technology to facilitate improvements in food grain production (Parayil, 1992). To achieve this objective, the U.S. government and private business consistently participated in joint committees or acted as special advisors on panels created by developing nations, examining how to improve or reform agricultural education practices. The participation of American private enterprise and government representatives in these committees and panels was largely self-serving, with many members advocating for the adoption of U.S. type agricultural methods.

The most important recommendation adopted by many of these committees and panels in developing nations was to revamp the indigenous agricultural research systems (Parayil, 1992). The first step in achieving this objective was to create agricultural universities in the developing nations for teaching advanced farming methods. Many developing nations lacked any centralised knowledge system related to indigenous farming and its techniques. In order to construct these university facilities, US-AID provided initial capital construction costs and, later, grants to assist with daily operational expenses. US-AID and private foundations (i.e., Rockefeller and Ford) also facilitated the establishment of close academic ties between these newly established agricultural educational facilities and more prestigious American agricultural universities, such as the University of Illinois, Kansas, Ohio, Missouri, Pennsylvania, and Tennessee. These universities entered into "partnership arrangements" with many of the newly created agricultural post-secondary institutions in developing nations (Parayil, 1992, p. 747). These strategic partnerships, financed by US-AID and private foundations, allowed American university researchers and agricultural professionals to travel to these new universities and assist with the establishment of the program curriculum and research facilities (Shiva, 1991). Many top agricultural scientists and academics lectured in these foreign universities, imparting advanced knowledge on farming methodology and training individuals to become highly specialized agricultural scientists. This funding also allowed many students in these universities to attend American universities to learn about American farming methods and, upon graduation, to return

to their homes equipped with newly acquired knowledge. The graduates then returned to their agricultural universities to teach and carry out research. In many cases, private foundations like Ford continued to provide financial funding to agricultural universities in developing nations to facilitate continued research on Green Revolution farming and to provide grants to implement pilot projects designed to expand the use of this technology in these nations (Parayil, 1992).

In addition to assisting developing nations create agricultural universities that would produce the technicians, scientists, and academics needed to disperse Green Revolution farming technology, the Rockefeller Foundation established the American Development Council (ADC) in 1953 to train the managers needed to oversee this program (Deol, 2000). The ADC operated within many agricultural universities in developing nations, and its objective was to train "agricultural managers and economists who could take over agricultural policy formation in their home countries and mold it in forms compatible with stability and profit" (Cleaver, 1972, p. 178). The ADC program largely selected young university students from developing nations and sent them for training in American universities or research institutes (CIMMYT or IRRI) where they were trained in agricultural development policy. The ADC program was important to the implementation of Green Revolution farming because they trained many of the future bureaucrats who would formulate agricultural policy in their home nations (Cleaver, 1972).

The establishment of agricultural universities in developing nations with strong links to American universities and research institutes facilitated the strict control of what developing nation students, scientists, and agricultural researchers learned about modern farming technology. Western governments and private industry knew that in order to effectively implement their economic agenda in relation to farming, they needed to control the body of knowledge pertaining to farming and to ensure that all others adopted similar beliefs. New agricultural universities in developing nations funded by private business interests and the American government supported individuals in learning domestically or abroad about a farming technology in which the American government and private enterprises had a vested political interest and whose continued success would bring them financial reward. The ability to direct the curricula that developing nation students were exposed to facilitated the control of discourse (Shiva, 1991). The American government and private business interests understood that teaching individuals from developing nations only about a capital-intensive farming method would facilitate implementation of this technology later in the individual's home country, as these professionals would go home to become managers, technicians, and advisors in charge of formulating agricultural policy (Cleaver, 1972). This strategy was highly successful by the mid-1960s, with many developing nations in Asia, Latin America, and Africa adopting Green

Revolution farming, a process that was facilitated by American-trained agricultural professionals who now, in effect, formulated and guided domestic agricultural policy.

3.4. Subsistence Farming

Prior to Green Revolution farming technology being implemented, most developing nation's agricultural economies were based on subsistence farming. Subsistence farming was primarily carried out in areas where land was plentiful and where a majority of the farmers lived in villages. The objective of farming during this period was to produce enough food to maintain the nutritional requirements of one's family and to ensure the survival of the family and their livestock (Chakravarti, 1973; Pearse, 1980). Any excess food grain or commodities that were produced were either stored for use in period of food scarcity or were used for barter with other peasants to obtain items or services needed for survival. It was relatively rare for farmers to sell excess food grain or commodities in undeveloped markets and, in cases where this did occur, monies received were primarily saved for future expenses. Farmers and the village community in which they resided were primarily self-sufficient, with individuals self-producing, the majority of the time, enough for living with minimal dependence on external sources (Bhalla, 1983; Bowonder, 1979; Parayil, 1992).

Individuals involved in subsistence farming tended to operate small landholdings with little or no mechanized equipment. Labour-intensive farming activities were carried out manually by the cultivator and his family or with the assistance of animal labour (i.e., oxen, cattle, and horses) (Day, 1975; Stein, 1977). Farmers subsisting on a small area of land tended to plant a number of plant varieties simultaneously, to yield one crop per year, and to depend upon a system of mixed and rotational cropping (Blyn, 1983; Frankel, 1971; Shiva, 1991; Staub, 1971). This system of rotational and mixed-crop farming ensured that the land had an opportunity to replenish the micro-nutrients needed for plant growth. For example, many farmers in developing nations utilized "leguminous" crops, such as pulses, to revitalize soil conditions (Shiva, 1991, p. 109). Over the centuries, the farmers utilizing this type of farming had developed extensive knowledge about the idiosyncrasies of effectively producing a bountiful harvest (Pearse, 1980). They intimately understood preparation and maintenance of the subsoil during cropping; they used native seed varieties that their ancestors had bred and that were capable of withstanding pests, disease, droughts, flood, low soil fertility, and crude tillage practices; and they knew the most opportune times to expose plants to moisture to ensure effective growth (Chakravarti, 1973; Falcon, 1970; Frankel, 1971; Shiva, 1991).

In subsistence farming, the initial phase of preparation involved preparing the soil, which entailed first applying or spreading organic fertilizer, primarily animal manure, which had been saved through the year. The application of manure to the soil was a labour-intensive job that required all household members' assistance so that it could be completed in an efficient time frame. Once organic fertilizing was completed, the farmer ploughed the field with the assistance of an ox- or bullock-drawn plough. The ploughing overturned all of the soil to remove any grass or weeds that had grown and enabled the manure to mix with the soil. The manure facilitated the revitalization of the soil with micro-nutrients and acted as an organic fertilizer to help in the growth of the plant. Once ploughing was completed, the land lay undisturbed for a period of days and then was tilled with the assistance of an ox- or bullock-drawn tiller. The tilling process broke down large clumps of soil and smoothed the land for planting purposes. Once tilling was completed, the farmer again ploughed channels to plant seeds and immediately afterwards, tilled the soil again to cover the seedlings. The sown plant would normally take months to grow to maturity.

During the growing season, the farmer and his family maintained the crop through manual hoe-based weeding and ensured its health by removing any plants showing signs of disease. The average farmer spent 16 to 18 hours a day tending his field and livestock. In cases where cultivators were incapable of performing all their own agricultural tasks, they hired lower-class labourers. These individuals provided their labour on a year-round basis in return for living quarters, clothing, food grains, and, sometimes, land to cultivate their own crops (Thiesenhusen, 1974). Also, many landowners rented their land to peasant farmers in return for 50% of their harvest (Cleaver, 1972).

Irrigation of the crop largely depended upon rain-water, but in many cases, cultivators created packed-earth canals which were fed by Persian water-wheels that drew water from shared community wells. Their operation depended on oxen or bullocks that drove a shaft that "rotated a worm gear that turned the water wheel", pushing buckets into the well and thus extracting the water (Blyn, 1983, p. 714). Farmers using community wells were allotted specific usage times for drawing water. This allotment usually occurred 4 to 5 times per growing season. Once the crop reached maturity, the farmer, with the assistance of family members or hired help, harvested the crop. Harvesting was time-consuming because everything was done manually with the use of a scythe or machete. Depending on the crop, the harvesting process ranged from 1 to 3 months, with the sole focus of ensuring the crop was rapidly processed. Once the harvest was completed, most of the crop was stored for the family's consumption, and a portion was dried and converted for the following year's seed crop. Only surplus was sold or traded for other goods and services. Time consuming and physically demanding on family members, subsistence farming

left little opportunity for them to leave the village. Also, because farming largely occurred in isolated rural areas, there was no influence of consumerism, and the farmers' meagre incomes prevented them from participating in such a lifestyle. The focus of individuals in these rural areas was on the immediate family, and people held traditional values and strong religious beliefs. They did not have many possessions, but, rather, led simple lives.

3.5. Green Revolution Farming (High Yielding Variety Seeds)

In the mid-1960s, developing nations adopted Green Revolution farming with its introduction of high yielding varieties (HYVs) of wheat and rice on a mass scale. The hope of many of these nations was to unleash the full potential of their underdeveloped agricultural sectors through increased food grain productivity (Biasucci, 1997; Deol, 2000; Shiva, 1991). For many of them, achieving food self-sufficiency would resolve ongoing social problems related to hunger and poverty. Believing they possessed the technical solution to their social problems, these nations first implemented Green Revolution farming in resource-rich areas (e.g., fertile soil, access to water, financially secure farming populations) in hopes of assuring its success (Chakravarti, 1973). Green Revolution farming emphasized wheat and rice subsistence crops as these grains were the staple foods in the diets of the majority of individuals residing in these nations. Green Revolution farming as a technology is, in layman's terms, the use of high yielding seed varieties (HYVs) that are capable of producing food grain yields, much greater than traditional farming methods, when they are grown in conjunction with the application of chemical fertilizers, irrigation, and the efficient use of mechanized farm equipment (Deol, 2000). In order to understand Green Revolution farming and its affect on traditional farming, it is useful to understand the science underlying the technology.

3.5.1. High Yielding Variety- Plant Physiology

Prior to the adoption of HYV seeds, the majority of farming in developing nations had been based on the use of natural indigenous seed varieties. By the 1960s, the ability of indigenous plant varieties to increase their yields had been reached, and they were incapable of increased output. For example, attempts were made to increase yield levels of wheat varieties in developing nations through the increased application of chemical fertilizers. However, these attempts were unsuccessful because these plant varieties converted the nutrients from higher doses of chemical fertilizers into overall growth of the plant, with little increase in actual grain yield. The increased growth led to *lodging* which occurs when the tall and thin stalk of the plant

can no longer support the plant's weight, leading to the stem's breaking and "lodging" the grain in the soil where it is lost (Shiva, 1991, p. 107). In order to solve this problem, scientists began to develop plant varieties (wheat and rice varieties, at this time) that would be capable of overcoming this limitation.

HYV seeds (wheat strain) were pioneered by Norman Borlaug in the CIMMYT laboratory in Mexico. Borlaug and his colleagues had been experimenting with global wheat seed varieties for more than a decade. In particular, Borlaug was studying a semi-dwarf wheat seed variety, "Norin 10", which was imported from Japan and was showing promise for producing increased yields when exposed to chemical fertilizers. In the early 1960s, through cross-breeding of the Norin wheat variety with American indigenous seeds, Borlaug was able to produce a new, stable, and productive Mexican semi-dwarf wheat variety that was capable of higher grain yields (Parayil, 1992; Shiva, 1991).

The Borlaug Mexican semi-dwarf wheat variety was biologically engineered and selectively bred to possess desirable qualities to attain increased yield levels and production (Pearse, 1980). It was capable of absorbing a "3 or 4 times higher dose of chemical fertilizer to produce higher quantities of grain than traditional varieties" (Shiva, 1991, p. 107). The semi-dwarf wheat varieties were highly efficient in converting nutrients from the soil directly into the grain of the plant with little nutrients being allotted to the non-productive components of the plant structure (Das, 1998; Pearse, 1980). To facilitate nutrient uptake from the fertilizer through the plant root, significantly increased amounts of water were needed for HYVs to mature (Blyn, 1983). Borlaug's semi-dwarf wheat variety was also efficient because of its short stature and thick stalk which enabled it to support "heavier grain clusters (panicles)" without fear of the stalk's breaking and "lodging", making it more capable of withstanding weather-related damage (Shiva, 1991, p. 107).

The new wheat variety also had an increased *tillering* rate, which refers to the number of "root shoots" it sends up to form either "grain bearing panicles or ears" or leaves that contribute to "growth by photosynthesis" (Pearse, 1980, p. 10). *Photosynthesis* is the "combining of carbon dioxide in the air with water with the action of sunlight to form carbohydrates", an essential component of plant growth (Shiva, 1991, p. 108). In order to increase plant growth and grain-bearing panicles, HYV need the ability to absorb high levels of nitrates which "requires increased solar radiation" (Shiva, 1991, p. 108). In order to increase solar radiation, HYVs were designed to have erect leaves, which maximized their exposure to sunlight. An increased tillering rate and erect leaves were structural modifications built into HYV to increase photosynthesis and, hence, grain productivity. Non-photosensitivity was another feature that was bred into these plants,

allowing them to reach maturity within a given time frame unaffected by “variations in the climate or by local variations in the day length” (Pearse, 1980, p. 10). The ability of these plant varieties to reach maturity within a guaranteed time frame facilitated increased productivity by allowing multiple-cropping within a cultivation year. It must be reiterated that HYV are not effective without the application of fertilizer and irrigation. Clearly, the enhanced capacities of the laboratory-developed HYV seed varieties would revolutionize traditional subsistence farming.

3.5.2. Green Revolution Farming Methods

With the implementation of Green Revolution methods, the traditional nature of farming was fundamentally changed. The once simple peasant cultivators were transformed into capitalist entrepreneurs who, in order to participate in this new economic system, had to sell their agricultural products for profit (Biasucci, 1997; Frankel, 1971; Parayil, 1992). The goal of the farmers, who were now linked to the commodity market, would be to make higher profits every year through the sale of their increased food grain yields. Profits on the sale of their agricultural products would provide them with money to purchase the material necessities they needed to raise their standards of living. Capitalist farming would provide the means to attain the food and economic security they desired. The once-independent farmer now would become an active participant in the global commodity trade, and, more importantly, a capitalist consumer.

The Green Revolution, in addition to changing the objective of farming, also dramatically changed the manner in which it was carried out. Previously, the peasant farmer was self-sufficient, producing the inputs needed to carry out agricultural tasks free of cost (Shiva, 1991). With the adoption of capital-intensive Green Revolution farming, the farmer now became dependent upon the purchase of externally manufactured inputs (Bowonder, 1979; Cleaver, 1972; Pearse, 1980). They had to now purchase HYV seeds, fertilizer, chemical products, fuel, and farming equipment. They also became dependent upon buying technical services to maintain their mechanical products and upon accessing financial institutions to obtain the credit needed to finance their farming. The control that farmers once enjoyed over their agricultural enterprises was gone; they now were dependent upon external parties.

In order to begin using and then maintain Green Revolution farming methods, farmers needed access to considerable capital to pay for both initial investments and, later, such necessities as seeds, fertilizer, chemical products, and mechanical equipment such as tractors, threshers, and irrigation pumps (Deol, 2000; Randhawa, 1997; Stein, 1977). Such financing required farmers to either draw on their own savings or access capital through financial institutions. However, savings among rural peasants in developing nations generally could not

cover the costs of this new method of farming or pay for needed pre-crop inputs. In order to remedy this situation, many developing nations made capital available through government-operated financial institutions or co-operative credit societies. Farmers could also obtain credit from newly accessible commercial banks that now made credit available to farmers. Many of these financial institutions provided both short-term loans to help cover pre-crop input costs and also long-term loans for larger capital expenses such as mechanical equipment (Kolhi, 1997; Leaf, 1980). Farmers' land became collateral, and the farmers were required to repay the loans with interest within a defined time frame (Chakravarti, 1973). The ability of farmers to obtain financing allowed them to purchase the necessary products to implement Green Revolution farming (Gill, 1980).

In addition to adjusting to the new financial realities of Green Revolution farming, cultivators also had to learn and adapt to a number of new techniques and the more sophisticated mechanized equipment needed to facilitate optimum plant growth. Compared to subsistence farming, HYV farming was highly dependent upon the accurate and timely application of particular chemicals (fertilizers, pesticides, herbicides), the carrying out of specific operations (plant spacing, transplanting, weeding, watering, harvesting) at pre-determined time intervals, and the increased use of labour to attend to the crop (Pearse, 1980).

The first major change with the implementation of HYV farming was in relation to land preparation. Previously, farmers had used draught animals with pre-industrial farm implements to plough and level the soil, and seeds were manually planted. The new model emphasized the use of tractors with attached modern implements such as ploughs, discs, and harrows to level the soil (Frankel, 1971). Once land preparation was complete, the tractor-drawn seed cone fertilizer drill would be used to plant the seed and fertilize at the proper shallow depth and also to space the seeds appropriately. The accurate planting of the seed and co-application of fertilizer was necessary to ensure proper growth of the plant. The spacing of seeds was essential for providing the plant with the appropriate amounts of room to grow fully and also for allowing row planting, which facilitated later weeding. The use of tractors and various attachable implements allowed the farmer to complete these tasks with increased speed and efficiency (Pearse, 1980; Randhawa, 1997). With mechanization, farmers could reduce dependence on draught animals, a practice that was time-consuming and more prone to inaccuracies.

In addition to increasing duties during the sowing season, the new farming method was more labour intensive, requiring increased plant maintenance during the growing season. Plant maintenance primarily involved application of the chemicals developed to optimize proper and maximum plant growth. Farmers had to ensure that adequate levels of fertilizers were applied at

specified intervals for the plants to receive the sufficient levels of nutrients needed to achieve maximum grain yield potential, which would be 3 to 4 times that of indigenous varieties. Unfortunately, besides facilitating plant growth, chemical fertilizers also promoted the growth of weeds. This new nuisance was costly for farmers who then had to expend more capital on herbicides or hire more labourers to manually eradicate this new problem (Pearse, 1980; Thiesenhusen, 1979).

Because they have been genetically engineered in laboratories where they have not been exposed to the natural eco-systems needed to evolve natural resistance to disease, HYV seeds are also highly susceptible to disease and pests and thus require greater use of pesticides (Frankel, 1971). Indigenous seed varieties had developed immunity to many plant and pest diseases that had evolved in the same environment, and farmers had retained specific varieties due to their resilience (Falcon, 1970). HYV also fostered increased disease because the crops were planted more densely than indigenous varieties, providing an environment conducive to the spread of disease. Finally, the increased use of monoculture cropping (i.e., planting the same crop continually) encouraged pest outbreaks (Bowonder, 1979; Chakravarti, 1973; Shiva, 1991). HYVs' greater susceptibility to plant or insect disease required farmers to invest a great deal of capital in preventative measures.

In addition to greater investments in agro-chemicals, Green Revolution farmers were also required to make other essential large capital outlays on the farming equipment needed for irrigation and harvesting. The new HYV plants required significantly more water than indigenous plant varieties for the uptake of fertilizer through the plant root, another process essential for producing increased crop yields (Blyn, 1983; Falcon, 1970; Shiva, 1991). For example, HYV wheat has been shown to require 36 inches of irrigation in comparison to indigenous wheat varieties that require only 12 inches (Shiva, 1991). Another crucial requirement is that water must be available at specified intervals of the growth cycle for the HYV to realize its full potential (Frankel, 1971). Farmers adopting the new technology understood that the water needs of their new plants could no longer be met by poorly operated government canals or natural rainfall. Ensuring that a reliable source of water was always accessible to meet their crops' needs, many farmers had to invest in the installation of costly electrical or diesel- operated tube wells. The tube well was an efficient method of extracting large quantities of ground water for irrigation and delivering them in a timely manner (Blyn, 1983). Modern irrigation equipment was necessary for agricultural farmers to effectively implement Green Revolution farming.

Multiple-cropping within a single growing season is another unique benefit for farmers implementing HYV farming. Multiple-cropping was possible with this new farming technology

because the new plant varieties mature more rapidly due to their biological construction, exposure to fertilizer, access to sufficient levels of water, and efficient application of agricultural machinery (Frankel, 1970; Shiva, 1991; Staub, 1971). Farmers could now plant a crop in both the summer and winter, whereas previously, they were limited to a single crop a year. This capability was seen as crucial for improving living standards. The farmer could now increase annual output, making farming substantially more profitable (Frankel, 1971). Although multiple cropping increased revenues, it also increased expenses for farmers as they were required to purchase increased labour or mechanized equipment to offset the increased workload (Pearse, 1980).

Substantially increased yields and planting more than one crop a year required farmers to invest heavily in mechanized harvesting equipment. The first major investment in farm equipment that many farmers made was in reapers which could rapidly cut crops for processing. The use of mechanical reapers allowed farmers to cut a crop in one day, a task that would have previously taken labourers 13 days to complete (Staub, 1971). The second major investment that many farmers were required to make was in threshers. These were capable of rapidly separating the grain from the plant stock. The tractor-drawn thresher would later be replaced by large combines capable of completing this process even more quickly (Pearse, 1980). Mechanical equipment was essential for efficient and timely harvesting.

Using pre-industrial farming methods, farmers would have been unable to process or handle the increased food grain volumes quickly enough, and portions of the harvest would likely have been lost to rot (Randhawa, 1977). Besides making it possible for farmers to harvest their high-yield crops quickly and effectively, mechanized equipment was also essential in getting the crops quickly to the markets. This quick turnover period was needed to facilitate the planting of the second seasonal crop. The use of mechanical equipment also reduced labour costs because tasks could be completed more rapidly -- and at a reduced cost -- than they could with manual labour (Staub, 1971).

3.6. Government Investment in Green Revolution Agriculture

Although farmers were responsible for rapidly implementing the new farming methods, many developing nation governments found they were required to invest in large capital expenditures and implement specific agricultural policies to ensure that this new method of farming was successful. These large capital infrastructure expenditures were primarily made in

three areas: (1) transportation, (2) irrigation, and (3) electrical grids. Investment in asphalt/cement for rural roads linking villages to market centres was an essential element for the success of Green Revolution farming. Farmers had to be able to bring their crops to market in a timely manner. This was essential for the sale, storage, grading, milling, and later distribution of products to consumers (Falcon, 1970; McGurik, 1992; Randhawa, 1977). Rural road development was also needed so that farmers had access to industrial producers from whom they could purchase necessary agricultural inputs. Government expenditures on irrigation projects, in particular, the construction of canals, was also necessary for fully implementing the new method of farming. Given the dependence of Green Revolution farming on large quantities of water, it was imperative that governments invest in irrigation canal systems to meet the anticipated growing demand for this resource. Finally, in addition to large capital outlays on irrigation canals, many governments also had to make substantial investments in electrical projects. The energy demands for Green Revolution farming had risen drastically with the introduction and use of electrically powered tube wells. It was also necessary for farmers to have access to a reliable source of power in order to complete time-sensitive farm operations that relied on equipment powered by electricity. In order to meet these new energy requirements, governments needed to invest heavily in the expansion of power production and to establish or expand power grids into rural areas where the majority of farms were located (Bowonder, 1979; Randhawa, 1977).

In association with increased capital expenditures on physical infrastructures, developing nations also needed to adopt agricultural policies that would facilitate farmers' success with this new technology. The most important policy issue was the need for price supports to ensure farmers' financial stability. At a great cost, many governments instituted guaranteed procurement prices for food grains. The reasoning behind price support policies was that if this new approach to farming were to succeed, farmers needed to make profits high enough to meet their input costs, labour charges, and depreciation of agricultural machinery (Randhawa, 1977). If farmers received a reasonable profit from their cultivation, they would be more likely to adopt this new form of farming, more likely to make the adequate investments to increase their production, and, most importantly, more likely to maintain current production outputs (Bhalla, 1983; Frankel, 1971). The extreme dangers with this policy were that it increased inflationary pressures on food prices, leading to food prices too high for poor members of society to afford and, consequently, social discontent. However, more importantly, if national governments were unable to sustain adequate support prices, agriculture, the largest sector of the economy, would suffer. Negative impacts on the financial well-being of a considerable portion of the population could lead to political upheaval or dramatic social unrest (Bhalla, 1983; Frankel, 1971).

3.7. Promised Benefits of the Green Revolution

When Green Revolution farming was first introduced to rural peasants in developing nations, a host of widespread social and economic benefits were promised. Farmers adopting this new technique were assured that its use would substantially increase total grain production. Increasing this production would, in turn, ensure that farmers and their families would be fed and that these families would no longer suffer from hunger and starvation (Chakravarti, 1973; Hindmarsh, 2003). Society at large would also benefit as surplus food grain from higher yields would be available in the markets, reducing the likelihood of widespread food scarcity or famine (Bowonder, 1979). Green Revolution farming was seen as a viable method to eradicate mass hunger and malnutrition in developing nations.

By implementing this new agricultural technology, peasant farmers would be capable of producing surplus food grain that could be sold in the commodity market for profit. The profitable financial gains from farming operations would then allow peasant cultivators to drastically improve their standards of living by making it possible for them to purchase products or services necessary for a healthy lifestyle. The increased annual income would provide a means of continually improving standards of living, providing a means of escaping poverty or a means by which to maintain their newly achieved higher social status (Chakravarti, 1979). The ability of farmers to reinvest capital back into their agricultural operations would lead to crucial improvements in efficiency and productivity also leading to ongoing financial gains. Continual financial success promotes an increase in savings, which provides financial reserves for periods of economic stagnation and prevents farmers from sliding back into poverty (Johl, 1975).

In addition to believing that this new farming technology would ameliorate the poor social conditions peasant farmers faced, advocates of Green Revolution farming also believed that the other members of society, in particular those from lower classes, would benefit from the greater employment opportunities that would be created. Farm labourers, in particular, were seen as benefiting greatly from the implementation of this new labour-intensive agricultural technology, as the HYVs required significantly more maintenance than traditional indigenous varieties (Johl, 1975). Farmers who adopted HYVs would need more labour on a continuous basis to perform agricultural tasks such as better preparing fields, ploughing, watering, frequent application of fertilizers, herbicides, and pesticides as well as more regular weeding (Bhalla, 1983; Frankel, 1971; Jacoby, 1972; Ladejinsky, 1970; Staub, 1971).

HYVs could also potentially increase employment opportunities for farm labourers because of double cropping. Multiple-cropping within a growing season naturally doubled the

amount of agricultural labour or tasks that needed to be completed and also vastly increased the crop volume that needed to be harvested and processed. The increased annual labour demands throughout the year, and, specifically, during peak farming periods like harvesting, would provide labourers with consistent and regular employment year round (Bhalla, 1983; Das, 1998; Frankel, 1971; Randhawa, 1977). This, in turn, would increase farm labourers' annual incomes as they would be employed more regularly throughout the year. Increased labour demands at peak periods (i.e., harvesting or sowing) would also facilitate dramatic increases in the daily wage rates and annual incomes of labourers because labour shortages would force employers to provide competitive wages to attract workers. The overall increase in employment and income for labourers would improve living standards of this population (Bhalla, 1983; Jacoby, 1972; Stein, 1977).

Many scholars and bureaucrats supportive of Green Revolution farming also believed that agricultural expansion would inevitably lead to growth in employment in industries and in service sectors. They reasoned that with the increased mechanization of farming, there would be an increased demand for the production of machines (e.g., tractors, threshers, and ploughs) and farm implements (tube wells) (Staub, 1971; Stein, 1977). Although supplies of such farm equipment could be coming from external producers, they believed the demand for these products would be so robust that it would likely outstrip production capability of foreign producers, and, in many cases, foreign equipment would be too expensive for domestic consumers. Thus, local small- and medium-scale industrial producers would likely be established to produce farming equipment to meet local farming equipment demand. The dependence of agricultural farming on mechanized equipment would also drive employment in the skilled or semi-skilled service sector. Agricultural service workshops would likely be opened to repair tractors or other agricultural machinery, mechanical parts shops would be opened to provide the needed spare parts, and other essential companies providing technical services to the agricultural sector would develop (Das, 1998; Frankel, 1971).

However, scholars and bureaucrats envisioned a larger expansion in employment opportunities in the consumer products and service sector (Lele, 1972; Stein, 1977). It was expected that as farmers and those employed by the agricultural sector began to realize profits, they would begin to purchase consumer items. They would demand clothing, cosmetic goods, household items, furniture, vehicles, and homes to improve their standard of living and accommodate their new social status. The demand for consumer goods would lead to increased opportunities in the manufacturing, retail, and service sectors of the economy. The Green Revolution was seen as not only improving the lives of agrarian farmers, but, in general, all

members of society through increased employment opportunities and resulting income which would considerably improve standards of living among the rural masses.

The Green Revolution, as it succeeded in providing food and financial security to rural agrarian farmers, was, more importantly, expected to provide the necessary pre-conditions needed for social stability. The two major causes believed by many political bureaucrats to fuel agrarian violence -- poverty and food scarcity -- would be effectively resolved. The creation of a new, stable middle class of farmers and labourers would facilitate and create the investment environment needed for continual economic growth. The Green Revolution promised a new era of peace and prosperity for citizens of developing nations.

3.8. Green Revolution Turmoil

The promise and great expectations attending the adoption of Green Revolution farming did not prove entirely realistic, as it produced some unforeseen negative consequences. Few developing nations foresaw that implementation of the Green Revolution would produce drastic economic disparity between large and small farmers and create violent agrarian conflict (Shiva, 1991). The major weakness of this farming method was that it was *biased to scale,* meaning that large farms, because of their size, would generate more market surplus (i.e., more grain per total acre) and therefore realize higher profits (Johl, 1975). Farmers of these large farms could then meet not only their domestic consumption needs, but also pay for farming operations, and continue to produce substantial profits (Deol, 2000; Pearse, 1980). Their profits and savings could later be reinvested into farm operations or applied to outstanding debt. Designers of Green Revolution farming claimed that the new technology was scale neutral. The notion of *scale neutrality* claims that HYV technology can be implemented on any size of land, large or small, at a similar cost regardless of farm land size for the same cost relative to the scale of the farm operations (Cleaver, 1972; Kolhi, 1997).

In reality, this claim was grossly incorrect, as Green Revolution farming was significantly biased in favour of large landowners with access to resources to fully implement the new technology (Lele, 1972; Oberoi, 1990). As discussed earlier, Green Revolution farming is highly capital-intensive, requiring large amounts of money to initiate and maintain. Given the large capital investments required for both start-up and maintenance of this program, large land owners were in privileged positions, often having personal capital to draw upon to pay input costs and make large capital investments do to their savings. Also, large land owners were capable of readily accessing institutional credit; because of their influential status, credit providers (banks or

cooperative societies) tended to prefer loaning to large farmers as the possibility of debt default was minimal and their land provided sufficient security (Thiesenhusen, 1974).

Green Revolution farming had the greatest negative impact on marginal and small farm operators who did not enjoy the advantages that large-farm owners did. In many developing nations, these farmers comprised a large portion of all farm operations, with a majority of the lower class population being concentrated in this group. Their primary challenge was raising the capital required to initiate and maintain Green Revolution farming. Responses to these financial challenges can be categorized into three distinct groups. The first group were those marginal and smaller farmers who realized from the outset that they would be incapable of adopting this new technology because they did not have the savings needed to invest in it (Randhawa, 1977). They understood that HYV farming would require capital they would have to raise through loans (banks or private lenders), and they were unwilling to risk going into debt to and possibly forfeiting the little land they owned (Chakravarti, 1973). Therefore, this group of small farmers continued with their subsistence farming, living in poverty or, in some cases, withdrawing from agriculture completely to become landless labourers (Thiesenhusen, 1974).

A second group of marginal and small farmers adopted the new technology but were unable to acquire all the necessary components. These farmers, through personal investments, were able to purchase the basic supplies to initiate HYV farming but were unable to get the loans needed to obtain other necessary agri-chemicals, maintain appropriate farming practices, and purchase the necessary farm equipment. Their inability to secure loans was primarily because banks' were controlled or influenced by wealthy landowners they were also unwilling to lend money to parties with few assets. Unable to secure the necessary credit needed to perform essential farm operations and obtain needed farming equipment, many of these farmers failed to produce good grain yields. Repeated poor yields and increasing farming costs led many of them into debt they could not repay, forcing them to forfeit or sell their land and join the ranks of the unemployed.

The final and most important category, because of its size, was marginal and small farmers who were capable of fully adopting the technology through the assistance of loans. This group initially did well because they were able to take advantage of artificially low input prices and government-controlled and subsidized grain market prices to make a profit from the surplus yields they then produced. Nevertheless, over time, conditions markedly changed when, simultaneously, the price of inputs began to increase drastically and subsidized food grain purchase prices decreased rapidly because governments could no longer afford to provide this

financial support (Frankel, 1971; Shiva, 1991). In addition, the amount of fertilizer and pesticides that needed to be applied to maintain yields also dramatically increased (Shiva, 1991).

The consequences of these factors were that even for marginal and small farmers, agriculture became a losing proposition (Biasucci, 1997; Sidhu, 2005). They could no longer meet the cost of inputs and their own personal consumption needs on the profits they made from their crops (Bhalla, 1983; Randhawa, 1977). The economic condition of many marginal and small farmers was further compounded by the fact that they were unable to repay large loans for capital investments they made to implement Green Revolution farming; the capital expenses were too great for these farmers to incur given their landholdings. For example, a farmer with two acres of land was required to purchase a tractor to carry out farming functions. The expense of this tractor far exceeded the financial benefit he received. The result of increasing expenses and decreasing profits was that many marginal and small farmers were forced into debt or defaulted on their loans. Considerable numbers were forced to withdraw from farming and join the ranks of the unemployed and landless labourers. Others rented their land out to large farm owners while they tried to find employment. It must also be understood that these negative economic conditions in farming were widespread, impacting medium and large farmer's financial well-being as well.

In addition to negatively impacting the lives of many marginal and small farmers, the implementation of Green Revolution farming also had a drastic impact on tenant farmers. Prior to Green Revolution farming, tenant farmers leased land from large land owners in return for a share of their crop and, in rare circumstances, cash rent. The share of the cultivated crop to landowners traditionally tended to be 50% of the yield (Ladejinsky, 1970). Many large farm owners previously were willing to lease land to tenants because they were, in many cases, unable to perform the required labour to farm their vast properties, and there was little economic incentive. With dramatically increased farm yields and increased profits, the leasing out of land became disadvantageous to large landowners. Many of them preferred to remove tenants in order to resume working the farms themselves because they now realized the financial advantage of cultivating larger segments of land (Jacoby, 1972; Thiesenhusen, 1974). To remove their tenants, many of these land owners increased rents, requiring their tenant farmers to provide, annually, 70% of their crops or fixed cash rents; in some cases, tenants were evicted outright (Deol, 2000; Johl, 1975). Large farmers reasoned that the increase in crop allotment and/or rent was justified as their tenants were now capable of increasing yields through the implementation of HYV technology and could therefore afford to pay more rent (Pearse, 1980). However, many small tenant cultivators could not afford to invest in optimal HYV cultivation practices and found the new rental amounts uneconomical and generally withdrew from farming (Frankel, 1971). These tenant cultivators thus became landless labourers who were now free to

seek employment but, in many cases, became paid labourers on the same farms they once cultivated (Cleaver, 1972).

When Green Revolution farming was first introduced, the promoters of the technology argued that it would raise the demand for labour because the new plant varieties required increased maintenance and double cropping. In the early days of its implementation, in the absence of mechanical equipment, the new technology did require substantially more labour (Cleaver, 1972). However, this demand for labour quickly dissipated with the mechanization of a majority of labour functions. Machinery could now perform a majority of agricultural tasks; tractors for ploughing, seed drills planted crops, irrigation pumps provided water, combines and threshers harvested. The impact of machinery on labour requirements was drastic (Jacoby, 1972). For example, in 1975-1976, the use of labour per hectare for wheat was 686.23 man hours; this was reduced to 301.15 man hours per hectare by 1999-2000. The use of labour per hectare for rice was 961.44 man hours but by 1998-1999, it was reduced to 450.44 man hours per hectare (Sidhu, 2005).

The implementation of labour-saving mechanized farming equipment dramatically reduced labour requirements. Even when agricultural labourers retained employment, demands for their services were reduced drastically, from year-round to specific times when labour demands peaked, such as during harvesting, transplanting, and marketing (Singh, 2006; Thiesenhusen, 1974). New farming methods required a small, reliable, and well-qualified labour force that could carry out agricultural duties efficiently and in a timely manner with the assistance of machines. The reduction of labour requirements had a catastrophic effect for labourers residing in the countryside. Agricultural labourers en mass became unemployed or under-employed, with little opportunity to obtain further employment in a downsizing agricultural sector and with limited employment in urban industries. Green Revolution farming, with its dependence on mechanization, stripped agricultural labourers of their employment, financial security, and means of survival.

3.8.1. Green Revolution Violence Unleashed

Green Revolution farming fundamentally changed the nature of rural agrarian farming. The individual farmer lost control of his own destiny and agricultural success. Farmers were now dependent upon third parties and conditions to which they had no control in determining their success or failure. In addition to removing the control farmers once had over their livelihoods, Green Revolution also forced many into financial ruin. Being a capital-intensive operation, Green Revolution farming was not compatible with third world agricultural economics, where marginal

and small landowners composed a majority of farm producers. Marginal and small landowners found it difficult to participate in Green Revolution farming because they could not afford this expensive technology, and it was not economically viable for them to sustain farm operations, leading many small and marginal farmers to lose their land and livelihood and join the ranks of the unemployed. Many other farmers of sized land holdings also found it difficult to maintain farm operations because of decreasing returns that resulted from increasing input prices and decreasing purchase prices for crops. Green Revolution farming dependence on mechanization also led to a substantial reduction in the use of farm labourers leading to massive unemployment amongst this segment of society. Added to this was the displacement of tenant farmers by large landowners who reclaimed leased properties so they could take advantage of this new, profitable Green Revolution farming method.

Disenchanted now-landless farmers, unemployed labourers, and farmers still in operation began to question Green Revolution farming. They were beginning to perceive the government as responsible for their dire economic circumstances and for creating the lack of control they now had over their own destinies. Developing nation governments were responsible for promoting, implementing, and maintaining Green Revolution farming in their countryside's. The continual build-up of frustration and anger because of the poor, ongoing social conditions led many, peasants to participate in violence against the state. The objective of this violence was to overthrow the government in order to correct economic wrongs and to bring attention to the calamitous realities of many peasant farmers. The Green Revolution unleashed violent political movements against the state that would evolve into sustained anti-state terrorism movements.

4. The Green Revolution in India

The conditions of poverty and hunger that led to the promotion and adoption of Green Revolution farming technology existed in India as in most of the developing nations. Ultimately, these conditions and the adoption of this agricultural technology would, prove to have negative economic implications that would in the subsequent decades, give rise to extremist terrorist violence in the Indian state of Punjab, the historical home state of the Sikh people. In 1947, the modern state of India was established with the peaceful withdrawal of British Colonial rule and the establishment of Indian democratic self-governance. In the immediate years following colonial rule, the Indian political establishment and its bureaucratic policy elite held the view that to maintain sovereignty, stability, and establish a unified Indian state, food self-sufficiency needed to be addressed and managed effectively. There were several political and economic imperatives for the Indian government to address food self-sufficiency. The primary objective was reducing foreign states' influence on domestic and foreign policy through the reduction of food aid dependence. Other reasons included reducing the likelihood of internal civil unrest or disorder and assisting in establishing a strong agricultural sector needed for future economic industrial development and growth.

The primary reason driving the Indian government's policy toward food self-sufficiency was the desire of the Indian state to become self-reliant, both politically and economically. The Indian state's inability to attain food self-sufficiency exposed them to constant diplomatic pressures by donor nations to modify certain domestic and foreign policies in return for receiving food aid (Biasucci, 1997; Singh, 2008). In return for giving food assistance, foreign nations consistently imposed various political and economic conditions on the Indian government, thus hindering its ability to formulate its own sovereign policies. In particular, the American administration, through the late 1950s and 1960s, utilized the Public Law 480 Food Aid Programme to manipulate the Indian government to favourably modify its foreign policy towards Pakistan and adopt domestic policies that favoured American business interests (Biassucci, 1997). During the Cold War era, the American government regarded Pakistan as an ally and relied upon them as a counterweight against the influence of the Soviet Union and its pro-India policy. The consequences of relying on external food aid became most pronounced during the 1965 Indo-Pakistan conflict, during which the American administration threatened to withhold food aid to India if it did not ease its war activities against Pakistan. Under Public Law 480, the

Americans discontinued food aid to India when the conflict with Pakistan began (Singh, 2008). These underlying factors contributed to the Indian state's pursuing agricultural development to substantially increase internal food production not only to quell domestic and foreign pressures but also to establish Indian self-governance and sovereignty.

The ruling Indian political establishment was keenly aware of rising peasant unrest abroad and within periphery states, specifically caused by food scarcity. Their own inability to address this issue rapidly and efficiently only led to festering discontent amongst large segments of the Indian peasant population, which became more prone to adopt rival political and economic paradigms such as communism that threatened not only the democratic and capitalist economic system upon which the Indian state was founded upon, but also its territorial unity (Shiva, 1991; Singh, 2008).

Indian political leaders also recognized that in order to advance India's political and economic sovereignty, they needed to strengthen the agricultural sector before advanced industrial development could occur because an advanced agricultural sector was needed to provide the natural resources required by a developing industrial sector. Also, with appropriate mechanization, human resources could be freed from agriculture to work in an expanding industrial base in urban centres. The social and economic equality created by monetary surpluses in agriculture would spur consumer demand for products and services and promote further development of the Indian economy. Thus, a stable and productive agricultural sector was imperative to ensure political and economic stability and foster an environment conducive to attracting the private capital investment needed for the expansion of the industrial and service sectors of the economy.

4.1. Indian Domestic Agricultural Policy

4.1.1. Grow More Food Program (G.M.F.-1947 to 1960)

In 1948, leading policy-makers and agricultural experts in the Indian government recognized that there was an approximate 10% gap between the output of the Indian agricultural sector and total domestic consumption needs (Krishna, 1971). The domestic demand for food grain products was expected to increase annually by approximately 1.3% mirroring the natural growth of the Indian population and leading to further reliance on imported food grains. In 1949, in order to address the food grain deficiency, the Indian government reconstituted a previous agricultural program, the "Grow More Food Campaign", with the objective of achieving food grain

self-sufficiency by 1952 (Krishna, 1971, p. 8). Indian agricultural policy and, in particular, the Grow More Food Campaign were based on the premise that in order to ensure proper growth of the agricultural sector, the central government would have to intervene and play a key role in its development. The need for the central Indian government to control, plan agronomical practices, and oversee the development of the agricultural sector was deemed necessary because the large financial outlays and logistical resources needed for its growth were beyond the capacity of the private sector (Oberoi, 1982; Rao, 2005; Singh, 2008).

The Grow More Food (GMF) campaign was initially introduced in 1942, but after Indian independence (1947) was revived with increased vigour. The program had four general objectives. First, it advocated the expansion of cultivable acreage for food production through conversion of unused land, increased double-cropping of existing food producing lands, and reconverting land utilized for non-agricultural purposes. Second, it promoted acquisition and distribution of nationally improved seed varieties to farmers to increase productivity. Third, it recommended increasing water distribution to the agrarian sector through extension or construction of new irrigation canals and the financing of the drilling of water wells. Finally, the program advocated introducing inputs such as fertilizers and manure to farmers and promoting their use to increase food grain yields (Harriss, 1972; Krishna, 1971). In order to support this program, the Indian government, in its initial 5-year financial outlay, assigned a dedicated amount to the agricultural sector to assist in its progress and to finance agriculture-related infrastructure. The GMF program was initially ineffective because bureaucratic oversight led to constant changes in its objectives, with emphasis not being given to all measures equally. Instead, there was constant adaptation of measures to rapidly evolving domestic events. In addition to bureaucratic wrangling in its administration, the program effectiveness was also hindered by having a scope that was too broad geographically. The program attempted to distribute a limited amount of agricultural inputs (e.g., seeds and fertilizers) to all areas of the country producing food grains. The ineffectiveness of the GMF program was reflected in India's needing to import 4.7 million tonnes of food grains to meet domestic demands in 1951 (Krishna, 1971).

In 1952, the GMF Enquiry Committee was established to review concerns about the ineffectiveness of the program, and found that it had been ineffective, overall, in achieving its goal and in engaging Indian farmers in enhancing their farming methods (Krishna, 1971). In an attempt to increase the effectiveness of the GMF program, the committee made a number of recommendations: (1) Increased capital expenditures and more timely construction of minor irrigation projects, (2) increased rural credit for farmers to finance agricultural improvements, and (3) enhanced nationwide extension services to assist farmers. These recommendations were coupled with a policy change that aimed to concentrate resources into select, defined areas

called “Intensive Cultivation Areas” instead of spreading them too thinly over the entire nation (Krishna, 1971, p. 9).

The Intensive Cultivation Area program sought to invest in irrigation projects and bring into production those areas deemed most suitable (i.e., having good soil quality and assured water supply) for food grain production (Krishna, 1971). These Intensive Cultivation Areas would also receive increased distribution of efficient seeds and access to fertilizer for increasing food grain productivity levels. A number of regions across India were selected for the Intensive Cultivation Area project, including regions in Punjab. The GMF program, with its Intensive Cultivation Area focus, was initially successful, showing an 18% increase in the total irrigated area under production, a 15% increase in gross cropped area, and an overall 22% increase in agricultural food grain yields with the assistance of favourable weather conditions (i.e., favourable monsoon seasons) (Parayil, 1992). In 1955, the government imported only .5 million tonnes of food grains to meet domestic demand. These positive returns were so promising and reassuring that the Indian government, believing agricultural growth would continue unabated, decided to switch its economic focus to the industrial sector in its 1956 budget (Second Five Year Plan 1956-1961) and to remove financial outlays to the agricultural sector (Parayil, 1992).

Despite initial signs of success, however, in 1957 the first signs of a plateau in the GMF program were observed, with food grain yields being 3.7 million tonnes short of what was needed to meet Indian domestic demand. Subsequent forecasts predicted an ever-increasing rise in demand, with population growth coming in at 2% per annum, compared to the anticipated increases of 1.3% per annum that had been forecasted (Krishna, 1971) The decline in the effectiveness in the GMF program was a result of a change in the government's philosophy over time in which there was decreased focus on agricultural production and greater allotment of resources for the development of community social programs (i.e., health, education, and sanitation). Towards the latter half of the 1950s, the government came to the stark realization that it’s National Agricultural Policy and associated programs were incapable of meeting rising domestic food grain demands using existing agricultural practices and technologies.

4.1.2. Intensive Agricultural Development Program (IADP) (1960-1966)

In 1959, the Indian government was greatly concerned about the ongoing food deficits and, in particular, the below-average performance of the previous agricultural development program (Harriss, 1972; Krishna, 1971). In order to better understand the situation, they summoned Ford Foundation agricultural experts to analyze the agricultural situation and advise

them on a viable coordinated national solution to increase food grain production. The Ford Foundation team was to work with Indian agricultural experts to put forward a proposal that took into account the unique Indian farming landscape. The team published its findings in a report titled “India’s Food Crisis and Steps to Meet It”, in April 1959, with the Indian government subsequently adopting many of its proposals as agricultural policy and gradually implementing an enhanced program based on its findings (Krishna, 1971, p. 16).

The core recommendations of the report focused on transforming the Indian agriculture sector through a more focused program with more emphasis being given to promoting certain varieties of crops and selecting specific areas for crop production. The Ford Foundation team also recommended that the Indian government adopt a more focused, “intensive” approach in the use of resources, whereby resources were to be channelled to designated geographical regions that were most likely to increase food grain yields and had demonstrated a long-term potential for further increased production growth (Krishna, 1971, p. 16). This recommendation was a condemnation of the previous GMF program, which dispersed input materials and technology over a vast area, often into regions that were less productive agriculturally, inefficiently used resources, and lacked long-term food grain growth potential. Based on the findings of the report, the Indian government invited another group from the Ford Foundation to assist in planning and developing a newly constructed agricultural program called the Intensive Agricultural District Program (IADP) (Krishna, 1971).

After studying the situation, the Ford Foundation team of researchers released a second report in 1959 titled “Suggestions for Ten Point Programme to Increase Food Production” and forwarded its recommendations to the Indian government (Krishna, 1971, p. 17). The 10 recommendations for the development of the Intensive Agricultural District Program called for transforming Indian agriculture from a subsistence-based model to a modern, Western-style, capital-intensive model with an emphasis on marketable surplus food grain production for sale in the market. The recommendations included the following:

1) Adequate farm credit based on production potential made readily accessible through strengthened cooperatives.
2) Adequate supplies of fertilizers, pesticides, improved seeds, improved farm implements and other essential production needs made readily accessible through strengthened service cooperatives.
3) Price incentives to participating cultivators through assured price agreements for rice, wheat, and millets announced two years in advance.
4) Marketing arrangements and services which enable the cultivator to obtain the full market price for his marketed surplus.

5) Intensive educational, technical and farm management assistance made available in every village in every development block in the district.
6) Participation of all interested cultivators both large and small, in direct individual farm planning for increase food production.
7) Village planning for increased production and village improvement to include livestock improvement programs, strengthening of village organizations and village leadership.
8) A public works programme using local labour to undertake drainage, building, soil conservation, minor irrigation, building of approach roads, and other development works contributing directly to increased production.
9) Analysis and evaluation of the program from its inception.
10) Coordination on a priority basis by village, by block district, state centre, of all resources essential to mount to carry out the program with maximum speed and effectiveness.

(Krishna, 1971, p. 17)

The IADP and its principles were accepted by the Indian government in 1960, and the program was implemented within the same year. The IADP's overall goal was to increase food grain yields; however, the Ford Foundation's true intention was to expose Indian farmers to modern Western-developed input farming and to popularize its associated practices for financial gain (Sidhu, 2002). The IADP model was perceived as progressive because of its use of modern inputs and its application of specific technical farming methods that would enhance the true capability and potential of India's agrarian sector (Shiva, 1991).

The Intensive Agricultural Development Program began in 1960. The Ford Foundation selected and identified the districts with conditions it believed would make them successful: assured water supply, established local institutions (e.g., cooperative societies and panchayats), potential to increase food grain yields quickly, and not being located on a flood plain or in an environment characterized by soil infertility, drought, water logging, or inadequate drainage. Initially, the program identified seven states in which to begin the program. This was later expanded to include at least one district in every state and, by 1965, was extended to 114 out of 325 total districts through phased expansion (Harriss, 1972; Jodhka, 2004; Krishna, 1971). The Ludhiana district with its focus on wheat production, was the only region selected in Punjab. The IADP commenced in earnest in 1960, with farmers in chosen districts being exposed to improved agricultural inputs and farming techniques.

The IADP emphasized the sowing of improved seeds with exposure to balanced levels of fertilizers, herbicides, pesticides, use of mechanized implements, and adequate irrigation practices (Krishna, 1971). The farmers were also provided instruction on how seeds were to be sown, recommended time of sowing, level of fertilizer and pesticides required and the appropriate

application times, and the level of water application to crops. Each district received its own specific package of improved farming inputs and practices based on what would be ecologically most effective in that district for increasing production. The IADP program made sure that any difficulties farmers' experienced were reported to researchers who could identify deficiencies and continually adapt the program to increase efficiency and resolve any concerns that arose through innovation (Krishna, 1971).

By the mid-1960s, the effectiveness of the IADP had come into serious doubt. The ability of indigenous plant varieties to increase their output through application of fertilizers and other inputs had reached its limit. The IADP was unable to increase food productivity at a pace necessary to meet Indian domestic demand. In addition, other unforeseen events were diverting crucial financial support away from the agricultural sector: in 1962, a war with China began over border disputes and, in 1965, another war with Pakistan. In addition to conflict-related complications, from 1965 to 1966, India suffered two consecutive droughts, vastly decreasing agricultural output and creating fear in the Indian government of possible food riots if domestic demand was not met (Sidhu, 2002; Singh, 2008).

As a result of political conflict, drought, and the inability of the IADP to substantially increase food grain productivity, by the mid-1960s the Indian state faced an ongoing food deficit and fear of famine (Parayil, 1992). In 1961, India had to import 3.5 million tonnes of food grains. In 1964, food imports increased to 6.27 million tonnes, and, by 1966, a record 10.36 million tonnes had to be imported (Sidhu, 2002). The deteriorating food situation forced the Indian government to take dramatic policy action at the national level. In 1967, India decided to implement a technological solution to the food shortage situation with the adoption of the High Yielding Variety (HYV) agricultural program that would dramatically change the nature of Indian farming.

4.2. Green Revolution- High Yielding Variety Program (HYV) India

4.2.1. Agricultural Universities

Although the Green Revolution was ushered in officially in 1967, the Indian government had built the foundation for the implementation of this program in the preceding decades, and its collaborative work with external agricultural entities (i.e., US-AID, Rockefeller Foundation, and Ford Foundation). In the years preceding independence, the Indian government appointed the

University Education Commission to conduct a critical evaluation of its post-secondary system and to implement required changes to enhance its functioning (Parayil, 1992). The University Education Commission recommended the establishment of "rural universities" patterned after the American system of land grant universities (Parayil, 1992, p. 746). In relation to agricultural education provided in India, the commission recommended the creation of agricultural universities in each of the states that would focus on practical indigenous field study research. This focus on research-based agricultural universities was driven educators' desire to move away from theoretical book-based learning to a system where universities taught more practical field knowledge that could produce solutions to real problems faced by Indian farmers and the Indian agricultural sector. The United States Agency for International Development (US-AID) assisted by providing initial capital to construct land-grant type agricultural universities, across India, including, initially, the Gobind Ballabh Pant University of Agriculture and Technology in Uttar Pradesh and, later, Punjab Agricultural University in Ludhiana. US-AID also funded the establishment of formal links between Indian agricultural universities with American and land grant universities, facilitating the transfer of American agricultural knowledge and research to Indian universities (Parayil, 1992). The transfer of knowledge was hastened by US-AID, who provided grants to American agricultural researchers and academics to travel to India to assist with the creation of these agricultural university programs and research facilities. Also, conversely, between 1956 and 1970, 2,000 Indian agricultural students received grants from US-AID to attend American universities for formal agricultural training (Shiva, 1991). These students then returned to India to conduct research and educate new students in agricultural institutions (Parayil, 1992).

4.2.2. Indian Agricultural Research Institute (IARI)

In addition to constructing a university system to impart agricultural knowledge and research, the Indian government also wanted to construct a pre-eminent research institute to produce advanced graduate and doctoral agricultural scientists, and also to conduct advanced agricultural research domestically (Parayil, 1992). In 1958, the Indian Agricultural Research Institute (IARI) was opened in New Delhi with the assistance of the Rockefeller Foundation (Shiva, 1991). With the creation of IARI, the Indian government hoped for access to a group of top agricultural scientists who could conduct research at the national level and also coordinate and provide oversight to research done at the state and district levels. The objective in developing advanced agricultural research capabilities was to assist in the advancement of Indian agricultural sector and provide a practical solution to food self-sufficiency. The Rockefeller Foundation committed to developing a professional graduate program imparting technical skills to

graduate students. To accomplish this, they transferred some of their top scientists (e.g., Cummings, Grant, and Moseman) to this institute (Parayil, 1992). The administration of the IARI was placed under the control of top agricultural scientists in order to attract elite academic talent and students to the institution. Individuals and top agricultural scientists like Ralph Cummings, A. B. Joshi, and Swaminathan would go on to become the deans of the IARI and shape its development. The Rockefeller Foundation provided a number of travel grants for Indian agricultural scientists from the institute to attend American agricultural institutions and research stations to keep abreast of advanced technical research (Shiva, 1991). In time, the IARI became a key component in overseeing agricultural research in the country, but, most importantly, it initiated research and development of hybrid maize (wheat) and rice for the domestic agricultural sector (Parayil, 1992).

The Ford Foundation's role in India was more purposeful, as the foundation primarily reserved its functioning to funding agricultural universities and facilitating innovative research of HYVs in the field (Parayil, 1991). Its support of the agricultural universities' field research had several benefits: it created a means by which agricultural scientists could apply advanced agricultural farming methods influenced by Western research into the Indian agricultural context; it provided national and local agricultural universities a means by which to test advanced agricultural technologies on Indian farms; it facilitated improved farming methods, and related technologies such as the modifying of seeds for local conditions and improving food grain production (Parayil, 1992). The Ford Foundation played an instrumental role in the establishment IADP that had been implemented across India previously.

4.2.3. Indian Council of Agricultural Research (ICAR)

With the creation of a national agricultural research infrastructure through the establishment of agricultural universities and the IARI, the Indian government deemed it essential to create a civil oversight agency that would simultaneously manage and coordinate strategic national agricultural research and development (Parayil, 1992). The Indian Council of Agricultural Research (ICAR) was established and acted as a nodal agency for developing federal agricultural research and providing assistance to state officials conducting local level agricultural studies (Parayil, 1992; Sidhu, 2002). The ICAR was important because it controlled the direction of agricultural policy and practices in India, in particular, during the late 1950s and 1960s. The Indian Food and Agriculture Minister consulted the council prior to formulating agricultural policy and their input was critical in transforming or modifying any policy decisions. During the mid-1960s, the Food and Agriculture Minister, Mr. Subramaniam, conducted an overhaul of this agency by reducing civil bureaucratic influence in the agricultural research sector. His first move

was to remove the director general of the ICAR, which historically had been an internal civil appointment position (i.e., the individual did not need to possess an agricultural background) and, instead, appointed an individual (P.B. Pal) who had a scientific agricultural background. He also modified the ICAR, increasing its scope by incorporating various independent research institutes and national commodity committees under its umbrella of organizations and creating an agricultural research structure within the organization based on a Western model to promote scientific agricultural careers (Parayil, 1992). The overall significance of these changes was that Food and Agriculture Minister Subramaniam assisted in the creation of a council that was progressive in its agricultural policy and outlook and removed any impediments to transforming the Indian agricultural sector into one based on a Western model of science based research and technology.

4.2.4. Policy Shift - Green Revolution Farming

By 1965, the Indian government was in a precarious position, facing a considerable shortage of food grains to meet domestic demand. In addition to domestic issues, the Indian government, which had been reliant on foreign donors such as the United States to meet gaps between production and demand, could no longer rely on this source to ensure stability (Postgate, 1994). President Lynden Johnson had become concerned about the cost of the food aid program and the continual inability of emerging third world countries to avoid internal turmoil caused by increased hunger and poverty. President Johnson refused to provide India long-term food aid unless they shifted development towards addressing their inherent agricultural deficiencies by adopting Green Revolution technology and allowing greater access to American agro-businesses to assist in making the agricultural sector more productive (Cleaver, 1972).

The Indian administration recognized the problems with the Indian agricultural sector and that, to increase productivity, a technological solution was needed (Jain, 2006; Sidhu, 2002). This shift toward a technological solution to India's agricultural stagnation had been a gradual process that was precipitated by the influence and participation of Western organizations such as the Rockefeller Foundation, US-AID, and the Ford Foundation. These organizations, which had assisted in the development of the agricultural sector in the creation of the agricultural universities and research institutions, persuaded officials that only through modern technology and science could the food grain deficit in India be resolved, in particular, through the implementation of Green Revolution farming (Cleaver, 1972; Shiva, 1991). Through formal training programs, these organizations had educated many of the agricultural mangers and politicians who now controlled Indian agricultural policy and who were convinced that India's agricultural policy needed to conform to modern Western modals of farming.

In the same year, India imported 400 kilograms of Mexican semi-dwarf (HYV) wheat and rice varieties, and the Indian agricultural research infrastructure (i.e., IARI and agricultural universities) began conducting tests throughout the country on these new seeds. The new hybrid seeds were exposed to a host of "exhaustive physiological pathological" chemical and agronomic practices within the various agricultural environments across India (Krishna, 1971, p. 32). Research conducted by Indian agricultural scientists through careful field studies was able to develop specific agronomic practices to make the HYV seeds achieve their optimal yield potential in the Indian environment. The new HYV seeds were more responsive to fertilizer, produced yields four times those of indigenous varieties, were more drought resistant, and matured more quickly, allowing for the sowing of second major crops (Chakravarti, 1973).

In 1965, after two years of testing, Ralph Cummings of the Indian Agricultural Research Institute informed Food and Agriculture Minister Subramaniam that he believed the new HYV seeds could be released on a larger scale and requested that the minister speed up the introduction of the new HYV seeds (Shiva, 1991). Subramaniam agreed with the evaluation and, in 1965, 250 tonnes of HYV wheat seed were imported (Krishna, 1971). Minister Subramaniam understood that in order to proceed with agricultural development, he needed to demonstrate to Indian farmers the effectiveness of the new HYV seeds. In 1965, the New Agricultural Program (NAP) was unveiled and was concentrated in the previous IADP areas because these districts possessed the input resources, water access, and infrastructure to make the new program successful. In 1965 to 1966, the Indian government distributed the small quantity of seeds at a subsidized rate to approximately 5,000 farmers in the former IADP areas (Krishna, 1971; Parayil, 1992).

A massive public information campaign to educate farmers on the agricultural technology and its benefits was launched through the use of radio, press, cinema, and demonstration programs (Parayil, 1992). When the HYV seeds were distributed to farmers across India, agriculture officials required them to sow a minimum two acres with the new seeds and the used these farms for demonstration purposes, with other local farmers from the countryside being invited to view the new technology. At these demonstrations, agricultural scientists and extension officers explained how the technology worked and its effectiveness and attempted to convince them to abandon their old farming methods (Parayil, 1992).

The demonstrations were successful, with cropped areas under the HYV program producing substantially increased crop yields, leading, in turn, to increased demand for the HYV technology. In 1966, India ordered 18,000 tonnes of HYV seeds from Mexico, and 4.66 million acres in the 1966-1967 crop years were placed under the HYV seed program. This signified the

official acceptance and commencement of Green Revolution farming in India (Chakravarti, 1973). The HYV seed program continued to increase and, by the 1968-1969 crop years, the area covered by this new technology was 22.97 million acres (Chakravarti, 1973). The success of the program was measured by its ability to increase wheat and rice production specifically to meet India's food grain deficit (see Table 4.1).

Table 4.1. India Wheat and Rice Production (Million Tonnes)

Crop	1966-1967	1967-1968	1969-1970
Wheat	11.53	16.54	20.10
Rice	30.44	37.61	40.43

Note. Adapted from "Green Revolution in India" by A.K. Chakravarti, 1973, *Annals of the Association of American Geographers, 63*(3), p. 321 (original from James Boulware, Brief on Indian Agriculture 1971-New Delhi India: Office of the Agricultural Attache, American Embassy, 1970, p. 28).

Wheat grain production in India under the HYV program increased from 11.53 million tonnes in 1966-1967 to 16.54 million tonnes in 1967-1968 and to a further 20.10 million tonnes in 1969-1970. Rice crop yields also demonstrated a considerable increase: from 30.44 million tonnes in 1966-1967 to 37.61 million tonnes in 1967-1968, reaching 40.43 million tonnes in 1969-1970. The HYV program would be expanded throughout India and would continue to increase food grain production nationally, with total food grain production reaching 130 million tonnes in 1980-1981 and 175 million in 1990-1991. The implementation of Green Revolution farming technology assisted India in effectively meeting the demands of its growing population (Singh, 2008).

Development of HYV Infrastructure Components

The HYV program was officially ushered into India by 1967 and was adopted by the Indian government as its primary agricultural technology. It was, in essence, very similar structurally and technically to the IADP. The HYV technology was introduced into the previous selected IADP districts across India because those areas possessed the conditions needed to increase food grain productivity and had the established infrastructure to support the program (Biasucci, 1997; Chand, 1993; Krishna, 1971). The one major difference in the new HYV program was its use of early maturing semi-dwarf variety of seeds and the supplementation of their growth by the timely application of certain types of purchased agricultural inputs (Jodhka, 2004). The transition to the use of genetically modified seeds was the crucial component in HYV technology, as these new seeds were considerably more responsive to fertilizers and produced substantially greater food grain yields. Proponents of the technology argued that it was scale neutral and could be adopted by any farmer regardless of landholding size.

National Seed Corporation

The success of the HYV program was primarily based on the infrastructural foundation and networks the IADP had previously developed and constructed. The Indian government had established an intricate "supervised and subsidized" centrally controlled input distribution system in order to ensure the success of the new agricultural system (Nicholoson, 1984, p. 571). In 1963, the National Seed Corporation had been established for supplying quality seeds to farmers. Over time, the corporation established a number of regional facilities where they produced, processed, and stocked seeds and created a number of seed farms for multiplication purposes (Harriss, 1972). The National Seed Corporation employed agricultural scientists who were highly trained in how to produce quality seeds and how to process them efficiently for distribution. This public entity worked in conjunction with agricultural universities and the Indian Agricultural Research Institute (IARI) to certify any new seeds that were developed after formal testing in their laboratories (Krishna, 1971). The National Seed Corporation would become the primary agency multiplying and distributing HYV seeds to farmers participating in this agricultural program (Harriss, 1972). In the following decades, private industry would play a bigger role in the production of HYV seeds, but distribution would continue to be done primarily through the National Seed Corporation.

Fertilizer Corporation of India

In the mid-1960s, India created the Fertilizer Corporation of India in order to meet the increasing demand for fertilizers from farmers participating first in the IADP and, then, the HYV programs. The timely application of fertilizer to HYV seeds was essential for the success of the program and for ensuring bountiful production yields. The Fertilizer Corporation of India became the main entity from which fertilizer from domestic and foreign producers was purchased and distributed to cooperative agencies for sale to farmers (Harriss, 1992; Sidhu, 2002). An adequate and timely supply of fertilizer and an efficient supply network facilitated the success of the HYV program in India.

National Corporative Development Corporation

In 1963, the National Cooperative Development Corporation was created, and its role in the success of implementing the HYV program was essential. The National Cooperative Development Corporation had been created under the IADP program, its primary role being "promoting programs for production, marketing, processing and storage of agricultural produce through cooperative societies" (Krishna, 1971, p. 24). Cooperative organizations were primarily located in rural farming districts, and farmers from the surrounding were the members of these organizations. The restructuring of the various cooperative societies was essential for the IADP

and later the HYV program as these organizations would become the key distribution points of farm inputs and purchase points for farmers. The cooperative agencies would also become the key institutional agencies for supplying credit to farmers (Krishna, 1971). The Indian government provided these cooperatives the financial capital needed so they could assist farmers in a timely manner to adopt the new farming methods.

Agricultural Refinance Corporation

In 1963, the Agricultural Refinance Corporation was established and its primary objective was providing financial capital to commercial and land development banks. These banks were to provide financial resources to farmers in the form of loans for agricultural development (Krishna, 1971). The Indian government understood that to implement the IADP and, later, the HYV program, farmers would need substantial agricultural credit, but cooperative societies alone could not finance these credit needs, that lending needed to be augmented by commercial and land development banks (Singh, 2001). The role of the Agricultural Refinance Corporation would diminish with the nationalization of all commercial banks in India in 1969. Their mandate was later altered to include increased lending to agricultural institutions and to promote capital investment by the farming sector (Bawa, 2000).

Agricultural Price Commission (APC)

The Agriculture Price Commission (APC) was created in 1965, and its primary role was to annually advise the Indian government on appropriate prices for food crops (Maini, 2004; Singh, 1997). The objective of setting support prices for agricultural commodities was to promote the new agricultural program and also to induce individuals to adopt the new farming technology. It was reasoned that making farmers aware of how much they would receive for their food crops would reduce the uncertainty that might impede their adopting the new technology, for they would know what the potential returns would be on their investments. Also, if highly remunerative agricultural prices were set, farmers would be more willing to invest in the new technology (Maini, 2004). Guaranteed minimum support and remunerative prices would provide farmers the economic safeguards they needed to adopt the new farming technology and also increase profitability, thus raising their income and quality of life (Krishna, 1971). The price support policy of the IADP and later the HYV program was beneficial in inducing many farmers to adopt the new agricultural technology.

Food Corporation of India (FCI)

The final key component of the new agricultural farming policy was the creation of the Food Corporation of India (FCI) in 1965 (Sidhu, 2002; Singh, 1997). The Indian government, in

essence, nationalized the food grain trade, with the FCI becoming the primary agency for purchasing food grains for the central pool and distributing food grains across the nation through its government-operated distribution outlets (Singh, 2001). The FCI was created to provide farmers adopting the new HYV technology a guaranteed purchaser of their food grain at prices that were equitable to the producers. The FCI became an organization by which the Indian government could not only procure food grains to ensure that domestic demand was met but also could stock reserve food supplies to prevent the likelihood of the famine or food shortages that threatened political stability. The Indian government continued to enhance the essential components of the HYV program through the next three decades to improve its scope and efficiency and to increase food grain productivity.

5. Green Revolution in Punjab

The Punjab region has had a long and storied history with its inhabitants participating in agriculture as a means of sustenance. The success of the Punjab agricultural sector dates back to British Colonial rule in the late 19th century, when the region at one point produced 42% of India's wheat output and was the most advanced region technically in farming practices (Singh, 2001). The British were so impressed with the fertile soils of the region that they expanded commercial agriculture in the area through the creation of canal colonies. The canal colonies constituted a unique rural living concept which saw over 15 million acres of previously underutilized land brought into active cultivation through the development of an intricate canal system. Over time, the canal colonies became major exporters and suppliers of cotton, sugarcane, and wheat to the British Empire and to other regions in India (Singh, 2001). In 1947, British colonial rule came to an end, and the historical Punjab region was bifurcated between two nations, with Muslims settling in West Punjab, now located in Pakistan, and Sikhs and Hindus migrating to settle in East Punjab, now located in India (Thandi, 1997). The partition saw individuals abandon their homes and land-holding assets and transplant themselves into new territories according to their religious affiliations.

With partition, the Punjab government inherited 30% of the canal-irrigated land along with large tracts of dormant agricultural land, but only a minimal rural road and electrical infrastructure (Maini, 2004; Thandi, 1997; Wallace, 1986). This lack of agricultural infrastructure resulted in Punjab's having a food deficit of 35,000 tonnes from 1947 to 1948, leading to the importation of food grains (Singh, 2001). In the early 1950s, the Punjab government, deriving its authority from the Indian constitution, with administrative control over the agricultural sector within the state began the process of redeveloping the agricultural economy. The government determined that to increase productivity in the agricultural sector, it needed to infuse substantial investment into farming infrastructure. This commitment to the farming sector was buoyed by a highly motivated peasantry committed to improving their standard of living. Many of the migrant peasants from Pakistan had a great deal of farming experience and were willing to implement more advanced and progressive techniques and to commit personal capital for farming development (Maini, 2004; Singh, 2001). Punjab after partition would begin the process of developing its agricultural sector through legislative changes and modifying its agricultural practices.

5.1. Land Tenure

After partition, the state of Punjab (East Punjab) faced a monumental task in rebuilding its political, social, and economic structures. The government recognized that the large influx of former landholders from Pakistan needed to become active members of the Punjab economy as their ability to find employment in the non-agricultural sector was limited due to the lack of industrial and service-based industries in the state (Kahlon, 1984). The government understood that to establish normalcy, it needed to immediately address issues of land proprietorship through legislative reforms. The Punjab government's strategy was to develop its agricultural sector, which could then drive economic and political stability and growth. To succeed, the new agricultural development strategy required legislative reforms pertaining to land tenure and land consolidation.

To facilitate the settlement of former landholders from Pakistan, the government implemented the Punjab Security of Land Tenures Act (1953) and the PEPSU Tenancy and Agricultural Land Act (1955) (Singh, 2001). The objective of these acts was to implement limits on the amount of property Punjab households could own and also to reduce the number of absentee landowners who were not engaging in productive use of the land they owned. The cumulative impact of this legislation was that it allowed for 242,656 acres to be declared as surplus, thus permitting former landholders and tenants who were renting from absentee landowners to be assigned ownership of tracts of agricultural land. The assigning of absentee land to new migrants assisted their becoming active participants in the economy. Migrants to Indian Punjab were also provided land abandoned by former residents of the state who had fled to Pakistan during the communal violence. The legislation was further modified in 1972, with the implementation of the Punjab Land Reform Act. This Act further reduced the allowable land ownership ceiling to 7 hectares, which led to another 47,342 acres being declared surplus and redistributed to those individuals who did not own any land (Singh, 2001).

These legislative changes had a major impact on Punjab agriculture. Landless migrants from Pakistan were now settled and farming, and the number of absentee landowners and tenant farmers was reduced. The rise in owner-cultivators resulting from the legislated changes was considerable: from 51.4% in 1947, to 66.4% in 1957, and to 80.89% by 1970 (Kahlon, 1984). The legislation created a class of owner-cultivators who had a vested interest in the success of their farming operations and were thus willing to invest in farming production and technological innovation (Harriss, 1972). It was on this progressive basis that the Punjab agricultural sector would continue to evolve after partition, leading later to its adopting innovative farming technology.

5.2. Land Consolidation

In addition to changes in land tenure after partition, the Punjab government also examined issues of land consolidation. Land consolidation was deemed imperative by the Punjab government because fragmented landholdings had possible negative ramifications on the development and growth of the agricultural sector. Over the generations, as properties were divided among heirs, village landholdings had become reduced to small, scattered plots (Singh, 2001). Fragmented landholdings posed several problems. First, cultivators were required to expend much time and energy travelling between plots. Second, and more importantly, owners could not invest adequately to increase productivity because their holdings' economic viability did not justify the expense (Singh, 2001).

Thus, in 1948, the Punjab government enacted the Consolidation and Prevention of Fragmentation Act (East Punjab) with the objective of consolidating scattered landholdings (Kahlon, 1984). Participation in land consolidation was mandatory. The state took a leading role, requesting the assistance of village advisory committees who were to provide input on land valuations and insight into locations of land equivalencies within the villages for determining entitlements and subsequent land re-assignment or exchanges (Singh, 2001). The end product of this process was landowners' being assigned a single consolidated section of land in exchange for the fragmented property they had previously owned (Johar, 1983).

The consolidation of landholdings in Punjab had several noteworthy benefits. It led to a more efficient use of land and allowed farmers to invest in improved agricultural practices in a concentrated area (Maini, 2004; Randhawa, 1977; Singh, 2001). It provided government officials an opportunity to plan the layout of rural communities and readjust rural agricultural properties to acquire land that would be used for the development of future schools, hospitals, roads linking villages and cultivated areas, and community buildings (e.g., cooperative societies, panchayats, and government offices) (Maini, 2004; Singh, 2001). These changes later assisted in the development of rural infrastructure in Punjab and key institutions needed for the advancement and promotion of the agricultural economy.

5.3. Punjab Agriculture Post Partition

5.3.1. Grow More Food Program Punjab (1947 to 1960)

The expansion of agricultural development in Punjab after partition was rapid, as the region possessed fertile alluvial soil and the ready access to water needed for irrigation (Bryjak, 1985). The government adopted the national agricultural policy, the Grow More Food Program, which promoted an increase in the total cultivable area under production, increasing the amount of land under irrigation through canals or wells and enhancing production through the deployment of seeds and other inputs through officially developed agricultural extension services organized by government (see Chapter 4.2.4).

The government initially focused on developing access to water by financing major and medium irrigation projects, including the expansion of canal irrigation and also the construction of the Bhakra dam. They also provided loans or grants for the sinking of private tube wells and the purchase of pump sets for irrigation. Through these infrastructural investments, about 50% of gross cropped area was under irrigation by the late 1950s; by 1966, gross area irrigated reached approximately 64% (Harriss, 1972; Khalon, 1984).

In addition to irrigation projects, the government initiated an ambitious expansion of the electricity infrastructure, increasing output capacity through the development of dam projects and the expansion of the electrical grid into rural village areas, providing power for the tube wells to provide irrigation (Gill, 1983). The Punjab government also invested substantial financial outlays for expanding road infrastructure, increasing road lengths from 2,820 km to 6,836 km by the early 1960s (Johar, 1983). This expansion was highly beneficial to agricultural development, making farming supplies more accessible and allowing farmers to get their produce to market (Krishna, 1971). Finally, during the 1950s, the government continued to expand extension services to farmers

In 1954, the Punjab State Cooperation Supply and Marketing Foundation was registered. The purpose of this government-constructed organization was to facilitate both the supplying of farm production inputs and the sale of surplus food grain products (Gill, 1983; Kahlon, 1984). To this end, new market centres called “Mandis”, where farmers could sell their produce, were constructed across the state, and the Punjab Agricultural Produce Markets Act was passed in 1960 to ensure farmers received maximum financial remuneration for their produce (Singh, 2001, p. 47).

The Grow More Food Program strategy in Punjab was effective: by 1960, the Punjab was a net exporter of 1 million tonnes of food grain. The Punjab agricultural sector crop production grew at an annual compound rate of 3.8% compared to an Indian average of 1.6% between 1954 and 1966 (Singh, 2001).

5.3.2. Intensive Agricultural Development Program (IADP) Ludhiana (1960 to 1967)

The success and progress of the Grow More Food Program in the 1950s led to the selection of the Ludhiana district for participation in the national IADP program (see Chapter 3). This district of Punjab was selected for the IADP wheat program because 75% of the cultivable land was irrigated, and the district had in place effective and progressive extension services to aid the farming sector (Harriss, 1972). The IADP program was introduced to 600 of the 900 villages in Ludhiana district through an enhanced training program provided by agricultural scientists (Krishna, 1971). The implementation of this program in the Ludhiana district was instrumental in introducing modern farming technology to the Punjab region and beneficial in demonstrating to the Punjab government and to farmers the crucial elements needed to effectively implement advanced farming technology and what infrastructural investments needed to be made by government to ensure its success. An effective distribution system for seeds was established, an efficient input supply system to the villages was implemented through the use of local cooperative societies, enhancements to the irrigation infrastructure were made by both the Punjab government and private landowners, and financial capital was made available through agencies to assist farmers in making investments. This pilot program demonstrated the resources and institutions necessary for the development of a progressive agricultural sector through the adoption of technology.

Punjab Agricultural University (PAU)

In 1962, Punjab Agricultural University (PAU) was opened in Ludhiana. It would become a key component in agricultural research and development in the state, establishing an advanced research and education program designed to assist in the development of the farming sector, particularly in increasing food grain yields (Khalon, 1984; Randhawa, 1977; Singh, 2001). PAU initially played an integral role in the IADP in Ludhiana by educating farmers across the district on the new farming technique of utilizing improved quality seeds and increased application of inputs. Researchers from the university attempted to persuade farmers to adopt the technology and touted its benefits. Under the IADP, PAU tested and developed new varieties of seeds not only in the laboratory but also in the fields of Punjab cultivators under actual farming conditions (Singh,

2008). This testing of seeds was instrumental in developing new seed varieties that were suited for the region's own agronomic conditions and for developing specialized strains that produced increased yields, were resistant to disease, and had the ability to avoid insect damage (Singh, 2001). A great deal of this research was facilitated by farmers being in direct contact with PAU researchers and providing them with feedback about the problems they were having with new seed varieties.

In addition to conducting research on seed varieties, PAU also conducted extensive extension work in the district. Working in the field with farmers enabled the researchers to acquire extensive agronomical knowledge about optimal farming management practices. This continual refinement of management practices, which included identifying the most advantageous sowing times, seed spacing, and depth of sowing, as well as the most efficient time to fertilize and the quantity needed, the appropriate time to apply herbicides and pesticides, and when to irrigate, facilitated the collection and later dissemination of the most efficient agronomical practices to Punjab farmers. The improvement of these practices translated directly into continual advancements in yields per acre and an increase in absolute food grain production in Punjab (Singh, 2001; Singh, 2008).

5.4. High Yielding Variety (HYV) Pilot Program Punjab

The HYV program was introduced unofficially in the Punjab in 1965 with the shipment of semi-dwarf wheat seeds to the state. The seeds were primarily introduced in the IADP district of Ludhiana because this region was known to possess the technical and service requirements to effectively implement the new program. Punjab Agricultural University would play an important role in the HYV program's implementation and dissemination of knowledge about the program. PAU personnel and trained Agricultural Extension Officers (AEO) fanned out through the Ludhiana district to educate farmers on the new program and technical aspects of its implementation, holding training camps in villages and conducting demonstrations in farmers' fields. In addition, they conducted courses for farmers at the university and training centres on the HYV program (Harriss, 1972). Educational aids were also made available to farmers through posters, pamphlets, press releases, technical bulletins, and radio programs designed to increase familiarity with the technology. The Punjab Agricultural University Extension Service Program also maintained continual interaction with Ludhiana district farmers to identify any problems with the program and to find solutions to remedy any difficulties that arose. Throughout, scientists continued to conduct research on HYV seeds, making modifications to improve their efficiency in local conditions and to increase yield potential. The HYV program showed a great deal of

promise, with yields per hectare increasing from 1,104 kilograms in 1965-1966 to 1,520 kilograms in 1966-1967, demonstrating a 37.68% increase in wheat yields (Singh, 2001). The success of the overall HYV pilot program nationally would lead to its full implementation in 1967, and Punjab would adopt the technology throughout the state.

5.5. Implementation of HYV Program in Punjab

In 1966, the modern state of Punjab was established through its division along linguistic lines by the passing of the Punjab State Reorganization Bill (see Chapter 2 for details) and also ushered in a period of rapid expansion of the HYV program within the state (Mohan, 1991). Although Punjab had witnessed another territorial re-alignment, the newly formed Akali Dal and Janata party coalition government in conjunction with the National government, ushered the HYV agricultural program into the state and commenced its immediate expansion into all districts. The Akali Dal, being a party composed primarily of large agricultural landowners, and their economic policy emphasized agricultural development as the way to promote growth in the state economy.

The expansion of the HYV program was initiated by the Indian and Punjab state government through the assistance of Punjab Agricultural University. In 1966-1967, the Farmers Training and Education Scheme was launched as a means of educating Punjab farmers about the HYV program and providing them with a practical understanding of how this agricultural technology functioned (Krishna, 1971). PAU personnel, working with the Punjab State Agricultural Department, coordinated the HYV education program for farmers, but also, regularly provided information on innovations or changes in the HYV program to Punjab Agricultural Department employees and trained a number of its own agriculture extension officers and those employed by the Punjab Agriculture Department in HYV program technology (Kahlon, 1984). These individuals would assist in training farmers in the new technology.

Punjab Agricultural University, the Department of Agriculture, and trained agricultural extension officers used a number of methods to disseminate information and promote the HYV program. The primary method was to conduct pre-arranged demonstrations in the fields of farmers in selected areas in which surrounding villagers were invited to attend (Krishna, 1971). This method allowed farmers to observe how the farming technology functioned and provided them an interactive opportunity to ask questions about the workings of the technology. The use of training camps and discussion groups was another avenue utilized to educate farmers on HYV farming practices, with officials conducting open discussion with farmers as to the benefits of the technology (Harriss, 1972). PAU also facilitated class-based training programs to educate

farmers on the technology and provided training in associated areas such as farm organization and management practices (Kahlon, 1984). The overall benefit of all these methods of educating farmers was that it gave them access to personnel and officials operating the program and opportunities to ask about any deficiencies in the technology and get advice on how to overcome particular difficulties they might face initially, or that they had incurred in implementing the technology. Another benefit of the program was that personnel associated with the program, who worked in the field assisting farmers with their problems, forwarded information about those problems to PAU researchers. In this way, researchers were continually modifying agronomical practices or creating solutions to technical problems in order to improve the HYV program. In addition to hands-on approaches to inform Punjab farmers about the HYV program, secondary methods were also used. The PAU Extension Program also publicized HYV technology and new techniques through articles in magazines or newspapers, posters, brochures, disseminated technical bulletins, and also utilized radio programming (Krishna, 1971; Leaf, 1980). The Farmers Training and Education Scheme was successful in assisting Punjab farmers across the state to adopt the agricultural technology en masse and rapidly increase agricultural production.

5.5.1. Punjab HYV Infrastructural Development

Green Revolution Technology (HYV) was introduced to farmers in Punjab in the late 1960s during a period when the national agricultural policy was in a state of transition and Punjab was rebuilding its own agricultural sector after partition. The Indian and Punjab governments worked in unison to develop the technical framework and agencies to implement the new Green Revolution farming practices and also invested in the physical infrastructure needed to promote its success. The Punjab region possessed the technical requirements to effectively implement Green Revolution farming: lands had been consolidated, peasant proprietors dominated the agrarian structure, irrigation resources and functional extension services had been expanded (Sidhu, 2005). The adoption of the program was driven by an enterprising and hard-working class of rural Jat Sikhs, the dominant agrarian caste in the state (Jodhka, 2006). The new farming technology was rapidly adopted by a majority of farmers and would lead to the Punjab region's becoming the “bread basket” of India.

The Punjab government demonstrated a strong commitment to the HYV program and, in particular, advancing the growth of the agricultural sector in the state. In order to initiate an increase in agricultural productivity, the state government understood that investment in key areas of rural infrastructure was needed. These initial investments in strategic areas would begin a process of sustained progressive advancement and modernization of the agricultural sector (Kahlon, 1984). In order to ensure success of the HYV program, the Punjab government, in the

late 1960s and in subsequent decades, invested a substantial portion of their financial resources and budgetary allocations in expanding the infrastructure needed to make HYV farming technology effective. The government focused primarily on developing and enhancing irrigation, roads, the power infrastructure, and cooperative marketing societies, areas deemed most important to stimulating and supporting agricultural development (Gill, 1983).

Irrigation

Irrigation was an essential component of the HYV agricultural technology as timely access to water was necessary to ensure proper germination of HYV seeds so they could absorb fertilizer and to ensure high levels of food grain production. Farmers adopting this technology could not rely on unpredictable levels of rainfall for proper growth of their crops but had to have ready and adequate access to water (Chakravarti, 1971). To increase accessibility to water for irrigation, the Punjab government initiated a number of irrigation infrastructure projects, allotting funds primarily to three key types of irrigation infrastructure projects: major and medium irrigation projects, minor irrigation projects, and flood control and water logging. *Major and medium* irrigation projects were any infrastructural improvements that impacted irrigation to 2,000 to 10,000 or more hectares of land. The type of infrastructural work carried out under this category primarily included the expansion of state canals, construction of dams, development of reservoir capacity, construction of river links, lining of canals, and improvements to water conveyance channels. The development of major and minor infrastructure was essential for providing farmers access to critically needed water. Table 5.1 shows that, during the initial implementation of the HYV program, the government increased funding in 1971-1972 from 526.16 Lakh (6.68% of total budget) to 2,862.11 Lakh (28.68%) in 1972-1973, an increase of 5-times from the previous year. This dramatic increase was the result of recognition that major irrigation projects were needed to implement the new technology and to bring as much land as possible into active production. Between 1972 and 1986, the Punjab government continued to allocate substantial funds and percentages of the yearly budgets to these infrastructural improvements to steadily improve irrigation capacity particularly canal-supplied water to farmers. In addition to major and medium agricultural irrigation projects, the Punjab government also pursued infrastructural development of *minor irrigation* which largely impacted 2,000 hectares of land or less. Projects under this category were primarily directed at assisting farmers to access groundwater through the construction and burrowing of tube wells on private property and the purchase of tube well motors (pumps) to extract water for irrigation. Funds for this program were largely used to provide loans to farmers to make irrigation improvements on their property. The funding provided for these projects between 1969 and 1980, when farmers were being encouraged to adopt HYV technology quickly, was greater than in later years (see Table 5.2). However, the level of funding for this

program would increase considerably once again after 1985-1986 as the state re-focused its economic policies on assisting farmers to further improve access to irrigation resources.

Table 5.1. Yearly Punjab Government Expenditure on Major and Medium Irrigation Projects

Year	Major and Medium Irrigation Projects (Rs. in Lakh)	% of Total Budget Expenditure
1969-1970	311.72	5.19
1970-1971	335.88	5.12
1971-1972	525.16	6.68
1972-1973	2,862.11	28.68
1973-1974	2,876.25	23.30
1974-1975	*	*
1975-1976	3,042.25	18.31
1976-1977	4,267.43	16.96
1977-1978	2,814.50	13.82
1978-1979	2,130.03	9.64
1979-1980	3,188.94	11.84
1980-1981	4,520.89	15.10
1981-1982	5,322.97	15.56
1982-1983	5,002.16	12.99
1983-1984	4,652.88	10.83
1984-1985	4,895.00	11.12
1985-1986	4,031.84	8.16
1986-1987	4,716.94	6.94
1987-1988	5,327.00	7.10
1988-1989	5,694.00	6.69
1989-1990	3,831.16	4.41
1990-1991	*	*
1991-1992	*	*
1992-1993	*	*
1993-1994	*	*
1994-1995	5,704.56	4.02
1995-1996	6,937.60	4.37
1996-1997	7,581.33	6.07
1997-1998	7,698.45	3.67

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1982, 1987, 1990, 1993, 1997, 2000), Chandigarh, Government of Punjab.

* Not Available.

Table 5.2. Yearly Expenditures of Punjab Government on Minor Irrigation

Year	Minor Agricultural Irrigation (Rs. in Lakh)	% of Total Budget Expenditure
1969-1970	288.24	4.81
1970-1971	348.54	5.32
1971-1972	198.97	2.53
1972-1973	302.37	3.03
1973-1974	194.27	1.58
1974-1975	*	*
1975-1976	380.09	2.29
1976-1977	389.22	1.75
1977-1978	421.29	2.07
1978-1979	434.56	1.97
1979-1980	1,051.81	3.91
1980-1981	181.79	0.61
1981-1982	170.35	0.50
1982-1983	111.43	0.29
1983-1984	226.18	0.53
1984-1985	255.00	0.58
1985-1986	543.98	1.10
1986-1987	577.38	1.85
1987-1988	619.00	.83
1988-1989	842.00	0.98
1989-1990	963.28	1.11
1990-1991	**	**
1991-1992	**	**
1992-1993	**	**
1993-1994	**	**
1994-1995	2,810.56	1.98
1995-1996	2,934.87	1.85
1996-1997	3,325.67	2.66
1997-1998	3,454.90	1.65

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1982, 1987, 1990, 1993, 1997, 2000), Chandigarh, Government of Punjab.

* Not available due to national emergency

** Not available

The final area of irrigation infrastructural investment by the Punjab government was in *flood control and water logging.* The government recognized, particularly in the south, that there were large tracts of productive agricultural land that was not cultivable due to problems of water logging and periodic flooding. In order to address this problem, the state had engineering officials

construct flood control measures, including diversion canals to remove excess water. The government also invested in the construction of drainage systems in water-logged areas to divert excess water away from agricultural land Table 5.3 shows the Punjab government's steady increase in its financial commitment to flood control and water logging from 1969, demonstrating a commitment to ensuring all possible land was available for HYV farming. After a decade, when HYV agriculture was introduced and numerous major water control projects were completed, investments in this kind of infrastructure were greatly reduced.

Table 5.3. Yearly Punjab Government Expenditure on Flood Control and Water Logging Projects

Year	Expenditures on Flood Control and Water Logging (Rs. In Lakh)	% of Total Budget Expenditure
1969-1970	364.02	6.06
1970-1971	225.00	3.43
1971-1972	200.00	2.55
1972-1973	210.36	2.11
1973-1974	282.08	2.28
1974-1975	*	*
1975-1976	400.00	2.41
1976-1977	500.00	2.25
1977-1978	663.80	3.25
1978-1979	1,150.74	5.21
1979-1980	1,052.28	3.95
1980-1981	573.48	1.92
1981-1982	681.66	1.99
1982-1983	623.98	1.62
1983-1984	613.86	1.43
1984-1985	467.00	1.06
1985-1986	873.41	1.77
1986-1987	1,025.21	1.51
1987-1988	614.00	0.82
1988-1989	1,464.00	1.73
1989-1990	2,170.00	2.50
1990-1991	**	**
1991-1992	**	**
1992-1993	**	**
1993-1994	**	**
1994-1995	1,340.21	0.94
1995-1996	3,416.24	2.15
1996-1997	6,590.00	5.27

Year	Expenditures on Flood Control and Water Logging (Rs. In Lakh)	% of Total Budget Expenditure
1997-1998	7,000.00	3.33

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab (1979, 1982, 1987, 1990, 1997, 2000), Chandigarh, Government of Punjab.

* Not available do to National Emergency; ** Not available

The Punjab government's investment in irrigation projects in particular the canal system led to expansion of net area irrigated by this source (see Table 5.4). The net area irrigated by tube wells and wells had increased from 921,000 hectares in 1965-1966 to 1,939,000 hectares by 1980-1981 and to 2,408,000 hectares by 1996-1997. HYV farming technology and its need for water led to expansion of assured irrigation facilities provided by both public and private sectors. Government canals in 1965-1966 distributed water to approximately 1,288,000 hectares and gradually expanded to 1,430,000 hectares by 1980-1981 and to 1,660,000 by 1990-1991. The primary source of expansion in irrigation, however, came from tube wells and well sources, with many Punjabi farmers investing in technology/equipment financed by the government or bank-approved loans to extract groundwater supplies for irrigation. The percentage of net area irrigated to net area sown saw a corresponding increase with 59% of the net area in Punjab being irrigated in 1965-1966 (see Table 5.4). This percentage increased with irrigation development to 72% by 1971-1972, becoming more than 81% by 1980-1981, and finally reaching 95% by 1996-1997. The state's investments in irrigation infrastructure brought large portions of agricultural land under irrigation, and ensured the successful adoption of Green Revolution farming methods, and increased productivity.

Table 5.4. Punjab Net Irrigated Area By: (Thousand Hectares)

Year	Punjab Government Owned Canals	Privately Owned Canals	Tube wells and Wells	Other Sources	Total	% of Net Area Irrigated to Net Sown Area
1960-1961	1,173	7	829	11	2,020	54
1965-1966	1,288	6	921	48	2,263	59
1971-1972	1,364	5	1,554	32	2,955	72
1972-1973	1,275	5	1,652	8	2,940	72
1973-1974	1,284	5	1,680	7	2,976	72
1974-1975	1,406	4	1,766	7	3,183	78
1975-1976	1,366	4	1,742	7	3,119	75
1976-1977	1,382	4	1,802	6	3,194	77
1977-1978	1,390	4	1,859	33	3,286	79
1978-1979	1,388	-	1,842	32	3,262	78
1979-1980	1,515	-	1,997	11	3,523	84

Year	Punjab Government Owned Canals	Privately Owned Canals	Tube wells and Wells	Other Sources	Total	% of Net Area Irrigated to Net Sown Area
1980-1981	1,430	-	1,939	13	3,382	81
1981-1982	1,323	-	2,073	12	3,408	81
1982-1983	1,462	-	2,080	8	3,550	84
1983-1984	1,478	-	2,123	8	3,609	86
1984-1985	1,399	-	2,212	10	3,621	86
1985-1986	1,412	-	2,274	4	3,690	88
1986-1987	1,483	6	2,222	6	3,717	89
1987-1988	1,409	6	2,307	6	3,724	89
1988-1989	1,452	6	2,309	9	3,776	90
1989-1990	1,500	7	2,426	3	3,936	94
1990-1991	1,660	9	2233	7	3,909	93
1991-1992	1,503	9	2,420	8	3,940	93
1992-1993	1,453	-	2,386	3	3,842	93
1993-1994	1,537	-	2,387	3	3,927	93
1994-1995	1,537	-	2,398	14	3,949	94
1995-1996	1,561	-	2,283	8	3,844	95
1996-1997	1,620	-	2,408	7	4,035	95

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1982, 1984, 1987, 1990, 2000), Chandigarh, Government of Punjab.

Electricity Infrastructure

Another area of infrastructure development the government undertook to promote agricultural development was expansion of its electrical infrastructure from the 1960s by exploiting its vast hydro-electric resources (Singh, 2001). The Punjab government had taken the lead in power generation as capital costs in improving the infrastructure were substantial and fell within the purview of state responsibility. The sustainability of Green Revolution farming that became prevalent throughout the state was dependent on farmers having access to assured irrigation that was provided by electrically powered tube well equipment as well as to a reliable energy source to ensure proper irrigation practices and agricultural production without interruption. In order to achieve this objective, emphasis was given to the expansion of the electrical power grid in rural areas to reach farms in the villages (Jain, 2006; Krishna, 1971). The Punjab government invested a substantial portion of the annual budget on power and transmission projects (see Table 5.5). In 1969-1970, the Punjab government invested Rs. 3,422.08 Lakh in power and distribution projects; by 1989-1990, this investment had increased to Rs. 43,932.94 Lakh a 12-fold increase in 2 decades. These investments in power and transmission, between 1969-1970 and 1989-1990, consumed a considerable portion of the

state's annual budget per year, ranging from 20.56% to 60.27%. Punjab's installed electrical plant capacity increased from 680 megawatts (M.W.) in 1969-1970 to 3,049 megawatts (M.W.) by 1990-1991 (see Table 5.6).

Table 5.5. Yearly Punjab Government Expenditure on Power/Transmission Distribution

Year	Power/Transmission Distribution Projects (Rs. Lakh)	% of Total Budget Expenditure
1969-1970	3,422.08	57.00
1970-1971	3,187.28	48.61
1971-1972	4,112.60	52.36
1972-1973	2,921.92	29.28
1973-1974	3,591.90	29.09
1974-1975	*	*
1975-1976	4,643.16	32.90
1976-1977	5,797.96	26.13
1977-1978	4,194.35	20.56
1978-1979	7,887.65	35.70
1979-1980	8,960.93	33.28
1980-1981	10,310.05	34.42
1981-1982	13,966.21	40.82
1982-1983	20,029.94	52.03
1983-1984	21,405.46	49.83
1984-1985	21,510.00	48.89
1985-1986	26,985.00	54.60
1986-1987	39,400.48	58.03
1987-1988	45,208.00	60.27
1988-1989	43,990.00	51.64
1989-1990	43,932.94	50.54
1990-1991	**	**
1991-1992	**	**
1992-1993	**	**
1993-1994	**	**
1994-1995	65,000.00	45.79
1995-1996	83,979.20	52.92
1996-1997	21,000.00	16.80
1997-1998	78,400.00	37.33

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1982, 1984, 1987, 1990, 2000), Chandigarh, Government of Punjab.

* Not available do to National Emergency; ** Not available

Table 5.6. Level of Installed Plant Capacity and Yearly Electricity Generated by Punjab State Electricity Board (1969 to 1991)

Year	Installed Plant Capacity (M.W)	Electricity Generated (Million KWH)
1969-1970	680	2,728.94
1970-1971	680	2,364.80
1971-1972	706	2,787.55
1972-1973	758	2,797.31
1973-1974	771	3,527.70
1974-1975	896	2,690.08
1975-1976	1,009	3,841.21
1976-1977	986	4,216.23
1977-1978	1,246	4,416.46
1978-1979	1,541	6,072.85
1979-1980	1,536	6,235.25
1980-1981	1,536	6,482.95
1981-1982	1,586	6,996.80
1982-1983	1,704	7,776.64
1983-1984	1,828	8,384.44
1984-1985	2,315	8,629.01
1985-1986	2,449	10,688.94
1986-1987	2,459	12,181.71
1987-1988	2,660	12,207.79
1988-1989	3,048	12,130.61
1989-1990	3,049	14,617.54
1990-1991	3,049	14,617.54

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1982, 1987, 1990, 1996, 2000), Chandigarh, Government of Punjab.

The corresponding generated kilowatt hours increased from 2,728.94 (Million KWH) to 14,617.54 (Million KWH) by 1990-1991. By 1977-1978, all Punjab villages were electrified, and the percentage of Punjab households using electricity increased from 36.42% in 1969-1970 to 82.84% in 1995-1996 demonstrating the expansion of the power grid in the state and also the adoption of electricity by the public (see Table 5.7). The increase in power generation and transmission was consumed by an expanding agricultural sector which, in 1960-1961, consumed only 15% of total electric power; its share rose to 43.66% by 1980-1981 and decreased slightly to 42.87% in 1990-1991 (see Table 5.8) (Kahlon, 1984). The increase in demand for electricity was driven by electrification of tube wells which the farmers needed for irrigation and to exploit groundwater resources (Kahlon, 1984). Punjab farmers preferred electric tube wells because they were substantially cheaper to operate than diesel-powered tube wells (Jain, 2006). The government's commitment to develop power generation and electricity infrastructure was key in

expanding agricultural growth and vital for ensuring the electrification of tube wells used for the irrigation needed for HYV farming.

Table 5.7. Percentage of Punjab Households Using Electricity

Year	Percentage (%)
1974-1975	36.42
1975-1976	38.13
1976-1977	43.06
1977-1978	45.73
1978-1979	49.62
1979-1980	57.14
1980-1981	56.53
1981-1982	60.38
1982-1983	64.04
1983-1984	67.72
1984-1985	70.27
1985-1986	72.89
1986-1987	75.52
1987-1988	77.77
1988-1989	80.54
1989-1990	83.63
1990-1991	83.85
1991-1992	81.85
1992-1993	81.78
1993-1994	84.10
1994-1995	82.92
1995-1996	82.84

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1982, 1987, 1990, 1996, 2000), Chandigarh, Government of Punjab.

Table 5.8. Electrical Power Consumption in Punjab by Agricultural Sector

Year	Percentage (%)
1973-1974	41.69
1974-1975	44.83
1975-1976	43.16
1976-1977	42.41
1977-1978	41.7
1978-1979	45.0
1979-1980	46.7
1980-1981	43.66

Year	Percentage (%)
1981-1982	41.26
1982-1983	40.71
1983-1984	38.95
1984-1985	40.40
1985-1986	39.74
1986-1987	44.35
1987-1988	47.15
1988-1989	43.88
1989-1990	45.41
1990-1991	42.87

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1982, 1987, 1990, 2000), Chandigarh, Government of Punjab.

Road Infrastructure Punjab

Another of the Punjab state's strategies to promote Green Revolution farming was to invest heavily in transportation infrastructure. This investment played a major role in driving economic growth by providing access to regions with untapped resources and potential and integrating them into the dominant economy. Road development into rural districts made it possible to more widely introduce and sustain Green Revolution farming as well as to supply farmers with the resources necessary to HYV farming and make it possible for them to transport their surplus food grains to markets (Harriss, 1972; Kahlon, 1984; Singh, 1995). By 1969 through 1974, the Punjab government consistently invested over 10% of its annual budget in the construction of roads and bridges (see Table 5.9). The budgetary percentage of investment in road and bridge expenditures would decrease from 1975 to 1990, but the state continued to invest substantially in road expansion and improvements. Investment in road infrastructure resulted in increasing the total kilometers of surfaced (cement) roads in Punjab, much of it into rural farming districts. As seen in Table 5.10, from 1964 to 1996, the total number of kilometers of roads (both surfaced and un-surfaced) increased fourfold from 8,966 km in 1964-1965 to 39,950 km by 1995-96. The Punjab government also-invested in building all-weather roads between rural villages, affecting more than 12,000 villages and nearly doubling the number of kilometers of this kind of road from 15,985 km's in 1973-1974 to 30,904 km's by 1994-1995 (see Table 5.11). This interconnectivity among villages, towns, and cities facilitated the smooth flow of agricultural inputs and outputs throughout the state as well as the growth and development of the agricultural sector.

Table 5.9. Yearly Expenditure of Punjab Government on Roads and Bridges

Year	Roads and Bridges (Rs. In Lakhs)	% of Total Budget Expenditure
1969-1970	656.82	10.94
1970-1971	724.60	11.05
1971-1972	627.58	7.99
1972-1973	1,213.93	12.16
1973-1974	1,744.64	14.13
1974-1975	*	*
1975-1976	852.57	5.13
1976-1977	943.82	4.25
1977-1978	1,329.15	6.52
1978-1979	1,501.46	6.80
1979-1980	1,531.09	5.69
1980-1981	1,301.22	4.34
1981-1982	1,257.31	3.67
1982-1983	860.78	2.24
1983-1984	1,441.00	3.35
1984-1985	1,480.00	3.36
1985-1986	1,343.49	2.72
1986-1987	1,396.27	2.06
1987-1988	1,361.00	1.82
1988-1989	1,891.00	2.23
1989-1990	1,289.01	1.48
1990-1991	**	**
1991-1992	**	**
1992-1993	**	**
1993-1994	**	**
1994-1995	4,127.51	2.91
1995-1996	3,931.62	2.48
1996-1997	6,407.00	5.13
1997-1998	4,547.00	2.17

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1982, 1987, 1990, 1996, 2000), Chandigarh, Government of Punjab.

* Not available do to National Emergency

** Not available

Table 5.10. Total Kilometres of Roads in Punjab

Year	Kilometres
1964-1965	8,966
1965-1966	9,115
1966-1967	9,206
1967-1968	9,295
1968-1969	9,820
1969-1970	11,768
1970-1971	13,859
1971-1972	14,687
1972-1973	18,208
1973-1974	23,222
1974-1975	24,372
1975-1976	25,705
1976-1977	26,872
1977-1978	28,556
1978-1979	30,836
1979-1980	31,849
1980-1981	32,446
1981-1982	32,657
1982-1983	32,789
1983-1984	33,134
1984-1985	33,797
1985-1986	34,701
1986-1987	35,501
1987-1988	35,964
1988-1989	35,969
1989-1990	35,969
1990-1991	38,500
1991-1992	38,723
1992-1993	38,723
1993-1994	38,723
1994-1995	39,197
1995-1996	39,950

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1971, 1974, 1982, 1987, 1990, 1993, 1997, 2000), Chandigarh, Government of Punjab.

Table 5.11. Number of Punjab Villages Connected by All-Weather Roads and Total Length of Village Roads

	1973-1974	1984-1985	1994-1995
Number of Punjab Villages Connected by All Weather Roads	N/A	12,043	12,089
Total Length of Village Roads (Km)	15,985	26,395	30,904

Note. Adapted from "Green Revolutions Reconsidered: The rural world of contemporary Punjab" (p. 178), by H. Singh, 2001, Oxford: Oxford University Press.

Punjab State Cooperative Supply and Marketing Federation Limited (MARKFED)

In addition to investing financially in the physical infrastructure, the Punjab government also carried out a number of improvements over time to key state agricultural institutions that were crucial for implementing the HYV agricultural program and ensuring its growth and success. One of the key institutions pivotal for the success of the HYV program was the Punjab State Cooperative Supply and Marketing Federation Limited (MARKFED), established in 1954 (Kahlon, 1984; Singh, 2001). The MARKFED cooperative was operated by the Punjab government, and its primary objective was to supply agricultural inputs to farmers and to assist in the marketing of their food grains (Singh, 2001). The state-wide cooperative system was beneficial in a number of ways. With their bulk-buying power, the cooperatives could purchase needed supplies on more favourable terms, passing on substantial savings to farmers participating in the system (Leaf, 1980). The cooperative system also acted as a conduit for promoting adoption of Green Revolution technology, bringing the necessary inputs directly to farmers (Nicholson, 1984).

MARKFED was reorganized in 1968, incorporating a number of changes intended to address the requirements of the new agricultural technology. The cooperative system's input capacity was substantially increased, and its distribution system was expanded and made more efficient to ensure timely supplies of materials to farmers. However, the increase in this capacity also ensured expansion and success of the technology as the critical inputs became readily available. More importantly, the cooperatives became a means by which Punjab farmers could attain essential credit. MARKFEDs working capital was increased through the infusion of funds to assist farmers to obtain the short-term credit needed to purchase inputs and also to obtain financing for the acquisition of crucial irrigation equipment (Leaf, 1980; Singh, 2001). Both the central and state governments would ensure adequate credit was available to farmers throughout the cooperative system over the next few decades.

In addition to expanding the cooperative system, the Punjab government also initiated a progressive expansion of the marketing system for agricultural products in the late 1960s. In 1961, they amended the Punjab Agriculture Produce Markets Act in order to bring all markets

under a set of common, regulated practices by introducing rules and regulation to eliminate malpractice and ensure Punjab farmers received appropriate remuneration for their produce (Bawa, 2000). With the development of consistent formal rules and regulations of all markets in the state, there was also a need for expanding the physical marketing infrastructure to receive food grains. There was a considerable increase in food grain surpluses produced due to the adoption of HYV farming by Punjab farmers that resulted in a considerable increase in the amount of grain arriving at the wholesale food grain markets (Harriss, 1974). As can be seen in Table 5.12, wheat arrivals in the states marketing facilities (i.e., Mandis) with the initial implementation of HYV farming increased from 801,000 metric tonnes in 1966-1967 to 2,962,000 metric tonnes in 1970-1971, a 370% increase (Singh, 2001). Market arrivals for wheat continued to rise as productivity increased, an overall increase of 885% from 1966 to 1991. Rice arrivals to market saw a similar increase, with an almost 300% increase in a 4-year span between 1966 and 1971 alone. Overall, this market arrival trend for rice experienced an overall increase by 1991 of 2,050% (Singh, 2001).

Table 5.12. Total Arrival of Wheat and Rice in Punjab Marketing Yards (Unit Metric Tonnes)

Year	Wheat	Rice
1966-1967	801,000	382,000
1970-1971	2,962,000	1,131,000
1980-1981	4,390,898	4,308,882
1990-1991	7,108,000	7,894,000

Note. Adapted from "Green Revolutions Reconsidered: The rural world of contemporary Punjab" (p. 181), by H. Singh, 2001, Oxford: Oxford University Press.

In order to accommodate increasing food grain arrivals, the Punjab state government invested heavily in the expansion of marketing facilities across the state, increasing the number of collection centers over 3 decades (Harriss, 1974). The priority location for these new centers was along major transport routes, ensuring farmers' ready access to facilities and a means by which to get their produce to market efficiently (Harriss, 1979). Locations were also selected strategically in an attempt to minimize travel time. The centers were within a half day's travel or a 16- to 32-kilometer radius from "market surplus villages" (Harriss, 1974, p. 57). As can be seen in Table 5.13, the number of regulated markets showed a substantial increase from 88 regulated markets in 1966-1967 to 143 by 1990-1991, and the average number of villages served by a regulated market decreased from 139 in 1966-1967 to 86 by 1995-1996. The average area served per regulated market (square kilometer) also decreased from a high in 1966-1967 of 573 (sq. km) to 350 (sq. km) by 1995-1996, thus ensuring farmers had ready and timely access to markets for the selling of their food crop harvest.

Table 5.13. Government Regulated Food Grain Markets in Punjab

Year	Total Number of Regulated Food Grain Markets	Total Number of Sub Yards attached to Regulated Food Grain Markets	Average Number of Villages Served per Regulated Food Grain Markets	Average Area Served per Regulated Market (Sq. Km)
1966-1967	88	154	139	573
1977-1978	109	210	112	462
1978-1979	109	224	112	462
1979-1980	109	217	112	462
1980-1981	120	382	102	420
1981-1982	123	503	99	409
1982-1983	125	503	98	402
1983-1984	130	509	94	387
1984-1985	130	511	94	387
1985-1986	130	516	94	387
1986-1987	141	519	88	357
1987-1988	143	512	86	352
1988-1989	143	505	86	352
1989-1990	143	519	86	352
1990-1991	143	519	86	352
1991-1992	143	519	86	352
1992-1993	144	519	86	352
1993-1994	144	519	86	352
1994-1995	144	519	86	350
1995-1996	144	519	86	350

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1978, 1982, 1984, 1986, 1988, 1990, 1996), Chandigarh, Government of Punjab.

In addition to constructing new marketing facilities, the government also initiated a program of opening temporary purchase centres during peak seasons in order to reduce the considerable congestion at Mandi's because of the sheer volume of food grains in the system (Singh, 1995). These purchase centers would acquire food grains from farmers and then would ship them to larger facilities for storage and distribution at a later time. The number of temporary purchase centres increased substantially over the next 2 decades, with 4 times the number of wheat purchase centres increasing from 216 in 1970-1971 to 836 by 1990-1991 and over four times the number of rice purchase centres which increased from 147 in 1970-1971 to 627 by 1990-1991 (see Table 5.14). Storage space was another area of concern within Mandi's because the volume of food grains coming into them was increasing rapidly. To increase storage space, "sub yards" to marketing facilities, where food grain could be stored were constructed. In addition, storage capacity was increased by government agencies procuring grains and

supplemented by private warehousing entities that received long-term government contracts to store grain for specified periods (Singh, 2001).

Table 5.14. Temporary Wheat and Rice Food Grain Purchase Centres in Punjab

Year	Wheat	Rice
1970-1971	216	147
1981-1982	867	602
1990-1991	836	627

Note. Adapted from "Punjab Economy: The emerging pattern" (p.191), by P. Singh, 1995, New Delhi: Enkay Publishers Pvt. Ltd.

The substantial increase in the number of sub yards attached to regulated markets increased from 154 in 1966-1967 to 519 by 1990-1991 (see Table 5.13). The storage capacity of state agencies and privately contracted agencies from 1966 to 1991 increased substantially, as shown in Table 5.15. As shown above, the key government-operated food-procuring agencies such as the Food Corporation of India (FCI) markedly increased their capacity from 1973 to 1996 (328% increase), and MARKFED Punjab, during the same period, with an increase of 470%. The total state-owned storage capacity in Punjab improved with a 500%-plus increase. The Punjab government's commitment and its successful expansion of the marketing system over 3 decades was essential for ensuring farmers had access to facilities for the timely and efficient selling of their food grain surplus. Increased storage capacity also meant that considerable amounts of food grain products could be acquired and stored for later exporting to food-deficient areas in India and to global markets.

Table 5.15. State Owned Food Grain Storage Capacity in Punjab (Lakh Tonnes)

Year	Food Corporation of India (FCI)	Civil Supplies Department	MARKFED Punjab	State Warehousing Corporation	Central Warehousing Corporation	Punjab State Civil Supply Corporation	Marketing Board
1973-1974	17.64	1.32	5.83	1.90	0.78	-	-
1974-1975	10.75	4.59	6.65	2.99	-	-	-
1975-1976	10.81	5.07	7.84	5.41	0.81	0.81	-
1976-1977	10.44	1.42	6.84	1.66	0.88	-	-
1977-1978	19.77	7.50	9.00	3.86	-	-	-
1978-1979	35.07	7.96	13.46	6.99	-	1.48	-
1979-1980	47.23	14.36	12.46	7.81	3.62	1.48	-
1980-1981	51.80	26.07	12.83	8.60	4.05	8.38	-
1981-1982	44.21	18.17	12.11	9.62	4.20	11.40	-
1982-1983	39.47	13.85	12.90	10.10	4.80	7.49	-
1983-1984	41.22	13.03	15.74	10.97	4.80	9.01	-
1984-1985	45.72	18.08	12.44	10.80	4.87	9.77	-

Year	Food Corporation of India (FCI)	Civil Supplies Department	MARKFED Punjab	State Warehousing Corporation	Central Warehousing Corporation	Punjab State Civil Supply Corporation	Marketing Board
1985-1986	45.94	22.20	17.97	14.20	5.52	11.75	-
1986-1987	57.36	16.99	14.12	15.60	3.50	18.11	0.41
1987-1988	59.43	11.29	11.03	15.21	5.74	15.32	2.41
1988-1989	58.35	7.13	18.36	11.81	5.42	8.05	2.41
1989-1990	45.46	5.63	16.02	18.62	5.42	5.83	2.41
1990-1991	49.62	4.10	16.05	22.21	6.06	9.41	2.41
1991-1992	43.63	4.00	16.09	19.73	6.15	7.26	2.41
1992-1993	46.38	4.58	16.17	20.02	6.15	7.74	2.41
1993-1994	57.43	13.61	20.90	26.56	5.95	16.48	0.54
1994-1995	57.67	5.35	22.63	24.92	5.68	16.50	0.54
1995-1996	57.76	5.64	27.63	25.66	5.62	16.60	0.56

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1982, 1987, 1990, 1993, 1996, 1997, 2000), Chandigarh, Government of Punjab.

5.5.2. Successful Adoption of Green Revolution Farming (HYV) by Punjab Farmers

Mechanization of Punjab Agriculture

As has been seen, to implement Green Revolution farming, farmers had to make substantial capital investments. Trends in farm investment in Punjab show that, per farm, real investment in 1971-1972 was Rs. 68,948, increasing gradually to Rs. 131,592 per farm by 2000-2001 (see Table 5.16). The level of farm investment per hectare was, on average, Rs. 4,400 in 1971-1972, increasing to Rs. 7,956 by 2000-2001 (Table 5.16). Farm investments were primarily in the area of farm machinery and irrigation (Table 5.17). Irrigation investments by farmers were specific to constructing wells and purchasing tube well motors to extract groundwater. However, in addition to investment in irrigation, farmers also made major investments in farm machinery. The level of mechanization in Punjab agriculture was considerable as demonstrated in the increase in purchases of mechanical equipment between 1950 and 1997 (Table 5.18).

Table 5.16. Decennial Punjab Farm Investment Trends

Year	Per Farm Investments (Rs.)	Farm Investments (Per Hectare-Rs.)
1971-1972	68,948	4,400
1981-1982	84,347	5,072
1991-1992	89,400	5,960
2000-2001	131,592	7,956

Note. Adapted from "Farm Household Income, Investment and Consumption" by A. Joshi, 2004, *Economic and Political Weekly*, 39(4), p. 322.

Table 5.17. Breakdown in Allocation of Punjab Farm Investments (Percentage)

Year	Building Structures	Farm Equipment	Irrigation	Draft Animals	Farm Animals
1971-1972	18.55	21.75	26.08	13.27	20.48
2000-2001	22.93	29.59	16.14	1.23	30.12

Note. Adapted from "Farm Household Income, Investment and Consumption" by A. Joshi, 2004, *Economic and Political Weekly*, 39(4), p.322.

Table 5.18. Increased Mechanization of Punjab Agriculture 1950 to 1997 (Farm Machinery)

Equipment	1950-1951	1996-1997
Tillers	3,100	235,000
Disc Harrows	3,000	255,000
Seed/Fertilizer Drills	2,100	140,000
Spray Pumps	2,000	525,000
Threshers	-	315,000
Reapers	-	3,000
Combines	-	7,100
Sugarcane Crushers	6,200	35,000

Note. Adapted from "Green Revolutions Reconsidered: The rural world of contemporary Punjab" (p.69), by H. Singh, 2001, Oxford: Oxford University Press.

There were dramatic increases in the number of tillers, disc harrows, seed/fertilizer drills, spray pumps, and threshers purchased. The number of tractors in the state also increased from 30,000 in 1970 to 387,000 by 1997 (Sidhu, 2005; Singh, 2001). Tractors were essential because attachments conducted a range of agricultural tasks such as tilling, sowing, application of pesticides and herbicides, and harvesting. Increased investment in mechanization assisted Punjab farmers to become more efficient, facilitated multiple-cropping and intensive cultivation, and assisted in the reduction of long-term manual labour costs. The success of Green Revolution farming in Punjab has been the by-product of substantial investments by the state government and the farming community to adopt innovative farming technology.

Total Area under High Yielding Varieties (HYV)

The most critical component of the Green Revolution farming was the introduction of high yielding variety seeds with their increased production ability. The overall area under high yielding variety seeds (in particular wheat and rice) expanded rapidly with the seeds ready distribution to and adoption by Punjab farmers. The total area under HYV wheat in the 1970-1971 season was 1,589,000 hectares, increasing to 2,800,000 hectares in a decade (see Table 5.19). By 1990-1991, 3,271,000 hectares were using HYV wheat, a doubling of total land after 1970 with HYV wheat cultivation. The increase in areas using HYV rice was more dramatic: in a 2-decade

period, the total area of land growing HYV rice increased by a staggering 1,400%. In 1974-1975, 73% of the total area growing HYV food grains used high yielding varieties (all India: 31%); this rose to 95% by 1984-1985 (all India; 54%).

Table 5.19. Area under High Yielding Varieties of Wheat and Rice in Punjab

Year	Rice (000 Hectares)	Wheat (000 Hectares)
1970-1971	130	1,589
1977-1978	768	2,447
1978-1979	1,001	2,634
1979-1980	1,040	2,650
1980-1981	1,100	2,800
1981-1982	1,201	2,885
1982-1983	1,263	3,033
1983-1984	1,407	3,107
1984-1985	1,584	3,090
1985-1986	1,623	3,110
1986-1987	1,701	3,176
1987-1988	1,527	3,116
1988-1989	1,671	3,151
1989-1990	1,905	3,215
1990-1991	1,906	3,271
1991-1992	1,948	3,233
1992-1993	1,905	3,280
1993-1994	2,013	3,324
1994-1995	2,116	3,311
1995-1996	2,039	3,223
1996-1997	2,041	3,230
1997-1998	2,152	3,301
1998-1999	2,394	3,278
1999-2000	2,604	3,388

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1982, 1984, 1987, 1990, 1993, 1997, 2000), Chandigarh, Government of Punjab.

Fertilizer

The more extensive use of HYV seeds also saw a corresponding increase in the use of the required fertilizers. The use of fertilizers in Punjab was almost non-existent before 1960, with farmers only utilizing 5,000 nutrient tonnes of nitrogenous (N) fertilizer (see Table 5.20). This lack of fertilizer use was largely because rural farmers relied upon animal manure to increase micro-

nutrients in the soil. However, in 1970-1971, the consumption of fertilizer increased to 213,000 tonnes, then to 762,000 tonnes by 1980-1981, and reached 1,220,000 tonnes by 1990-1991 (see Table 5.20). The level of fertilizer consumption in the state from 1970 to 1991 increased at a staggering rate of 560%. From 1971 to 1977, there was only a very gradual increase in fertilizer consumption due to supply shortages and volatile price increases in fertilizer that resulted in some farmers reducing purchase of this vital input. The use of phosphate (PO) and potassic (PO) fertilizers also gradually increased over time in conjunction with nitrogenous (N) fertilizer as farmers refined their practices to ensure balanced application to produce optimal growth (Singh, 1995).

Table 5.20. Chemical Fertilizer Consumption Levels in Punjab (000 Nutrient Tonnes)

Year	Nitrogenous (N)	Phosphatic (PO)	Potassic (KO)	Total Fertilizer Consumption (NPK)
1960-1961	5	*	*	5
1965-1966	43	3	*	46
1967-1968	83	12	4	99
1968-1969	135	27	10	172
1969-1970	147	21	6	174
1970-1971	175	31	7	213
1971-1972	225	53	12	290
1972-1973	240	66	19	325
1973-1974	218	68	21	307
1974-1975	189	42	13	244
1975-1976	232	53	10	295
1976-1977	259	93	21	373
1977-1978	331	105	29	465
1978-1979	419	155	29	603
1979-1980	477	179	30	686
1980-1981	526	207	29	762
1981-1982	562	217	34	813
1982-1983	626	230	36	892
1983-1984	706	253	32	901
1984-1985	759	267	22	1,048
1985-1986	787	287	24	1,098
1986-1987	863	290	23	1,116
1987-1988	791	297	24	1,112
1988-1989	796	301	20	1,117
1989-1990	818	315	12	1,145
1990-1991	877	328	15	1,220

Year	Nitrogenous (N)	Phosphatic (PO)	Potassic (KO)	Total Fertilizer Consumption (NPK)
1991-1992	930	314	18	1,262
1992-1993	934	254	11	1,199
1993-1994	947	245	7	1,119
1994-1995	1,014	256	15	1,285
1995-1996	1,020	227	16	1,263
1996-1997	962	229	17	1,208
1997-1998	1,005	287	22	1,314
1998-1999	1,081	275	19	1,375
1999-2000	1,086	335	27	1,448

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1982, 1984, 1987, 1990, 1993, 1997, 2000), Chandigarh, Government of Punjab.

Area Under Agricultural Production

As Punjab farmers implemented Green Revolution farming over time, they continued to bring all viable land into agricultural production. The net area sown in the state increased from 3,803,000 hectares (76% of total area) in 1965-1966 to 4,218,000 hectares (84% of total area) by 1990-1991 (see Table 5.21). Farmers have worked with the state to reclaim a majority of all fallow land, including reclamation of land impacted by alkalinity-and-salinity soil issues (Singh, 1995). Previously water-logged and flood-prone land was brought into production through adequate drainage systems. The total amount of cultivable waste area was .05 million hectares, with a limited ability to expand net area sown any further (Kahlon, 1984). The total cropped area increased from 4,080,000 hectares in 1969-1970 to 7,847,000 hectares by 1999-2000.

Table 5.21. Classification of Total Area in Punjab (Thousand Hectares)

Year	Overall Geographical Area (Thousand Hectares)	Net Area Sown by Agricultural Sector	Net Sown Area as % of Total Area	Areas Sown More Than Once by Farmers
1965-1966	5,038	3,803	76	1,086
1969-1970	5,038	4,027	80	1,472
1971-1972	5,038	4,076	81	1,648
1972-1973	5,038	4,086	81	1,845
1973-1974	5,038	4,113	82	1,924
1974-1975	5,038	4,092	81	1,812
1975-1976	5,038	4,158	83	2,097
1976-1977	5,038	4,167	83	2,118
1977-1978	5,038	4,171	83	2,219
1978-1979	5,038	4,177	83	2,453

Year	Overall Geographical Area (Thousand Hectares)	Net Area Sown by Agricultural Sector	Net Sown Area as % of Total Area	Areas Sown More Than Once by Farmers
1979-1980	5,038	4,182	83	2,353
1980-1981	5,036	4,191	83	2,572
1981-1982	5,036	4,210	84	2,719
1982-1983	5,036	4,202	84	2,713
1983-1984	5,036	4,212	84	2,765
1984-1985	5,036	4,189	83	2,824
1985-1986	5,036	4,197	83	2,961
1986-1987	5,036	4,202	83	3,015
1987-1988	5,036	4,157	83	3,169
1988-1989	5,036	4,205	84	3,182
1989-1990	5,036	4,191	83	3,200
1990-1991	5,036	4,218	84	3,284
1991-1992	5,036	4,215	84	3,303
1992-1993	5,036	4,134	83	3,416
1993-1994	5,036	4,214	84	3,409
1994-1995	5,036	4,210	82	3,483
1995-1996	5,036	4,136	84	3,576
1996-1997	5,036	4,234	85	3,584
1997-1998	5,036	4,218	84	3,284
1998-1999	5,036	4,223	84	3,585
1999-2000	5,036	4,266	85	3,605

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1982, 1987, 1990, 2000), Chandigarh, Government of Punjab.

Area Irrigated in Punjab

As the area of agricultural land for production increased there was a corresponding increase in the total area under irrigation. The total net area under irrigation increased from 2,263,000 hectares in 1965-1966 to 4,035,000 hectares by 1996-1997 (see Table 5.22). The total percentage of net area irrigated to net sown area also increased from 59% in 1965-1966 to 95% in 1996-1997, an approximate 60% increase in irrigated area. This growth in irrigated areas was primarily been driven by farmers' private investments creating additional irrigation capacity by drilling tube wells and wells on their properties. This increased irrigation capacity was needed as the level of canal irrigation started to slow in the 1980s because the Punjab government reduced its building of new water canal capacity (see Table 5.22).

Table 5.22. Punjab Net Area Irrigated by: (Thousand Hectares)

Year	Punjab Government Canals	Private Canals	Tube wells	Other Irrigation Sources	Total	% of Net Area Irrigated to Net Sown Area
1960-1961	1,173	7	829	11	2,020	54
1965-1966	1,288	6	921	48	2,263	59
1971-1972	1,364	5	1,554	32	2,955	72
1972-1973	1,275	5	1,652	8	2,940	72
1973-1974	1,284	5	1,680	7	2,976	72
1974-1975	1,406	4	1,766	7	3,183	78
1975-1976	1,366	4	1,742	7	3,119	75
1976-1977	1,382	4	1,802	6	3,194	77
1977-1978	1,390	4	1,859	33	3,286	79
1978-1979	1,388	-	1,842	32	3,262	78
1979-1980	1,515	-	1,997	11	3,523	84
1980-1981	1,430	-	1,939	13	3,382	81
1981-1982	1,323	-	2,073	12	3,408	81
1982-1983	1,462	-	2,080	8	3,550	84
1983-1984	1,478	-	2,123	8	3,609	86
1984-1985	1,399	-	2,212	10	3,621	86
1985-1986	1,412	-	2,274	4	3,690	88
1986-1987	1,483	6	2,222	6	3,717	89
1987-1988	1,409	6	2,307	6	3,724	89
1988-1989	1,452	6	2,309	9	3,776	90
1989-1990	1,500	7	2,426	3	3,936	94
1990-1991	1,660	9	2233	7	3,909	93
1991-1992	1,503	9	2,420	8	3,940	93
1992-1993	1,453	-	2,386	3	3,842	93
1993-1994	1,537	-	2,387	3	3,927	93
1994-1995	1,537	-	2,398	14	3,949	94
1995-1996	1,561	-	2,283	8	3,844	95
1996-1997	1,620	-	2,408	7	4,035	95

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1982, 1984, 1987, 1990, 2000), Chandigarh, Government of Punjab.

The overall number of tube wells has increased from 192,000 in 1970-1971 to 925,000 by 1999-2000 (see Table 5.23). The growth in tube well installation primarily occurred in the 1970s and 1980s, with farmers acquiring loans through government and private financial agencies to implement this necessary technology. Many farmers initially purchased diesel-operated tube wells due to a lack of electrical connection in the countryside, but electric-operated tube wells,

which were more economical than diesel-operated, were adopted later with the expansion of the power infrastructure (see Table 5.23). Through investments in irrigation by government and farmers, the percentage of irrigated area to gross cropped area went from 55.9% in 1960-1961 to 96.1% 1999-2000, ensuring successful implementation of Green Revolution farming and its associated water requirements (see Table 5.24).

Table 5.23. Total Number of Irrigation Tube Wells in Punjab (Lakhs)

Year	Diesel Powered	Electric Powered	Total Number of Tube Wells
1970-1971	1.01	0.91	1.92
1972-1973	2.52	1.09	3.61
1973-1974	2.70	1.30	4.00
1974-1975	3.00	1.39	4.39
1975-1976	3.04	1.46	4.50
1976-1977	3.03	1.67	4.70
1977-1978	3.04	1.96	5.00
1978-1979	3.02	2.33	5.35
1979-1980	3.23	2.62	5.85
1980-1981	3.20	2.80	6.00
1981-1982	3.10	3.00	6.10
1982-1983	2.90	3.33	6.23
1983-1984	2.57	3.80	6.37
1984-1985	2.47	4.00	6.47
1985-1986	2.21	4.41	6.62
1986-1987	1.83	4.90	6.73
1987-1988	1.73	5.10	6.83
1988-1989	2.06	5.36	7.42
1989-1990	2.00	5.65	6.65
1990-1991	2.00	6.00	8.00
1991-1992	1.90	6.22	8.12
1992-1993	1.85	6.45	8.30
1993-1994	1.81	6.69	8.50
1994-1995	1.76	6.84	8.60
1995-1996	1.75	7.00	8.75
1996-1997	1.70	7.25	8.95
1997-1998	1.75	7.35	9.10
1998-1999	1.70	7.45	9.15
1999-2000	1.70	7.55	9.25

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1982, 1987, 1990, 1997, 2000), Chandigarh, Government of Punjab.

Table 5.24. Gross Irrigated Area and Percentage to Total Cropped Area in Punjab (Thousand Hectares)

Year	Gross Cropped Area	% of Gross Irrigated Area to Gross Cropped Area
1960-1961	2,646	55.9
1965-1966	3,136	64.1
1969-1970	4,080	77.2
1970-1971	4,930.8	78.8
1975-1976	5,080.2	80.8
1977-1978	5,194.9	81.3
1978-1979	5,505.7	83.1
1979-1980	5,699.5	87.2
1980-1981	5,781.6	85.5
1981-1982	5,965.7	86.1
1982-1983	6,148.8	88.9
1983-1984	6,273.4	89.9
1984-1985	7,013	90.5
1985-1986	7,158	91.0
1986-1987	7,217	91.3
1987-1988	7,326	91.9
1988-1989	7,398	92.4
1989-1990	7,391	93.7
1990-1991	7,502	94.0
1991-1992	7,732	94.4
1992-1993	7,552	94.6
1993-1994	7,623	94.9
1994-1995	7,693	95.1
1995-1996	7,705	95.0
1996-1997	7,808	95.4
1997-1998	7,871	96.1
1998-1999	7,739	96.2
1999-1900	7,847	96.1

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1982, 1984, 1987, 1990, 1993, 1997, 2000), Chandigarh, Government of Punjab.

Cropping Patterns

Cropping intensity in Punjab increased from 136% in 1970-1971 to 161% in 1980-1981 and reached 179% in 1990-1991, which was the highest average in the country (see Table 5.25) (Singh, 1995). The increase in cropping intensity was a direct result of farmers sowing more than one crop per year. There were several reasons for multiple-cropping: HYVs had a shorter

growing period, the lack of additional land being available for cultivation necessitated multiple-cropping to increase food grain production, and increased financial returns from multiple-cropping ensured financial viability of farm operations (Singh, 1995).

Table 5.25. Cropping Intensity in Punjab (Decennial)

Year	Cropping Intensity
1970-1971	136
1980-1981	161
1990-1991	179

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1990, 2000), Chandigarh, Government of Punjab.

With the implementation of HYV farming, the level of crop diversity in Punjab dropped progressively (Dhesi, 2008; Gill, 2006). Punjab agronomical conditions were more conducive to and promoted a "productivity enhancing effect" toward the specialization of a wheat and rice crop rotation (Gill, 2006, p. 2763). The agricultural season in India is divided into two distinct sowing seasons: the *Rabi* (winter) season, starting in October and proceeding to April, and the *Kharif* (summer) season, starting in June and proceeding to September. Over time, in the Rabi season, wheat came to be the predominant crop, as its overall percentage of net sown area (NSA) has increased from 60.01% through the 1970-1980 period to 78.10% by the 1990-2000 period (see Table 5.26) (Dhesi, 2008).

Table 5.26. Crop Specialization in Post Green Revolution Period (Crop Share in Net Area Sown (NSA))

Period	Wheat	Rice
1970-1980	60.01	15.40
1980-1990	73.48	37.70
1990-2000	78.10	53.15

Note. Adapted from "Rural Development in Punjab: A success story going astray" (p.88), by Chand in Dhesi & Singh (Eds.), 2008, London: Routledge.

During the Kharif season, rice was the primary crop as its overall percentage of net sown area (NSA) increased from 15.40% through the period of 1970-1980 to 53.15% by 1990-2000 (Chand, 2008). The gradual rise of rice during the Kharif season is attributed to its slow initial introduction into the Punjab agricultural sector, rice cultivation being foreign to many farmers and new to the region (Kahlon, 1984). This increased concentration on wheat during the Rabi season and rice during Kharif season resulted in a wheat-rice cycle domination in cropping patterns (Dhesi, 2008). The wheat and rice crop rotation came to occupy 71.78% of the total cropped area during the 1990s, a rise of 20.86% from the 1970s (see Table 5.27). As can be seen, the

diversity in the cropping pattern decreased: pulses, oilseeds, and other crop varieties declined substantially over time. The total gross cropped area in Punjab shows an observable trend toward the dominance of wheat and rice in total cropped area and the decreased relevance of other crops (see Table 5.28).

Table 5.27. Cropping Pattern Changes in Punjab from 1970 to 2000 (Unit: Percentage Total Crop Area)

Year	Rice and Wheat	Fodder	Fruits and Vegetables	Oilseeds and Pulses	Other Crops
1970-1980	50.92	12.59	1.21	11.21	26.58
1980-1990	65.56	12.60	1.25	5.82	16.82
1990-2000	71.78	9.77	1.95	3.72	15.96

Note. Adapted from "Rural Development in Punjab: A success story going astray" (p.88), by Chand in Dhesi & Singh (Eds.), 2008, London: Routledge.

Table 5.28. Decennial Shift in Crop Patterns in Punjab (Area in '000 Hectares)

Crop	1970-1971	1980-1981	1990-1991
Rice	390 (6.87)	1183 (17.49)	2015 (26.86)
Maize	555 (9.77)	304 (4.50)	183 (2.444)
Bajra and Corn	212 (3.37)	70 (1.03)	12 (0.16)
Groundnut	174 (3.06)	83 (7.23)	11 (0.15)
Sesamum	15 (0.26)	17 (0.25)	18 (0.24)
Sugarcane	128 (2.25)	71 (1.05)	101 (1.35)
Kharif Pulses	33 (0.58)	58 (0.86)	73 (0.97)
Wheat	2299 (40.49)	2812 (41.58)	3273 (43.63)
Barley	57 (1.00)	65 (0.96)	37 (0.49)
Gram	358 (6.30)	258 (3.81)	60 (0.80)
Rapeseed & Mustard	103 (1.81)	136 (2.01)	69 (0.92)

Note. Adapted from "Production Conditions in Contemporary Punjab Agriculture," by H.S. Sidhu, 2005, *Journal of Punjab Studies*, 12(2), p. 202.

In 1970-1971, 2,294,000 hectares (40.49%) of the gross cropped area was under wheat cultivation; this increased to 3,273,000 hectares by 1990-1991 (43.63%). The increase in gross cropped area under wheat production was the result of farmers not planting gram, mustard, and rapeseed during the Rabi season. The total gross cropped area under rice also substantially increased from 390,000 hectares (6.87%) in 1970-1971 to 2,015,000 hectares (26.86%) by 1990-1991 (Sidhu, 2005). This substantial increase was promoted by the shift away from the cultivation of maize, bajra, jowar (corn), groundnuts, and millet during the Kharif season. The Punjab farmers' preference for the wheat-rice rotation was driven by the increased yields that these two crops produced in comparison to other plausible contending crop cycles (Sidhu, 2005).

Increased crop yields brought increased income, thus enhancing incentive for adopting this specific crop rotation. However, more importantly, the Indian government's implementation of a preferential support policy for rice and wheat under the HYV program, with remunerative and secure pricing for these two cereals being guaranteed by the central government, acted as a strong financial incentive. These price guarantees during the harvest period increased certainty among the Punjab farming population that sowing wheat and rice would bring a known and stable income, thus promoting the adoption of this cereal rotation.

5.5.3. Punjab Agricultural Output

The success of the Green Revolution farming in Punjab is represented in the pronounced increase in agricultural food grain output by the state and its farmers over a four-decade period. This increase in agricultural production was driven by the adoption and diffusion of advanced high yielding variety farming methods and the increased mechanization of the agricultural sector leading to increased efficiency. Agricultural production overall in Punjab increased three fold between 1967 (97.41) and 2000 (321.72) (see Table 5.29). In addition to the adoption of modern farming methods and mechanization, the increases in the overall net area sown in combination with increased yields promoted agricultural production growth. As demonstrated in Table 5.29, the overall net area sown increased by about 20% between 1969 and 1991, and food grain yields doubled between 1969-1970 (106.50) and 1999-2000 (219.47). The cumulative impact of these variables and double cropping led to a substantial increase in productivity per hectare. Productivity per hectare in the state increased threefold between 1967 (89.72) and 2000 (298.74) (see Table 5.29).

Table 5.29. Agricultural Index Numbers in Punjab: 1967 to 2000 (Base: Triennium Ending 1969-70 = 100)

Year	Net Area Sown	Cropping Intensity	Yield	Agricultural Production	Productivity per Hectare Net Area Sown
1967-1968	99.18	100.46	94.30	97.41	89.72
1968-1969	99.30	98.90	99.20	94.66	101.02
1969-1970	101.52	100.64	106.50	107.93	109.26
1970-1971	101.57	103.26	107.74	109.76	113.04
1971-1972	102.73	103.50	115.21	118.92	120.33
1972-1973	102.80	106.98	110.76	120.10	118.80
1973-1974	103.87	108.18	113.52	128.32	122.01
1974-1975	103.95	106.36	118.87	131.67	126.64
1975-1976	106.55	110.87	121.37	144.80	136.30

Year	Net Area Sown	Cropping Intensity	Yield	Agricultural Production	Productivity per Hectare Net Area Sown
1976-1977	107.34	111.17	122.80	146.75	144.17
1977-1978	107.75	112.92	133.19	164.13	159.37
1978-1979	109.52	115.89	140.74	179.94	175.95
1979-1980	108.89	115.25	139.23	168.95	173.29
1980-1981	107.72	118.94	138.73	171.08	173.43
1981-1982	109.36	121.30	149.36	189.44	194.00
1982-1983	109.55	121.29	155.19	197.46	206.00
1983-1984	109.63	122.08	155.74	192.66	209.64
1984-1985	108.55	123.39	169.59	219.33	231.07
1985-1986	109.22	125.70	178.95	236.04	248.58
1986-1987	110.69	128.14	164.55	242.78	239.67
1987-1988	105.69	124.58	176.64	244.00	206.26
1988-1989	120.83	132.83	174.73	246.88	214.94
1989-1990	119.77	128.83	189.76	279.70	229.14
1990-1991	121.57	130.46	187.01	269.55	229.24
1991-1992	121.57	130.46	187.01	268.55	229.24
1992-1993	119.57	131.93	193.83	291.04	242.61
1993-1994	120.24	134.14	201.00	286.19	251.56
1994-1995	120.08	133.41	205.00	295.49	244.90
1995-1996	118.33	135.62	186.02	290.33	289.92
1996-1997	119.06	137.09	203.92	306.33	266.75
1997-1998	102.45	138.56	192.88	277.17	263.57
1998-1999	103.05	136.35	201.79	287.02	270.88
1999-2000	103.77	137.09	219.47	321.72	298.74

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1982, 1987, 1990, 1996, 1997, 2000), Chandigarh, Government of Punjab.

The practical impact of these increases in agricultural production is demonstrated in the growth of the principal crops of wheat and rice in the state (see Table 5.30). Wheat production in Punjab grew from 1,742,000 million tonnes in 1960-1961 to 15,910,000 million tonnes by 1999-2000, representing more than a 900% increase. Rice production also saw a dramatic increase: from 227,000 tonnes in 1960-1961 to 8,716,000 million tonnes by 1999-2000. In a 40-year period, rice production increased by more than 38 times. The overall level of food production of all food crops in, Punjab increased overall production from 7.3 million tonnes in 1970-1971 to 25.3 million tonnes by 2000-2001, an increase of over three and half times. The most important advancement that Green Revolution farming produced in Punjab was increases in food grain yields per hectare as measured by kilograms in crop grains. These increases in food grain yields

were the result of continual refinement and improvement of agronomical practices by farmers in the state and steady advancements in seed technology to improve genetic breeding of specific crops (Singh, 2001).

Table 5.30. Area and Production of Principal Crops in Punjab

Year	Rice (Area Thousands of Hectares)	Production (Thousand Metric Tonnes)	Wheat (Area Thousands of Hectares)	Production (Thousand Metric Tonnes)
1960-1961	227	229	1,400	1,742
1965-1966	292	292	1,550	1,916
1969-1970	359	535	2,166	4,685
1971-1972	450	920	2,336	5,618
1972-1973	476	955	2,409	5,368
1973-1974	499	1,140	2,338	5,181
1974-1975	569	1,179	2,267	5,286
1975-1976	567	1,447	2,439	5,788
1976-1977	680	1,776	2,630	6,392
1977-1978	858	2,497	2,617	6,642
1978-1979	1,052	3,090	2,739	7,439
1979-1980	1,172	3,052	2,813	7,868
1980-1981	1,183	3,233	2,812	7,677
1981-1982	1,269	3,750	2,914	8,544
1982-1983	1,322	4,156	3,052	9,168
1983-1984	1,481	4,536	3,124	9,422
1984-1985	1,644	5,052	3,094	10,176
1985-1986	1,714	5,485	3,112	10,988
1986-1987	1,786	5,949	3,185	9,447
1987-1988	1,720	5,492	3,131	11,084
1988-1989	1,778	4,925	3,158	11,580
1989-1990	1,905	6,680	3,216	11,548
1990-1991	2,015	6,506	3,273	12,159
1991-1992	2,064	6,739	3,237	12,300
1992-1993	2,073	7,031	3,283	12,399
1993-1994	2,179	7,645	3,335	13,378
1994-1995	2,265	7,662	3,311	13,542
1995-1996	2,185	6,843	3,221	12,510
1996-1997	2,159	7,334	3,229	13,672
1997-1998	2,278	7,890	3,301	12,751
1998-1999	2,518	7,993	3,278	14,192
1999-2000	2,604	8,716	3,338	15,910

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1982, 1984, 1987, 1990, 1993, 1997, 2000), Chandigarh, Government of Punjab.

As can be seen in Table 5.31, wheat yields, as measured by kilograms per hectare, steadily increased since 1970-1971 from 2,238 (Kg per hectare) to 4,203 (Kg per hectare) by 1996-1997. The most substantial increase in wheat yields came between 1966-1967 and 1969-1970 when HYV seeds were initially introduced to Punjab farmers with considerable double digit gains. It can be observed that wheat production has been steady over the 30-year period, with 9 years showing declines. These declines were, however, temporary, and any declines were compensated for by substantial increases in future years. Rice yields showed similar positive trends observed in yields as measured by kilograms per hectare (see Table 5.31). Rice yields in 1970-1971 were 1,764 Kg per hectare and increased to 3,396 Kg per hectare by 1996-1997. They showed a more gradual increase than wheat yields because they were introduced later, and farmers were still establishing optimal agronomical practices in relation to this specific cereal. Overall, the spread of HYV seeds and related technologies increased areas under cultivation, cropping intensity, and irrigated area, substantially assisting Punjab to thereby increase its overall food grain output and cereal yields. The success of Green Revolution farming in Punjab assisted the Indian state in addressing its food grain shortage and making India a food surplus nation.

Table 5.31. Wheat and Rice Yields 1970 to 1997 (Kilograms Per Hectare)

Year	Wheat Yield (Kg/Ha)	% Increase or Decrease	Rice Yield (Kg/Ha)	% Increase or Decrease
1970-1971	2,238	*	1,764	*
1971-1972	2,204	-1.50	2,045	15.92
1972-1973	2,233	1.30	2,007	-1.85
1973-1974	2,216	-0.76	2,287	13.95
1974-1975	2,995	35.15	2,071	-9.44
1975-1976	2,372	-20.80	2,553	23.27
1976-1977	2,432	2.53	2,611	2.27
1977-1978	2,537	4.31	2,910	11.45
1978-1979	2,517	-3.15	2,937	0.92
1979-1980	2,797	11.12	2,604	-11.33
1980-1981	2,731	-2.35	2,733	4.95
1981-1982	2,932	7.35	2,955	8.12
1982-1983	3,007	2.55	3,144	6.39
1983-1984	3,015	0.26	3,063	-2.57
1984-1985	3,289	9.08	3,073	0.32
1985-1986	3,531	7.35	3,200	4.13
1986-1987	2,966	-15.15	3,331	4.09
1987-1988	3,506	18.20	3,164	-5.01
1988-1989	3,668	4.63	2,770	12.45
1989-1990	3,593	-2.04	3,510	26.71

Year	Wheat Yield (Kg/Ha)	% Increase or Decrease	Rice Yield (Kg/Ha)	% Increase or Decrease
1990-1991	3,714	3.36	3,229	-8.00
1991-1992	3,802	2.36	3,257	0.86
1992-1993	3,776	-0.68	3,391	4.11
1993-1994	4,011	6.22	3,507	3.42
1994-1995	4,090	1.96	3,382	-3.56
1995-1996	3,883	-5.06	3,131	-7.42
1996-1997	4,203	8.34	3,396	8.46

Note. Adapted from "Green Revolutions Reconsidered: The rural world of contemporary Punjab" (p.58), by H. Singh, 2001, Oxford: Oxford University Press.

* Not Available

Statistically, Green Revolution farming appeared to have a major positive impact on Punjab society, developing the agricultural sector in the state over three decades and assisting in substantially increasing Punjab food grain production by the 1990s. However, the implementation of Green Revolution farming in Punjab in the late 1960s, in conjunction with other negative economic conditions and political events, would, by the early 1980s, be a catalyst for the economic disenfranchisement of the rural Jat Sikh farming population. Segments of this population would go on to use anti-state terrorist violence in an attempt to ameliorate their declining social status. In order to understand the rise of the Sikh anti-state terrorism movement, it is essential to understand how the interplay of events during the 1970s, including instability in the Punjab agricultural sector, weak secondary and tertiary sectors of Punjab's economy, and a shift in demographic characteristics, contributed to the development of conditions and feelings of relative deprivation among a segment of the Punjab Sikh population and facilitated the emergence of the Sikh fundamentalist movement. A major contributory factor to the outbreak of Sikh anti-state terrorism in Punjab by the early 1980s was the presence of economic instability in the Punjab agricultural sector throughout the 1970s, which would have a devastating impact on small and marginal Sikh farmers in the state.

6. Relative Deprivation in Punjab

6.1. Hypothesis I

Hypothesis I: Anti-state terrorism is more likely to occur in countries with a more inequitable distribution of wealth.

It has been hypothesized that anti-state terrorism is more likely to occur in countries with a more inequitable distribution of wealth. An examination of conditions in Punjab during the early 1980's reveals the existence of a pronounced financial discrepancy emerging between the upper and lower segments of Punjab society. In particular, this discrepancy was most acute in the countryside where Green Revolution farming had substantially impacted the distribution of wealth amongst segments of agricultural cultivators. Weaknesses in the agricultural sector were compounded by weak secondary and tertiary sectors of the economy which also contributed to rising unemployment. Rural Punjab was also simultaneously undergoing demographic changes: an increase in the number of individuals entering the workforce and an increasingly literate working population. Feelings of relative deprivation amongst the increasingly disenfranchised segment of Punjab society set in, contributing to the use of violence aimed at reconfiguring Punjab society and redistributing wealth more equitably amongst its members. This disenfranchised segment of Punjab society turned to Sant Jarnail Singh Bhindranwale to make sense of their reality and participated in his Sikh anti-state terrorism movement against the Indian state, the perceived source of their deprived socio-economic status.

6.1.1. Impact of Green Revolution (HYV) Farming

Green Revolution farming transformed Punjab from a food deficit state to the "bread basket" of India contributing 75.3% of the wheat and 45.3% of the rice to the Indian central food grain pool by 1980-1981 (Singh, 2000, p. 93). The new technology increased agricultural output in the state exponentially, creating the most advanced agricultural economy in the nation with the highest per capita income in India (Alam, 1986). As shown in Table 6.1 the per capita income in Punjab rose from Rs. 1,030 in 1971 to Rs. 2,361 by 1981, a 129.2% increase in per capita income within a decade.

Table 6.1. Per Capita Income in Punjab 1971-1989

Year	1971	1981	1989	% Change
Per Capita Income (Rs.)	1030	2361	5477	+431

Note. Adapted from "Ethnic Conflict in India" (p. 95), by G. Singh, 2000, New York: Macmillan Press Ltd.

A majority of the economic indicators in Punjab were demonstrating positive economic growth with an expanding state economy and improving quality of life indicators. As has been discussed in previous chapters, even though prospects for Punjab farmers looked good during the initial stages of the implementation of Green Revolution farming, by the mid-1970s, the agricultural sector showed signs of stagnation and exhibited a downward trend impacting agricultural producers within the state (Patel,1987; G. Singh, 1984). The decline in the agricultural sector in the state was initiated by a number of simultaneous inter-linked events that placed substantial pressure on agricultural producers. The cumulative impact of these events overtime was considerable as it led to a decline in the profitability of the Punjab agricultural sector and dramatically escalating levels of indebtedness among farmers (Chadha, 1989; Patel, 1987; Shiva, 1991).

However, by the early 1980's, the inherent weaknesses in Green Revolution farming became apparent with disastrous consequences for specific segments of Punjab farmers. The impact of the decline in the agricultural sector in Punjab although felt economically by the full spectrum of farmers within the state, specifically had a dramatic impact on small and marginal farmers. The reality in Punjab by the early 1980's indicated that Green Revolution farming was not scale neutral and the benefits were not shared equally among all segments of farmers instead it created new socio-economic inequalities (Naboto, 1994; Shiva, 1991). It was very difficult for many small and marginal farmers in Punjab to adopt and successfully implement Green Revolution (HYV) farming. In order to continue farming, small and marginal landowners needed to realize significant financial returns, but this was difficult because their landholdings were so small and, additionally, because of the negative agricultural conditions that were plaguing the Punjab farming sector in the mid-1970s. By the 1980s, despite their efforts, these farmers were either barely making a living or were heavily in debt (Bhalla, 1983; Nicholson, 1984).

The full impact of negative economic conditions in the Punjab agricultural sector became evident during the late 1970s and early 1980s with, among other signs, the emergence of inequitable distribution of wealth amongst cultivators. An examination of the distribution of landholdings in Punjab between 1970-1971 and 1980-1981 shows, a dramatic decrease in the overall number of agricultural landholdings, with a consolidation of smaller landholdings into larger ones. In 1970-1971, the total number of operational landholdings in Punjab was

1,375,392; this number declined dramatically to 1,027,127 by 1980-1981 (see Table 6.2). This constitutes a decline of 348,265 (25.3%) agricultural landholdings within a decade. The largest decline was seen exclusively in marginal and small landholding categories. The number of marginal landholdings (below one hectare) declined from 517,568 in 1970-1971 to 197,323 in 1980-1981 an overall decrease of 320,245 operational landholdings. The number of small landholdings (1 to 2 hectares) declined from 260,083 in 1970-1971 to 199,638 in 1980-1981, a further decline of 60,715 operational landholdings. During the same time period, the total operational land holdings within the semi-medium, medium, and large categories increased by 32,695 landholdings. Accordingly, the size of operational holdings in Punjab increased from 2.89 hectares in 1970-1971 to 3.79 hectares by 1980-1981. This shift in the agricultural population led to an increase in the ratio of landless labour in the total agricultural workforce from 32.1% in 1971 to 40% by 1983 (Chima, 1994; Gill, 1988).

Table 6.2. Distribution of Land Holdings in Punjab

	1970-1971	1980-1981	1990-1991
Marginal (Below 1 Hectare) Percentage of Farms	517,568 (37.63%)	197,323 (19.21%)	295,668 (26.48%)
Small (1 to 2 Hectares) Percentage of Farms	260,083 (18.91%)	199,368 (19.41%)	203,842 (18.25%)
Semi-Medium (2 to 4 Hectares) Percentage of Farms	281,103 (20.44%)	287,423 (27.99%)	288,788 (25.58%)
Medium (4 to 10 Hectares) Percentage of Farms	247,755 (18.02%)	269,072 (26.2%)	261,481 (23.41%)
Large (10 Hectares and Above) Percentage of Farms	68,883 (5%)	73,941 (7.19%)	67,172 (6.01%)
Total	1,375,392 (100%)	1,027,127 (100%)	1,116,951 (100%)
Average Size Of Holdings (Hectares)	2.89	3.79	3.61

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1980, 1987, 1990), Chandigarh, Government of Punjab.

The implementation of Green Revolution farming and the negative economic conditions that prevailed in the agricultural sector in Punjab during the 1970s made farming uneconomical for many farmers leading to increased indebtedness or financial instability (G. Singh, 1984). Many marginal and small farmers were forced to withdraw from farming after defaulting on their loans. Many farmers in this category were also forced to sell off their land or lease it out to larger landowners and pursue employment in the non-agricultural sector (Chand, 1999). Many Jat Sikh farmers were enraged by the loss of their only means of making a living. Sikh farmers within Punjab during the 1970s became very critical of Green Revolution farming, and were particularly

critical of the Indian central government and its perceived discriminatory agricultural policies. Sikh farmers blamed the Indian government for their negative socio-economic conditions because Green Revolution farming had been introduced by that government in Punjab to increase agricultural production. In implementing Green Revolution farming, the central Indian government had maintained control over key components of the program including the setting of purchase prices for agricultural commodities, supplying and setting prices of agricultural inputs, providing agricultural credit, and marketing of food grains purchased by Punjab farmers. Sikh farmers perceived that the Indian government had failed to implement measures that could have directly prevented the decline in profitability of the Punjab agricultural sector. Many Punjab Sikh farmers saw this inaction a direct result of religious discrimination by the central Hindu-led government as a means of repressing the Sikh population.

Sikh farmers displaced from agricultural production joined the ranks of landless labour attempting to obtain meaningful employment. The Jat (landowning caste) Sikhs, were the highest social caste in rural Punjab. They were thus unwilling to work as farm labourers, because this would mean a drop in their social status. The humiliation of losing their ancestral farm land was already a dishonour but to lose their social status, in Punjab society would only compound their disappointment and extenuate their failure. The loss of farming operations in rural Punjab not only impacted a single generation of cultivators but also prevented successive generations from participating in farming. The inability of successive generations to farm deprived them of the financial and economic security they once possessed and a guaranteed profession by which to provide for their households.

At the same time, as has been described, these displaced farmers, hoping to find employment within the agricultural sector during the late 1970s and early 1980s also found it difficult to obtain employment in other agricultural areas. The labour-absorbing capacity of the agricultural sector had become almost nil. The agricultural sector in Punjab during this period had experienced continuous years of deteriorating economic conditions with farmers demonstrating reduced financial returns or deficit and limited gains in productivity. In this economic climate of uncertainty, agricultural producers were incapable of or unwilling to hire more labour. Increased mechanization of the Punjab agricultural sector had also significantly reduced need for labourers. The adoption of labour-saving agricultural technology by Punjab farmers displaced manual labour as many farming functions and tasks were now mechanized (Singh, 1995; Singh, 2006). The labour requirements in the agricultural sector were shifting towards the hiring of temporary/casual labour for limited periods to complete specific and specialized tasks (H. Singh, 2001). For the limited agricultural positions that did exist, Sikh farmers found themselves competing for employment opportunities with low caste non-Sikhs and non-Punjabi labourers

from the surrounding states of Bihar and Uttar Pradesh who migrated to Punjab seeking employment in the agricultural sector. It was difficult for displaced Sikh farmers to compete for agricultural positions with these labourers who accepted substantially lower wages to perform similar agricultural tasks.

Employment opportunities outside of the agricultural sector in Punjab were also challenging, as the swelling ranks of cultivators being released from agriculture were not being absorbed by the industrial and service sectors due to the lack of development and presence of these sectors in Punjab's economy (Gill, 1988; Oberoi, 1990). During the 1970s and early 1980s, Punjab agricultural sector growth and the financial health of agricultural operations were not sufficient enough to drive rapid expansion of the industrial and consumer related sectors (Patel, 1987).

There are no comprehensive studies that examine the deteriorating employment situation in Punjab during this period nor are there any government-produced statistics demonstrating percentages of unemployment in Punjab (Singh, 1995). The strongest statistical indicator examining the rising unemployment within the state is the number of individuals registered in Punjab on the Live Register Employment Exchange (Johar, 1983). The Live Register Employment Exchange are government-operated dual-purpose facilities where employees advertise job opportunities and unemployed individuals register to obtain assistance in locating employment. The number of individuals registered with employment exchanges is not a true indicator of the total number of individuals unemployed as illiterate and unskilled workers were hesitant to register with these exchanges because of the limited job opportunities the employment exchanges offered them. However, the number of individuals registered on employment exchanges does provide a strong indicator in trends of overall unemployment in the state (Johar, 1983).

The impact of deteriorating economic conditions in the agricultural sector and the impact of weak secondary and tertiary sectors of the economy can be observed in the table on the number of unemployed individuals on the live register through the 1970s. The number of individuals unemployed in Punjab starts to rise rapidly, as can be seen in Table 6.3 in the early 1970s. The number of unemployed person registered on the live register rose dramatically from 84,732 in 1969, with considerable subsequent yearly increases to 636,408 unemployed individuals being registered by 1985. In a span of 16 years, the number of registered unemployed individuals increased by 551,676 (651%). A large number of unregistered unemployed individuals in Punjab were seeking employment but were unaccounted for statistically during this period. The rapid rise in unemployment through the 1970s and early

1980s corresponds with the deterioration of economic conditions in the agricultural sector and the inability of the industrial and service sectors of the economy to absorb unemployed individuals in the population, exacerbating the inequitable distribution of wealth in the state.

Table 6.3. Number of Unemployed Persons Registered on Punjab Live Register Employment Exchange

Year	Number of Unemployed Persons On Live Register	Year	Number of Unemployed Persons On Live Register
1969	84,732	1985	636,408
1970	95,656	1986	609,690
1971	120,711	1987	618,435
1972	161,433	1988	575,177
1973	208,286	1989	584,643
1974	267,272	1990	659,250
1975	299,882	1991	751,555
1976	324,875	1992	747,786
1977	359,061	1993	645,822
1978	389,482	1994	558,232
1979	420,661	1995	506,236
1980	452,596	1996	542,695
1981	486,081	1997	581,018
1982	507,586	1998	568,212
1983	530,786	1999	545,017
1984	526,175	2000	*

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1982, 1984, 1987, 1990, 1993, 1997, 2000), Chandigarh, Government of Punjab.

The rapid rise in unemployment was compounded by the coming of age of the "baby boomer" adults who were entering the workforce through the 1970s and early 1980s. The arrival of this new generation into the labor force only worsened joblessness and increased competition for the limited job openings. The new generation found it difficult to obtain employment due to their lack of training or previous work experience. As can be seen in Table 6.4, of the number of individuals on the live register of the employment exchanges, a major portion lacked any experience or training. The impact of this population can be seen starting in 1971 when 47,690 individuals on the live register lacked any formal training or experience; by 1985, this group had reached a staggering 307,404 individuals, an increase of 259,714 individuals in a span of 15 years.

Table 6.4. Individuals without any Experience or Training on Punjab Live Register Employment Exchange

Year	Number on Live Register	Year	Number on Live Register
1969	*	1985	307,404
1970	*	1986	319,520
1971	47,690	1987	319,678
1972	77,634	1988	304,537
1973	146,749	1989	344,006
1974	175,090	1990	377,849
1975	150,399	1991	461,507
1976	163,810	1992	451,133
1977	178,073	1993	399,640
1978	185,833	1994	341,989
1979	204,745	1995	328,985
1980	227,033	1996	335,492
1981	250,562	1997	364,821
1982	263,693	1998	363,530
1983	274,276	1999	355,706
1984	272,168	2000	*

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1982, 1984, 1987, 1990, 1993, 1997, 2000), Chandigarh, Government of Punjab.

* Not Available

These young people entering the labour force were largely from rural Sikh cultivating households who had experienced the impact of negative economic conditions in the state. Having received secondary or higher education, this new generation was increasingly literate and had correspondingly higher occupational aspirations and also came from rural families who wanted them to pursue a better quality of life and find employment, and higher incomes outside of farm employment (Chand, 1999; Kapur, 1987; Sharing, 1989). However, through the late 1970s and early 1980s, this new generation of rural Sikh youths entering the labour force faced bleak job prospects. Many of these Sikh youths from rural agricultural households were unsure of the future viability of household agricultural operations and in conjunction with rural Sikh youth from displaced cultivating household found limited job prospects in the agricultural, and secondary and tertiary sectors of the economy. By the early 1980s, there was a substantial inequitable distribution of wealth with 348,625 Sikh farmers displaced from agricultural production and a large rural Sikh population of approximately 500,000+ unable to secure employment within any sector of the Punjab economy. This increased disparity among the Sikh population in Punjab produced a disenfranchised population with a strong sense or feeling of relative deprivation with mounting frustration directed at the Hindu-dominated Indian central government (Oommen, 1971).

6.1.2. Relative Deprivation in Punjab

When examining terrorist conflicts globally, Corrado's anti-state terrorism model argues that economic inequality in its various forms, in part, contributes to terrorist violence. In the present model, it has been argued that in Punjab, the financial instability of the agricultural sector, inability of the secondary and tertiary sectors of the economy to absorb unemployed skilled and non-skilled workers providing them meaningful employment, and inequitable distribution of wealth are the necessary economic conditions needed for Sikh anti-state terrorism violence to occur. According to Corrado's model, economic inequality contributes to feelings of "relative deprivation" the gap existing between what people expect from society and what society is capable of providing for them (Corrado, 2000, p. 50). He further articulates that when the government or its institutions are seen as the cause of relative deprivation, then those feelings of being deprived may turn to violence (e.g., terrorism) to produce change. Although Corrado's use of relative deprivation in his anti-state terrorism model is essential for understanding the rise of the Sikh anti-state terrorism movement in Punjab, in order to explain the process by which relative deprivation contributes to anti-state terrorism violence, Lichbach's Deprived Actor Theory has been adopted for greater specificity. The use of Lichbach's Deprived Actor (DA) Theory is appropriate because of its greater explanation of the psychological processes that lead individuals to partake in anti-state terrorist violence and its greater theoretical explanation of the concept of relative deprivation which is essential for explaining the rise and decline of the Punjab anti-state terrorism movement.

6.1.3. Lichbach- Deprived Actor (DA) Theory

The premise upon which DA Theory is based is relatively simple. Lichbach states that deprivation causes discontent, which, in turn, causes or leads to political dissent in its various forms, including terrorism. DA theory suggests that a range of special "psychological processes (cognitive and emotional)" intercede and transform grievances into political dissent (Lichbach, 1989, p. 456). In the DA approach, a number of specific assumptions exist, which psychologically link economic inequality and political conflict (e.g., terrorism) (Lichbach, 1989).

In particular, the concept of relative deprivation is important in that it describes the discrepancy between what people have and what they believe they are entitled to (Lichbach, 1989). The relative deprivation concept proposes that each individual has a formulated set of private financial expectations or standards about what they should have, and they evaluate the success of the economic system based either on what they actually do have or are able to achieve or obtain. Individual members' economic expectations and standards are influenced by a variety of cultural forces that form their standards of justice and equality, their standards of justice

and equality directly influence social interactions, and, more significantly, individual expectations of themselves and their society in general. In forming economic expectations, individuals will make "equality-inequality comparisons" between themselves and others to determine their relative position in society (Lichbach, 1989, p. 456). That is, individuals' economic expectations are not formed by ideal standards, but, rather, by concrete comparisons with others in their immediate environment or with known historical standards.

If individuals see themselves as being economically deprived when, using their own subjective standards, they compare themselves to others, then they may formulate economic grievances and experience feelings of "anger, frustration, and/or other non rational motivations" (Lichbach, 1989, p. 459). The emotional build-up of frustration and anger from these initial psychological processes will incline some individuals toward behavioural dissent (e.g., terrorism). It must be understood that in addition to economic inequality, DA Theory, also emphasizes the importance of political and social inequalities which, in conjunction with economic variables, may also induce terrorist violence (Lichbach, 1989).

DA theory is applicable to emergence of anti-state terrorism in Punjab: The negative economic conditions that began in the early 1970s with the implementation of Green Revolution farming and the lack of development of the industrial and service sectors of the economy led, finally, to widespread unemployment, loss of land, status, and living standards contributing to the rise of the Sikh anti-state terrorism movement in India. The Sikh population in Punjab, since their inclusion into the Indian Union post partition, enjoyed relatively favourable economic conditions for its citizenry. The initial agricultural development of the Punjab state in the 1950s, and further agricultural expansion through the implementation of Green Revolution farming in the 1960s, benefitted Punjab residents and the Sikh population as a whole, and provided initial economic security. The Punjab population and Sikhs the numerical majority as a whole, as discussed previously, had the highest per capita income in India, extremely low levels of unemployment, moderate levels of disposable income, profitable agricultural farm operations, and one of the highest standards of living in India by the early 1970s. This economic prosperity, in comparison to other regions within India, became the standard and expectation that the Sikh population in Punjab became accustomed to and upon which perceived societal functioning was based.

6.1.4. Hypothesis I – Confirmed: Inequitable Distribution of Wealth in Punjab.

Hypothesis I has been confirmed as an inequitable distribution of wealth emerged amongst the Punjab population. In the mid-1970s, with the cumulative effects of negative

economic conditions in the agricultural sector, weak industrial and service sectors, and demographic changes, the Punjab economy was propelled into a period of instability that would adversely impact Punjab and, in particular, the Sikh population for the next decade. The level of unemployment rose rapidly and an increasingly literate Sikh population, with higher aspirations, were entering the workforce hoping to obtain meaningful employment but, instead, were facing discouragingly few job prospects.

The Punjab region, which had become so accustomed to the highest per capita income within India, found that its economic stature was rapidly declining and its high standard of living considerably eroded. Punjab residents and the Sikh population, in particular, were now feeling an extreme disjuncture (relative deprivation) between what they possessed economically and what they believed the Punjab economy should be providing for them financially. Instability in Punjab economy was leading to increased frustration and discontent amongst the Sikh population as the state economy was unable to sustain and/or fulfill the economic aspirations of this population (Kapur, 1987; Singh, 1995). Punjab residents and the Sikh populations' economic expectations were based on economic standards and conditions prior to the deterioration of the agricultural sector of the economy, on living standards Punjab residents had come to expect as a result of the events of that period.

The Sikh population in Punjab specifically reflected on its economic situation subjectively and collectively and held the Indian state directly responsible for the deteriorating economic conditions. The Indian state was held accountable for the economic decline in the Punjab region because it had introduced Green Revolution farming and had continued to maintain strict regulatory control over many key components of this farming program. Green Revolution farming brought the Indian state into direct contact with Sikh farmers in Punjab on a daily basis through the supply of agricultural inputs, the setting of input prices, the provision of agricultural credit, the setting of food grain harvest prices, and the procurement of food grains, all issues that contributed to creating between them an adversarial relationship. When economic conditions deteriorated and Sikh farmers faced the prospect of economic ruin, through the loss of their agricultural landholdings, many believed that the Hindu-dominated Indian government could have adverted this economic crisis through implementation of economic measures designed to maintain stability and profitability in the agricultural sector.

The Indian state governing was also held accountable for the economic decline in Punjab because of the regulatory control it had over the development of industry in the state. The Indian government’s unwillingness to develop the industrial sector contributed to the inability of displaced Sikh farmers to obtain non-farm employment and prevented successive Sikh

generations entering the labour force from obtaining meaningful employment; instead, they were relegated to join the ballooning ranks of the unemployed in the state. Sikhs began to feel that the economic security upon which they depended for a livelihood was either gone or under extreme threat. The commercialization of the Punjab agricultural sector by the Indian government through the introduction of Green Revolution farming and its implementation by Sikh cultivators weakened the financial security of agricultural peasants and the foundation of a previously cohesive rural community (Lichbach, 1994).

Many Punjab residents began to perceive the economic deprivation as an extension of the political and cultural repression the Sikh population had been exposed to under Indian Hindu rule since independence in 1947. These feelings of economic deprivation quickly translated to anger and frustration towards the Indian state, leading individuals to openly criticize the Indian central government. During the latter half of the 1970s and early 1980s, segments of the Sikh population felt extremely alienated and disenfranchised as they had no recourse, now way to change their bleak economic conditions. The Sikhs attempted to engage the dominant political parties in the state and nationally to bring attention to their deteriorating economic plight but there concerns fell on deaf ears. The Akali Dal implemented limited measures to assist marginal and small farmers in the state or the rural landless population as the Akali Dal sought to protect their economic position and status within Punjab society (G. Singh, 1984). The disenfranchised Sikh population took forward their concerns about their deteriorating economic conditions to the state Congress and National Indian Congress (I) government but there concerns were ignored and not seen as legitimate (Chima, 1994). This Sikh population no longer possessed legitimate political or social avenues by which to have their economic grievances heard or addressed as they faced complete isolation and alienation within Punjab society (B. Singh, 2000). Some segments of the Sikh population faced with complete economic and political isolation in part accepted their economic reality and chose to pursue conventional political solutions, whereas, others chose an alternative solution to changing the negative economic trajectory of their lives (Lichbach, 1990; Singh, 1989).

6.1.5. Bhindranwale's Sikh Anti-State Terrorism Unleashed

During the 1970s, the Punjab's Sikhs were exposed to a period of rapid socio-cultural changes with the implementations of Green Revolution farming to the rural agricultural economy (Alam, 1988; Chima, 1997). This new method of farming based on a capitalist mode of production not only altered economic relationships within Punjab society but also drastically transformed social practices, cultural norms, social relationship, and individuals everyday lived realities (Oberoi, 1999; P. Singh, 2007). The Sikh population in Punjab who had led a simple

traditional religious lifestyle were now introduced to a capitalist economic system that promoted a modern way of living based on secularism and consumerism (Hapke, 1998). The pace of change in Punjab society was so dramatic and drastic it did not provide the Sikh population the ability to synthesize the nature of their evolving day to day reality. The by-product of this socio-economic change was a rising tide of visible economic inequality in the form of a growing inequitable distribution of wealth amongst the Sikh population and a deepening feeling of alienation or disconnection amongst the Sikh population (Malik, 1986). It's within this context of rising uncertainty and increased feelings of disconnection from mainstream Punjab society, the Sikh population sought a solution to their negative economic plight.

Rise of Bhindranwale and Sikh Fundamentalism

Through the late 1970s and early 1980s, there was an ever increasing young Sikh underclass population composed of small farmers and landless peasants facing increasingly limited employment avenues (Bryjak, 1985). Increasing numbers of unemployed Sikhs were now roaming the cities and towns in Punjab looking, with little success, for jobs harbouring strong feelings of resentment and deprivation (G. Singh, 1984). They were ripe for mobilization to bring some kind of solution to their seemingly impossible circumstances. During this turbulent period, Sant Jarnail Singh Bhindranwale stepped forward with his "pure" religious doctrine and teaching, offering an explanation to the Sikhs for the reality they had helped to construct but no longer could control (Oberoi, 1990, p. 267). Bhindranwale's religious message resonated with this growing disenfranchised Sikh population as it promised a reversal of their life circumstances and returning Sikhs to their former level of glory in Punjab society (Malik, 1986).

Sant Jarnail Singh Bhindranwale was a charismatic leader with a magnetic personality who preached the essence of Sikhism (Pettigrew, 1987). He came from very humble beginnings born in 1947 in the village of Rhode into a poor rural Jat Sikh family (Yaeger, 1991). In the 1960s, at a young age, his family sent him to study religion at Damdami Taksal located in Chowk Mehta 40 kilometres outside of Amritsar in the hopes he could attain the prestigious profession of becoming a religious preacher. Damdami Taksal was a religious institution that traced its origins back to Baba Deep Singh, known to have been instructed and trained by Guru Gobind Singh, the 10^{th} and final guru, who had founded the Khalsa order (Army of the Pure) (Oberoi, 1990). During his time, at this religious institution, Sant Jarnail Singh Bhindranwale would become the protégé of Sant Kartar Singh, the master of the prestigious learning centre. Damdami Taksal was known for teaching its students the proper manner in which to read the Guru Granth Sahib (Sikh Holy Book) and learned to recite its scripture by heart (Sharma, 1990). The institution taught that strict adherence to the Sikh tenets was essential in order to lead a life of piety and purity which was the essence of the Guru's teachings. Students at the institution were exhorted to participate in

selfless missionary work and to practice baptismal vows to admit individuals into the Sikh faith. However, most critically, Sant Bhindranwale was taught to defend the Sikh faith through all measures deemed appropriate (verbally or with arms) including the use of violence for the righteous cause of preservation of the Sikh faith (Major, 1987). Other faiths, in particular Hinduism, were looked upon suspiciously and were deemed to be enemies of the Sikh faith due to their ability to absorb rival faiths and exhort its influence on Sikhism. In 1977, at the age of 24, Sant Bhindranwale took control of Damdami Taksal after the passing of Sant Kartar. Toward the end of his religious education, he was fully indoctrinated and a faithful blind follower of Sikhism (Sharma, 1986).

As the leader of Damdami Taksal, Sant Bhindranwale, in the late 1970s, was pro-active in disseminating his vicious form of Sikh fundamentalism, captivating those who watched his sermons and provocative teachings. He engaged the Sikh population and his followers by touring rural villages imploring the congregations to not abandon the essence of the faith or discard external Sikh symbols (Kapur, 1987). Sant Bhindranwale's popularity increased through his religious tours in the countryside, where he launched his "Amrti Prab" campaign, exhorting his followers to become fully baptised Sikhs and maintain the external five symbols of the Sikh faith (i.e., katcha, kara, kunga, kes, kirpan) (Oberoi, 1990, p. 231). He believed that only through formal baptism could Sikhs cleanse themselves of their impurities and demonstrate their inner commitment to the Holy Scripture (Mcleod, 1998; Yaegar, 1991). Sant Jarnail Singh Bhindranwale wanted his Sikh followers to lead a pure and ethical Sikh way of life, maintaining their moral integrity as a religious population (Singh, 2007).

In the late 1970s, Sant Bhindranwale was witnessing a rapidly changing Punjab society where a large portion of the disenfranchised Sikh population approached him to make sense of their continual suffering and the economic despair that was plaguing the countryside. He attracted a large following throughout the 1970s, due to his engaging style of preaching and ability to translate Sikh history into a simple language. His style of preaching could be understood by the uneducated masses, and he recited historical religious teachings that were directly applicable to the reality his Sikh followers were facing in rural Punjab during that period (Pettigrew, 1987). Sant Bhindranwale saw the social, political, religious, and economic suffering that the Sikh population was being exposed to as being caused by two simple factors: internal decline in the faith in the form of religious dissoluteness among the Sikhs and intensifying external threats posed by “ever increasing Hindu domination over” the Sikh population (Oberoi, 1990, p. 267).

Sant Bhindranwale was highly critical of the Sikh community making specific reference to the internal decline of the population with its abrupt transition away from a pure, traditional Sikh lifestyle (Bryjak, 1985). He saw the Sikh population practising a daily form of living that was devoid of substance and a "departure from God's truth" (Pettigrew, 1987, p. 11). Sant Bhindranwale saw the Sikh population in Punjab showing irreverence to Sikhism by deviating away from established religious norms and by many ceasing to practise the faith altogether (Hapke, 1988). Bhindranwale saw this transformation in the Sikh population and internal decline in the religion as being caused by the rising influence of Western ideals and adoption of secular practices (Chima, 1997). The impact of Western influence in Punjab was evident with visible socio-cultural changes and the adoption of more modern thought processes amongst the Sikh population (G. Singh, 1984). Sant Bhindranwale was critical of Western modernization because it emphasized consumerism where social relationships were commoditized and individuals pursued personal economic gains at all costs, with little consideration for the well-being of the collective Sikh population (P. Singh, 2007). He also saw the moral decline of the Sikh population progressing rapidly with the rampant rise of Western social diseases threatening the identity and very existence of the Sikh faith (Sharma, 1996). An increasing number of Sikh youth were lured by more "progressive Western values" which brought social diseases like alcoholism, drug addiction, smoking, and viewing of pornographic literature rise at alarming rates (Kang, 2005, p. 42). Sikhs adopted western styles of dress, women began to apply make-up products and dress provocatively, adults listened to inappropriate music and viewed vulgar cinema, and youth became openly defiant within the family (Kang, 2005; P. Singh, 2007). In particular, the Sikh religious fundamentalist movement was concerned with the growing number of Sikhs who were modifying their distinct external appearance by shaving or trimming their beards and ceasing the practise of tying a turban and cutting their hair (Jaswal, 1996).

In addition to the internal moral decline of the Sikh population, the Sikh fundamentalist movement was growing excessively concerned about breakaway heterodox sects within Sikhism that were modifying the traditional teachings and practices of the faith (P. Singh, 2007). The non-orthodox Nirankari's were the object of the greatest ire of Sant Bhindranwale's orthodox fundamentalist movement because of their increased popularity amongst weaker sections of the rural Sikh population (Purewal, 2002). The Nirankari's believed in and worshipped a living guru, which was contrary to the belief of orthodox Sikhs that the line of gurus ended with the 10th guru and the Holy Guru Granth Sahib scriptures were deemed to be the 11th and final Guru (Jaswal, 1996; Kang, 2005; Mohan, 1991). The Nirankari group had also developed its own distinct set of Holy Scriptures in which specific passages were considered "blasphemous" by orthodox Sikh followers and were believed to deviate from traditional Sikh practices (Jaswal, 1996, p. 11). This

group also participated in idol adoration and did not perform ritual baptisms, which was contrary to traditional orthodox Sikh practices (Purewal, 2000).

During the latter half of Sant Bhindranwale's Sikh fundamentalist movement, his focus turned directly towards the external threat the Hindu population posed to the continued existence of the Sikh faith within Punjab. Bhindranwale possessed a deep-seated fear that through the introduction of secular practices by the Hindu-dominated Indian government, practices that were contradictory in many ways to the Sikhs' way of life, the Sikh population would, over time, be assimilated (Sharma, 1996). The core components of his criticisms echoed arguments made previously by Sikh leaders and members of the Akali Dal party who had openly criticized what they perceived as internal Hindu discrimination and repression of the Sikh population (Kang, 2005; Pettigrew, 1987). Sant Bhindranwale spoke openly in his sermons about the continual political, cultural, and economic repression Sikhs in Punjab faced historically and continued to face on a daily basis. He pointed to the unwillingness of the central Hindu government to implement policies and measures to protect the Sikh religion, Punjabi language, and cultural traditions or practices (Kang, 2005). Sant Bhindranwale argued that if the Indian government truly believed in entrenching the Sikh populations' unique place within Indian society and wanted to protect the Sikh faith, they would have "accepted the political, religious, economic, and territorial demands presented in the Anandpur Sahib Resolution (ASR)" (Kang, 2005, p. 45).

Bhindranwales' criticisms of the Indian government intensified over time and expanded to the economic sphere where the Sikh population was facing dire financial conditions in the late 1970s and early 1980s (Kang, 2005). He was highly critical of what he saw as the increasing centralization of economic power in the hands of the Indian government who continued to guide the development of the agricultural and industrial sectors of Punjab's economy (Pettigrew, 1987). The central government having failed to address Sikh concerns and continuing to hinder industrial development within the state of Punjab through strict control of industrial licensing policies preventing job growth needed to absorb the increasing number of individuals entering the labour force in Punjab. Bhindranwale asserted that the poor economic conditions faced by the Sikh population were not the result of the natural cycle in economic markets but rather the direct result of discriminatory economic decision making by the Hindu dominated central government (Pettigrew, 1987).

Bhindranwales' Sikh Fundamentalism Objectives

Sant Bhindranwale, in response to the ominous social and economic conditions, saw two feasible solutions to the Sikh's predicament. He believed that to reduce suffering, the Sikh population needed to practise their faith with greater drive and fully adopt an orthodox Sikh

lifestyle (Kang, 2005; Oberoi, 1990). Sikh's were seen leading a very impure way of life that contradicted "Gods" will and measures needed to be implemented in order to purify the community from this devious state of existence (Pettigrew, 1987, p. 11). In order to purify the Sikh community, followers were encouraged to lead a simple ethical pure Sikh way of life where faith was the central principle of their existence (Kang, 2005; P. Singh, 2007). This pure Sikh lifestyle it was believed would only be achieved through the adoption of a very rigid form of the traditional Khalsa identity and strict adherence to "rehetnama (codes of conduct)" (Pettigrew, 1987, p. 13). This orthodox Sikh lifestyle that Bhindranwale preached required followers to maintain their unique outward symbols of the Khalsa faith (Kes (unshorn hair), Kara (iron bangle), katcha (long breeches), kanga (comb), kirpan (sword), and demonstrate their "inner conviction to Sikhism" by becoming fully baptized through taking of amrit (i.e., baptismal nectar) (Kang, 2005; Teleford, 1992).

Followers of the Sikh faith were to adhere to strict rules of moral conduct abstaining from activities such smoking, consuming alcohol, gambling, and narcotic use (Pettigrew, 1987). In particular immoral activities such as adultery and theft were frowned upon, and Sikh women were to be barred from wearing jewellery, cosmetics, and provocative clothing to reduce temptation (Kang, 2005; Oberoi, 1990). Devote Sikhs were to recite bani (i.e., lord's prayer-religious hymns) at least twice a day at dawn and at sunset, and they were to memorize text from the Holy Scripture (i.e., gurbani) (Judge, 2004; Kang, 2005).

Second, Sant Bhindranwale saw the creation of Khalistan, an independent state for Sikhs, as essential for the preservation of the Sikh population (Wallace, 1986). He implored his followers through carefully articulated speeches to participate in a justified violent "Holy War" (Dharam Yudh) against the Hindu-dominated Indian government. The newly established state of Khalistan would be solely under the control of a Sikh government and be governed by Sikh theology (Oberoi, 1990). The creation of an independent theocratic Sikh state was deemed essential by Bhindranwale in order to provide a protective environment where the Sikh religion, culture, language, and social practices would be protected and could blossom without continual intervention by the Hindu state (Chima, 1997; Kang, 2005). The independent state of Khalistan would also reduce the continual repression and social inequalities the Sikh population were exposed to at the hands of the Hindu government.

Sikh Violence Justified

In order to achieve his final solution of Khalistan, Bhindranwale reverted to the use of violence. Bhindranwale argued that the Sikh religion was under direct threat, the population was being repressed in various contexts, and that the Hindu dominated Indian government was

attempting to annihilate the Sikh faith (Pettigrew, 1987). He entrenched the notion within his followers that the use of violence was justified when used in legitimate situations of collective self-defence against continual threat or repression at the hands of the Hindu government (Shani, 2000). Bhindranwale skillfully altered Sikh history in his speeches by citing text from holy Sikh scriptures and making specific reference to the guru's teachings that emphasized the right of the Sikh population to use violence in self-defence and to combat injustice (Kang, 2005; Major, 1987). He equated the repressive situation the Sikh population was facing in Punjab in the early 1980s to the persecution the Sikh gurus had faced when opposing Muslim and Moghul tyranny in previous centuries (Shani, 2000). He pointed to the religious tradition as taught by the Sikh Guru's in the Holy Scripture that the Sikh population had the right to bear weapons in order to preserve the Sikh faith and to cease the suffering of the community (Kang, 2005; Kapur, 1987). His followers were encouraged to demonstrate sacrifice and become martyrs for the Sikh cause as they would be rewarded in the afterlife with internal bliss (Pettigrew, 1987). A new generation of Sikh youths yearned for the return of historical Sikh glory and to participate in a righteous religious cause to ameliorate their negative everyday reality: Bhindranwale provided them with a solution.

6.1.6. Profile of Sikh Terrorist

An examination of the profile of participants in the Sikh anti-state terrorism movement over the length of the conflict shows a major portion of the individuals drawn into the conflict were from the economically disenfranchised segment of the Sikh population. The most significant study conducted examining the demographic characteristic of Sikh terrorists was conducted by Puri, Judge, and Sekhon (1999) who examined the socio-economic background of 323 Sikh terrorists from 28 villages from the district of Amritsar. Information regarding Sikh terrorists was obtained through field interviews with former members of Sikh terrorist organizations, family members of Sikh terrorists, security personnel, and other individuals with intimate background knowledge of members of these organizations. The study found that 81.73% (264) of Sikh terrorists hailed from the Jat Sikh caste, with the Mazbhi caste composing the next largest group at 7.42% (24) (see Table 6.5).

Table 6.5. Caste Background of Sikh Terrorists

Caste	Total	Percentage (%)
Jat	264	81.73
Arora	1	0.31
Ramgarhia	8	2.48
Kumhar	6	1.86

Caste	Total	Percentage (%)
Jheer	4	1.24
Chhimba	2	0.62
Nai	6	1.86
Mazhbi	24	7.42
Brahmin Hindu	1	0.31
Khatri Hindu	1	0.31
Christian	3	0.93
Other (Kashmiri Sikh)	3	0.93
Total	323	100%

Note. Adapted from "Terrorism in Punjab: Understanding Grassroots Reality", (p. 60), by H. Puri, P. Judge, & Sekhon, 1999, New Delhi: Har-Anand.

A majority of individuals who joined Sikh terrorist organizations were under the age of 25 (79.89%), with 15.48% being between the ages of 26 to 35 (see Table 6.6). The educational levels of Sikh terrorists show that 24.15% were illiterate, with a majority 66.88% having achieved at least matriculation (i.e., high school graduation standard) or below (see Table 6.7). Though the caste characteristics demonstrated that a majority of Sikh terrorists belonged to the dominant Jat Sikh caste, only 13.62% of the total came from families owning landholdings of 10 or more acres (see Table 6.8). Approximately 19.2% came from families that were landless and a majority (45.21%) came from small and marginal landholdings of up to 5 acres. Of the prior professions of those who joined Sikh terrorist organizations, 36.53% were previously engaged in farming, and the second largest category, at 24.77% were unemployed (see Table 6.9).

Table 6.6. Age Composition of Sikh Terrorists

Age (In Years)	Number	Percentage (%)
< 25 (Less than)	258	79.89
26-35	50	15.48
>36 (And Over)	15	4.63
Total	323	100%

Note. Adapted from "Terrorism in Punjab: Understanding Grassroots Reality", (p. 64), by H. Puri, P. Judge, & Sekhon, 1999, New Delhi: Har-Anand.

Table 6.7. Education Level of Sikh Terrorists

Level of Education	Number	Percentage (%)
Illiterate	78	24.15
Matriculation and Below	216	66.88
Graduates and Above	29	8.97
Total	323	100%

Note. Adapted from "Terrorism in Punjab: Understanding Grassroots Reality", (p. 65), by H. Puri, P. Judge, & Sekhon, 1999, New Delhi: Har-Anand.

Table 6.8. Family Land Holdings (Ownership) of Sikh Terrorists

Size of Land In Acres	Total	Percentage (%)
Landless	62	19.20
< 5 (Less than)	146	45.21
5-10	71	21.97
> 10 (And Over)	44	13.62
Total	323	100%

Note. Adapted from "Terrorism in Punjab: Understanding Grassroots Reality", (p. 62), by H. Puri, P. Judge, & Sekhon, 1999, New Delhi: Har-Anand.

Table 6.9. Occupation Prior to Joining Sikh Terrorist Movement

Occupation	Number	Percentage (%)
Farming	118	36.53
Unemployed	80	24.77
Student	20	6.19
Casual/Attached Worker	14	4.33
Soldier	9	2.79
Policeman	7	2.17
Illicit Liquor Distiller	7	2.17
Shopkeeper/Small Businessman	6	1.86
Other	62	19.19%
Total	323	100%

Note. Adapted from "Terrorism in Punjab: Understanding Grassroots Reality", (p. 67), by H. Puri, P. Judge, & Sekhon, 1999, New Delhi: Har-Anand.

The study conducted by Puri, Judge, and Sekhon (1999) is the most extensive analysis completed on the socio-economic backgrounds of Sikh terrorists, but two other, smaller micro-level studies have been conducted examining the background of these individuals. A study conducted by Bal and Judge (2001) attempted to establish the socio-economic background of 22 Sikh terrorists from the village of Butala, Amritsar. The study found that a majority of the terrorists (91.81%) were below the age of 25; a majority (72.72%) were from the dominant Jat Sikh caste;

72.72% had achieved matriculation or below, with only 13.64% being illiterate (see Table 6.10, 6.11, 6.12). Finally, a majority (69.09%) were unemployed prior to joining the Sikh terrorist movement, and only 18.18% were engaged in farming (see Table 6.13).

Table 6.10. Age Composition of Sikh Terrorists

Age (In Years)	Number	Percentage (%)
< 25 (Less than)	20	91.81
25 to 27	2	9.09
Total	22	100%

Note. Adapted from "Terrorism and Rural Entrepreneurship in Punjab", by G. Bal & P. Judge, 2001, *The Journal of Entrepreneurship*, 10(2), p. 197. New Delhi: Sage Publication.

Table 6.11. Education Level of Sikh Terrorists

Level of Education	Number	Percentage (%)
Illiterate	3	13.64
Matriculation and Below	16	72.72
Graduates and Above	3	13.64
Total	22	100%

Note. Adapted from "Terrorism and Rural Entrepreneurship in Punjab", by G. Bal & P. Judge, 2001, *The Journal of Entrepreneurship*, 10(2), p. 197. New Delhi: Sage Publication.

Table 6.12. Caste Background of Sikh Terrorists

Caste	Total	Percentage (%)
Jat Sikh	16	72.72
Kashmiri Brahmin Sikh	3	13.64
Mazbi Sikh	3	13.64
Total	22	100%

Note. Adapted from "Terrorism and Rural Entrepreneurship in Punjab", by G. Bal & P. Judge, 2001, *The Journal of Entrepreneurship*, 10(2), p. 197. New Delhi: Sage Publication.

Table 6.13. Occupation Prior to Joining Sikh Terrorist Movement

Occupation	Number	Percentage (%)
Farming	4	18.18
Unemployed	13	69.09
Lawyer	1	4.54
Pathi (Reciter of Gurbani)	1	4.54
Mechanic	1	4.54
Vegetable Worker	1	4.54
Labourer	1	4.54
Total	22	100%

Note. Adapted from "Terrorism and Rural Entrepreneurship in Punjab", by G. Bal & P. Judge, 2001, *The Journal of Entrepreneurship*, 10(2), p. 197. New Delhi: Sage Publication.

Relatively similar conclusions were obtained by S.S. Gill (1991), who examined the socio-economic background of 40 Sikh terrorists from the districts of Ropar and Kapurthala in Punjab. His study involved interviewing 40 Sikh terrorists in January, 1991, and he examined four characteristics pertaining to their socio-economic backgrounds. Gill's findings indicate that 72.5% of the terrorists were under the age of 25, with a further 22.5% being between the ages of 26 to 30 (see Table 6.14). In relation to educational background, only 7.5% were found to be illiterate, and a majority at 62.5% had achieved matriculation or below (see Table 6.15). A majority (75%) were from the Jat Sikh caste, and only 20% were from landless households (see Table 6.17). In relation to family background, Gill's findings are different in that they indicate a higher number of terrorists came from families possessing medium-size landholdings (35%) but also that a major portion (27.5%) were drawn from the marginal holdings category (see Table 6.16).

Table 6.14. Age Composition of Sikh Terrorists

Age (In Years)	Number	Percentage (%)
	S.S. Gill Study (1990)	
< 25 (Less than)	29	72.5
26-30	9	22.5
>30 (And Over)	2	5.0
Total	40	100%

Note. Adapted from "Religion and nationalism in India: The case of the Punjab", (p.141), by H. Deol, 2000, London: Routledge.

Table 6.15. Education Levels of Sikh Terrorists

Level Of Education	Number	Percentage (%)
	S.S. Gill Study (1990)	
Illiterate	3	7.5
Matriculation and Below	25	62.5
Graduates and Above	12	30.0
Total	40	100%

Note. Adapted from "Religion and nationalism in India: The case of the Punjab", (p.141), by H. Deol, 2000, London: Routledge.

Table 6.16. Family Land Holdings (Ownership) of Sikh Terrorists

Size of Farm (In Acres)	Number	Percentage (%)
	S.S. Gill Study (1990)	
Landless	8	20.0
< 5 (Less than)	11	27.5
5-10	14	35.0
> 10 (And Over)	7	17.5
Total	40	100%

Note. Adapted from "Religion and nationalism in India: The case of the Punjab", (p.141), by H. Deol, 2000, London: Routledge.

Table 6.17. Caste Background of Sikh Terrorists

Caste	Number	Percentage
	S.S. Gill Study (1990)	
Jat Sikh	30	75.0
Kamboj	3	7.5
Saini	2	5.0
Harijan	2	5.00
Arkhan (Carpenter)	1	2.5
Nai (Barber)	1	2.5
Rai Sikh	1	2.5
Total	40	100%

Note. Adapted from "Religion and nationalism in India: The case of the Punjab", (p.141), by H. Deol, 2000, London: Routledge.

The findings of these three studies examining the socio-economic background of participants in the Sikh anti-state terrorism movement are important because they provide support to the hypothesis that the inequitable distribution of wealth plays an instrumental role in the rise of

terrorist violence. The socio-economic background of those who joined Sikh terrorist organizations was largely a generation of disenfranchised young rural Jat Sikhs from landless or small/marginal landholding households. Many of these individuals had directly experienced the negative impact of Green Revolution farming, with many of their farming households being forced to withdraw from agricultural production or facing continual economic hardship because of financial losses. Also, a large number of those who enlisted in Sikh terrorist organizations were unemployed prior to joining the movement, indicating that these Jat Sikhs were unable to secure employment in either agriculture or the underdeveloped secondary or tertiary sectors of the economy. For a portion of the young rural Jat Sikh population facing dire economic conditions and limited future employment, participating in a violent terrorist uprising was perceived as a viable solution; a minority of this population were willing to join in terrorist violence against the Indian state in order to force economic improvements that would, among other results, bring about an equitable redistribution of wealth in Punjab society.

6.1.7. Sikh Anti-State Terrorism

The initial focus of Sant Bhindranwale and his religious Sikh fundamentalist movement was the perceived heretical Nirankari sects who were viewed as practising a blasphemous version of Sikhism (Kang, 2005; Kapur, 1987). The initial bloody clash with this group was orchestrated by Bhindranwale in 1978 in the city of Amritsar, where the Sant Nirankari's were holding a convention (Kang, 2005; Purewal, 2000). Bhindranwale was upset that a heretical Sikh sect would dare to hold a convention in the Sikh's holiest city (Oberoi, 1990). He delivered an inflammatory sermon within the confines of the Golden Temple encouraging his followers to exact revenge against the Nirankaris for their actions, precipitating a clash that resulted in the deaths of 12 orthodox Sikhs and 3 Sant Nirankari's. This initial clash facilitated the growth of violence led by Bhindranwale as it provided him legitimacy and mobilized his followers to pursue his political objectives (Teleford, 1992). In April 1980, Baba Gurcharan Singh, the spiritual leader of the Nirankaris was assassinated by a person believed to be a member of Bhindranwale's terrorist organization, at his direction (Sharma, 1996). Bhindranwale had a particular disdain for the Nirankaris because he believed this reformist group had been created by the members of the Hindu faith as a means to corrupt Sikhism and eventually lead followers of the Nirankari sect back into the fold of Hinduism (Ali, 1985). Niranakaris' would continue to be a favorite target of Sikh fundamentalists into the early 1980s, particularly by members of Bhindranwale's religious institution of Dam Dami Taksal, who openly killed members of this sect (Jaswal, 1996; Kang, 2005). Members of the Nirankari sect were, attacked regardless of gender or age, as, for

example, in April, 1984, when three female followers and a child were murdered while they attended a Nirankari place of worship (Unknown, 1984).

During the early 1980s, the target of Bhindranwale's Sikh anti-state terrorism movement shifted as he commenced his reign of terror against the Indian state. The acts of violence were primarily carried out by three terrorist organizations, Dal Khalsa, AISSF (All India Sikh Student Federation), and Dashmesh Regiment, all believed to be under the direct control of Sant Bhindranwale (Kang, 2005). Bhindranwale continuously denied any links to or having influence on Sikh terrorist organizations and purported to have no influence on the acts committed by these groups. These Sikh terrorist organizations did not possess any formal political wings but were rather militaristic in structure (Unknown, 1985). The strongest terrorist organization within this group was the AISSF, which had 100,000 organized members and was led by Bhai Amrik Singh, the "blood brother" of Sant Bhindranwale and son of the former seminary leader of Dam Dami Taksal (Teleford, 1992, p. 981). Members of the Sikh student federation were dispersed throughout the various universities and colleges in the state, with members having strong social links in Punjab's rural community (Kang, 2005; Teleford, 1992). The AISSF was unique in that a dedicated segment of its supporters had taken an allegiance to defend the Sikh faith at all costs and pledged their lives for the movement (Unknown, 1984). In addition, the AISSF was heavily armed and had access to sophisticated automatic firearms. The AISFF was strongly committed to Bhindranwale's cause of Khalistan as a result of familial links (Bhai Amrik Singh) but also because a large portion of its membership were disenchanted with poor economic conditions of the landless Sikh peasantry and the continual underemployment in the state (Major, 1987).

As Sant Bhindranwale's movement and beliefs matured over time, there was also a corresponding change in the targets of his terrorist activities and the tactics used by Sikh terrorist groups. The violent activities perpetrated by Sikh terrorist organizations can be classified into two distinct categories; "targeted killings and random indiscriminate killings" or acts of violence (Kang, 2005, p. 50). The Sikh terrorist organizations under the control of Bhindranwale in the early 1980s initially showed a great deal of discipline with acts of violence being perpetrated to obtain a specific goal. Initially, Sikh terrorist organizations primarily targeted selected individuals who openly criticized Bhindranwale and his long-term objectives for the Sikh population (Major, 1987). Sant Bhindranwale did not take well to individuals openly criticizing the belief system upon which the Sikh fundamentalist movement was based nor the actions he took to further the Sikh cause (Kang, 2005). He was critical of print media, politicians, and scholars who vocalized concerns and pointed out deficiencies in his arguments and teachings (Ali, 1984).

In addition, Bhindranwale was content to liquidate those individuals he believed posed a threat in achieving his goal of Khalistan or posed a major threat to his anti-national activities (Sharma, 1996). Bhindranwale created "hit squads" within Dal Khalsa and the Dashmesh Regiment whose sole purpose was to eradicate individuals he deemed expendable. The hit squads of Bhindranwale were highly active, targeting individuals within Punjab and also demonstrating their capability by eliminating individuals throughout India or abroad. Bhindranwale intimidated his most vocal critics with the threat of violence and demonstrated an ability to reach out and expose his adversaries to violence regardless of their location (Ali, 1984) Individuals targeted via assassination included moderate Sikh or Hindu politicians, moderate Sikh religious leaders, civil servants, and Hindu newspaper editors (Bryjak, 1985; Kang, 2005; Sharma, 1996). The influence and capability of Bhindranwale's Sikh terrorist organization was vast and actively infiltrated various branches of national and state governments. He then utilized embedded Sikh extremists in government agencies to collect intelligence on perceived threats to his movement or used these individual to assassinate government officials to promote fear and provoke communal violence (Unknown, 1984). In particular, Bhindranwale's group's favorite targets included political leaders of the Congress (I), BJP (Bhartiya Janata Party), Jan Sangh, Akali Dal, and members of or workers for these opposition parties (Kang, 2005; Sharma, 1996). Members of the Congress (I) party were sought-after targets, with Sikh terrorists eliminating federal and state level officials due to their links to the Indira Gandhi central government (Ali, 1984). These terrorist organizations also targeted select law enforcement personnel who had participated in security operations designed to apprehend participants or members of Sikh terrorist organizations (Sharma, 1996). These killings of Punjab law enforcement personnel were designed to intimidate security agencies to cease their counter-terrorism operations (Kang, 2005). Members of Bhindranwale's Sikh terrorist organization demonstrated a great deal of bravado directly engaging Punjab police and security personnel in armed conflict by attacking police stations or checkpoints to demonstrate their open contempt for Indian authority (Keesings, 1983).

The second set of Sikh terrorist activities can be classified as indiscriminate murders or violent activities perpetrated against the Hindu population in Punjab (Kang, 2005). These acts of violence perpetrated were designed to intimidate and create panic among the Hindu population, leading to their mass exodus from the state and facilitating the creation of Khalistan where Sikhs would comprise the overwhelming majority (Kapur, 1987; Mohan, 1991). It was also hoped that acts of violence perpetrated against the Hindu population would prompt reprisals against Sikhs outside the state, leading to the immigration of Sikhs back into Punjab (Kapur, 1987; Mohan, 1991). Sikh terrorist organizations worked diligently to promote and construct an atmosphere of distrust between the Sikh and Hindu populations in order to promote communal violence (Ali, 1986). A favorite tactic of Sikh terrorists to provoke the Hindu population in Punjab was the

desecration of Hindu temples, setting Hindu idols and pictures of Hindu gods ablaze, and dumping severed cow heads onto the grounds of these religious institutions. Also, within the holy city of Amritsar and later other major Punjab cities Sikh terrorist organizations called for a ban on cigarette sales and intoxicants which were seen as insulting members of the Sikh faith (Unknown, 1982). In order to demonstrate their displeasure with these practices, members of Sikh terrorist organizations set fire to cigarette shops and liquor stores and also shot dead Hindu shopkeepers (Ali, 1986). These acts would spur tit-for-tat violence, with members of the Hindu community throwing cigarettes on the grounds of Sikh temples, invading temples, tearing copies of Sikh scriptures, and setting fire to Sikh shops or killing Sikh citizens in retaliation (Unknown, 1982). Various forms of religious violence perpetrated by members of one community were responded to with acts of communal violence and rioting, leading to the destruction of homes, property, and the loss of life.

The number of indiscriminate killings of Hindu residents in Punjab commenced in the early 1980s, as individuals were chosen as targets solely based on convenience by armed members of Sikh terrorist organizations during the commission of a terrorist act (Chima, 2002; Kang, 2005; Mohan, 1991). Members of the Hindu community in Punjab were continuously exposed to general death threats by Bhindranwale and members of his terrorist organization, as they were threatened to be slaughtered if they retaliated against the Sikh population (Unknown, 1983). The tactics used to kill Hindu residents in Punjab included Sikh terrorists on motorcycles shooting unsuspecting citizens at point blank range, Hindu commuters on hijacked buses or trains being dragged out, segregated, and executed, and bomb attacks on Hindu congregations attending religious festivals or processions (Jaswal, 1990; Kang, 2005; Sharma, 1996). Buses transporting Hindus to religious festivals were subdued and set on fire, and Hindu passengers physically assaulted. The range of terrorist activities to increase Hindu casualties included derailing commuter trains and arson attacks on Hindu businesses and residences. Over the length of the conflict, Sikh terrorist organizations began to specifically target members of the Hindu business community located primarily in major urban centres, leading to arson attacks on industrial and commercial units designed to expedite the exit of Hindus from the state (Ali, 1986). Sikh terrorists frequently bombed railway stations, commuter trains within and outside the state, postal outlets, and government offices (Bryjak, 1985; Kapur, 1987). Sikh extremists also expanded their terrorist activities to include hijacking of commercial aircraft using daggers and petrol bombs to commandeer airplanes (Unknown, 1984). In many cases, hijacked planes were flown to Pakistan with hijackers later surrendering to Pakistani authorities. Sikh militants also targeted physical infrastructures in the state, such as bombing electrical transmission towers, communication networks, and major traffic thoroughfares to inflict damage to the state economy (Ali, 1985). To secure funds needed to finance their operations, Sikh terrorist robbed banks and

businesses and to access weapon caches and munitions, they looted home guard armouries (Kang, 2005; Mohan, 1991; Sharma, 1996). As can be seen in Table 6.18 and Table 6.19, the number of murders, explosive terrorist attacks, arsons, robberies, and armed activities continued to rise throughout the 1980s and into the early 1990s as the Sikh anti-state terrorism conflict intensified.

Table 6.18. Sikh Terrorist Crime in Punjab from 1981 to 1995

Year	Murder/ Shootout Cases	Explosives Act	Arson Damage to Property	Robberies	Attacks on Nirankaris	Assault on Gov't Servant
1981	7	11	6	0	3	2
1982	5	24	15	1	9	21
1983	54	49	16	98	22	29
1984	275	81	184	285	11	39
1985	64	55	39	61	2	4
1986	357	26	26	255	6	2
1987	791	56	100	638	4	3
1988	1124	89	29	553	1	10
1989	846	73	18	229	1	7
1990	2116	188	59	511	3	1
1991	2107	187	43	340	3	0
1992	979	147	15	131	0	0
1993	47	78	2	14	0	0
1994	0	18	0	4	0	0
1995	0	9	0	2	0	0
Year	Seditious Activities	Act on Sacrilege	Arms Act	Police Encounters	Other Misc. Cases	Total
1981	0	1	0	0	34	64
1982	6	53	13	5	61	213
1983	9	30	17	3	59	386
1984	194	27	52	80	82	1310
1985	49	8	64	20	89	455
1986	77	5	441	109	362	1666
1987	202	3	1378	410	1274	4859
1988	81	2	1268	461	1413	5031
1989	21	0	1153	582	798	3728
1990	14	0	849	746	778	5265
1991	23	0	976	1282	884	5845
1992	24	0	750	1399	393	3838
1993	4	0	636	571	191	1543
1994	3	0	189	79	15	308
1995	1	0	77	27	4	120

Note. Adatped from Extremist/Terrorist Crime: Punjab, by South Asia Terrorism Portal, October 11, 2012, retrieved from http:// www.satp.org/

Table 6.19. Annual Fatalities of Sikh Terrorist Related Violence in Punjab from 1981 to 1995

Year	Annual Civilian Fatalities	Annual Terrorist Fatalities	Annual Security Force Fatalities	Total
1981	13	14	2	29
1982	13	7	2	22
1983	75	13	20	108
1984	359	77	20	456
1985	63	2	8	73
1986	520	78	38	626
1987	910	328	95	1333
1988	1949	373	110	2432
1989	1168	703	201	2072
1990	2467	1320	476	4263
1991	2591	2177	497	5265
1992	1518	2113	252	3883
1993	48	798	25	871
1994	2	76	0	78
1995	0	11	0	11

Note. Adatped from Annual fatalities in terrorist related violence, by South Asia Terrorism Portal, October 11, 2012, retrieved from http:// www.satp.org/

In the early 1980s, anti-state terrorism violence was perpetrated almost exclusively by Bhindranwale and his Sikh terrorist organisations of Dal Khalsa, AISSF, and Dashmesh Regiment (Kang, 2005). The law and order situation in Punjab deteriorated rapidly in 1984 with security personnel unable to control the increasing levels of violence and forcing the Indian government to act in a decisive manner. In 1984, Bhindranwale and a number of "key members of his terrorist" organizations were killed in "Operation Bluestar", a military operation that involved army personnel storming the Golden Temple, Sikh's holiest shrine to clear it of extremist elements (Kang, 2005, p. 52; Sharma, 1996). Simultaneously, "Operation Woodrose" was launched in Punjab's countryside leading to the raid of 40 other Sikh shrines to dislodge extremist elements and seize weaponry and munitions hidden in these religious institutions. Villages in rural Punjab were also encircled by the Indian army, with security personnel conducting house-to-house searches for Sikh extremist elements, and all males between 18 and 30 were detained for questioning, with some never being returned to their families upon the completion of Operation Woodrose (Ram, 1984). There was a lull in terrorist violence in Punjab in 1985 as the remaining members of Bhindranwale's organization recouped and re-established operations.

After “Operation Bluestar”, the Sikh population’s feelings of alienation intensified, as the desecration of their holiest shrine came to symbolize the pinnacle of Hindu repression (Kapur, 1987). Members of the Sikh community compared the attack on the Golden Temple by armed forces during “Operation Bluestar” to the 1762 Ahmed Shah Abdali attack, where the Sikh temple was desecrated and Sikhs massacred by the Muslim ruler (Ram, 1984). There was a groundswell of support for Sikh terrorist organizations and their continual violence directed at the Indian state. In 1985, a number of new spin-off Sikh terrorist organizations emerged to continue the terrorist activities, including Bhindranwale Tiger Force (BTF), Khalistan Commando Force (KCF), Khalistan Liberation Army (KLA), Sakira group, United Sikh Army, and Tat Khalsa Armed Forces. These new Sikh terrorist organizations continued to perpetuate similar acts of terrorist violence. Targets of Sikh violence continued to be Hindu citizens in Punjab, Hindu politicians, Indian security personnel, and moderate Sikh political and religious voices. Particularly after “Operation Bluestar”, terrorists targeted Sikh politicians or officials who attempted to promote peace and advanced a conciliatory approach to the Punjab conflict (Unknown, 1988). Migrant Hindu workers in the state also became formal targets of Sikh extremists who saw the seasonal Hindu migratory labour population as a threat to the Sikh majority (Unknown, 1988). Unorthodox Sikhs also became targets as the Sikh fundamentalist movement evolved, as this population was seen as living impure lives that betrayed the Sikh faith (Unknown, 1986). As can be seen in Table 6.18, the intensity and frequency of violence in Punjab after 1985 continued to increase exponentially, with the number of murders, robberies, explosives acts, and arms acts increasing every year into the early 1990s. This increase in anti-state terrorism violence was facilitated by a dramatic increase in the number of Sikh terrorist organizations operating in Punjab and the continuing inability of security personnel to quell the level of terrorist violence. Sikh terrorist organizations operating in Punjab post-1984 developed an organized cell structure and were more capable of carrying out clandestine terrorist operations with increased success. Sikh terrorist organizations dramatically increased their capability to inflict mass casualties in carrying out terrorist operations through the acquisition of higher intensity explosives and sophisticated weaponry. Sikh anti-state terrorism violence would continue into the early 1990s unabated.

7. Economic Instability in the Punjab Agricultural Sector

7.1. Hypothesis II

> Hypothesis II: The likelihood of anti-state terrorism in Punjab is greater when landowners in the primary agricultural sector are unable to maintain financial stability.

Among the factors that influenced the rise of the Sikh anti-state terrorism movement in Punjab, financial instability of the primary agricultural sector of the economy played an important role. This financial instability in Punjab resulted from a number of interwoven variables, including access to financial capital, crop yields and cropping intensity, stability of input costs, sale of agricultural products into free markets without restriction, and procurement prices received for food grain yields. During the 1970s and early 1980s, a number of events impacted the agricultural sector in Punjab, rendering some segments of farmers unable to maintain financial stability and causing a downturn in the agricultural economy. Given that a majority of the Sikh population resided in rural areas and engaged in farming, this downturn significantly affected small and marginal segments of rural Jat Sikh farmers, forcing them to withdraw from farming and bringing into question the long-term financial viability of the state's agricultural operations. This financial instability in the agricultural sector of the Punjab economy substantially increased animosity toward the central Indian state and would later contribute to the rise of the Sikh anti-state terrorism movement in Punjab.

7.2. Hypothesis II (i)

> Hypothesis II (i): Anti-state terrorism is more likely to occur when farmers do not have access to substantial financial capital in order to invest in agricultural production and efficiency.

This section will provide an explanation of the sub hypothesis that anti-state terrorism in Punjab is more likely to occur when farmers do not have access to substantial financial capital in

order to invest in agricultural production and efficiency. Access to financial capital is determined by the ability of farmers to obtain loans from financial institutions and also for sufficiently capitalized financial institutions to have the ability to provide loans to all segments of agricultural cultivators. Key financial institutions financing the agricultural sector in Punjab during the introduction of Green Revolution farming had major deficiencies in these two areas. Segments of Punjab farmers had difficulty in accessing financial capital due to stringent loan conditions, and financial institutions financing the agricultural sectors were not sufficiently capitalized, limiting their ability to provide loans. In the next section, an overview of these inherent weaknesses will be provided, with a specific emphasis on the 1970s and the implementation of Green Revolution farming in the state.

As discussed earlier (see Chapters 4 and 5), Green Revolution farming fundamentally changed the manner in which farming practices occurred in Punjab, and, to be successful, required farmers to incur large financial expenditures both on initial purchases of agricultural inputs, primarily through cash transactions, and also on larger, long-term capital investments in irrigation, farm machinery, maintenance, and land improvements (Singh, 1974). Most Punjab farmers did not have the financial resources to make these investments and were thus dependent on borrowing to meet their operational needs (Jodhka, 2006) Initially, Punjab farmers obtained their credit primarily from government-operated institutions that had been established with the implementation of the HYV farming program (Satish, 2006).

7.2.1. Agricultural Financial Institutions in Punjab

Punjab Agricultural Cooperative Society

The Punjab Agricultural Cooperative Society was the primary government-operated agency responsible for providing agricultural credit to farmers (Singh, 2005). The Agricultural Cooperative had been reorganized in 1968 to act as an institution responsible for providing loans to farmers and was underwritten by the Punjab state and the federal government (Leaf, 1980). The agricultural cooperatives were selected as conduits for credit to farmers due to their extensive locations throughout the countryside, their ready access to farmers, and established relationships in farming communities. They primarily provided short-term loans to assist in covering costs of seeds, fertilizers, insecticides, pesticides, herbicides, and minor implements (Johar, 1983; Singh, 1995). However, cooperatives also offered limited long-term loans to assist in financing irrigation and mechanical equipment. The loans to Punjab farmers were based on farmers' ability repay the loans within a given time period and also on the amount of land owned by the farmer (Leaf, 1980).

Primary Land Mortgage Bank

In addition to agricultural cooperatives, Primary Land Mortgage Banks were responsible for advancing medium-to long-term loans used primarily to facilitate the purchase of equipment such as irrigation pumps, tractors, threshers, and tube wells and also to provide capital for land improvements. Primary Land Mortgage Banks were also underwritten by the Punjab and Indian governments. These banks were not as extensively spread throughout the state as cooperatives but played a considerable role in providing Punjab farmers access to long-term capital (Johar, 1983).

Commercial Banks

In the early stages of the Green Revolution program, the role of commercial banks in the agricultural credit sector was minimal and obscure. Historically, commercial banks in India had provided only limited agriculture-related loans, as they did not regard this sector as credit-worthy. However, when the national government committed to HYV farming, they understood that state agricultural cooperatives alone could not fully meet all the farmers' credit needs due to expected long-term financial demands and the gradual development of funding gaps. In 1969, the Indian government nationalized all major commercial banks and instructed these institutions to lend 18% of total credit to the agricultural sector (Bawa, 2000). The number of commercial banks in Punjab would steadily increase through the 1970s, expanding into rural farm districts and underserviced areas (Krishna, 1971). Ultimately, their primary role became providing long-term credit to farmers for major investments such as irrigation and mechanized farm equipment.

7.2.2. Punjab Farmers' Access to Credit

In order for Punjab farmers to implement Green Revolution farming technology in the 1970s, they needed ready access to financial capital. Proponents of HYV farming technology argued that it was scale-neutral, that any farmers adopting this technology, regardless of the size of their land, would increase their food grain productivity. Although this statement was, in part, correct in relation to productivity gains regardless of land size, nonetheless adopting the technology did not make sense economically for particular classes of farmers, specifically marginal and small farmers (Biasucci, 1997). The economic feasibility of HYV farming for small and marginal farmers was difficult because the financial returns associated with the technology in comparison to the investment were negligible, whereas, large farmers could recoup costs through larger returns based on total land size (Saini, 1976; Staub, 1971). For example, a marginal or small farmer owning a diminutive portion of land -- less than one acre -- was forced to purchase all inputs, burrow tube wells, install a pump set, and then also purchase other mechanical

agricultural implements. For this marginal or small farmer, the associated initial investments were so great that the long-term feasibility of this undertaking was challenging: a large percentage of future financial returns would go towards financing the credit the farmers obtained. This reality increased the likelihood that these classes of farmers were facing impoverishment or being exposed to economic crisis (Biasucci, 1997).

As Green Revolution farming was adopted and became increasingly prevalent, a segment of small and marginal farmers completely withdrew from cultivation from the outset by selling or leasing their land to other landowners. This group of farmers could not adopt the farming technology that was now standard in the Punjab agricultural sector because they could not afford it (Saini, 1976; Sandhu, 1974). They also could not revert to traditional subsistence farming methods because the advancements in agricultural inputs and technologies were now based on a Green Revolution farming platform. This group of farmers would join the ranks of employed farm labourers or seek employment in alternative sectors.

The institutional credit structure established by the state to provide sufficient credit to Punjab farmers was also plagued with a number of irregularities that prevented the appropriate flow of agricultural credit from reaching all segments of farmers, especially in the 1970s. The agricultural cooperatives, the main financing authority in the state, distributed funds through its network to farmers. The inherent flaw with the agricultural cooperative system was that the individual cooperatives were primarily operated by local public officers who failed to follow professional standards. In many cases, these cooperative employees were amenable to influence or conducted practices preferred by the dominant power structures in the area (Ladjensky, 1970; Singh, 1995). The result of this was that many cooperatives would not provide financing to some small and marginal farmers and instead would channel significant portions of funds to larger landowners because of their political power (Gill, 1983). The large farm owners with their access to substantial levels of credit were able to expand their agricultural holdings and implement the technology needed to ensure increased food grain production.

The establishment of formal credit structures in the state also inhibited the flow of capital to many segments of farmers in the 1970s. These credit agencies preferred to provide loans to large farmers as they were unlikely to default and were consistent with loan repayment (Rao, 2005). In providing loans to Punjab farmers, as opposed to others, the agricultural cooperative societies, commercial banks, and Primary Land Mortgage Banks adopted stringent and rigid credit processes for determining loan eligibility. A substantial number of farmers, particularly, marginal and small farmers, were unable to navigate the cumbersome loan processes because they were uneducated and unable to understand the paperwork they were required to sign. Many

farmers were concerned about the collateral often demanded: fixed assets such as land, which were too high a price, as land was the only item of value they owned and their only means of income or livelihood (Gill, 2004). These credit agencies also based their loans on the total amount of land owned and would determine the amount of credit to be provided to farmers based on this (Harris, 1972). In many cases, small and marginal landowners were unable to secure loans due to the small size of their property or their properties would be undervalued, preventing them from qualifying for loans (Gill, 1996). In cases where some of these farmers were able to secure loans, a portion of them were unable to afford the extensive debt burden and defaulted, losing their property. This lack of access to capital would impede the successful operation of many landowners.

7.2.3. Punjab Credit Agencies Capitalization

During this time, the credit institutions themselves were in a period of major transition as they coped with the massive demand for credit from a rapidly expanding agricultural sector. A unique feature of the Green Revolution program in Punjab was that its implementation was not a gradual process; rather, it was being promoted and converting all farmers in the state to the technology rapidly. To meet the heavy demand for loans and to provide accessibility to all segments of the farming population, credit institutions required sufficient capitalization. An examination of these credit institutions in Punjab during the first decade of implementation of Green Revolution farming reveals that they lacked adequate capital to achieve their objective and were also not readily accessible to all spectrums of farmers.

The agricultural cooperatives were the primary institutions providing credit to farmers as the short-term loans provided by this agency were needed to purchase crucial inputs required for planting of food crops and also providing long-term financing for important farm mechanization. The overall number of agricultural cooperatives within Punjab during the 1970s was relatively stable, but, in 1978, it decreased when they were amalgamated to increase efficiency (see Table 7.1). Farmers' accessibility to agricultural co-operatives during the initial implementation of Green Revolution farming in Punjab, although demonstrated an extensive membership increase from 1,464,000 members in 1970-1971 to 1,755,000 by 1979-1980. This increase in membership of 283,000 members after a decade, although a positive trend, was, however, also indicative of an agriculture cooperative structure that was not inclusive and meeting the credit needs of all farmers in Punjab. Punjab agricultural cooperatives were not inclusive because not all farmers were able to become active members and gain access to financial resources. In particular, marginal and small farmers in the state faced significant administrative hurdles in obtaining the necessary credit to maintain farm operations.

Table 7.1. Primary Agriculture Credit Societies Total Numbers and Membership

Year	Number of Societies	Membership (Lakh)
1970-1971	10,932	14.64
1971-1972	10,931	14.82
1972-1973	10,935	15.28
1973-1974	10,932	15.59
1974-1975	10,938	15.96
1975-1976	10,936	16.23
1976-1977	10,937	16.60
1977-1978	10,942	16.82
1978-1979	4,259	17.18
1979-1980	4,271	17.55
1980-1981	4,266	17.84
1981-1982	4,266	18.25
1982-1983	4,266	18.49
1983-1984	4,270	18.78
1984-1985	4,240	18.84
1985-1986	4,235	18.96
1986-1987	4,235	19.30
1987-1988	4,630	19.47
1988-1989	4,648	19.60
1989-1990	*	*
1990-1991	4,633	20.40
1991-1992	4,570	20.60
1992-1993	4,485	20.89
1993-1994	4,293	21.01
1994-1995	4,205	20.63
1995-1996	4,171	20.75
1996-1997	4,184	21.01
1997-1998	4,190	21.26
1998-1999	4,200	12.68
1999-2000	4,214	21.90

Note: Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1982, 1987, 1987, 1990, 1993, 1997, 2000), Chandigarh, Government of Punjab.

* Not Available

The amount of agricultural credit cooperatives dispersed increased from 8,410.45 Lakh in 1970-1971 to 22,948.27 by 1979-1980, reflecting a 272% increase (see Table 7.2). However, there was a considerable stagnation in the level of agricultural credit that was dispensed from 1972 to 1978. This stagnation was the direct result of internal administrative changes that

occurred in the Punjab government related to the department of agriculture (Gill, 1983). Previously, the Development Commission of Punjab, that oversaw the development of the agricultural sector in the state, had control over the Registrar of Cooperative Societies and the Director of Agriculture. In 1972, however the Development Commission lost administrative control over the Registrar of Cooperative Societies when this department was placed under the control of the Excise and Taxation Secretary. This administrative change was important in that the Development Commissioner who was in charge of directing agricultural development in the state no longer had control over the Registrar of Cooperative Societies, who is the primary agencies for providing credit to agricultural farmers (Gill, 1983). This lack of coordination resulted in the new administrative overseers of the cooperative societies maintain available credit at relatively constant levels. This administrative error was costly in that during a period when increased agricultural credit was needed for an expanding agricultural sector undergoing radical implementation of a new farming technology, the necessary funding was not present.

Table 7.2. Agricultural Flow of Credit to Punjab Farmers from Co-operatives and Commercial Banks

Year	Cooperatives (Rs. Lakh)	Commercial Banks (Rs. Lakh)	Total (Rs. Lakh)	Cooperatives Share (%)	Commercial Banks Share (%)
1970-1971	8410.45	1799.39	10209.84	82.83	17.62
1971-1972	9223.18	2750.96	11974.14	77.03	22.97
1972-1973	12573.92	3756.96	16330.88	76.99	23.01
1973-1974	8665.28	5327.86	13993.14	61.93	38.07
1974-1975	9633.62	6808.43	16442.05	58.59	41.41
1975-1976	8648.46	7497.11	16145.57	53.57	46.43
1976-1977	10979.58	9866.24	20845.82	52.67	47.33
1977-1978	12284.25	10943.76	23228.01	52.89	47.11
1978-1979	16895.78	11923.31	28819.09	58.63	41.37
1979-1980	22942.87	12935.47	35878.34	63.95	36.05
1980-1981	24058.45	14458.14	38516.59	62.46	37.54
1981-1982	29819.65	14228.31	44047.96	67.70	32.30
1982-1983	38280.76	13220.84	51501.60	74.33	25.67
1983-1984	42978.88	16120.20	59099.08	72.72	27.28
1984-1985	48652.19	16528.87	65181.06	74.64	25.36
1985-1986	44109.68	15406.13	59515.81	74.11	25.89
1986-1987	49140.08	17515.00	66655.08	73.72	26.28
1987-1988	45233.02	19784.09	65017.11	69.57	30.43
1988-1989	42918.79	23725.09	66643.88	64.40	35.60
1989-1990	57307.62	25767.76	83075.38	68.98	31.02

Year	Cooperatives (Rs. Lakh)	Commercial Banks (Rs. Lakh)	Total (Rs. Lakh)	Cooperatives Share (%)	Commercial Banks Share (%)
1990-1991	51358.30	27545.22	78903.52	65.09	34.91
1991-1992	66015.25	34311.88	100327.13	65.80	34.20
1992-1993	74724.07	39011.19	113735.26	65.70	34.30
1993-1994	84592.74	44359.61	128952.35	65.60	34.40
1994-1995	102496.73	53996.85	156493.58	65.50	34.50
1995-1996	106257.63	67240.12	173497.75	61.24	38.76
1996-1997	129843.44	79904.86	209748.30	61.90	38.10
1997-1998	154319.70	116179.80	270499.50	57.05	42.95
1998-1999	198170.74	136682.04	334852.78	59.18	40.82
1999-2000	221994.48	183243.25	405237.73	54.78	45.22

Note. Adapted from "Institutional Credit, Indebtedness and Suicides in Punjab", by P. Satish, 2006, *Economic and Political Weekly*, 41, p. 2755.

The commercial banking sector in Punjab during the 1970s, after nationalization, played a more prominent role in providing credit to farmers, especially long-term loans for the purchase of irrigation equipment and machinery. The number of commercial banks in the state increased from 530 branches in 1970 to 1,563 branches by 1980, an almost three-fold increase (see Table 7.3). The expansion of commercial banks in the region was beneficial in that branches were brought into areas that previously were underserviced, providing farmers access to another credit agency. Although the commercial banking sector was undergoing a period of expansion and attempting to establish operations, the absence of the commercial banking sector hindered Punjab farmers from being able to readily access capital needed for production during the crucial initial expansion period. The level of capital provided by commercial banks in the state increased from 1,799.39 Lakh in 1970-1971 to 12,935.47 Lakh by 1979-1980, representing a 718% increase (see Table 7.2). Although this credit increase was substantial, it was not enough to meet the increasing demand for agricultural, in particular by farmers wanting to invest in irrigation and farming equipment. The lack of capitalization was a direct result of commercial banks' not allocating sufficient capital to their agricultural loan division. Commercial banks in Punjab lacked sufficient capital throughout the 1970s, to substantially increase the number of loans they provided to Punjab farmers, thus limiting access to capital needed by an expanding agricultural sector.

Table 7.3. Number of Commercial Bank Offices in Punjab

Year	Number of Branches
1970	530
1980	1,563
1990	2,133
2000	2,574

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1990, 2000), Chandigarh, Government of Punjab.

The Primary Land Mortgage Bank in Punjab was the primary source of credit for Punjab farmers for making investments in irrigation equipment and farming machinery. The number of Primary Land Mortgage banks in Punjab increased from 34 in 1970-1971 to 43 in 1979-1980. The membership of this bank increased from 115,000 in 1970 to 268,000 by 1980, an increase of 153,000 members (see Table 7.4). An examination of the total amount of loans advanced on annually to farmers reveals that the amount of overall credit available over a 10-year period between 1970 and 1980 was stagnant (see Table 7.4). The total amounts of loans advanced to farmers were particularly slow between 1971 and 1976 when the total fluctuated between Rs. 1,519.58 Lakh and Rs. 1,697.51 Lakh. This stagnation in the amount of funding for loans to Punjab farmers was concerning during this period because the failure to increase capital provided to farmers reduced the number of loans that could potentially be provided. This inability of Punjab farmer to access loans with Primary Land Mortgage banks due to administrative reasons and the lack of capitalization prevented many farmers from obtaining the crucial loans for investment in irrigation and farm machinery.

Table 7.4. Number of Primary Land Mortgage Banks in Punjab and Membership Levels (1970 to 1997)

Year	Number of Banks	Membership (Lakh)	Loans Advanced during the Year (Lakh Rs.)
1970-1971	34	1.15	1,956.61
1971-1972	35	1.36	1,519.58
1972-1973	41	1.67	1,626.52
1973-1974	42	1.97	1,583.65
1974-1975	42	2.09	1,599.52
1975-1976	42	2.20	1,697.51
1976-1977	43	2.46	2,799.01
1977-1978	43	2.59	1,850.70
1978-1979	44	2.68	2,245.88

Year	Number of Banks	Membership (Lakh)	Loans Advanced during the Year (Lakh Rs.)
1979-1980	43	2.78	2,296.95
1980-1981	43	2.97	4,337.20
1981-1982	43	3.13	4,976.53
1982-1983	44	3.27	4,566.19
1983-1984	45	3.47	5,196.68
1984-1985	46	3.65	4,495.28
1985-1986	47	3.83	5,100.40
1986-1987	51	4.10	6,566.83
1987-1988	52	4.24	6,256.79
1988-1989	52	4.48	5,613.31
1989-1990	*	*	*
1990-1991	57	4.84	7,397.32
1991-1992	61	4.94	8,816.48
1992-1993	64	5.19	9,375.23
1993-1994	69	5.39	12,636.36
1994-1995	71	5.72	18,657.91
1995-1996	72	6.00	23,512.66
1996-1997	74	6.11	29,370.22

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1987, 1990, 1996, 2000), Chandigarh, Government of Punjab.

* Not available

7.2.4. Informal Financial Lenders

The inability of farmers in the 1970s to access sufficient financial resources from agricultural cooperatives or commercial banks led them, in many cases, to accept credit from informal private money lenders. Informal money lenders provided them with the funds to acquire the necessary inputs or purchase the necessary machinery to appropriately practise HYV farming. In many cases, this source of credit was the only way smaller-scale farmers, in particular, could participate in the new farming methods. Farmers preferred these money lenders because of the limited bureaucratic wrangling and paperwork involved in obtaining loans from them (Gill, 2006; Jodhka, 2006). Informal money lenders preferred taking the crop at harvest as collateral, which landowners preferred because this form of collateral was not undervalued and, more importantly, did not put their land directly in danger of forfeiture. However, the major drawback in using this source of credit was the hefty rate of interest charged, averaging 24% to 36% (Gill, 2004). During the 1970s, a substantial number of small and marginal farmers turned to informal money lenders to obtain capital, but, in many cases, because of the high costs and poor

financial returns of HYV farming, they were ultimately forced to sell their land to larger farmers or to default on their land to repay their loans (Singh, 1984).

7.2.5. Hypothesis II (i) – Confirmed: Inability to Access Agricultural Credit.

Hypothesis II (i) has been confirmed, as not all Punjab farmers were able to gain access to substantial financial capital in order to invest in agricultural production and efficiency. By the end of the 1970s, farmers in Punjab had made considerable advances in the adoption of Green Revolution farming. The ability of all segments of farmers to obtain access to financial capital in order to invest in agricultural production and efficiency throughout the 1970s had been, in part, inhibited. Marginal and small farmers, in particular, were impacted, most facing major difficulties in accessing credit from agricultural cooperatives, commercial banks, and the Primary Land Mortgage Bank in Punjab. The primary barriers faced by these farmers in accessing capital were the unwillingness of these credit agencies to provide loans to farmers with small landholdings and also the influence of larger landowners on these agencies in monopolizing available credit for their own personal benefit. In addition, the capital available for providing credit to farmers was also insufficient: The credit agencies did not have enough financial resources to meet the increasing credit needs of Punjab farmers practising Green Revolution farming. The inability of farmers in Punjab to access credit needed to purchase inputs for farming operation and make crucial investments in irrigation equipment and machinery prevented them from maintaining financial stability as they could not participate in the dominant method of agricultural production. This situation, in part, not only resulted in many farmers withdrawing from agriculture but also increased hostility toward the central government for failing to provide needed credit to farmers wanting to participate in farming and maintain their means of livelihood.

7.3. Hypothesis II (ii)

> Hypothesis II (ii): The likelihood of anti-state terrorism is more when agricultural crop yields and cropping intensity fail to increase over time ensuring food grain harvests provide sufficient return over cost to Punjab farmers.

It is hypothesized that the likelihood of anti-state terrorism is more when crop yields and cropping intensity fail to increase over time ensuring food grain harvests provide sufficient returns over cost to Punjab farmers. There were two distinct periods of development (1970s and 1980s) of Green Revolution farming in Punjab. The 1970s saw farming expanding, characterized initially

by a rapid growth spurt and then, by the mid- 1970s, a period of tepid growth. It is during this latter period of reduced growth that segments of Punjab farmers and their farming operations were in a precarious position in conjunction with other, simultaneous negative agricultural events.

Green Revolution farming was introduced into Punjab to address the food grain deficit that was plaguing India. The adoption of this agricultural technology was based on the implicit understanding that genetically engineered HYV seeds would produce increased food grain yields. It was expected that through continual seed innovation and adjustment of technical agronomic practices, year after year, food grain yields would continue to show major advances, improving the profitability and plight of farmers. When one examines the decennial data on principal crop yields, the impact of Green Revolution farming is evident (Table 7.5). In 1960-1961, wheat yields prior to Green Revolution farming were 1,244 kilograms per hectare and increased substantially to 2,238 kilograms per hectare in 1970-1971, post-Green Revolution implementation (see Table 7.5). Rice yields increased from 1,009 kilograms per hectare to 1,764 kilograms per hectare in the same decade period, showing a pronounced increase with the adoption of Green Revolution technology.

Table 7.5. Yield of Wheat and Rice in Punjab (Kilograms per Hectare)

Crop	1960-1961	1970-1971	1980-1981	1990-1991	1999-2000
Wheat	1,244	2,238	2,731	3,714	4,696
Rice	1,009	1,764	2,733	3,229	3,347

Note. Adapted from "Green Revolutions Reconsidered: The rural world of contemporary Punjab" (p.12), by H. Singh, 2001, Oxford: Oxford University Press.

Note. Adapted from "Production Conditions in Contemporary Punjab Agriculture", by H.S. Sidhu, 2005, J*ournal of Punjab Studies*, 12(2), p. 202.

Principal crop yields of wheat and rice, as measured in kilograms per hectare, in Punjab through the 1970s demonstrated an overall increase, shown in Table 7.6. Wheat yields increased from 2,238 kilograms per hectare in 1970-1971 to 2,797 kilograms per hectare by 1979-1980, and rice yields increased from 1,764 kilograms per hectare in 1970-1971 to 2,604 kilograms per hectare in 1979-1980 (see Table 7.6). Between 1970-1971 and 1973-1974 wheat and rice yields were, overall, flat as year-to-year increases were slight. The lack of yield increase was in relation to poor agronomical practices, deficiencies in seed technology, and deficiencies in the physical infrastructure needed to support the capital-intensive farming method. Farmers during this period were also experiencing shortages in crucial inputs such as fertilizer, and the HYV seeds were showing an inability to increase yields through the use of commercial inputs. Although this lack of wheat and rice yield increases did not have a devastating effect on the financial returns of farmers, as they did receive strong remunerative prices for crops, it did mark the beginning of reduced financial returns for farmers in this decade.

Table 7.6. Wheat and Rice Yields Kilograms Per Hectare (1970 to 1997)

Year	Wheat Yield (Kilograms per Hectare)	% Increase or Decrease	Rice Yield (Kilograms per Hectare)	% Increase or Decrease
1970-1971	2,238	*	1,764	*
1971-1972	2,204	-1.50	2,045	15.92
1972-1973	2,233	1.30	2,007	-1.85
1973-1974	2,216	-0.76	2,287	13.95
1974-1975	2,995	35.15	2,071	-9.44
1975-1976	2,372	-20.80	2,553	23.27
1976-1977	2,432	2.53	2,611	2.27
1977-1978	2,537	4.31	2,910	11.45
1978-1979	2,517	-3.15	2,937	0.92
1979-1980	2,797	11.12	2,604	-11.33
1980-1981	2,731	-2.35	2,733	4.95
1981-1982	2,932	7.35	2,955	8.12
1982-1983	3,007	2.55	3,144	6.39
1983-1984	3,015	0.26	3,063	-2.57
1984-1985	3,289	9.08	3,073	0.32
1985-1986	3,531	7.35	3,200	4.13
1986-1987	2,966	-15.15	3,331	4.09
1987-1988	3,506	18.20	3,164	-5.01
1988-1989	3,668	4.63	2,770	12.45
1989-1990	3,593	-2.04	3,510	26.71
1990-1991	3,714	3.36	3,229	-8.00
1991-1992	3,802	2.36	3,257	0.86
1992-1993	3,776	-0.68	3,391	4.11
1993-1994	4,011	6.22	3,507	3.42
1994-1995	4,090	1.96	3,382	-3.56
1995-1996	3,883	-5.06	3,131	-7.42
1996-1997	4,203	8.34	3,396	8.46

Note. Adapted from "Green Revolutions Reconsidered: The rural world of contemporary Punjab" (p.58), by H. Singh, 2001, Oxford: Oxford University Press.

In the mid-1970s, the Punjab agriculture sector began to show problems in that there appeared to be a plateau effect in the yield of principal crops. Specifically, there was a slowing in yield outputs for both wheat and rice between the periods of 1975-1976 and 1980-1981. During this 6-year period, wheat yield output only increased by 359 kilograms (59.83 Kg per year average) per hectare, and rice yields only increased by 180 kilograms per hectare (30 Kg per year average) (see Table 7.6). Also, when examining Punjab agricultural index numbers pertaining to yield, we see that between 1970-1971 (109.76) and 1979-1980 (139.23), the yield

number rose by 32.09 points, representing an overall average 3.209% increase in yield per year (see Table 7.7). This slowing in yields for wheat and rice was the product of a number of compounding factors that inhibited agricultural producers from increasing agricultural productivity substantially during a period of tumultuous increases in input expenses of 10% to 30% per year which threatened the financial viability of many farm operations.

Table 7.7. Agricultural Index Numbers for Net Area Sown and Yields in Punjab (Base: Triennium Ending 1969-1970= 100)

Year	Net Area Sown	Yield
1967-1968	99.18	94.30
1968-1969	99.30	99.20
1969-1970	101.52	106.50
1970-1971	101.57	107.74
1971-1972	102.73	115.21
1972-1973	102.80	110.76
1973-1974	103.87	113.52
1974-1975	103.95	118.87
1975-1976	106.55	121.37
1976-1977	107.34	122.80
1977-1978	107.75	133.19
1978-1979	109.52	140.74
1979-1980	108.89	139.23
1980-1981	107.72	138.73
1981-1982	109.36	149.36
1982-1983	109.55	155.19
1983-1984	109.63	155.74
1984-1985	108.55	169.59
1985-1986	109.22	178.95
1986-1987	110.69	164.55
1987-1988	105.69	176.64
1988-1989	120.83	174.73
1989-1990	119.77	189.76
1990-1991	121.57	187.01
1991-1992	121.57	187.01
1992-1993	119.57	193.83
1993-1994	120.24	201.00
1994-1995	120.08	205.00
1995-1996	118.33	186.02
1996-1997	119.06	203.92
1997-1998	102.45	192.88

Year	Net Area Sown	Yield
1998-1999	103.05	201.79
1999-2000	103.77	219.47

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1982, 1987, 1990, 1996, 1997, 2000), Chandigarh, Government of Punjab.

7.3.1. Reasons for Slowing of Agricultural Yields

The slowing in wheat and rice yields during this time can be explained primarily by deficiencies in seed technology, poor agronomical practices, and the rise of input expenses. In the 1970s, as Green Revolution farming continued to expand, the high yielding variety of seeds that the new farming technology was so dependent upon started to show a slowing-down in their ability to increase crop yields. The Punjab Agricultural University and the Indian Agricultural Research Institute (IARI) continued to develop HYV varieties of wheat and rice, but there was no significant innovation in genetic engineering to produce HYV seeds that was capable of increasing food grain production yields substantially (Singh, 2001). Although agricultural researchers at PAU and IARI continued to develop improved high yielding wheat and rice varieties with the ability to adapt to local climate and soil conditions and also with increased resistance to disease and drought, their output capability only increased gradually due to the biological limitations of the seed strains. There was a levelling in the average kilograms per hectare new HYV wheat and rice varieties could produce. The average yield for wheat varieties in Punjab between 1964 and 1980 increased slightly from 45 (Kg/Ha) average to approximately 49 (Kg/Ha) in a 16-year period.

The stagnation of wheat and rice crop yields was also affected by inefficient agronomical practices by Punjab farmers. Green revolution farming is a very technical and precise farming method that required cultivators to have a significant specialization in effective management practices to ensure optimal agricultural output of food grain yields. Punjab cultivators, in part, had to re-educate themselves on agricultural practices because the knowledge they had acquired through generations of subsistence farming was no longer applicable. They had to learn technical aspects of the new farming method from when to sow crops, spacing levels, depth of sowing, "time and rate of fertilizer application", appropriate irrigation rates and times, and also application of herbicides and pesticides (Singh, 2001, p. 57). In addition, farmers had to adopt and learn the functioning of mechanized equipment to carry out specific and important agricultural functions. Although during the implementation of Green Revolution farming major steps had been taken to educate farmers, there was a period of transition during which farmers learned the special technical requirements to make the farming technology effective. The 1970s, in particular, was a period of learning for Punjab farmers. The stagnation of wheat and rice crop

yields, in part, was the result of farmers not applying the correct amount of fertilizer or other agronomical chemicals for proper growth, ineffective irrigation practises preventing effective maturation of crops, and other inefficient farming practices (Chakravarti, 1973).

The inability of Punjab farmers to increase wheat and rice yields was also compounded by the rise in input prices towards the latter half of the 1970s and also jointly the ability of farmers to adopt the capital-intensive farming technology in full. During the mid-1970s, the price of inputs needed for Green Revolution farming started to see a dramatic increases due to geo-political and national events. This rapid increase in input prices forced many farmers to adapt their agronomical practices to the economic conditions they were facing. This alteration in agronomical practices led many farmers to curtail the purchase of specific inputs, in particular, fertilizers and diesel fuel, in order to reduce farm operation costs. The negative consequence of this action was that many farmers did not apply suitable levels of fertilizer to wheat and rice crops, hampering their growth and yield capabilities. The reduction in diesel purchase/consumption inhibited many farmers from operating diesel-powered tube well motors, preventing the application of timely irrigation practices needed for appropriate crop growth. Many Punjab farmers during this period were also facing considerable hurdles in acquiring financing in order to purchase all the necessary mechanized equipment and inputs. The inability to adopt and acquire all the needed technologies greatly hampered the ability of Punjab farmers to increase food grain yields and make continual advancements.

7.3.2. Cropping Intensity

Cropping intensity was another crucial component in increasing food grain output and thus ensuring profits that would make it possible to sustain farm operations. *Cropping intensity* refers to the ability of farmers to maximize "the output per unit of area by sowing more than one crop a year and thereby increasing the intensity of cropping" (Singh, 1995, p. 71). Green Revolution farming was based on the philosophy that to increase overall food grain production, farmers must have the capability to sow more than one crop per year. To facilitate this process, HYV seeds had been engineered to mature more rapidly and efficiently so that farmers could plant and harvest a second crop. The harvesting of two crops in a season was beneficial to farmers because it increased overall agricultural production and thus would lead to increased farm income (profits) and raise the living standards of farmers. With the implementation of Green Revolution farming in the late 1960s, cropping intensity had gradually increased, as seen in Table 7.8. The cropping intensity or area sowed more than once increased from 140% (5,724,000 hectares) in 1971-1972 to 156% (6,535,000 hectares) by 1979-1980, a 16% (809,000 hectare) increase. Farmers in Punjab primarily adopted a wheat and rice crop cycle, ensuring maximum

output from their parcel of land. However, the inherent weakness in increasing cropping intensity is that it places a substantial initial economic burden on farmers. If they wish to sow a second crop in the growing year, they must have the agricultural technology and inputs needed to ensure their HYV crops mature in time. In addition, they will need to purchase the necessary farming inputs for a second time in the year.

Table 7.8. Classification of Agricultural Area in Punjab (Thousands Hectares)

Year	Geographical Area in Punjab	Net Area Sown by Agriculture	Net Sown Area as Percentage of Total Area	Areas Sown More Than Once	Total Cropped Area Sown More Than Once	Cropping Intensity Percentage
1965-1966	5038	3,803	76	1,086	4,889	128
1969-1970	5038	4,027	80	1,472	5,499	136
1971-1972	5038	4,076	81	1,648	5,724	140
1972-1973	5038	4,086	81	1,845	5,921	145
1973-1974	5038	4,113	82	1,924	6,037	146
1974-1975	5038	4,092	81	1,812	5,904	144
1975-1976	5038	4,158	83	2,097	6,255	150
1976-1977	5038	4,167	83	2,118	6,285	151
1977-1978	5038	4,171	83	2,219	6,390	153
1978-1979	5038	4,177	83	2,453	6,630	158
1979-1980	5038	4,182	83	2,353	6,535	156
1980-1981	5036	4,191	83	2,572	6,763	161
1981-1982	5036	4,210	84	2,719	6,929	164
1982-1983	5036	4,202	84	2,713	6,951	164
1983-1984	5036	4,212	84	2,765	6,977	165
1984-1985	5036	4,189	83	2,824	7,013	167
1985-1986	5036	4,197	83	2,961	7,158	170
1986-1987	5036	4,202	83	3,015	7,217	172
1987-1988	5036	4,157	83	3,169	7,326	176
1988-1989	5036	4,205	84	3,182	7,387	170
1989-1990	5036	4,191	83	3,200	7,391	176
1990-1991	5036	4,218	84	3,284	7,502	177
1991-1992	5036	4,215	84	3,303	7,518	178
1992-1993	5036	4,134	83	3,416	7,550	182
1993-1994	5036	4,214	84	3,409	7,623	181
1994-1995	5036	4,210	82	3,483	7,693	182
1995-1996	5036	4,136	84	3,576	7,712	186
1996-1997	5036	4,234	85	3,584	7,818	185
1997-1998	5036	4,218	84	3,284	7,502	177

Year	Geographical Area in Punjab	Net Area Sown by Agriculture	Net Sown Area as Percentage of Total Area	Areas Sown More Than Once	Total Cropped Area Sown More Than Once	Cropping Intensity Percentage
1998-1999	5036	4,223	84	3,585	7,808	185
1999-2000	5036	4,266	85	3,605	7,871	184

Note: Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1982, 1987, 1990, 2000), Chandigarh, Government of Punjab.

It can be seen that although cropping intensity increased from 140% in 1971-1972 to 156% in 1979-1980, 42% of cultivable land in Punjab could still not be sown more than once in a year. This did not occur even during the 1970s, when, in particular, cropping intensity should have increased substantially and been accessible to all Punjab farmers. Specifically, there was substantial stagnation in cropping intensity during the period of 1975-1976 (150%) and 1979-1980 (156%) when there was only a 6% increase in the overall level of cropping intensity. In essence, during that 5-year period on average, cropping intensity increased by 1.2% per year. The inability to increase cropping intensity was related primarily to small and marginal farmers' being unable to obtain the financing needed to reinvest in mechanization or purchase agricultural inputs to allow for the planting of a second crop. Also, poor financial returns from harvests, as a result of increasing input prices and low prices for food grains, prevented small and marginal farmers from having access to substantial financial returns to reinvest into farming operations and increase cropping intensity.

7.3.3. Hypothesis II (ii) - Confirmed: Failure of Crop Yields and Cropping Intensity to Increase Sufficiently over time.

Hypothesis II (ii) has been confirmed as crop yields and cropping intensity failed to increase sufficiently over time ensuring food grain harvests provided sufficient return over costs to Punjab farmers. For Punjab farmers, the 1970s was a contradictory period of agricultural development in that it showed a great deal of promise with the implementation and growth of Green Revolution farming but also exposed farmers to a great deal of stress as agricultural conditions deteriorated towards the latter half of the decade. The success of Punjab farmers was dependent upon a number of interrelated conditions, in particular, continual increases in crop yields and cropping intensity which offset costs and ensured sufficient returns. As has been shown, by the late 1970s, there was a substantial slowing in crop yields and many farmers were unable to increase cropping intensity. The resultant inability to increase food grain yields prevented Punjab farmers from being able to offset rapidly rising agricultural production expenses that were reducing profits and the viability of farm operations. The impact of crop yield stagnation

impacted all classes of farmers and produced intense levels of general anger and hostility toward the state.

In conjunction with this increasing hostility amongst all segments of farmers over the stagnation in crop yields, there was also increased frustration being expressed by smaller and marginal farm operators about their inability to increase cropping intensity and enhance the viability of their farm operations. Small and marginal farmers were becoming increasingly frustrated in comparison to other farmers because they faced considerable more difficulty implementing HYV technology to increase cropping intensity. The cumulative impact of these two conditions produced a substantial level of frustration among all Punjab farmers, but in particular among Jat Sikh farmers, the numerical majority, as their inability to increase food grain harvests prevented their ability to offset rapidly increasing farming operation costs. Jat farmers were put in a precarious position as they could not alter the declining viability of farming operations and their livelihoods. They blamed the central Indian government for their deteriorating position because they had been persuaded to implement an agricultural technology that now threatened their ability to sustain their farm operations and to provide for their families. This anger and hostility would become the catalyst for vocal expressions of displeasure and action by Jat Sikh farmers against the central Indian government.

7.4. Hypothesis II (iii)

> Hypothesis II (iii): Anti-state terrorism in Punjab is more likely to occur when input costs into agricultural production do not remain relatively stable over time.

It is hypothesized that anti-state terrorism is more likely to occur when input costs into agricultural production do not remain relatively stable over time. It can be seen that during the 1970s and early 1980s, input prices into agricultural production were very unstable, with dramatic fluctuations during various stages. These fluctuations were the result of a number of factors, including changes in the Indian government agricultural input subsidy policy, geopolitical events that increased the prices of specific natural resources, and increased costs associated with human labour and mechanization. The continuous increases in input prices would have an impact on certain segments of farmers due to their limited access to financial resources and ability to recover costs.

7.4.1. Evolution of Input Structures in Punjab Farming

The implementation of the Green Revolution in Punjab in the late 1960s changed drastically the manner and methods in which agricultural production took place. No longer was farming subsistence based; it now required the purchase of modern inputs. As can be seen in Table 7.9, there was an extensive change in the input structure in Punjab agriculture from 1960-1961 (Pre-Green Revolution) to 1980-1981 (Green Revolution). It can be observed that more traditional farm-produced inputs once essential for subsistence farming such as organic manure, bullock feed, and seed expenses declined rapidly with the adoption of HYV farming methods and that there also was a substantial increase in the use of modern purchased inputs such as fertilizer, diesel oil, irrigation charges, electricity charges, pesticides, and repair and maintenance related expenses. The overall use of purchased inputs increased dramatically from 30% in 1960-1961 to 87% by 1980-1981; while farm-produced inputs now comprised only 13% of the input structure. The traditional Punjab farm had become dependent upon purchased inputs to achieve agricultural production.

Table 7.9. Agriculture Input Structures in Punjab: 1960-1961 to 1980-1981

Input	1960-1961	1970-1971	1980-1981
	Percentage		
Fertilizers	1.52	27.20	37.70
Organic Manures	5.93	3.60	2.09
Diesel Oil	9.24	26.53	38.73
Irrigation Charges	6.62	2.71	1.03
Electricity Charges	1.11	2.60	2.80
Pesticides	1.51	1.00	3.60
Repair and Maintenance	5.93	4.14	2.12
Seed Cost	37.44	22.00	6.33
Bullock Feed	27.83	7.64	4.28
Other	2.87	2.58	1.32
Total Inputs	100.00	100.00	100.00
Purchased Inputs	30.00	70.00	87.00
Farm Raised Inputs	70.00	30.00	13.00

Note: Adapted from "Agricultural growth and structural changes in the Punjab economy: An input-output analysis", (p.24), by Bhalla,G., Chadha, G., Kashyap, S., & Sharma, R., 1990, New Delhi: International Food Policy Research Institute.

In addition to the increased use of purchased inputs, there was also increased input use per unit of output. As can be seen in Table 7.10, showing the index number of selected inputs into Indian agriculture, the overall use of inputs per unit of output increased considerably within a

decade in India (Kahlon, 1984). Although the table represents index numbers of selected inputs for the overall Indian agriculture sector, the findings can be directly applied to Punjab which had adopted HYV farming methods. The index numbers show that overall, between 1970 and 1980, there was a 40.94% increase in input use per unit of agricultural output. Regarding consumption of individual inputs per unit of output over a decade-long period, pesticide consumption increased 339.06%, electricity use increased by 201.2%, chemical fertilizers saw a 168.48% increase, diesel 162.55%, and irrigation, a 162.45% increase. Increased use of inputs to increase output productivity must be offset by associated increases in overall productivity and remunerative prices to cover the cost of production or it will lead to dwindling returns.

Table 7.10. Index Number of Specific Farming Inputs in Indian Agriculture (Base: 1970-1970 = 100)

Year	All Inputs	Chemical Fertilizers	Pesticides	Irrigation	Electricity	Diesel
1970-1971	100.00	100.00	100.00	100.00	100.00	100.00
1974-1975	112.65	151.65	318.78	153.98	174.20	152.49
1979-1980	140.94	268.48	439.06	262.45	301.20	262.55

Note: Adapted from "Modernization of Punjab Agriculture" (p. 88), by A.S. Kahlon, 1984, New Delhi, Allied Publishers Private Limited.

7.4.2. Input Policy and Expenses

As has been shown, the Indian central government played a major role in the introduction and adoption of Green Revolution farming in Punjab. For example, it initially offered a subsidy program for Green Revolution inputs to keep the start-up costs low and thereby entice farmers to adopt the technology and ensure inflated positive financial returns from increased agricultural productivity (Nicholson, 1984). However, in 1970-1971, the Indian government recognized that continual subsidization of inputs nationally for the Green Revolution program placed a considerable burden on the public coffers and threatened the long-term financial well-being of the state. In particular the foreign currency reserves would be reduced as the government would be required to purchase the inputs from international producers. Policy makers understood that the HYV program would continue to expand and thus would require increased financial outlays for support. In order to reduce its exposure, the Indian government, in the early 1970s, started to download some of the associated costs of the HYV program, in particular, state-supplied inputs (i.e., fertilizer, fuel, and pesticides), directly onto the farmers with a reduction in subsidies.

The rise of input prices in Punjab occurred primarily throughout the 1970s and towards the early 1980s. The rise in input prices was abrupt for some commercial products and more

gradual for others, but the cumulative impact was devastating on a portion of Punjab farmers. The increase in farm input prices commenced in the early 1970s when the government increased the prices of commercial inputs commensurate with the rates of inflation in order to pass the average associated expenses onto agricultural producers (Hapke, 1988). However, in the mid-1970s, the overall price for seeds, chemical fertilizers, pesticides, germicides, and also irrigation began to increase at increments of 20% to 30% per year (Chima, 1994: 856; Leaf, 1985). The greatest increase in input expenses came from the rise of fuel and fertilizer expenses due to geo-political events. During the 1970s and early 1980s, the Punjab agricultural sector was impacted by three substantial increases in global oil prices that directly affected the cost of fuel and fertilizer that is produced through the use of petroleum products. In October, 1973, the world price of oil jumped from $3.29 to $11.58, signifying a 351% increase (see Table 7.11).

Table 7.11. Global Oil Prices per Barrel ($U.S.)

Year	Oil Price Per Barrel	Year	Oil Price Per Barrel
1969	1.80	1985	27.56
1970	1.80	1986	14.43
1971	2.24	1987	18.44
1972	2.48	1988	14.92
1973	3.29	1989	18.23
1974	11.58	1990	23.73
1975	11.53	1991	20.00
1976	12.80	1992	19.32
1977	13.92	1993	16.97
1978	14.02	1994	15.82
1979	31.61	1995	17.02
1980	36.83	1996	20.67
1981	35.93	1997	19.09
1982	32.97	1998	12.72
1983	29.55	1999	17.97
1984	28.78	2000	28.50

Note: Adapted from "Historical Crude Oil Prices" by Charts bin statistics collector team , 2010. Retrieved October 30, 2012, from http://www.chartsbin.com/view/oau.

The sharp increase in oil was the result of the Yon Kippur War in the Middle East during which OPEC (Organization of the Petroleum Exporting Countries) imposed an oil embargo on the United States for assisting Israel in this conflict. This was followed by another increase in oil prices in 1979 as a result of the Iranian revolution, where protestors blocked Iran's oil exports (see Table 7.11). World oil prices increased from $14.02 per barrel in 1978 to $31.61 in 1979, an increase of 130%. This was followed by another oil price increase: from $31.61 per barrel in

1979 to $36.83 per barrel in 1980, a 14% increase (see Table 7.11). The final dramatic increase in oil prices was the result of the Iran and Iraq war which slowed oil output from the Middle East and in particular from these two major oil-producing nations. The impact of the increases in international petroleum prices was important for Punjab as increased mechanization of agricultural operations required the use of fuel to power machinery and to ensure essential cultivation functions were performed. Particularly affected were a substantial number of farmers who operated diesel-powered pump sets that were needed for timely irrigation of crops. The increases in fuel prices substantially increased irrigation expenses. As well, expenses for operating farm machinery such as tractors, threshers, and combines rose. Because fertilizer is a derivative of natural gas processing, fertilizer prices increased in 1974-1975, 1978-1979, and 1980-1981 as international oil prices continued to increase dramatically. It has been estimated that between 1970 and 1980, the cost to operate mechanized agricultural equipment in Punjab increased by 319%, and fertilizer expenses rose by 147% (Kahlon, 1984).

In addition to commercial input expenses, there were also higher expenses as increased agricultural production and timely agricultural practices associated with Green Revolution farming initially led to greater demands for human labour. The demand for farm labour increased initially as intensification of planting, field preparation, water and fertilizer application, weeding, double cropping, and bigger harvests from the new farm technology all required more labour (Cleaver, 1972; Staub, 1971). These activities substantially increased the number of hours worked by labourers and placed upward pressure on wages as farmers competed to ensure their agricultural operation remained functioning. As shown in Table 7.12 throughout the 1970s, daily wages paid to agricultural labourers consistently increased for ploughing, sowing, weeding, and harvesting into the early 1980s. The rate of increase for these specific job duties appears to have increased by 40% to 50% in over a decade, gradually increasing the associated expense for farmers in Punjab.

Table 7.12. Wages Paid to Agricultural Labourers in Punjab (Rupees)

Year	For Ploughing (Rs.)	For Sowing (Rs.)	For Weeding (Rs.)	For Harvesting (Rs.)
1971	6.62	6.62	6.55	7.94
1972	6.64	6.73	6.72	8.24
1973	7.14	7.24	7.12	8.98
1974	7.54	7.59	7.36	8.38
1975	8.43	8.58	8.48	10.34
1976	8.64	8.65	8.54	11.04
1977	9.21	9.21	9.01	9.96
1978	9.73	9.68	9.51	11.29

Year	For Ploughing (Rs.)	For Sowing (Rs.)	For Weeding (Rs.)	For Harvesting (Rs.)
1979	10.31	10.62	10.22	12.91
1980	10.95	11.03	10.86	13.47
1981	10.90	12.16	11.46	13.60
1982	12.87	12.52	12.46	13.71
1983	13.87	13.86	13.24	16.04
1984	15.91	16.24	15.39	18.03
1985	17.33	18.70	17.54	21.42
1986	20.04	20.20	19.38	25.47
1987	21.91	22.18	21.33	26.25
1988	23.87	25.19	23.64	27.97
1989	28.86	28.07	26.83	32.41
1990	31.04	32.58	30.75	35.92
1991	*	*	*	*
1992	41.89	43.63	41.32	46.80
1993	47.61	50.93	47.26	56.13
1994	54.87	55.47	52.03	63.89
1995	59.92	58.24	56.25	63.33
1996	60.36	62.86	59.01	70.19
1997	*	*	*	*
1998	72.48	72.04	72.06	83.67
1999	79.38	78.94	75.82	85.68
2000	81.62	82.09	77.68	98.89

Note: Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1982, 1987, 1990, 1996, 2000), Chandigarh, Government of Punjab.

* Not available

7.4.3. The Cost of Agricultural Production

In order to quantify the increase in input expenses, two studies looking at the cost of wheat production in Punjab for the period between 1970 and 1980 will be examined. The first study by Kahlon (1984) examined the cost of wheat production in Punjab utilizing prices from the year 1984. The study shows that the cost of Punjab wheat production per quintal had increased from Rs. 61.04 in 1970-1971 to Rs. 101.45 in 1978-1979, a 66% increases in less than a decade (see Table 7.13). It can be observed that the per quintal increase in 1974 to 1975 (Rs. 87.46 from Rs. 74.34) and in 1977-1978 (Rs. 108.57) correspond to the geopolitical events that lead to the increases in oil prices. A similar study by Chadha (1984) also examined costs of production per quintal for wheat in Punjab from 1967 to 1981. The author defines *cost of production* as material input, machines, human labour, bullocks, and leased in land rent (Chadha, 1984). The author indicates that the production cost (Rs. per quintal) increased from 30.37 (Rs. Per quintal)

in 1967-1968 to 77.52 (Rs. per quintal) by 1980-1981, a 155% increase (see Table 7.14). This second data representation, although for a longer period of time compared to the previous study, also shows the impact of the oil price spike in 1980-1981 on input costs and the Punjab agricultural sector as the production cost per quintal increased from Rs. 62.28 in 1979-1980 to Rs. 77.52 in 1980-1981 (see Table 7.14). These costs can also be generalized to rice production, as the input expenses are very similar for this product.

Table 7.13. Cost of Production of Wheat in Punjab at Constant (1984) Input Prices

Year	Cost (Per Quintal at Currents Prices (Rs.)
1970-1971	61.04
1971-1972	59.71
1972-1973	67.10
1973-1974	74.34
1974-1975	87.76
1975-1976	99.45
1976-1977	101.39
1977-1978	108.57
1978-1979	101.45

Note: Adapted from "Modernization of Punjab Agriculture" (p. 86), by A.S. Kahlon, 1984, New Delhi; Allied Publishers Private Limited.

Table 7.14. Cost of Production Wheat Production Punjab

Year	Production Cost (Rs. Qtl)
1967-1968	30.37
1968-1969	37.94
1969-1970	35.03
1970-1971	28.44
1971-1972	31.37
1972-1973	36.65
1973-1974	41.08
1974-1975	42.00
1975-1976	50.91
1976-1977	58.27
1977-1978	62.65
1978-1979	60.74
1979-1980	62.28
1980-1981	77.52

Note. Adapted from "Procurement prices and farm incomes: Real issues and some policy options, by G. Chadha, 1984, *Journal of Social and Economic Studies*, 1(1), p. 6.

7.4.4. Input Supply Shortages

Compounding the drastic increase in the cost of agricultural inputs throughout the 1970s was the substantial shortage of crucial agricultural supplies throughout the state during this period. The Green Revolution implemented in Punjab was dependent on developing an intricate supply network throughout the state to supply required inputs to all farmers in all districts. From the onset of the program and throughout the 1970s, the input distribution network encountered

considerable disruptions in supplies as the central government was unable to ensure timely delivery of crucial inputs like seeds, fertilizer, pesticides and herbicides from its distribution centers outside of the state (Azad, 1975). This lack of timely and efficient delivery of commercial inputs greatly inhibited farmers' abilities to practice efficient farming and placed their harvests in peril.

Another aspect of the effect of increases in oil prices on Punjab farmers was the effect of the central government invoking a petroleum rationing program in order to conserve strategic national fuel supplies, especially in the mid-1970s and early 1980s. This rationing of fuel had a detrimental impact on Punjab agriculture as farmers could not obtain the diesel fuel they needed to operate their tube wells to irrigate their crops nor could they operate their agricultural machinery (Chima, 1994).

However, the largest complaint by Punjab farmers during this period was the consistent lack of access to assured electrical supplies that provided reliable electricity for continuous lengths of time (Chima, 1994; Hapke, 1988). Instead, farmers had to endure rolling blackouts for hours per day preventing the timely irrigation to their sensitive HYV crops (Singh, 1984). The central government in charge of power plants in the country was unable to consistently deliver coal to maintain operations of coal-powered steam plants in the state. Punjab farmers blamed the central Indian government for the lack of a reliable electricity supply to the state and its agricultural producers.

7.4.5. Hypothesis II (iii) – Confirmed: Failure of Input Costs into Agricultural Production to Remain Relatively Stable over time.

Hypothesis II (iii) has been confirmed as input costs into agricultural production in Punjab failed to remain relatively stable over time. The Green Revolution farming system brought Punjab farmers into direct contact with the state on a consistent basis, leading to conflict. The central Indian government was in charge of distributing and setting prices of all commercial inputs and also purchased all agricultural production from farmers at prices the government established (Hapke, 1988). In Punjab, throughout the 1970s and early 1980s, Jat Sikh farmers, who formed the agricultural majority, were becoming increasingly frustrated and resentful toward the central Hindu government. It had become increasingly difficult for them to operate and maintain farms in the face of continual and persistent increases in the prices of commercial inputs that were regulated by the Hindu-dominated central government. They were angered because they had made heavy investments in agricultural technology at great financial costs through loans, whose

repayment obligation they now could not meet because of dwindling profits (Puri, 1983). They felt betrayed by an agricultural technology and a central government that had promoted and promised a decline in overall farming operation costs through increased productivity and mechanization (Kahlon, 1984). Instead many Punjab farmers faced financial ruin as their input costs were well above any financial returns they received by selling their crops to the central government at depressed agricultural commodity prices.

7.5. Hypothesis II (iv)

> Hypothesis II (iv): Anti-state terrorism is more likely to occur when agricultural producers in Punjab are unable to sell agricultural products into free markets to highest bidders/purchasers without restrictions.

It is hypothesized that anti-state terrorism is more likely to occur when agricultural producers in Punjab are unable to sell agricultural products into the free market to the highest bidders/purchasers without restrictions. Restrictions on to whom producers could sell and at what prices prevented farmers from being able to maximize their profits and ensure profitability of farm operations. During the late 1970s and early 1980s, Punjab farmers faced ongoing frustration with the central government due to the imposition of Punjab as a “foodzone”, and the Indian government's ability to restrict the sale of produce by Punjab farmers.

One measure the central government had taken to implement the HYV program was the creation of the Food Corporation of India (FCI), which was to act as a guaranteed purchaser of food grain for the central grain pool. The FCI would purchase farmers' outputs at equitable prices, set annually by the central government in consultation with the Agricultural Price Commission (APC). The primary objective of the FCI was to ensure that domestic food grain demand was met and to prevent food shortages across the country. Farmers from Punjab historically had been strong contributors to the central pool through its sale of food grain harvests to FCI in Punjab. As can be seen in Table 7.15, in the late 1970s and early 1980s, Punjab consistently contributed 50% to 60% of the overall wheat and 40% of the total rice crops to the central grain pool on any given year.

Table 7.15. Punjab’s Percentage Share to the Central Food Grain Pool

Year	Wheat Share to the Central Pool	Rice Share to the Central Pool
1977-1978	62.6%	45.1%
1978-1979	58.5%	43.0%
1979-1980	52.5%	59.7%

Year	Wheat Share to the Central Pool	Rice Share to the Central Pool
1980-1981	75.3%	45.3%
1981-1982	57.1%	42.5%
1982-1983	62.5%	45.9%
1983-1984	62.3%	42.2%
1984-1985	53.9%	43.6%
1985-1986	59.4%	42.8%
1986-1987	61.5%	64.9%
1987-1988	56.1%	48.8%
1988-1989	72.7%	38.9%
1989-1990	62.9%	46.3%
1990-1991	60.9%	41.0%
1991-1992	71.5%	46.7%
1992-1993	70.3%	42.3%
1993-1994	50.6%	40.2%
1994-1995	61.4%	43.5%
1995-1996	59.2%	35.0%
1996-1997	68.8%	38.4%

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1984, 1987, 1990, 1993, 1996, 2000), Chandigarh, Government of Punjab.

7.5.1. Single Food Zone Program

The Single State Food Zone program was constructed in the mid-1960s by the central government to address chronic food shortages across the country (Singh, 1997). The impetus behind the program was that during periods of food shortages, the central government had the right to impose a food zone restriction on any state with food grain surpluses. The imposition of the food zone label meant farmers could not sell their food grain outside the state, thus disallowing sales to private purchasers and forcing farmers to sell directly to government procurement agencies at their set prices. The intention in implementing this program was to provide a means by which the government could rapidly purchase food grains and address food grain shortages, and also ensure there were no substantial price distortions across the country for consumers. The program was first implemented in Punjab in 1963 and was expanded to various other states by 1969; however, in 1970, the program was abolished when the central government believed the nation had become self-sufficient in food grains (Singh, 1997).

Although the Single State Food Zone had been abolished, the central government continued to implement zonal restrictions within Punjab throughout the late 1970s and early 1980s, when the government feared that it would be unable to meet its procurement goals for the

central food grain pool. The Indian government was fully aware that it no longer had the legal authority to implement the Single State Food Zone program forcing farmers to sell to the central government at a pre-determined rate, and, in order to get around that legal obligation, imposed restrictions on “interstate commerce” and transportation (Leaf, 1985, p. 486). In essence, the Indian government set up check points on all transportation routes exiting the state and prohibited the movement of food grains to deficit states by private carriers. In the years 1980-1981, 1981-1982, and 1983-1984, the Indian central governments imposed the “Foodzone” label on Punjab because of their fears of being unable to meet food grain procurement goals in the face of reduced harvests nationally that were caused by poor weather conditions (Singh, 1997).

Punjab farmers were enraged by the central government's imposition of Punjab as a food zone because they were then unable to sell their surplus food grains for profit to the deficit areas (Chima, 1994). The imposition of interstate commerce restrictions meant they could not sell their food grain surpluses on the open market but were forced to sell to the FCI for the central pool. They were particularly enraged at the central government because they were forced to sell their wheat and rice food grains for deflated prices, set centrally, between Rs. 100 and Rs. 150 per quintal, whereas they could have sold directly into food-grain-deficit areas for Rs. 200. Many Punjab farmers, particularly the dominant rural Jat Sikh class, saw this as another example of blatant discrimination by the Hindu-dominated Congress central government. They believed the government used its power and control over the agricultural sector to appease its urban Hindu voters throughout the country.

7.5.2. Hypothesis II (iv) – Confirmed: Agricultural Producers in Punjab Unable to Sell their Products without Restrictions in Free Markets.

Hypothesis II (iv) has been confirmed as Punjab agricultural producers were unable to sell agricultural products into free markets without restrictions. Many segments of the Sikh farming population could not understand why Punjab was continuously the only state to have the single-state food-zone designation assigned to them and why the central government was repeatedly denying them an opportunity to obtain an above-average return (Leaf, 1985). The continual imposition on Punjab of the food zone classification in the early 1980s was detrimental because during that time, the removal of the food zone classification could have ensured increased profitability and stability of farm operations. In removing the possibility of increased profits, this biased government policy may have contributed to some Punjab farmers, particularly marginal and small farmers, being unable to sustain their farm operations. It also increased animosity toward the central Hindu-led government.

7.6. Hypothesis II (v)

> Hypothesis II (v): Anti-state terrorism in Punjab is more likely to occur when procurement prices for food grain yields are not sufficient to offset input costs of farming and ensure sufficient profits for farmers.

It has been hypothesized that anti-state terrorism in Punjab is more likely to occur when procurement prices for food grain yields are not sufficient to offset input costs of farming and ensure sufficient profit for farmers. The stability of farming operations is influenced by a number of inter-related variables, but a key component is the ability of farmers to receive sufficient financial returns for their food crop yields, ensuring a profit. When examining the rise of the Sikh anti-state terrorism movement in Punjab in the years preceding and during the initial outbreak of violence, it can be seen that many Punjab farmers were struggling financially because of the consistently low procurement prices they were receiving for their crops. The setting of procurement prices for food grains in India is a highly political process, with decisions on price levels being influenced by a number of social factors.

7.6.1. Agricultural Price Commission (APC) and Indian Government Crop Price Setting Philosophy

In another of its efforts to implement Green Revolution farming, the central government established the Agricultural Price Commission (APC) in 1965. The APC was an autonomous agency that advised the government annually as to the appropriate prices of food crops, with the government taking these recommendations into consideration and setting food grain prices as they deemed appropriate. The establishment of minimum support prices was deemed necessary to bring increased financial security to agricultural producers in the country and to promote greater confidence among participants in the agricultural sector. In setting food grain price structures, APC and the central government had to take a balanced approach, ensuring that the overall needs of the economy were met and the needs of producers and consumers were respected. The Indian government and APC therefore examined food grain prices' impact or influence on four priority areas: (1) agricultural production, (2) consumption levels, (3) income levels, and (4) capital formation (Krishna, 1971). Depending on the priorities of the Indian government and the APC, yearly set prices for food grains would be adjusted accordingly.

Agricultural Production

Government food grain pricing has a direct impact on the level of agricultural production and also the specific type of crops farmers are willing to invest in. The success of farming is

based on the ability of agricultural producers to make a sufficient return on crop yields and, therefore, producers will allocate increased resources to production of crops that offer higher rates of return (Krishna, 1971). The ability to set prices of food grains provides the government an unparalleled ability to formulate the direction of agricultural growth of specific food crops based on their own specific priorities and objectives. Conversely, the setting of food grain prices at lower levels can be used as a disincentive to persuade agricultural producers away from certain food grains or can hamper overall agricultural production output.

Consumption Levels

When food grain prices are formulated, the impact on the consumer also has to be examined and taken into account. Any increase in food grain prices paid to farmers leads to a corresponding increase in the prices paid by consumers, especially for staple grains like wheat and rice. The increase in food grain prices had the most substantial impact on low income groups in India who already found it difficult to afford enough food to meet their basic dietary needs (Krishna, 1971). Any substantial increase in food grain prices would dramatically impact the weakest segments of Indian society, decreasing consumption and impacting the quality of life of those in the lower social strata's.

Income Level

Those setting food grain prices have to take into account the impact it is going to have not only on the incomes of agricultural producers but also on the general income of citizens. In determining agricultural prices, the Indian government and APC needed to determine what was of greater benefit to the overall well-being and stability of the Indian economy and to prioritize as to whose economic interests were of greater importance: those of agricultural producers or those of its general citizens. If agricultural price increases were allowed, it would lead to a greater transfer of income into the agricultural sector and to producers, but would reduce income from the non-agricultural sector of the economy (Krishna, 1971). This reduction in the transfer of income to the non-agricultural sector could have a detrimental impact in some cases on the growth of the economy and the non-agricultural sector of the economy. Conversely, if agricultural prices decreased or were maintained, it could negatively affect agricultural producers but benefit consumers who spent a considerably smaller portion of their income on agricultural commodities. An increase in agricultural commodity prices would produce a more pronounced impact or hardship on low income consumers who would then be required to spend a higher percentage of their overall income on basic food requirements (Krishna, 1971). In setting agricultural prices, the Indian government and APC had to conduct an assessment as to whether increases were

warranted and the possible negative ramifications of their price-setting policy on agricultural producers and consumers.

Capital Formation

The government's setting of agricultural prices also had a major impact on the level of capital formation in the agricultural and industrial sectors of the economy. Higher agricultural prices for food grains are most beneficial for producers who realize greater financial returns. These returns can be reinvested in agricultural production through the purchase of mechanized equipment or other time-saving implements. Correspondingly, increased financial returns for agricultural producers stimulates reinvestment in farming operations as the level of savings increase but also improves the credit-worthiness of agricultural producers, increasing their ability to secure loans from financial institutions (Krishna, 1971). The increase in agricultural prices also has a detrimental impact on the industrial sector as increasing food price places “upward pressure” on wages as incomes attempt to keep pace with rising food-price inflation (Krishna, 1971, p. 66). In industry, the increase in wages reduces profits, resulting in less financial capital being available for investment back into operations and also reduces industrial confidence in making future investments.

7.6.2. Food Grain Price Setting by Indian National Government and Agricultural Price Commission

There were considerable shifts over the years in the government's philosophy as to what specific objectives were to be achieved by setting prices. In the late 1960s and early 1970s, the APC and the Indian government introduced high remunerative prices for wheat and rice. The setting of wheat and rice prices at initially high levels was a deliberate act used by the government as an incentive to get farmers to switch to HYV farming that primarily focused on increasing wheat and rice food grain production. The setting of high prices for wheat and rice, initially was deemed necessary to show farmers what the potential return on their investments could be and as well reduce any uncertainty that might affect their adopting the technology (Krishna, 1971).

The high prices for wheat and rice during the late 1960s and early 1970s were extremely successful in influencing Punjab farmers to adopt Green Revolution farming. They quickly adopted the technology, and they were enticed by the potential for high financial returns. Subsequently, production of wheat and rice increased for a period. The high prices for agricultural crops was also successful in increasing farmers' financial returns, which they invested in more agricultural technology or other improvements designed to increase agricultural

production (Maini, 2004; Satish, 2006). Punjab farmers, during the late 1960s and early 1970s, enjoyed positive financial returns from farm operations with high remunerative prices substantially offsetting input expenses and allowing for increased agricultural production.

However, in the mid-1970s, there was a considerable shift in agricultural pricing as a result of changes in the central government's outlook and philosophy on the price of agricultural products. During the mid-1970s, the central government led by Indira Gandhi and the subsequent government in 1977 led by the Janata party began to reconsider the rates of agricultural prices paid to producers for food grains. In the mid-1970s, the Congress (I) government of Indira Gandhi had observed the successful implementation of Green Revolution farming throughout India and seen the considerable increases in food grain production bringing the nation to food independence. Based on the progress of majority of Indian farmers in successfully adopting Green Revolution farming, the government began to seriously question whether substantial increases in agricultural prices, in particular for wheat and rice, were needed, as continuing incentives to adopt the technology and promote investment was not deemed necessary (Krishna, 1971). It was also assumed that due to increased agricultural production as a result of HYV crops, farmers were benefitting substantially from increased profits and through technological innovation, agricultural production costs could be reduced further. Thus, there was a sense that agricultural producers in India and, specifically, Punjab had benefitted substantially financially from increased food grain yields and that increases in agricultural prices were not necessary because farmers would continue to make good profits.

However, a shift in agricultural pricing philosophy was also guided by political interests of the center-led Congress (I) government and the subsequent Janata-led coalition government. The dominant Indian political parties in power during this period had strong political support and allegiances to particular voting segments of Indian society. These parties had substantial support from an urban-based Hindu population that was primarily composed of working class or business interests, and, in addition, received major support from landless labourers and small farmers throughout the rural countryside (Bhalla, 1983; Chadha, 1984). In order to maintain political power, the ruling central Indian government could not afford to alienate segments of these strong voting blocs with increases in food grain prices. Such increases, although beneficial for farmers, would have a negative impact on consumer costs of living throughout India. Increases in food grain prices directly led to urban consumers, landless labour, and small farmers having to allocate a greater proportion of their incomes on food, thus, leading to deterioration in their quality of life or directly impacting their dietary needs (Bhalla, 1983; Singh, 1997).

In addition, political parties during this period had to manage the influence of the dominant urban-based Hindu business class, with their specific political interests. The business class put significant political pressure on the Congress (I) and Janata-led governments throughout the 1970s and early 1980s to maintain agricultural prices at stable and consistently low levels. This group did not want to see upward pressure on wages, which would increase the industrial cost structures (Krishna, 1971). The Indian government, through the mid-1970s and early 1980s, understood that protecting the interests of the business class was essential for increased economic growth and continued stability. The dominant political parties of the time understood that costs to business owners needed to be maintained at low levels in order to ensure healthy financial returns that could be then reinvested back into business enterprises. Increased business investment would facilitate expansion of the industrial and service sectors of the economy, fuelling increased employment, production, efficiency, and technological innovation which was needed in India to advance the economy from its agricultural base to the industrial phase of development. The Indian government also understood that it needed to maintain discretionary income of consumers across the country, income that could be used to purchase consumer goods and services and drive industrial and service sector growth. Keeping food grain prices low would increase the income available to consumers for discretionary spending. Thus, the Indian government, through the early 1980s, shifted agricultural pricing to favour business and consumer interests.

7.6.3. Impact of Agricultural Prices on Punjab Farmers

The 1970s was a turbulent decade for many Punjab farmers regarding procurement prices of major crops. In the late 1960s and early 1970s, the Indian government and the APC had set remunerative prices for wheat and rice that favoured agricultural producers. In the late 1960s, it was approximately Rs. 76 per quintal for wheat and Rs. 51 per quintal for rice (paddy), and this pricing for these crops would remain relatively consistent. Into the 1970s, Punjab farmers started to show early signs of protest and anger towards the central government as the profit margins of farming operations were showing signs of decline and stagnation. During this time, farmers were seeing gradual increases in the cost of input expenses, but procurement prices were not seeing any substantial increase (see Table 7.16). In the mid-1970s, the cost of inputs within Punjab rose sharply, impacted by supply shortages and geo-political events that dramatically increased the prices of fertilizer and diesel fuel (See above, section input policy and expenses). Increases in input prices would continue from the mid-1970s to the early 1980s, with prices of some inputs increasing 20% to 30% annually (Azad, 1975). The price of inputs was also regulated by the central government, adding to discontent against the government for failing to

increase prices gradually. The Indian Congress (I) and Janata governments in power during this period failed to increase procurement prices substantially for agricultural producers, choosing, instead, to make consumer and business best interests their priority. Also, the Indian government during this period was fearful of alienating supporters of their political parties (i.e., urban working class, rural landless labourers, and business class) by decreasing their incomes and standards of living. When examining the increase in wheat prices we see that between 1975-1976 and 1980-1981, the price for wheat increased from Rs. 105 per quintal to Rs. 117 per quintal, representing a Rs. 12 increase over a 5-year period (see Table 7.16). This increase of Rs. 12 over 5-years represents an increase in wheat procurement prices of 11.42% and a yearly average increase of 2.28%. Rice (paddy) prices increased from Rs. 76 per quintal in 1975-1976 to Rs. 105 per quintal by 1980-1981, an increase of Rs. 29. The increase of Rs. 29 (see Table 7.16) over 5-years represents an increase in rice procurement prices of 26.2% and a yearly average annual increase of 5.24%.

Table 7.16. Procurement Prices for Wheat and Rice (Rs. Per Quintal)

Year	Wheat	Rice
1970-1971	76	51
1971-1972	76	51
1972-1973	76	***
1973-1974	76	***
1975-1976	105	74 (*+2.00)
1976-1977	105	74 (* + 2.00)
1977-1978	110	77 (*+2.00)
1978-1979	112.50	85 (*+2.00)
1979-1980	115	95
1980-1981	117	105
1981-1982	130	115
1982-1983	142	122
1983-1984	151	132
1984-1985	152	137 (*+3)
1985-1986	157 (*+5)	142
1986-1987	162	146
1987-1988	166	150 (*+17)
1988-1989	173	160
1989-1990	183	185
1990-1991	215	205
1991-1992	225	230
1992-1993	250 (*+25)	270
1993-1994	305 (*+25)	310

Year	Wheat	Rice
1994-1995	350	340
1995-1996	360	360
1996-1997	380	380
1997-1998	415 (**+60)	415
1998-1999	455 (**+55)	440
1999-2000	550	490

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1982, 1984, 1987, 1990, 2000), Chandigarh, Government of Punjab.

* Figures within brackets for wheat and paddy are prices paid by the State Government in addition to the procurement prices actually paid by the State Governments.

** Bonus Paid by the Central Government

*** Not Available

During the 1970s, the continual increase of input prices and stagnation of procurement prices put all Punjab farmers in a precarious position. Towards the latter half of the 1970s, farmers started to see diminishing returns and a decline in profitability. As can be seen in Table 7.17, the rate of return over cost for wheat cultivation in Punjab declined from 24.50% in 1970-1971 to 1.32% by 1977-1978 (Gill & Singhal, 1984). The increase in input expenses had a considerable impact on Punjab farmers as demonstrated in Table 7.17. Declining rates of return were witnessed initially in 1972-1973, when farmers in the state were exposed to rising input expenses and saw a further decline of 14.02% between 1971-1972 (27.28) and 1972-1973 (13.26). The year-to-year fluctuations are evident over the decade, but the overall return over cost for wheat showed a pronounced downward trend.

Table 7.17. Punjab Wheat Production Costs and Rate of Return (1970 to 1979)

Year	Procurement Price for Wheat (Rs. Per Quintal)	Cost of Production for Wheat (Rs. Per Quintal)	Rate of Return Over Cost of Production (Percent)
1970-1971	76	61.04	24.50
1971-1972	76	59.71	27.28
1972-1973	76	67.10	13.26
1973-1974	76	74.34	2.23
1975-1976	113	99.45	13.62
1976-1977	105	101.39	3.56
1977-1978	110	108.57	1.32
1978-1979	112.50	101.45	10.89

Note. Adapted from "Farmers agitation: Response to development crisis of agriculture, by Gill & Singhal , 1984, *Economic and Political Weekly*, 19(40), p. 1729. (Original source is Rajbans Kaur "Agricultural Price Policy in Developing Countries with special reference to India" unpublished Ph.D Thesis, Punjab University, Patiala, 1982, p. 275).

A number of studies were conducted during the 1970s that examined the economic well-being of farmers in Punjab and provided a snapshot as to the financial viability of farming during this tumultuous period. One of these surveys, conducted by the Revolutionary Communist Party of India, showed that small farmers (0 to 5 acres) were running an annual Rs. -125 per capita loss, farmers with land between 5 and 10 acres were running a profit of Rs. 50 per capita, and larger farmers with land of more than 20 acres were producing a profit of Rs. 1,200 per capita (Oberoi, 1990). An unpublished thesis from Nirmal Singh Azad (1980) examined the financial well-being of small peasant farmers in Punjab between 1976-1977 and 1977-1978. Azad found that marginal farming households (0.10 to 2.49 acres) were running an annual average deficit of Rs. -1,513.17, and small farming households (2.50 to 4.99 acres) were also running an annual deficit also of Rs. -1,618.19 (Gill & Singhal, 1984). A similar study was conducted between 1972-1973 and 1977-1978 examining Punjab cultivators' farm accounts. A sample of 81 farm accounts were examined for farmers possessing up to 5 hectares, and 89 farm accounts were examined for farmers possessing between 5 to 10 hectares. The study found that for farmers between 5 and 10 hectares, their net income per acre was Rs. 91, but small farms, below 5 hectares, were showing a net income loss of Rs. -23.7 per acre (Blyn, 1983).

Bhalla and Chadha (1982) published the most extensive study examining the impact of Green Revolution farming on income distribution and, in particular, the impact on living standards of marginal and small farmers within Punjab. The survey was conducted between July 1974 and June 1975 and utilized two-stage stratified random sampling of 1,663 farming households from 180 villages in the state of Punjab. They divided participants of cultivation households into six distinct categories based on the total net agricultural area operated by the household. The six categories constructed were (1) 0.10 to 2.49 acres (marginal); (2) 2.50 to 4.99 acres (small); (3) 5.00 to 7.49 acres (medium); (4) 7.50 to 12.49 acres (large); (5) 12.50 to 24.99 acres; and (6) 25 acres and above. The study undertook a critical examination of the overall resources available to cultivating households, levels of investment, production income, and consumption and saving levels. The study found that marginal and small farmers were making significant efforts to adopt Green Revolution farming methods, using increased technological inputs even though they were faced with limited resource constraints. The authors found the household savings per family of marginal farmers that year was Rs. -699.24, while small farmers were also facing a bleak situation with a Rs. -794.78 household saving per family (see Table 7.18). This was in spite of efforts by these categories of farmers to supplement their income through other non-farm sources (e.g, dairying, poultry, and off-farm wage employment).

Table 7.18. Average Household Savings of Agricultural Farm Owners in 1975

Farm Size	Household Savings Per Family (Rs.)	Household Savings Per Capita (Rs.)
Marginal (0.10 to 2.49 Acres)	-699.24	-120.86
Small (2.50 to 4.99 Acres)	-794.78	-130.27
Medium (5.00 to 7.49 Acres)	175.39	26.18
Large (7.50 to 12.49 Acres)	2,995.83	387.26
Very Large (12.50 to 24.99 Acres)	7,199.85	861.42
Extremely Large (25 Acres and Above)	14,971.92	1,477.23

Note. Adapted from "Green Revolution and the small peasant: A study of income distribution in Punjab agriculture-I", by G. Bhalla & G. Chadha, 1982, *Economic and Political Weekly*, 17, p. 830.

In comparison, medium-size farming households were saving Rs. 175.39 per family, and extremely large farming households were saving Rs. 14,971.92 annually. The study also found that despite a deficit, marginal and small farmers continued to invest substantially in agricultural technology in order to improve the production levels of their farming operations. This survey by Bhalla and Chadha was important because it demonstrated that small and marginal farmers were incurring considerbale debt even with Green Revolution farming being deeply entrenched within the state. However, this study is more critical in that the survey was conducted in 1974 and 1975 when Punjab farmers were being exposed to the initial dramatic increase in input expenses. In the opinion of this writer, it is believed Punjab farmers' agricultural operations would face even more dire economic conditions with the continual rise of input expenses and stagnation in procurement prices towards the latter half of the 1970s.

7.6.4. Hypothesis II (v) – Confirmed: Procurement Prices for Food Grain Yields are Not Sufficient to Offset input Costs of Farming and Ensure Sufficient Profit for Punjab Farmers.

Hypothesis II (V) has been confirmed as prices for food grain yields were not sufficient to offset input costs of farming and ensure Punjab farmers sufficient profit margins. Jat Sikh Punjab farmers in the late 1970s became openly critical of the Indian government and the APC for failing to raise the procurement prices of wheat and rice in particular. They were angered deeply that the central Indian government was, on the one hand, actively increasing the price of inputs and offloading substantial costs onto agricultural producers, and, on the other hand, being unwilling to increase procurement prices for crops that would assist them in offsetting rising input expenses and improve the viability of farming operations. There was incongruence in that input prices were increasing at rates of 20% to 30% annually and support prices for agricultural food grains continued to rise at 2% to 10% annually, deepening the financial crisis for many Punjab farmers

(Leaf, 1985). The failure to raise procurement prices impacted all Punjab farmers, but the impact was particularly significant with certain segments of farmers: Marginal and small landowners were finding their sole means of making a living unsustainable, plunging many into bankruptcy or leasing out their land (Shergill, 2007). Jat Sikh farmers were critical of the Hindu-dominated central government whom they saw as protecting the rights of Hindu-urban consumers and business owners while the fate of Sikh agricultural producers did not matter. They believed the failure to raise procurement prices were the direct result of religious discrimination against Sikh farmers in Punjab who were being exposed to continual repression by a Hindu-dominated central government.

7.7. Hypothesis II – Confirmed: Landowners in the Primary Agricultural Sector are Unable to Maintain Financial Viability.

> Hypothesis II: The likelihood of anti-state terrorism in Punjab is greater when landowners in the primary agricultural sector are unable to maintain financial stability.

Hypothesis II has been confirmed as segments of Punjab landowners were unable to maintain financial viability. The Green Revolution had the implicit goal of increasing agricultural production for a food deficit-nation and improving the financial well-being of all Punjab farmers regardless of the size of their farm holdings. Though through the late 1960s the program was successful in improving Punjab farmers' financial returns and acting as a catalyst for the adoption of the technology by farmers through increased investment, by the 1970s, the financial viability of Punjab farming operations became questionable, as the result of a host of negative conditions that affected agricultural production.

In order to examine the financial viability of farming operations in Punjab the Indices of Parity will be examined. The Indices of Parity is an annual series that produces a percentage of ratios of prices received by farmers for agricultural commodities sold and prices paid by farmers for purchase of commodities for farm production and domestic consumption (Singh, 1995). The parity index at 100 would denote that the prices Punjab farmers received for agricultural commodities and their expenses for the purchase of commodities for production and consumption were equal. Any score over 100 represents that Punjab farmers have benefited from receiving higher prices from the sale of their agricultural commodities in comparison to the prices paid for the purchase of commodities. Any score below 100 represents that Punjab farmers are in debt

because they are receiving lower commodity prices for their agricultural produce but spending more on purchased commodities for agricultural production and domestic consumption.

An examination of the Indices of Parity in Table 7.19 shows that between 1965-1966 and 1969-1970, the terms of trade for farmers in Punjab was positive in that they were receiving healthy financial returns in comparison to prices they paid for agricultural inputs and their own consumption needs. However, in the 1970s the terms of trade started to turn considerably against Punjab cultivators, with 7 out of the 10 years showing negative returns and only 3-years showing positive returns: 1973-1974, 1974-1975, and 1978-1979. The overall earning capacity of farm operations in Punjab through the 1970s was under enormous stress, with substantial numbers of farmers being unable to make a profit (Chadha, 1984). The financial viability of farm operations was threatened as a result of a number of interlinked variables compounding the health of the agricultural sector. Marginal and small farmers were having difficulty accessing financial capital to invest in agricultural production and efficiency, input expenses were rising rapidly, procurement prices stagnated preventing the offsetting of input expenses, crop yield growth and cropping intensity was insufficient, and agricultural producers were unable to sell their produce to open markets to the highest bidder without restrictions. Punjab in the 1970s experienced a number of simultaneous negative agricultural events that made many farming operations financially unviable.

Table 7.19. Indices of Parity in Punjab for Agricultural Sector (Base: 1959-1960 to 1961-1962 = 100)

Year	Index Of Prices Received by Punjab Farmers	Index of Prices Paid by Punjab Farmers	Index of Parity
1965-1966	146.01	137.41	106.26
1966-1967	194.96	164.26	118.24
1967-1968	198.96	178.28	111.54
1968-1969	203.76	194.32	104.86
1969-1970	203.25	201.51	100.86
1970-1971	203.17	214.80	94.59
1971-1972	216.19	230.72	93.70
1972-1973	246.83	256.68	96.16
1973-1974	324.89	287.65	112.95
1974-1975	354.27	326.83	108.40
1975-1976	311.05	316.01	98.43
1976-1977	336.63	363.38	92.64
1977-1978	353	356.26	99.08
1978-1979	383.73	361.82	106.06
1979-1980	394.61	399.02	98.89

Year	Index Of Prices Received by Punjab Farmers	Index of Prices Paid by Punjab Farmers	Index of Parity
1980-1981	521.17	477.16	109.22

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1982), Chandigarh, Government of Punjab.

The continuous years of lack of economic viability of farming operations took a financial toll on all Punjab farmers, particularly on marginal and small operators. Due simply to the sheer size of their landholdings, large farmers were able to produce more volume of crop for sale, allowing them to stave off financial instability and sustain operations. However, small and marginal farmers did not have this luxury; instead, the continual years of negative agricultural returns led many of these farmers to incur increasing debt, with limited resources to finance its cost. Marginal and small farmers attempted to keep pace with rapid technological changes in HYV technology, but this new farming method effectively drove them out of agriculture when their total agricultural income could not meet consumption needs (Bhalla, 1983; Biassuci, 1997; Singh, 2005). Farmers in Punjab began to forfeit their land as result of bankruptcy, sell their land, or withdraw from agricultural cultivation and lease their land out to larger farmers.

8. Instability in the Punjab Secondary and Tertiary Sector of the Economy

8.1. Hypothesis III

> Hypothesis III: Anti-state terrorism in Punjab is more likely to occur when the secondary and tertiary sectors of the Punjab economy are unable to absorb unemployed skilled and non-skilled workers providing them meaningful employment.

It has been hypothesized that anti-state terrorism is less likely to occur when the secondary and tertiary sectors of the Punjab economy are able to absorb unemployed skilled and non-skilled workers, providing them with meaningful employment. An examination of conditions at the time of the Punjab conflict reveals that by the early 1980s, it was evident that, the secondary and tertiary sectors of the economy in Punjab were unable to absorb the increasing numbers of skilled and non-skilled rural Jat Sikh workers who were searching for employment. The dramatic rise in the demand for employment in these sectors was driven by the increased displacement of workers from the agricultural sector, greater numbers of individuals entering the labour force, an increasingly educated workforce, and a number of other compounding social factors. The root causes of the deficiencies in the secondary and tertiary sectors of the Punjab economy dated back as far as the period of British colonial rule.

8.1.1. British Colonial Rule in Punjab (1850 to 1947)

Colonial rule in Punjab began in 1850 when the British annexed the state after the death of Maharaja Ranjit Singh, its previous ruler. British economic policy in Punjab was consistent with their practices across their colonial empire: extract resources from their colonies for the benefit of industries in Great Britain. From the beginning, the British administration actively discouraged the development of the industrial and service sectors of the Punjab economy, wanting, instead, to develop exclusively the agricultural sector for the raw materials that could supply its own population and its own manufacturing industries (Maini, 2004). The British concluded that Punjab with its rich alluvial soil and ideal growing climate, had the potential to supply significant agricultural produce to its industrial base. It also recognized that Punjab had a long history of

exclusively agricultural production, with much of the population engaging in this profession (Maini, 2004). The British invested substantially in the Punjab region to construct the canal colonies, an agricultural area that was supplied water through man-made canals that greatly increased the regions agricultural output. Punjab not only supplied Great Britain with agricultural products but also became a major supplier of food grains to the rest of the Indian colony, particularly to food-shortage areas.

The British decision to not pursue industrial development was also because Punjab did not possess the prerequisites needed at the time for industrial advancement (Maini, 2004). It lacked mineral resources like coal, which was needed to power industrial sectors, navigable rivers for the movement of materials, and sources of cheap labour. It was primarily land-locked, with limited access to a functional port, and did not possess a strong, experienced entrepreneurial business class with access to capital for development (Maini, 2004). For these reasons, the British failed to pursue industrial development in the state or put in place the basic infrastructure (e.g., transportation and communication) needed for its development. Industrial development in the state was relatively limited: there were only a few large-scale industries and the predominating small-scale industries were primarily concentrated in a few industrial centres. Most industries in Punjab were agro-based: textiles, silk, wool, hosiery, cotton, sports equipment, leather, industrial chemicals, oil, sugar, paper, iron, and steel (Maini, 2004). Cotton spinning, in particular, was pre-eminent as it had strong established links with cotton producers in the state and, more importantly, textile production was being carried out by many village-operated handloom weavers producing quality goods. Most factories in the state were geared towards refining agro-based raw material for processing by factories located in other regions of India or the British Empire (Maini, 2004). The decision of the British rulers in Punjab to focus on agricultural development would guide the trajectory of economic development in the state during the 20th century and place Punjab in a precarious position in the latter half of the decade.

8.1.2. India Partition (1947)

In 1947, British colonial rule in India came to an end with the withdrawal of the British administration and the establishment of democratic rule under the newly formed Indian government. The impact of the British withdrawal was profound for Punjab as the state was then divided: A large portion of West Punjab was allocated to the creation of nation of Pakistan, and East Punjab was integrated into the Indian union. The partition would see a massive transfer of religious populations, with Muslims fleeing East Punjab for Pakistan (West Punjab), where they were the numerical religious majority, and Sikhs and Hindus leaving the newly created nation of Pakistan for India (East Punjab). Already weakened under British rule, what was left of Punjab's

industrial and service sectors in East Punjab after partition was even weaker, with only 6% of the population employed in manufacturing. The challenges were daunting East Punjab had lost a majority of its large industries, which had been located in Lahore, Wazirabad, Sialkot, and Gujranwala, and approximately three fourths of its industrial complex to Pakistan (Maini, 2004).

The data for this period is relatively limited as there appears to be some contradictions in the figures available from official sources, perhaps due to the disruption in data collection capabilities during partition (Singh, 2008). Two separate studies, conducted by Pandit (1978) and A. Singh (1983) based on 1951 Indian census data, indicate that Indian Punjab was left with only 547 registered factories that had a total of 37,486 working employees. A second analysis conducted by Pritam Singh (2008) of data compiled from a study by Khanna (1983) found that by 1950, Punjab had 811 fully operational factories, employing approximately 35,370 individuals. The composition of the total number of operating factories was as follows: manufacturers of machinery (except electrical machinery) 36.49%; followed by textiles, 22.57%; metal products, 14.18%; food (except beverages), 12.95%; processes allied to agriculture, 12.33%; non-metallic minerals, 1.36%; and paper products, 0.12% (see Table 8.1) (Singh 2008). Although the manufacturers of machinery operated the largest number of factories, the largest industrial employer in the state was the textile sector with 15,843 (44.79%) employees; followed by manufacturers of machinery, with 6,282 employees (17.76%); processes allied to agriculture, 3,709 employees (10.48%); and food (except beverages), 3,609 employees (10.20%) (Singh, 2008) (see Table 8.1). The majority of these factories were small, with 80% employing less than 50 workers, 50% employing less than 20 workers, and only 20% employing more than 50 workers. The presence of large-scale industrial producers in the state was limited, with only 14 factories (1.72%) out of the total 811 employing more than 500 workers (Singh, 2008). Geographically, these factories were not evenly distributed; they were concentrated in the areas around Delhi, Ambala, Ludhiana, Jalandhar, and Gurdaspur (Maini, 2004).

Table 8.1. Total Number of Working Factories and Number of Workers Employed in Punjab (1950)

Industry	Total Number of Working Factories in Punjab	Percentage	Number of Workers Employed in the Factories	Percentage
Textiles	183	22.57	15,843	44.79
Manufacture of Machinery	296	36.49	6,282	17.76
Processes Allied to Agriculture	100	12.33	3,709	10.48
Food Except Beverages	105	12.95	3,609	10.20
Manufacture of Metal Products	115	14.18	3,334	9.42
Paper and Products	1	0.12	1,652	4.67
Non-Metallic Minerals	11	1.36	941	2.66
Total:	811	100	35,370	100.00

Note. Adapted from "Federalism, nationalism and development" (p.140), by P. Singh, 2008, London: Routledge.

The Indian Punjab also inherited, after partition, a limited number of ancillary small-scale industrial units that were primarily operated by independent operators and that engaged in relatively simple manufacturing operations. A portion of these producers supplied other processors in the region with required products for the manufacturing of final products. Data from a Statistical Abstracts of Punjab (1950) indicate that there approximately 1,147 of these operations, many engaged in the production of hosiery, leather products, machinery and parts, chemicals, metals, and alloys (see Table 8.2) (Maini, 2004).

Table 8.2. Number of Industrial Units in Punjab in 1950

Industry	Number of Small Factories
Food Products	40
Beverages	5
Hosiery	251
Wood Products	53
Leather Products	227
Chemicals	93
Metal & Alloy	85
Machinery & Parts	203
Transport Equipment & Parts	84
Electrical Machinery	19
Repair Services	58
Miscellaneous	29
Total	1147

Note. Adapted from "The giant awakens: Punjab industry and growth (p. 56), by G. Maini, 2004, New Delhi: India Research Press. Original from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1950), Chandigarh, Government of Punjab.

Punjab also inherited secondary and tertiary sectors where business activity was paralyzed due to the complete collapse in the functioning of government administration. During the lead-up to partition and thereafter, many industrial and service-based operations shut down due to the imminent division and massive migration of populations (Singh, 2008). In re-establishing democratic governance, the state and central government faced momentous challenges, including a non-functioning economy gripped with disorder, uncertainty, and limited production. Activity in the industrial and service sectors of the economy immediately after partition was dormant because of a number of interrelated and compounding factors. The Punjab had lost a considerable number of entrepreneurs who abandoned their operations to migrate to Pakistan. Entrepreneurs in other industrial and service operations also migrated out of the state to other parts of India, fearing for their safety because of the communal clashes in Punjab (Maini, 2004). In addition to the loss of owner/operators of business enterprises, the partition of Punjab also brought the loss of skilled labour, primarily of Muslim workers who possessed technical expertise in industrial-related production (Singh, 2008). The loss of these skilled workers prevented industrial operations from re-opening because many potential employees did not have the skills needed to perform critical functions.

Indian Punjab was also plagued by a host of other technical issues that prevented industrial and service sector operations. For example, many manufacturing operations were unable to function because the raw materials they needed for production were no longer available (Maini, 2004). Suppliers of agricultural raw materials (which were so readily accessible previously) were now in Pakistan. Many industrial operators also lost the markets for their products to Pakistan. Thus, they had to develop new markets in India. The banking sector in Punjab during partition was also adversely impacted by the dislocation of operations and capital (Singh, 2008). Post-partition, banking was in disarray and attempting to re-establish operations and re-access the flow of capital that had been temporarily suspended (Maini, 2004). Disruptions to the banking sector prevented industry from accessing capital critically needed to re-establish normal operations and production.

8.1.3. Post-Partition Punjab and Indian Government Development Policy

After partition, the central and state governments took similar stances pertaining to their long-term development objectives in Punjab. Initially, the focus was on providing the human and capital resources necessary to assist in the rehabilitation and resettlement of the huge refugee population (Maini, 2004). Governments at all levels focused resources on providing the refugees with the basic necessities and attempted to re-establish important civil institutions needed for

proper governance. The government expended substantial resources in finding residences for refugees and developing some semblance of economic order to assist them to find employment. In determining how to best re-invigorate the Punjab economy, both the central and state governments believed development of the agricultural sector should be given priority, though for diametrically opposing reasons. The state government in Punjab understood that it had a major humanitarian emergency with the large influx of refugees resettling into the territory that had no established formal links in the region and were not integrated into the local economy. The state government concentrated on meeting the basic dietary needs of this population and understood that providing them a means of making a living would help create stability. Thus, development of the agricultural sector of the economy was the only logical solution: Migrants could be settled in the underdeveloped wasteland tracts of land that could be cultivated, simultaneously also accelerating food grain production to meet the needs of the state's population (Maini, 2004).

The central Indian government was supportive of efforts to establish migrants and provided substantial financial outlays to the state government to that end. They also supported the development of the agricultural sector and a priority as a means of rapidly resettling the large influx of migrants and engaging them in productive employment in a sector that was beneficial to all. Individuals would be able to make a living and meet dietary needs through agricultural production, and, more importantly, any surplus food grain production could be re-distributed to feed the general Indian population.

However, the central Indian government did not see development of the industrial sectors of the economy in Punjab as beneficial given that its national interest of achieving food-self-sufficiency, especially in a state with ideal fertile agricultural land, was a higher priority. In addition, the Indian government specifically did not want to invest in developing the industrial sector in Punjab because of that regions lack of mineral resources, a pre-requisite for industrial development, and, more importantly, its close proximity to the Pakistan border. The development of an industrial base so close to the Pakistan was potentially risky; it could jeopardize the future of the Indian economy as any developed industrial assets could be destroyed or seized in attacks from Pakistan. Based on this reasoning, the central government was unwilling to approve the construction of large industrial units and only granted limited approval for the development of industry within the state (Maini, 2004).

During the initial post-partition years, the Punjab government did not pay considerable attention to the industrial and service sectors of the economy. However, in the early 1950s, government officials began to implement small, incremental increases in capital funding to develop these sectors. In the redevelopment of the infrastructure of the state to promote

expansion of the agricultural sector, some investments also had benefitted the industrial and service sectors. For example, in the early 1950s, the state government began rebuilding the network of roads connecting major cities and townships and also building crucial linking roads into rural districts for the transport of agricultural products (Maini, 2004). The redevelopment of the transport infrastructure was essential for the industrial and service sectors of the economy which not only needed secure supply routes for raw materials but also, more importantly, the ability to move finished products into markets within and outside of the region. During this same period, the Punjab government also recognized that the electrical power infrastructure was inefficient. Electricity was needed for the expanding agricultural sector and, as well, for urban centres and townships, growing with recently settled migrants. They therefore provided capital investments for projects to increase electric power generation and transmission. In 1947, construction on the Bhakra Dam and other major hydroelectric power projects began, and, by the late 1950s, electrical energy was available in abundance, providing an impetus for growth for all the sectors of the economy (Maini, 2004).

By the mid-1950s, the disruptions associated with the partition and resettling of refugees in Punjab stabilized, and the administrative apparatus of the state began to function efficiently. There was a stronger political commitment to increase overall prosperity through further economic development (Maini, 2004). During the second half of the 1950s, Chief Minister of Punjab Partap Kairon began implementing gradual measures designed to increase industrial development and spur economic activity in the service sectors of the state's economy (Maini, 2004). The government incrementally increased budget allocations for these sectors to stimulate further development and expansion of productivity and promote continued increase in employment.

In another strategy to simulate growth, the government began providing small loans and grants to businesses under the State Aid Industries Act and the Khadi and Village Industries Reward Schemes (Maini, 2004). These loans and grants were designed to provide capital to new businesses for the start-up phases of their operations or to established businesses for investments in production-enhancing technologies. The government distributed approximately Rs. 2 crore in loans to 8,000 industrial businesses over a 10-year period. The banks, having now re-established normal operations, could augment the capital available to the industrial and service sectors to promote growth (Maini, 2004). Nonetheless, banks were hesitant to provide substantial loans to industry due to continual political and social instability in the state.

Another initiative of the state government was to increase allotting funds to create institutes to train workers in skills they needed for employment in industry. In addition, they

established two rural industrial development centres to allow small-scale rural industrial owners to view and access new “tools and implements” that could be used to increase efficiency of their industrial operations (Maini, 2004, p. 88). To improve the quality of products produced by industry, the state opened nine “marking centres” to assist businesses to improve standards by conducting quality control tests on their products to make sure they met government-mandated specifications (Maini, 2004, p. 198). For entrepreneurs who had previously been in business in Pakistan, the government began an innovative rehabilitation program whereby these people were relocated into industrial cities and towns and provided with funds to re-establish their operations. This program successfully promoted economic growth of cities and towns by increasing industrial trade and commercial activity (Maini, 2004).

By the end of the 1950s, the industrial and service sectors of the economy was seeing some stability and expansion as the political and economic apparatus of the state became established. Growth in industry, after partition, showed improvement: engineering (14.7%) and chemical industries (12.4%) led the growth, with forest industries (9.5%), textiles (8%), and agricultural processing (3.4%) showing good improvement (see Table 8.3) (Maini, 2004). Growth in both the industrial and service sectors of the economy was primarily driven by-entrepreneurial initiatives and personal capital used to establish or re-establish businesses (Maini, 2004). The Punjab state and Indian national government had generally provided only limited capital or investment to this sector as both had perceived agricultural development as the best way to promote economic development and growth within the state.

Table 8.3. Growth of Industries in Punjab 1951 to 1958

Industry Group	Percentage Growth Increase during 1951 to 58 (Annual) for Specific Industrial Sectors
Agricultural Processing	3.9
Textile Industries	8.0
Forest-based Industries	9.5
Mineral-based Industries	-2.1
Engineering Industries	14.7
Chemical Industries	12.4
Miscellaneous	5.6

Note. Adapted from “The giant awakens: Punjab industry and growth (p. 91), by G. Maini, 2004, New Delhi: India Research Press. Original from NCAER, Techno Economic Survey of Punjab, New Delhi, 1962, p.77.

Even with only modest investment by the central and state governments, and the barriers faced by entrepreneurs as a result of partition and re-development of the state economy, by the early 1960s, Punjab saw the establishment of a number of primarily small and medium industrial enterprises participating in the production of textiles, machine tools, cycle parts, agro-products,

sporting goods, hosiery, and other miscellaneous finished goods. Large scale industrial development was mainly absent within the state.

8.1.4. Punjab Suba - Partition (1966)

Industrial and service sectors of the Punjab economy during the 1960s would continue to grow at a gradual pace, but the business community was still hesitant and apprehensive about investing in the state. This hesitation on the part of both domestic and foreign business interests was driven in part by the policies of the state and central governments whose focus was squarely on developing agriculture, with only limited investment in businesses. This created a negative investment environment and a disincentive for entrepreneurs to invest in the states business sector. The state and central governments continued to follow their initial plans of economic development which almost exclusively focused on increasing investments in the agricultural sector and allocating limited funds to the secondary and tertiary sectors of the economy. This policy of economic development negatively impacted business sector perceptions of Punjab which had been afforded few incentives to establish or expand operations.

Much of the business community's apprehension came from concern about the close proximity of conflict in that region that could affect the growth of the economy and performance and profits of industrial and service sector businesses. In 1962, India and China were engaged in a brief war on the northern border of the country over strategic interests in the Himalayan region. Although not directly located in the Punjab region, this conflict created a great deal of anxiety in the business community about its impact on their investment decisions, in particular, in border states. Punjab is also located along the Pakistan border, which exposed the economy to high risk and uncertainty that could not be ignored by investors. In 1965, India and Pakistan went to war, leading to limited military action within the state but having a negative impact on the functioning of the economy due to wartime restrictions. Also, the conflict with Pakistan reinforced concerns about investing in the state's industrial sector, in particular, in border districts like Ferozepur and Amritsar (Maini, 2004).

However, the Punjab *Suba* (Sikh majority state) agitation during the 1950s to the mid-1960s had a strong negative impact on the investment environment in the state. The Punjab Suba agitation was a long-running political conflict led by the Akali Dal, the political party that represented the interests of the Sikh population. After partition, the Hindu population were the majority (61%) in the state, and Sikhs were the largest minority (33%) (Maini, 2004). Having a long history of religious persecution and repression, the Sikh population feared cultural

disintegration and assimilation by the dominant governing community (i.e., the Hindu central government).

In post-partition Punjab, the Akali Dal continued to lobby the government for the creation of a separate state where Sikhs would be in the majority. In 1955, the States Reorganization Commission submitted its report recommending the re-alignment of other states boundaries along linguistic lines but the Akali Dal submission was rejected (Maini, 2004). The Akali Dal enraged by this decision, initiated mass protests, agitations, and distribution of political propaganda that would continue for a decade against the central Hindu ruling government (Maini, 2004). This consistent level of protest had a dampening effect on the economic environment: business owners were not willing to make new investments for fear of possibly losing assets in another partitioning of the state. This fear of conflict and further division of the state impeded the growth of the industrial and service sectors of the Punjab economy in the 1960s.

In 1965, after a decade of political agitations and continuous lobbying, the Indian government accepted the division of Punjab into Hindu-speaking and Punjabi-speaking areas (Chima, 1997). In 1966, under the Punjab State Reorganization Bill, some areas where the majority were Hindu-speaking formed the new state of Haryana and some other Hindu-speaking districts in the east were amalgamated with the adjacent state of Himachal Pradesh (Mohan, 1991). The Sikh population and the Akali Dal had finally achieved a separate state with Sikhs forming a majority 54% of the population.

The partition of Punjab in 1966 once again had a major impact on the industrial and service sectors of Punjab's economy. Crucial industrial and service-based businesses, in particular, were lost to Haryana, which inherited the developing industrial complex around the city of Delhi and the more established industrial complexes in Ambala, Saonepat, and Faridabad (Maini, 2004). A majority of the large-scale industries, including the major paper mills, cotton mills, glassware industry, cement factories, and bicycle industry also went to Haryana. The new state of Punjab was only able to retain 5 out of 13 urban industrial estates and forfeited all 24 rural industrial estates to Haryana. Punjab also lost all of its already limited access to mineral deposits, with Himachal Pradesh receiving most of the limestone, iron ore deposits, and forest resources (Maini, 2004). The Punjab industrial and service sectors of the economy received another setback, and the state's economy required another round of rehabilitation.

8.1.5. Punjab's Economy (1967 to 1980)

The new partitioning reduced the size of Punjab once more, but the disruption of the economy was more limited. There was no widespread communal violence and only minimal shifts in populations, as divisions amongst religious groups (Sikhs and Hindus) and along linguistic lines already existed. The transition was also greatly assisted by having clear political guidelines and a timeline as to how the division would proceed, ensuring the continued functioning of government institutions and the economy. There was no need for existing businesses to cease operations nor were the markets lost as Punjab maintained links to the broader Indian economy. The establishment of the new state of Punjab required the federal Indian and Punjab governments to re-examine their economic policies in relation to the state in order to determine its future development path.

Central Indian Governments' Economic Policy in Punjab After 1967

The central Indian government's economic policy in Punjab reflected their broader economic goals for the nation since independence. Their primary objective after independence was to create a strong, unified Indian nation where Indian nationalism overrode any loyalties to sub-national or linguistic identities (Singh, 2008). In order to achieve this objective, the government focused significant attention on particular social conditions it perceived as threatening the political and territorial unity of the state. Lack of food self-sufficiency had been established as a key factor contributing to possible conflict and had been addressed effectively during the decade following independence. The Indian government also identified maintaining balanced regional development and the reduction of socio-economic inequality between states as essential for avoiding internal conflict and strife. If India did not ensure a path of equal economic and social development across the union, inter-regional conflict, particularly between underdeveloped regions and the central government could result (Singh, 2008). It was believed that if political entities and the public in underdeveloped states perceived they would continue to suffer economically under Indian governance, it could lead affected groups to demand secession or autonomy from India. In order to avoid conflict, the Indian government had to provide these states with tangible economic benefits that would strengthen their desire to remain in the Union, and the government had to portray itself as being the only agency capable of improving economic conditions (Singh, 2008).

In order to ensure balanced regional development and socio-economic equality amongst the states, the government used its ability to control public sector spending and regulate private sector investment through the issuing of industrial licences as a means of promoting equitable growth (Singh, 2008). The Indian government used its powers, entrenched in the Indian

Constitution and legal statutes, to shape the trajectory of economic development within the states and across India. The Indian Constitution clearly delineates the division of powers between the federal and state governments and each one's areas of responsibility. The Indian Constitution in the Seventh Schedule clearly articulates that agriculture is under state control, and control of industry is under the purview of the central government; Parliament has the ability to define, through legislation, which industries are of "public interest" (Singh, 2008, p. 129). From independence, the Indian government, through Parliament, used legal statutes to strictly control and regulate the industrial sector in areas they deemed of national interest.

The most crucial legislation governing the industrial sector was the Industrial Policy Resolution of 1956 which shaped economic development in India. Over time, this piece of legalisation, through amendments, created a list of 171 industrial sectors that were to be under exclusive control of the central Indian government. The Industrial Policy Resolution (1956) was also key in that it articulated that the Indian government should play an instrumental role in initiating industrial development, in particular, industries that required significant levels of investment, and the state should maintain control over all "public utilities" (Singh, 2008, p. 131). However, most importantly, the legislation directed the central government to invest increased public sector investment into poorer regions across the country (Singh, 2008). The central government had the legal authority under the Industrial Policy Resolution to establish industries in specific geographic regions it deemed appropriate to reduce regional inequalities.

In 1966, after the re-alignment of Punjab's borders, the Indian government led by Indira Gandhi, conducted a critical analysis of the state and its place in the Indian Union. The central government had to balance two strategic national interests. The first strategic national interest was creating a strong unified Indian state. The government also needed to promote economic development to reduce socio-economic inequality through addressing the critical issues of food self-sufficiency and maintaining balanced regional development. In relation to Punjab, the central government agreed that the previous path of agricultural development was the correct path because it ensured increased food grain production, which was of national importance. The central Indian government argued that the development of the agricultural sector in Punjab since independence had benefitted the residents of the state, as they had one of the highest per capita incomes in India. It was difficult for the Indian government to justify increased industrial development in Punjab when other states (Bihar, Rajasthan, and Assam) were lagging substantially behind in their development and income compared to a prosperous state like Punjab. Based on this reasoning, it was determined that the agricultural sector would be the primary industry in Punjab, and only limited public and private investment would be directed there to develop its industrial and service sectors (Singh, 2008). At the same time, other

underdeveloped states would receive most of the public and private investment capital to establish industrial centers to improve socio-economic conditions and reduce inter-regional inequality.

Punjab Government Economic Policy Post 1967

After the 1966 division, the Punjab government, too, re-evaluated the state's economy to gauge the impact of the re-alignment of the state's borders. Given the Indian Constitution's delineation of the powers of federal and state government regarding industrial and agricultural development, the Punjab government had very limited options to consider in determining its own role in the future economic growth and objectives of the state. It had sole control over the agricultural sector of the economy and through development of that sector and related resources; it could build the state's economy. Indeed, development of the agricultural sector was the only viable option as the central government had directed the trajectory of economic development in the state by providing funds only for the expansion of the agricultural sector through implementation of Green Revolution farming and had withheld capital for investment in the industrial and service sectors (Singh, 2008). After re-alignment, the Punjab government directed considerable amounts of financial resources toward the agricultural sector and development of Green Revolution farming, with limited resources being directed to the secondary (industrial) and tertiary (service) sectors of the economy.

Though they had little capacity to directly affect industrial growth, the government and its policy makers' felt confident that the secondary and tertiary sectors of the economy would naturally see ancillary growth as the primary agricultural sector expanded (Randhawa, 1977). For example, some industries could produce needed agricultural input materials and others, process agricultural outputs (G. Singh, 1984). It was assumed that increased agricultural production would also lead to a natural increase in specialized services needed by the agricultural sector to maintain operations, resulting in an expansion of the tertiary sector of the economy. Local industries in the consumer sector would also see growth as the economic situation and disposable income of the agricultural producers improved (Maini, 2004). Thus, over the next decade, the Punjab government failed to articulate any formal industrial policy with clear objectives or long-term goals. The state government instead implemented only a few measures with limited coherency designed to assist entrepreneurs and promote growth in the secondary and tertiary sectors. The lack of a transparent and overarching policy would inhibit the expansion and optimal employment growth potential in these sectors.

In 1967, the Punjab government inherited an economy where agriculture produced over 61% of the net state domestic product, with the tertiary sector composing the next largest

component at 26%, followed by an underdeveloped secondary sector contributing 13% to the state's net domestic product (Statistical Abstracts of Punjab, 1980). Punjab's industrial complex was very limited and primarily composed of small-scale industry located largely in urban areas with restricted medium- and large-scale industries in the state; both groups were heavily dependent on the success of the state's agricultural production. Small-scale industry was predominately dominated by wool and cotton textiles, hosiery, steel re-rolling, cycle and parts, cotton ginning and processing, machine tools, sporting goods, and sewing-related equipment manufacturers (Singh, 2008). The medium and large industries were primarily concentrated on machine tool manufacturing, cotton textiles, food production, transport equipment and parts manufacturing, metal production, chemical production, and agriculture- related services (Maini, 2004). The Punjab government's limited attention to the development of the secondary and tertiary sectors was reflected in its budget outlays and policy measures for these sectors of the economy.

Federal and State Government Budget Outlays Industrial Sector (1966 to 1980)

In developing a vibrant industrial sector of an economy, federal and state governments play a critical role by providing impetus for growth and technical advancement through the implementation of strong industrial policy and capital investment. For example, in its earliest stages of development, the industrial sector needs public sector investment, which is essential for promoting and driving economic change, as private sector capital may not be available. Government investment in industry facilitates the development of infrastructure needed to promote growth but also acts as an incentive in attracting private industry to locate in areas where the basic infrastructure necessities for industrial development are in place (Singh, 2008). In the industrial development of Punjab between 1966 and 1980, both the federal and the state governments clearly showed a lack of financial commitment and neglected this sector (Hapke, 1988). As can be seen in Table 8.4, Punjab's share of central Indian government's total investments in the industrial sector was extremely low between the years 1967 and 1980. Between 1967 and 1975, the Indian government's total investment in industry in Punjab hovered around 1%, with a gradual increase to a 2% average by the end of the 1970s (Singh, 2008). This lack of investment reflects its economic policy towards the state of Punjab, which de-emphasized industrial development.

Table 8.4. The Central Indian Government's Yearly Share of Industrial Investment in Punjab

Year	Share of Public Investment in Industrial Sector in Punjab (%)
1963-1964	2.8*

Year	Share of Public Investment in Industrial Sector in Punjab (%)
1964-1965	2.6*
1965-1966	2.4*
1966-1967	2.0*
1967-1968	1.8*
1968-1969	1.2
1969-1970	1.1
1970-1971	1.0
1971-1972	0.9
1972-1973	0.9
1973-1974	0.8
1974-1975	0.8
1975-1976	1.2
1976-1977	2.2
1977-1978	2.1
1978-1979	2.0
1979-1980	2.7
1980-1981	2.3
1981-1982	2.3
1982-1983	2.0
1983-1984	1.7
1984-1985	1.2
1985-1986	1.0
1986-1987	**
1987-1988	**
1988-1989	0.83
1989-1990	0.74
1990-1991	0.67
1991-1992	0.62
1992-1993	0.70
1993-1994	0.60
1994-1995	0.61

Note. Adapted from "Federalism, nationalism and development" (p.143-144), by P. Singh, 2008, London: Routledge. Original from Bureau of Public Enterprises Annual Reports on the Working of Industrial and Commercial Undertaking of the Central Government, Government of India

* Punjab and Haryana Totals

** Not Available

The Punjab governments own expenditures on the industrial sector, although more positive, also clearly showed a lack of interest in the development of the secondary and tertiary sectors of the economy. In its Fourth Budget Plan (1969-1974), it allocated Rs. 1,125.95 Lakh to

industry and minerals, which only constituted only 2.64% of the state's total expenditures over this 5-year period (see Table 8.5). In the subsequent Fifth Plan (1974-1979), the government increased its overall expenditure to Rs. 3,756.12 Lakh still only 5.22% of the state's total budget allocated to the industrial sector (see Table 8.5).

Table 8.5. Expenditure of Five Year Plans in Punjab on Industry

Plans	Actual Expenditure (Rs. Lakh)	Percentage of Total Budget Expenditure
Fourth Plan (1969 to 1974)	1,125.95	2.64
Fifth Plan (1974 to 1979)	3,756.12	5.22
Sixth Plan (1980 to 1985)	7,413.98	3.93
Seventh Plan (1985 to 1990)	14,901.46	4.20

Note. Adapted from "The giant awakens: Punjab industry and growth (p. 218), by G. Maini, 2004, New Delhi: India Research Press. Original from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1997), Chandigarh, Government of Punjab.

The Punjab government's yearly expenditure on large-to-medium and small-scale industries between 1969-1970 and 1979-1980 echoed the lack of financial commitment to these sectors for development (see Table 8.6). These sectors of the industrial sector received a range from under 1% to as high as 5%, annually, of the total state's expenditures during the aforementioned period. Although the percentage of total budget expenditure failed to show a significant increase, the total financial capital allotted to small-through large-scale industries did increase, between 1966 and 1980, assisting in the minimal progress of Punjab's industrial sector. The funds allocated to the industrial sector during the late 1960s and 1970s were primarily concentrated in three specific areas: the establishment of publicly operated industrial loan agencies, the creation of promotional institutes, and the development of industrial parks or "focal points".

Table 8.6. Yearly Expenditures by Punjab Government on Large/Medium Industries and Village/Small Industries

Year	Large and Medium Industries (Rs. In Lakhs)	Percentage of Total Budget Expenditure	Village and Small Industries (Rs. In Lakhs)	Percentage of Total Budget Expenditure
1969-1970	18.83	0.31	145.74	2.43
1970-1971	95.50	1.46	119.04	1.82
1971-1972	80.60	1.03	74.20	0.94
1972-1973	184.18	1.85	81.67	0.82
1973-1974	4.87	0.04	329.78	2.67
1974-1975	*	*	*	*

Year	Large and Medium Industries (Rs. In Lakhs)	Percentage of Total Budget Expenditure	Village and Small Industries (Rs. In Lakhs)	Percentage of Total Budget Expenditure
1975-1976	570.24	3.43	115.65	0.70
1976-1977	918.02	4.13	195.62	0.88
1977-1978	878.55	4.31	236.19	1.16
1978-1979	790.46	3.58	340.78	1.54
1979-1980	1,533.04	5.59	230.89	0.86
1980-1981	972.64	3.25	247.26	0.82
1981-1982	1,211.75	3.54	311.09	0.90
1982-1983	707.79	1.84	266.59	0.69
1983-1984	1,176.51	2.74	522.48	1.21
1984-1985	1,215.01	2.76	480.99	1.09
1985-1986	1,419.00	2.87	487.21	0.99
1986-1987	2,855.27	4.21	539.84	0.80
1987-1988	1,915.00	2.55	713.00	0.95
1988-1989	2,785.00	3.28	799.55	0.94
1989-1990	2,325.08	2.67	342.11	0.39
1990-1991	*	*	*	*
1991-1992	*	*	*	*
1992-1993	*	*	*	*
1993-1994	*	*	*	*
1994-1995	2,742.00	1.93	1,293.89	0.91
1995-1996	1,714.03	1.08	399.58	0.25
1996-1997	1,400.00	1.12	534.26	0.43
1997-1998	4,615.00	2.20	533.56	0.25

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1984, 1987, 1990, 1996, 2000), Chandigarh, Government of Punjab.

* Not Available

Punjab Government Initiatives to Promote Industrial and Service Sector Development

In 1966, the Punjab government did initiate a number of gradual measures to assist entrepreneurs in the industrial and service sectors. The Punjab Financial Corporation, a public sector development bank established in 1953, was overhauled in the years following re-alignment. It was reinvigorated and re-capitalized to provide financial capital in the form of medium- and long-term loans to small industries (Bawa, 2000). The focus on small-scale industry was deemed essential as this group made up the largest percentage of industrial producers in the state. The loans were primarily for assisting applicants to acquire fixed assets such machinery or upgrades to plant infrastructure in order to increase production efficiency and also to assist small

industrial units to expand operations. As a public entity, the Punjab Financial Corporation was also used to attract investors into the state to set up new industries by providing them term loans at concessional rates (Johar, 1983).

The Punjab State Industrial Development Corporation (PSIDC) was established in 1966 to assist and promote large and medium industries in the state (Bawa, 2000; Johar, 1983). The role of this corporation was two-tiered: It provided financing to industry but also acted as a promotional institution for industry in Punjab. Its loans to entrepreneurs in large and medium industries were based on the level of investments they were making in the state and were primarily intended to assist with construction costs and acquiring capital assets (Johar, 1983). In its role as a promotional agency, it identified particular projects to be initiated jointly or solely through the public sector and acquired the necessary "letters of intent for registration of industrial licenses from the Government of India" in order to proceed with the development of projects (Bawa, 2000, p. 254). The corporation initiated a number of medium and large industrial projects to assist the redevelopment of the state's industrial sector.

Another initiative the Punjab government took for redeveloping the state's industrial sector after re-alignment was to establish a number of promotional institutes designed to help the dominant companies in the industrial sector. Most of these institutes were established during the latter half of the 1970s, as industry was getting re-established and expanding after realignment. In 1976, the state Handloom and Textile Development Corporation was created, the primary responsibility of which was the promotion and development of the textile and handloom industry. The corporation focused primarily on assisting small entrepreneurs by providing them short- to medium-length loans at reasonable interest rates for the purchase of advanced handloom equipment (Bawa, 2000). This entity also purchased finished products and then marketed and resold them to commercial purchasers domestically and internationally. The corporation also became an employer by setting up a number of handloom weaving and textile complexes throughout the state (Johar, 1983). Finally, the corporation provided training in the technical skills needed in the handloom and textile industry with the creation of development centres that provided technical guidance on new skills or assisted craftsmen in the resolution of production-related deficiencies (Singh, 2001).

The Punjab State Hosiery and Knitwear Development Corporation was created in 1977, as Punjab was the primary supplier of knitwear and hosiery products to the country (Johar, 1983). The new corporation was established to assist producers in this sector to access modern technology to increase efficiency and the quality of finished products. In particular, the corporation assisted producers to acquire technology that allowed for the diversification of

product lines by increasing the ability of industry to produce and design a wide range of hosiery and knitwear products from a single raw material (Bawa, 2000). The corporation also played an active role in promoting products produced by this sector and establishing new markets for goods. A number of finishing facilities were established across Punjab to improve the quality of goods, and manufacturing complexes were constructed to attract private enterprise to set up operations and increase manufactured output of products (Bawa, 2000).

The final promotional institute established was the Punjab State Electronics Development Corporation in 1977. Its primary objective was to advance the electronic industry both in the town of Mohali and throughout the state (Johar, 1983). The corporation worked extensively with entrepreneurs in the electronic industry, assisting them to navigate regulatory bodies and to obtain approval from the central government for the establishment of their operations in the state (Bawa, 2000). The corporation's mandate was to attempt to lure major electronic firms internationally to the state and establish the physical infrastructure and facilities needed for growth (Bawa, 2000).

Through the 1970s, the Punjab government sector also allocated substantial funds for the development of industrial parks known as *focal points*. The goal of the focal point strategy, which was devised in 1967-1968, was to disperse industry throughout the state. At the time, it was concentrated in a few districts (Ludhiana, Patiala, Jalandhar, and Amritsar) along G.T. Road, the main arterial corridor running through the region (Johar, 1983). The objective in establishing these new industrial parks or focal points throughout the state was to integrate development of large, medium, and small industries into a concentrated area in an environment that was planned and organized (Johar, 1983; Maini, 2000). The land for this program was purchased by the government through the Punjab Small Industries and Export Corporation Limited who would develop the land into plots with the infrastructure (e.g., electricity, drainage, roads, communication networks) needed by industrial users. These plots of land would be available for sale at a subsidized low rate to industrial entrepreneurs who would establish industrial operations within these parks (Singh, 2001).

During the 1970s, in order to attract industrial development, the Punjab government developed four of these parks in Mohali, Dhandari Kalana, and Rajpura adding to the 10 already in operation in urban areas. Although the Punjab government implemented a number of measures to assist industrial development in the state, most of the aforementioned measures were ineffective in spurring substantial growth of the industrial sector during the 1970s. However, they did assist in creating the foundation upon which more effective measures could be implemented at a later date.

8.1.6. Punjab Industrial and Service Sector Development (1966 to 1980)

In the years following re-alignment, the overall Punjab economy went through a period of rapid change with the introduction of Green Revolution farming in the agricultural sector and the re-establishment of the industrial and service sectors of the economy. From 1967 to 1980, the agricultural sector continued to play a dominant role, in particular, with the introduction of Green Revolution farming and expansion of agricultural production. As can be seen in Table 8.7, by 1979-1980, the primary sector (agriculture) comprised 47.43% of the net state domestic product, a decline of 12.47% from 61.40% in 1969-1970. This decline in net state domestic product was expected as the secondary and tertiary sectors of the economy recovered and expanded in the post re-alignment period. The secondary (industrial) sector of the economy continued to show slow progress in Punjab in comparison to other states in India, rising from 15% of the net state domestic product in 1969-1970 to 20.45% by 1979-1980. The tertiary (service) expanded from 23.60% in 1969-1970 of net state domestic product to 32.12% by 1979-1980, demonstrating positive growth as the sector continued to expand with the overall state economy.

Table 8.7. Percentage Distribution of Net State Domestic Product by Sectors in Punjab

Year	Primary Sector	Secondary Sector	Tertiary Sector
1973-1974	62.77	13.69	23.54
1974-1975	60.62	14.94	24.44
1975-1976	56.68	16.61	26.71
1976-1977	56.79	15.84	27.37
1977-1978	55.47	16.65	27.88
1978-1979	54.13	17.47	28.40
1979-1980	47.43	20.45	32.12
1980-1981	44.54	21.41	34.50
1981-1982	45.54	21.44	32.92
1982-1983	43.20	22.22	34.58
1983-1984	42.20	22.98	34.82
1984-1985	44.35	20.85	34.80
1985-1986	44.46	20.87	34.67
1986-1987	43.36	21.47	35.17
1987-1988	45.48	21.07	33.45
1988-1989	44.76	21.62	33.62
1989-1990	45.28	21.71	33.01
1990-1991	44.62	22.41	32.97
1991-1992	47.01	20.23	32.76
1992-1993	47.25	20.62	32.13

Year	Primary Sector	Secondary Sector	Tertiary Sector
1993-1994	48.28	20.00	31.72
1994-1995	47.27	20.64	32.04
1995-1996	45.24	22.32	32.44
1996-1997	46.25	20.21	33.24

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1982, 1984, 1987, 1990, 1996, 2000), Chandigarh, Government of Punjab.

Another indicator of transformation of the economy was changes in the structure of the workforce in various sectors over time. The percentage of workers engaged in the agricultural sector (cultivators and agricultural labourers) in 1971 was 62.67% gradually declining to 58.02% in 1981, a reduction of 4.65% within a decade (see Table 8.8) (Gill & Singh, 2006). The percentage of workers engaged in the industrial sector increased slightly to 13.5% by 1981 from 11.3% in 1971, and of workers classified as "other", increased from 26.03% in 1971 to 28.47% in 1981. Overall, in this decade, there was no major shift in the workforce in the Punjab economy, with a majority of workers remaining dependent upon the agricultural sector and only small increases in employment in non-agricultural professions.

Table 8.8. Structure of Workforce in Punjab (Decennial)

Year	Agricultural Cultivators	Agricultural Labourers	Industrial Workers	Other Workers	Total Workers in Punjab
1971	1,665,153 (42.56%)	786,705 (20.11%)	442,070 (11.3%)	1,018,664 (26.03%)	3,912,592 (100%)
1981	1,767,286 (35.86%)	1,092,225 (22.16%)	665,442 (13.50%)	1,402,806 (28.47%)	4,927,759 (100%)

Note. Adapted from "Farmers' suicides and response of public policy: Evidence, diagnosis and alternatives from Punjab", by A. Gill & L. Singh, 2006, *Economic and Political Weekly*, 41(26), p. 2763.

The sub-sector rates of growth between 1967 and 1980 were also statistically strong, with a majority of sectors showing growth with the expansion of the economy post re-alignment. With the implementation of Green Revolution farming, the agricultural sector during the aforementioned time was expanding at a 3.18% per annum, a steady advance in agricultural production (see Table 8.9). Growth in the secondary and tertiary sectors of the economy was positive but this was expected as the majority of businesses in these sectors were strongly connected to the agricultural sector. The industrial manufacturing sector in Punjab from 1967 to 1980 grew at an 8.22% per annum rate, showing healthy expansion (see Table 8.9). Sectors associated with the service economy also demonstrated strong growth: construction (10.06%), banking and insurance (9.04%), gas and water supply (8.12%), trade, hotel, restaurants (7.56%), transport, storage, communication (7.55%), public administration (6.21%), and other services

(4.42%). The expansion of the service sector of the economy was particularly driven by growth in the agricultural sector where considerable funds were being invested in infrastructure development and demands for specialized services by cultivators contributed to increased growth. The overall expansion of agricultural incomes during this period also drove expansion of consumer services, as disposable income increased among Punjab residents.

Table 8.9. Sectoral Rates of Economic Growth in Punjab (1966 to 1980)

Sectors	1966-1967 to 1979-1980
	Growth Rate % Per Annum at 1980-1981 Prices
Agriculture	3.18
Livestock	6.10
Forestry and Logging	12.48
Fishing	4.17
Mining and Quarrying	-0.51
Manufacturing	8.22
Electricity, Gas, Water Supply	8.12
Construction	10.06
Trade, hotel and Restaurants	7.56
Transport, Storage and Communication	7.55
Banking and Insurance	9.04
Real Estate Ownership of Dwellings and Business Services	1.03
Public Administration	6.21
Other Services	4.92

Note. Adapted from "Deceleration of economic growth in Punjab: Explanation, and a way-out", by L. Singh & S. Singh, 2002, p. 581.

During the 1970s, the Punjab industrial sector went through a period of transformation and expansion as it re-established itself in the state economy after re-alignment. The high industrial growth statistics between 1967 and 1980 were reflective of this process as an almost non-existent industrial base with even gradual improvements showed a marked improvement statistically. The industrial sector that emerged in Punjab by the 1980s, although markedly improved from the previous decade, was also characterized by a number of deficiencies and weaknesses that would contribute to future social strife. Industrial development in Punjab, as a result of central and state government policies had not followed a normal trajectory of capitalist development with a well-diversified industrial base. The Punjab industrial sector was, rather, characterized by a high level of dependence on the agricultural sector for development and growth and was dominated by small-scale industry.

Small Industry

The industrial sector in Punjab, between 1967 and 1980, was dominated by small-scale industry which showed steady expansion. Small-scale industry was heavily reliant on the agricultural sector for raw materials to produce products to sell in the state or external markets (Singh, 2001). A majority of these small-scale units were concentrated in urban centres in the districts of Amritsar, Jalandhar, and Ludhiana (Kumar, 1984). These industries produced a limited line of products and were mainly engaged in the production of cotton and wool textiles, hosiery, agricultural implements, sporting goods, machine tools, cotton ginning and pressing, steel re-rolling, and cycles and cycle parts (Kumar, 1989). By 1979-1980, these industries dominated 90% of the total value of all small-scale production showing the specialization by producers in this sector. The total number of small-scale units increased from 8,023 in 1966-1967 to 33,716 by 1979-1980, an increase of 25,693 units (see Table 8.10). As Table 8.10 shows, the workforce employed by small-scale units increased from 56,000, for the same period, to 223,979, an increase of 167,979 employees. The number of small-scale industrial jobs averaged 12,921 per year over a 13-year period, providing limited employment opportunities to job seekers in the state. Fixed investment in small-scale units also increased from 60 crore in 1966-1967 to 273 crore by 1979-1980, showing increased investment by entrepreneurs in small-scale industrial units. Production values of goods produced by small-scale industry also rose from 200 crore in 1966-1967 to 924 crore in 1979-1980, as more small-scale units began production. The small-scale industrial sector in 1970-1971 constituted 61.78% of the total industrial output in the state, demonstrating its predominance over large- and medium-scale industry (38.22%) (Bawa, 2000). Over the decade, this ratio gradually shifted, with small-scale industry 49.49% of total industrial output by 1980-1981, compared to large and medium industry's 50.51% (Bawa, 2000).

Table 8.10. Selected Statistics of Small-Scale Industries in Punjab 1966 to 2001

Year	Number of Industrial Units	Employment (No.)	Fixed Investment (Rs. Crore)	Production (Rs. Crore)
1966-1967	8,023	56,000	60	200
1974-1975	18,114	122,162	134	484
1975-1976	20,271	136,334	153	568.3
1976-1977	22,298	152,638	169	633
1977-1978	24,231	163,134	195	702
1978-1979	27,509	186,197	225	779
1979-1980	33,716	223,979	273	924
1980-1981	43,338	264,869	332	1,118
1981-1982	54,021	304,155	402	1,343

Year	Number of Industrial Units	Employment (No.)	Fixed Investment (Rs. Crore)	Production (Rs. Crore)
1982-1983	64,091	339,972	492	1,586
1983-1984	76,588	378,846	572	1,786
1984-1985	88,271	424,478	656	1,958
1985-1986	97,517	464,809	739	2,151
1986-1987	108,913	503,397	830	2,359
1987-1988	119,888	545,560	943	2,682
1988-1989	132,962	594,354	1,064	3,109
1989-1990	146,443	633,964	1,218	3,504
1990-1991	160,388	668,845	1,349	4,050
1991-1992	176,378	711,417	1,499	4,437
1992-1993	181,563	732,580	1621	5,345
1993-1994	184,875	755,883	1,764	7,075
1994-1995	188,241	776,763	1,973	8,737.8
1995-1996	191,025	802,329	2,216.1	9,713.9
1996-1997	193,332	821,170	2,491.3	11,106.2
1997-1998	195,383	840,568	2,859.9	13,057.7
1998-1999	197,344	864,592	3,360.7	14,444.5
1999-2000	199,071	883,005	3,793.7	16,610.8
2000-2001	200,603	897,417	4,250	19,525

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1984, 1987, 1990, 1996, 2000), Chandigarh, Government of Punjab.

The increase in the number of small-scale industrial units in Punjab over the 1970s, although beneficial to the state economy, was, however, also indicative of slow development of the industrial sector. Small-scale industrial units were largely labour intensive, with lower levels of production output (Bawa, 2000; Singh, 2001). Many of them were unable to build up sufficient capital to invest in needed technology to increase production and improve the quality of goods. The inability to increase productivity also prevented them from being able to reduce their production costs and increase their profitability and competitiveness (Bawa, 2000). The small-scale industry in Punjab, which came to dominate the industrial sector by the early 1980s, offered low wages, suffered from low productivity, and failed to produce substantial employment opportunities for Punjab citizens.

Large and Medium Industry

Large- and medium industry in Punjab from 1967 to 1980, although statistically demonstrating a high level of growth, was realistically making only limited advancements as the sector contributed minimally to the state economy. The lack of development of large and medium

industries was the result of the unwillingness of the central Indian government, which controlled industrial development, to invest in Punjab to build and establish its industrial base. In addition to withholding public investment in Punjab's industrial sector, the central government also limited the amount of private investment it allowed into the state through strict control of the industrial licensing process. In order for private firms to establish industrial operations in a state, they needed to obtain licensing from the Indian government. The Indian government approved very few applications for the establishment of large and medium industries in Punjab and actively encouraged private investment into economically backward states. Punjab also faced challenges in attracting private capital to the state due to a host of technical factors that were not conducive to industrial development as well as its close proximity to Pakistan (Wallace, 1986; Hapke, 1988; Singh, 1995). Private sector industrial firms also found it a disincentive to establish operations there because of the lack of mineral resources (Teleford, 1992). The lack of mineral resources negated the establishment of certain types of heavy industries that were based on iron, coal, cooper, lead, aluminum and other base metals and also hinder other industrial development because any operations established in the state would be dependent upon the import of raw materials (Singh, 1995). Geographically, Punjab is isolated, located a considerable distance from ports and mineral resource deposits within India. The high costs of transporting raw materials for production and also getting finished goods to large markets would reduce profits and companies' competitive advantages. Infrastructurally, Punjab also lacked sufficient and consistent energy supplies needed sector to maintain production (Bawa, 2000). A significant portion of electrical output was allocated to the agricultural sector to sustain its functioning, placing the industrial sector at a disadvantage.

Large and medium industries were heavily connected to the agricultural sector and dependent upon it for their financial viability (Singh, 2001). This sector was dependent on the rural economy to provide raw input materials to produce goods and markets for their products. From 1966 to 1980, the number of large and medium industrial units established in the state was dismal. From 1966-1967 to 1979-1980, the number increased from 122 to 203, an addition of only 81 industrial units (see Table 8.11). Over this 14-year period, Punjab was annually adding a meager 5.78 large and medium industrial units. As Table 8.11 shows, the workforce in this sector increased from 42,735 in 1966-1967 to 97,533 by 1979-1980, an increase of 54,798 positions. The level of fixed investment also increased after re-alignment from 104 crore in 1966-1967 to 379 crore, as stability increased and entrepreneurs were more willing to invest. Increased industrial investment in mechanized equipment and refinement of production processes by industry led to a corresponding increase in the total value of good produced, rising from 93 crore in 1966-1967 to 864 crore in 1979-1980, an increase in production value of 776 crore. The

growth of large and medium industries in Punjab between 1966 and 1980 was weak and produced limited employment opportunities for residents of the state.

Table 8.11. Selected Statistics on Large and Medium Industries in Punjab 1966 to 2001

Year	Number of Units Industrial Units	Employment (No.)	Fixed Investment (Rs. Crore)	Production (Rs. Crore)
1966-1967	122	42,735	104	93
1974-1975	132	57,891	109	308
1975-1976	144	63,291	196	385
1976-1977	160	69,942	257	471
1977-1978	175	77,971	310	607
1978-1979	188	91,551	379	711
1979-1980	203	97,533	629	869
1980-1981	228	107,767	727	1,141
1981-1982	237	109,081	835	1,529
1982-1983	243	120,925	962	1,826
1983-1984	254	124,819	1,099	1,993
1984-1985	273	131,381	1,252	2,071
1985-1986	292	132,174	1,490	2,535
1986-1987	306	142,381	1,401	3,185
1987-1988	322	151,990	2,067	3,778
1988-1989	335	160,609	2,452	4,379
1989-1990	355	169,801	3,083	5,458
1990-1991	373	187,311	4,003	7,164
1991-1992	395	193,789	4,552	7,709
1992-1993	414	188,034	5,194	9,335
1993-1994	440	200,000	5,800	11,000
1994-1995	475	206,722	6,420	13,500
1995-1996	526	210,448	8,744.1	16,656.1
1996-1997	586	219,383	9,744.6	21,387.1
1997-1998	620	221,154	11,720.1	25,406
1998-1999	602	227,929	14,038.1	25,376
1999-2000	611	235,993	14,765.8	23,720.1
2000-2001	638	251,890	17,000	35,600

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1984, 1987, 1990, 1996, 2000), Chandigarh, Government of Punjab.

Tertiary Sector

The tertiary (service) sector of the Punjab economy between 1967 and 1980 also saw expansion increasing its portion of the net state domestic product from 23.6% to 32.1% for the stated period. Expansion in the service sector was primarily fueled by growth in the agricultural sector during the 1970s as this sector required increased specialized services. The rising per

capita income in the state during the 1970s also led to increased disposable income affording individuals the opportunity to increase discretionary spending on consumer goods. There is very limited statistical data for discussion on this sector of the economy. However, based on the limited statistical data available on employment levels for this sector, it is assumed that the tertiary sector did produce increased employment in the 1970s, but the increase was minimal and afforded Punjab citizens limited employment opportunities.

8.1.7. Hypothesis III – Confirmed: Weak Secondary and Tertiary Sector Employment.

Hypothesis III has been confirmed as a weak secondary and tertiary sector of the Punjab economy was unable to absorb unemployed skilled and non-skilled workers in Punjab providing them meaningful employment. In the 1970s and early 1980s, Punjab was going through a period of rapid transformation producing significant volatility to the socio-economic structures of the state. Though it improved agricultural productivity and enhanced the economic well-being of some segments of farmers, as has been shown, Green Revolution farming also had a particularly detrimental impact on marginal and small Jat farmers, many of whom withdrew from farming, either selling their holdings or losing their land through forfeiture. Many of these farmers and their families looked for employment in other sectors. In addition, more cultivators and their families who still had their farms were seeking non-farm employment to supplement their incomes.

The employment prospects in Punjab for unemployed Jat Sikhs during the late 1970s and early 1980s were bleak. The agricultural sector in Punjab was not capable of absorbing more workers as increased mechanization had led to decreased demand for manual labour, and the state was already saturated with migrant agricultural labourers from outside the region. Many agricultural labourers from the surrounding states of Bihar and Uttar Pradesh had migrated to Punjab seeking employment (Ghuman, 2005). Many unemployed Jat Sikh workers were also unwilling to work in the agricultural sector as labourers due to the belief that engaging in such work lowered their social status (Chand, 1999). Many displaced farmers and their families were from the Jat Sikh caste, the highest caste in the Sikh culture, and to work among low caste agricultural labourers was seen as the ultimate loss in social stature (Oberoi, 1990; Simmons, 1995). The inability to find employment in the agricultural sector and the unwillingness of some to do so drove many unemployed Jat Sikhs adults in the late 1970s to look for employment in the industrial and service sectors of the economy. Increased rates of literacy in Punjab during the previous decade had also tempered expectations of many of the unemployed farmers' children who were no longer willing to participate in blue collar agriculture as a career but, rather, looked for employment in white collar non-agricultural professions (Sharma, 1989).

The secondary and tertiary sectors of Punjab's economy in the late 1970s and early 1980s was unable to absorb the large number of unemployed skilled and non-skilled Jat Sikh workers and provide them with meaningful employment. The secondary sector of the economy was considerably underdeveloped lacking large and medium industrial units, and small-scale industry was unable to produce large employment increases. Small-scale industrial employment was primarily low-paying, manual labour which was unappealing to many unemployed Jat Sikh workers (S. Singh, 2000). The tertiary sector of Punjab's economy was also unable to offer significant employment to the rapidly increasing unemployed rural Jat Sikh population (Gill, 1988). The service sector growth was not sufficient or rapid enough during the 1970s to keep pace with the deteriorating employment situation in the state.

Besides finding there were few employment opportunities for them many Jat Sikh workers also found they could not compete for the limited job vacancies because they did not have the required specialized skills necessary to work in many of the industrial and service sectors jobs that were available, most of their work experience was in agriculture (Chand, 1992). The specialized agricultural skills they possessed were of no value in the urban business environment. Rural Jat Sikh workers also found considerable hurdles in obtaining employment in these sectors because of the natural ethnic occupational divide that existed in the state (Koehn, 1991). In Punjab, a majority of the businesses operated in the urban areas were controlled by Hindu entrepreneurs, with Sikhs primarily participating in the agricultural sector. Many businesses operated by Hindu owners had a strong hiring preference for urban non-Sikhs for positions in their businesses. This preference for non-Sikh workers was not based on discrimination solely but also on the desire of these businesses to hire migratory labour that worked for lower wages, had little weak political influence, and were more easily disposed of during labour disputes than were local workers (Chand, 1999; S. Singh, 2000).

The inability of rural Jat Sikhs to obtain employment in the secondary and tertiary sectors of the economy in the early 1980s led to increased anger and resentment amongst this population. They were enraged that through the implementation of Green Revolution farming, they had lost their only means of living and now were unable to secure any form of employment in the state. They blamed the Hindu central government for their inability to secure employment in the industrial sector and service sectors of the economy because of the government's economic policies that had limited public and private capital investment in these specific sectors. They argued that the Hindu central government and its economic policies had prevented the establishment and expansion of these sectors in Punjab, thus preventing increased employment opportunities in the state. They believed that the Hindu government was unwilling to see industrial development in the state because it did not want to see the Sikh community prosper.

The Sikh population also perceived the lack of development in the secondary and tertiary sectors of the economy as inhibiting their aspirations to achieve economic objectives and the ability of future Sikh generations to achieve their economic goals. Prolonged periods of unemployment for many rural Jat Sikhs substantially increased the level of social unrest in the Punjab countryside and placed many rural Jat Sikh families in dire financial positions. This population sought solutions to their economic situation and were willing to support any figure that could help ameliorate their economic situation and make sense of their bleak economic circumstances.

9. Punjab Demographic Trends and Instability

9.1. Hypothesis IV

> Hypothesis IV: The likelihood of anti-state terrorism in Punjab is greater when there are substantial variations in the demographic trends of the population.

It is hypothesized that anti-state terrorism in Punjab is greater when there are substantial variations in the demographic trends of the population. During the 1970s and early 1980s in Punjab, there were two major shifts in the demographic characteristics of the population: the number of adults of working age and the levels of literacy in the state. The "baby boom" of the late 1950s and 1960s had brought a dramatic spike in the population. This generation had now matured and its impact on Punjab society was felt in the early 1980s. The two changes in demographic trends had unique implications both placing demands on the Punjab's employment structure.

9.1.1. Population Growth (1970s and 1980s)

In 1971 there were 13,551,060 working adults in Punjab. By 1981, this rose to 16,788,915, an increase of 3,223,855 over one decade (see Table 9.1 and 9.2). Concomitantly, the number of working males during this time also increased: from 7,266,515 in 1971 to 8,937,210 in 1981, an increase of 1,670,695. Of particular interest is the effect of this growth in rural Punjab where the number of males between the ages of 15 to 30 rose from 1,372,471 in 1970-1971 to 1,780,430 in 1980-1981, an increase of 407,959 (see Table 9.3 and 9.4). This sudden 23% increase in males in this age bracket in rural Punjab was important because this group was of prime working age and seeking employment in the state's workforce. In the context of the economic downturn of the early 1980s, larger numbers of rural workers were competing for fewer employment opportunities.

Table 9.1. Population in Punjab by Age Group (1971 Census)

Age Group	Males	Females	Total
0 -14	2,976,800	2,616,924	5,593,724
15-19	773,916	665,470	1,439,386
20-24	601,795	532,459	1,134,254
25-29	485,072	428,189	913,261
30-39	758,788	707,541	1,466,329
40-49	610,232	547,414	1,157,646
50-59	458, 831	369,959	828,790
60+	597, 458	416,454	1,013,912
Age Not Stated	3,623	135	3,758
Total	7,266,515	5,284,545	13,551,060

Note. Adapted from "Statistical Abstract of Punjab", by Economic adviser to government Punjab, 1980, (p. 45), Chandigarh, Government of Punjab.

Table 9.2. Population in Punjab by Age Group (1981 Census)

Age Group	Males	Females	Total
0-14	3,261,548	2,907,320	6,168,868
15-19	1,003,527	879,445	1,882,972
20-24	873,845	766,102	1,639,947
25-29	678, 131	602,134	1,280,265
30-39	1,022,361	931,826	1,954,187
40-49	782,806	705,168	1,487,974
50-59	561,076	479,829	1,040,905
60+	745,054	572,724	1,317,778
Age Not Stated	8,862	7,157	16,019
Total	8,937,210	7,851,705	16,788,915

Note. Adapted from "Statistical Abstract of Punjab", by Economic adviser to government Punjab, 1987, (p. 47), Chandigarh, Government of Punjab.

Table 9.3. Population in Punjab by Age Group Rural (1971 Census)

Age Group	Males	Females	Total
0-14	2,312,562	2,022,815	4,335,377
15-19	581,664	499,647	1,081,311
20-24	435,762	390,604	826,366
25-29	355,045	315,711	670,756
30-39	552,183	525,347	1,077,530
40-49	449,234	416,961	866,195
50-59	354,785	292,218	647,003
60 +	491,998	337,998	829,996
Age Not Stated	242	105	347
Total	5,533,475	4,801,406	10, 334,881

Note. Adapted from "Statistical Abstract of Punjab", by Economic adviser to government Punjab, 1980, (p. 45), Chandigarh, Government of Punjab.

Table 9.4. Population in Punjab by Age Group Rural (1981 Census)

Age Group	Males	Females	Total
0-14	2,397,559	2,115,428	4,512,987
15-19	733,673	651,021	1,384,694
20-24	593,351	526,379	1,119,730
25-29	453,406	410,753	864,159
30-39	701,014	664,478	1,365,492
40-49	555,697	518,684	1,074,381
50-59	414,765	361,135	775,900
60 +	591,485	446,723	1,038,208
Age Not Stated	3,514	2,093	5,607
Total	6,444,464	5,696,694	12,141,158

Note. Adapted from "Statistical Abstract of Punjab", by Economic adviser to government Punjab, 1987, (p. 47), Chandigarh, Government of Punjab.

With the state's agricultural sector experiencing economic turbulence and smaller farming households, in particular facing economic uncertainty, these rural adults, who were primarily Jat Sikh youth, faced grim employment prospects. The likelihood of obtaining employment in the non-agricultural sector was minimal due to stagnation in the manufacturing and service sectors of the economy, and as well, the fact that few non-agricultural businesses were located in the countryside. Thus, increasing numbers of people found themselves without the means to maintain their standards of living.

9.1.2. Rise in Literacy Rates

In addition to the increase in the adult working population, there was also an overall increase in the rates of literacy in the state. After Punjab's partition in 1967, the government committed to increasing literacy rates through the establishment of formal educational structures located equally in rural and urban areas. The expansion of the educational system was implemented by the building of primary and secondary schools throughout the state, the number of which rose from 9,369 in 1970 to 16,045 by 1980 (Statistical Abstracts Punjab, 1980). In addition to the expansion of the lower-level education system, the government also expanded the post-secondary system, increasing the number of state-operated universities and colleges from 136 in 1970 to 190 by 1980 (Statistical Abstracts Punjab, 1980). The enrollments in these universities and colleges expanded exponentially, rising from 35,000 students in 1964 to 107,845 students by 1972, and reaching a high of 133,850 students by 1982 (Teleford, 1992). The

expansion of the post-secondary system was deemed necessary because the government wanted to create a dynamic and skilled workforce that had the technical abilities to meet the demand for positions in the industrial and service sectors of the economy as they expanded. In 1962, literacy rates in Punjab were 27%. The overall rates of literacy in the state rose from 33.67% in 1971, and then to 40.26% by 1981 (see Table 9.5). As in the state in general, literacy rates in rural areas also rose, as formal education became accessible in all districts, including previously underserviced areas. In addition to the greater availability of education, another factor affecting the literacy rate was the modernization of the agricultural sector which freed many children from working on the farms, allowing them to attend school (Teleford, 1992). Rural literacy rates increased from 27.81% in 1971 to 35.21% in 1981 (see Table 9.5).

Table 9.5. Rural and Urban Literacy Rates in Punjab (Decennial)

	1971	1981	1991
Rural	27.81%	35.21%	52.70%
Urban	52.49%	55.63%	72.09%
Total	33.67%	40.86%	58.51%

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1980, 1987, 1990), Chandigarh, Government of Punjab.

9.1.3. Hypothesis IV – Confirmed: Impact of Demographic Changes.

Hypothesis IV has been confirmed as there were substantial variations in the demographic characteristics in the Punjab population. The cumulative impacts of these demographic changes were observed in the late 1970s and early 1980s. During this period, a large rural Jat Sikh male population developed who were seeking employment but had few viable employment options. Although many of the rural Jat Sikh males during this period assisted in family farming operations, they were cognizant that the viability of the agricultural sector was precarious. There was an increasing segment of rural disenfranchised Jat Sikh males who were no longer able to participate in the agricultural sector as they or their families had lost their land and were now seeking employment. These men were unable to secure employment due to the lack of employment opportunities in the secondary and tertiary sectors of the economy.

Another effect of the higher rates of literacy in rural areas was a fundamental change in people's job aspirations: higher levels of education led to elevated occupational aspirations. Many, were no longer content with "blue collar" farming and sought improved lifestyles in "white collar" professions (Sharma, 1989, p. 87). In this unsettling time many rural Jat Sikh males questioned their long-term futures and were critical of the dominant political establishment's

inability to provide them with a stable living standard. This discontent festered and these rural Jat men become increasingly vocal about their plight and volatile in their behaviour and thinking.

The key economic factors that directly influenced the rise of the Sikh anti-state terrorism movement in Punjab during the 1970s began to gradually dissipate by the early 1990s. The restoration of economic stability in the agricultural sector allowed farmers to re-establish financial stability, created employment growth in the secondary and tertiary sectors of the economy during the 1980s, and reduced the number of unemployed individuals in the state. There were no substantial shifts in demographic characteristics during this decade, and the restoration of an equitable distribution of wealth amongst the population in Punjab reduced the intense feelings of relative deprivation that were once so prevalent amongst the Sikh population. The cumulative impact of these changing economic conditions, in conjunction with other social factors, would contribute to the decline of the Sikh anti-state terrorism movement in Punjab by the mid-1990s. The restoration of financial stability in the agricultural sector played an instrumental role in facilitating the decline of Sikh anti-state terrorist violence.

10. Dissipation of Relative Deprivation in Punjab

10.1. Hypothesis I

> Hypothesis I: Anti-state terrorism is less likely to occur in countries with a more equitable distribution of wealth.

It has been hypothesized that anti-state terrorism is less likely to occur in countries with a more equitable distribution of wealth. The Sikh anti-state terrorism movement in Punjab, rose rapidly in the early 1980s during a period when a pronounced financial discrepancy had emerged between the upper and lower segments of Punjab society. As has been seen, this discrepancy in the distribution of wealth was most evident among small and marginal Jat Sikh landowners in Punjab's countryside who had been forced to withdraw from agriculture due to Green Revolution farming. Economic distress among this population was compounded by increasing unemployment amongst the rural Sikh population who were unable to obtain employment within either a contracting agricultural sector or weak secondary and tertiary sectors of the economy. Over time a large disenfranchised rural Jat Sikh population emerged with a pronounced feeling of relative deprivation and willingness to participate in anti-state terrorism violence in order to redistribute wealth in Punjab in a more equitable manner.

When examining the rapid decline of the Sikh anti-state terrorism movement in Punjab by the early 1990s, the negative economic conditions that had been so prevalent in the previous decade had dissipated gradually over time. The improvement in economic conditions within the state was primarily driven by a return of stability within the agricultural sector and rapid economic expansion. Improving agricultural conditions were instrumental in facilitating the return of financial stability to farming operations within the state and preventing the further erosion in the number of active cultivators participating in agricultural production. Improving economic conditions within the agricultural sector of the economy also facilitated the direct positive growth within the secondary and tertiary sectors of the economy leading to employment growth and reduction in the vast unemployed Sikh population within the state. The cumulative impact of improving economic conditions assisted in the re-balancing of wealth within the state in a more equitable manner and decreased feelings of relative deprivation amongst the Sikh population. Improving economic conditions within Punjab by the early 1990s substantially reduced the

willingness of the Sikh population to participate in terrorist violence against the Indian state because the economic grievances once so prevalent had now dissipated overtime.

10.1.1. Punjab Agricultural Sector Early 1990s

During the mid-1980s and through the early 1990s, Punjab's agricultural sector witnessed a rejuvenation with the increased financial viability of farming operations. The rejuvenation of Punjab's farming sector was driven by a multitude of interlinked factors including improved domestic Indian agricultural policies implemented by the Indian government, stabilization of international energy prices, and further technical breakthrough in Green Revolution (HYV) farming methods. All segments of farmers within Punjab overtime were increasingly able to gain access to financial capital in order to participate in active cultivation and make investments in mechanization increasing overall production, efficiency, and competitiveness. The cumulative impact of these events led to the creation of a vibrant agricultural sector within Punjab by the early 1990s with a majority of Sikh farmers regardless of land size enjoying increased profitability and financially viable farming operations.

Improving economic conditions within the agricultural sector in Punjab could be witnessed by the early 1990s with a marked decrease in the discrepancy between lower and upper segments of Punjab society. When examining the number of operational holdings the state as can be seen in Table 10.1, the total number of holdings increased from 1,027,127 in 1980-1981 to 1,116,951 by 1990-1991.

Table 10.1. Distribution of Land Holdings in Punjab

	1970-1971	1980-1981	1990-1991
Marginal (Below 1 Hectare) Percentage of Farms	517,568 (37.63%)	197,323 (19.21%)	295,668 (26.48%)
Small (1 to 2 Hectares) Percentage of Farms	260,083 (18.91%)	199,368 (19.41%)	203,842 (18.25%)
Semi-Medium (2 to 4 Hectares) Percentage of Farms	281,103 (20.44%)	287,423 (27.99%)	288,788 (25.58%)
Medium (4 to 10 Hectares) Percentage of Farms	247,755 (18.02%)	269,072 (26.2%)	261,481 (23.41%)
Large (10 Hectares and Above) Percentage of Farms	68,883 (5%)	73,941 (7.19%)	67,172 (6.01%)
Total	1,375,392 (100%)	1,027,127 (100%)	1,116,951 (100%)
Average Size Of Holdings (Hectares)	2.89	3.79	3.61

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1980, 1987, 1990) Chandigarh, Government of Punjab.

In a decade, the Punjab agricultural sector had regained 89,924 landholdings. The most pronounced increase came from the number of marginal and small landholdings which had been decimated in the previous decade by Green Revolution farming. Marginal landholdings (below 1 Hectare) had the most substantial increase, rising from 197,323 in 1980-1981 to 295,668 by 1990-1991, an increase of 98,345 total landholdings. The number of small landholdings (1 to 2 Hectares) increased from 199,368 in 1980-1981 to 203,842 by 1990-1991, a total increase of 4,474 landholdings. The semi-medium agricultural landholding category (2 to 4 Hectares) also saw a slight increase from 287,423 in 1980-1981 to 288,788 by 1990-1991, an overall slight increase of 1,365 landholdings. The number of medium (4 to 10 Hectares) and large (10 Hectares and above) operational landholdings saw an overall total decrease with both these categories losing in total 14,360 farming operations. Accordingly, the average size of operational holdings decreased from 3.79 hectares in 1980-1981 to 3.61 hectares by 1990-1991.

Improved economic conditions in the agricultural sector in Punjab directly contributed to the decline of Sikh anti-state terrorism due to the re-distribution of economic wealth among lower and upper segments of Punjab's agricultural society. The increase in the number of operational holdings by 89,824 in the decade between 1980 and 1990, was important for three reasons. First, the overall stabilization in the number of operational landholdings in the state by the early 1990s was indicative of an agricultural sector that was profitable, with agricultural producers able to maintain farming operations. Jat Sikh landholders, the numerical farming majority in Punjab throughout the mid-1980s and early 1990s, regardless of their land size, were able to achieve healthy financial returns and provide for the families. In particular, small and marginal Sikh landowners benefitted from improving economic conditions because they were no longer facing dire financial conditions and or threat of impending bankruptcy. These marginal and small Sikh landowners by the early 1990s were able to achieve financial returns from farming that not only allowed them to maintain a basic standard of living but also provided them with discretionary spending to purchase consumer goods.

Secondly, the addition of 89,824 operational landholdings overall by 1990-1991 was a positive sign because it reversed the trend in the previous decade of small and marginal Sikh farmers withdrawing from agricultural production. Stability in the Punjab agricultural sector prevented a further decline in the number of Sikh farmers being forced to withdraw from agricultural production and the further growth of an unemployed and disenfranchised Sikh population. Preventing the growth of the disenfranchised Sikh population played an important role in reducing the level of Sikh anti-state terrorism because it reduce the pool from which Sikh terrorist organizations could recruit and prevented the growth of further hostility directed against the Indian state.

Finally, the addition of 89,824 operational holdings, particularly the increase in marginal (below 1 hectare) and small (1 to 2 hectares) landholdings was substantial in that a portion of vulnerable Sikh farmers from the lowest social strata of Punjab society who in the previous decade were forced to withdraw from agricultural production re-established farming operations. Increasing financial viability of farming operations in Punjab during the mid-1980s into the early 1990s, brought approximately 25% of the small and marginal Sikh landowners who had withdrawn from agricultural production back into active cultivation. Many Sikh landowners made the decision to lease out their land to larger landowners in return for secure levels of rent rather than participate in active cultivation. Also, a number of small and marginal landowners who had previously sold their farms obtained non-farm employment and were able to repurchase their land in order to recommence farming operations. As economic conditions in agriculture improved, many small and marginal landowners who resumed farming were able to finally enjoy the financial benefits of Green Revolution farming technology. The re-entry of marginal and small Sikh landowners was critical in facilitating the decline of anti-state terrorism in Punjab because the Punjab agricultural sector re-absorbed segments of the disenfranchised and disgruntled Sikh population that had emerged in the early 1980s and were hostile to the Indian state. Punjab farmers by the early 1990s were financially stable, could provide a decent standard of living for their families, and had a profession with a viable economic future, thus, reducing the overall level of discontent. The stability and growth of the agricultural sector in Punjab not only benefitted farming households but also drove employment growth within the secondary and tertiary sectors of the economy.

10.1.2. Non-Agricultural Employment in Punjab

The growth of the Punjab economy in the mid-1980s and early 1990s, which was driven by the resurgence of the agricultural sector and had returned farmers to profitability, fuelled growth in the industrial and service sectors of the Punjab economy. As the agricultural sector matured throughout the 1980s and financial returns for farmers were positive, demands for outputs produced by other sectors increased and the development of other ancillary services needed to maintain agricultural production was stimulated. This demand for products and services by the rapidly expanding agricultural sector had an employment multiplier effect by increasing employment in businesses related to agro-inputs, agro-engineering, agro-processing, agro-marketing, and specialized agricultural services needed to maintain technical functioning of the sector. The increased levels of income due to broad financial prosperity and increased standards of living led to demands for consumer goods and services which further facilitated increased economic growth and employment in the secondary and tertiary sectors of the

economy. Punjab households witnessed a substantial increase in discretionary spending by the early 1990s, as individuals purchased consumer goods in order to display their increasing prosperity and to re-establish their social standing within Punjab society.

The expansion of the secondary and tertiary sectors of the economy and the creation of jobs was also facilitated by the state government's adoption of an industrial policy that implemented measures to promote industrial development and diversify the economy. The Punjab government focused extensive attention on expanding small industrial development and introducing incentives such land subsidies, tax deferrals, power subsidies, and capital investment deductions to attract entrepreneurs to the state and stimulate business growth. The state also created promotional agencies to provide investment capital to new start-ups including low interest term loans to facilitate economic development.

In addition, the Punjab government implemented a number of measures designed to streamline regulatory procedures governing the approval and establishment of new industrial operations within the state. A number of industrial parks were constructed by the Punjab government throughout the state, designed to lure industrial entrepreneurs into centralized locations that were well serviced and promoted the growth of industry in a defined space. Research and development centres (R&D) were constructed in order to promote technical innovation and enhance production within various industries in the state. The role of the Indian central government in the development of industry within Punjab was on a smaller scale and greatly subdued through the 1980s and early 1990s. The Indian government held strict control over licensing approvals for medium and large industry and regulated the flow of private investment into the state. Although the Indian central government failed to change the overarching development strategy towards Punjab, it did gradually increase the number of medium and large scale industrial developments allowed to be established and the level of private investment that flowed into the state facilitating job creation. The direct impact of growth in the secondary and tertiary sectors of the economy was evident by the early 1990s. From 1980 to 1994, small-scale industry added 491,014 positions, medium- and large-scale industry added a further 102,467 positions, and the service sector (about which precise statistics are not available) in all probability produced approximately 1,000,000 jobs.

10.1.3. Unemployment Levels Punjab by the 1990s

The cumulative impact of increased job creation in the agricultural sector and expansion of employment in the secondary and tertiary sectors of the economy was an overall redistribution of wealth in Punjab society. An examination of the number of unemployed individuals on the live

register through the 1990s shows the impact of improving economic conditions in the agricultural sector and the increasing strength of the secondary and tertiary sectors (see table 10.2). The number of individuals unemployed in Punjab starts to stabilize as can be seen in the period subsequent to 1985. The level of unemployment between 1985 and 1994 was relatively stable, hovering each year between 575,000 to 751,000 unemployed individuals. During this time, there was slight variation in unemployment, with subsequent years offsetting gains or losses, and there was no rapid continuous increase in the level of unemployment in the state. The level of overall unemployment decreased in the 1990s, as the number of individuals unemployed decreased in proportion to the total number of individuals active in the workforce.

Table 10.2. Number of Unemployed Persons Registered on Punjab Live Register Employment Exchange

Year	Number of Unemployed Persons on Live Register	Year	Number of Unemployed Persons on Live Register
1969	84,732	1985	636,408
1970	95,656	1986	609,690
1971	120,711	1987	618,435
1972	161,433	1988	575,177
1973	208,286	1989	584,643
1974	267,272	1990	659,250
1975	299,882	1991	751,555
1976	324,875	1992	747,786
1977	359,061	1993	645,822
1978	389,482	1994	558,232
1979	420,661	1995	506,236
1980	452,596	1996	542,695
1981	486,081	1997	581,018
1982	507,586	1998	568,212
1983	530,786	1999	545,017
1984	526,175	2000	***

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1982, 1984, 1987, 1990, 1993, 1997, 2000), Chandigarh, Government of Punjab.

The improving employment situation in Punjab commencing in the mid-1980s and continuing into the early 1990s had a substantial impact on the level of social discontent within the state. A majority of the employment growth in the industrial and service sectors of the economy occurred in rural areas where chronic unemployment had been a problem in the previous decade. Many of the disenfranchised rural Jat Sikh farmers that been displaced by the implementation of Green Revolution farming were now were able to obtain meaningful employment within the secondary and tertiary sectors of the economy. Farming households

which witnessed increasing financial viability were also able to have household members participate in non-farm employment improving their standard of living and household income.

In the mid-1980s, the level of unemployment had also been compounded by a demographic shift in the state's population. As the employment situation in Punjab improved into the early 1990s, many of these younger, more literate rural Sikh adults were slowly absorbed into the Punjab labour force, finding employment in their fields of study or professions of choice. By the early 1990s, many young Sikh adults had opportunities to obtain gainful employment in a profession outside of the agricultural sector. The ability of this younger generation of literate Sikhs to achieve their occupational aspirations reduced the level of frustration they previously felt and allowed them to concentrate solely on their professional careers.

10.1.4. Corollary Hypothesis I: Dissipation of Relative Deprivation and Inequitable Distribution of Wealth amongst the Sikh Population.

Hypothesis I has been verified with the restoration of the equitable distribution of wealth and dissipation of relative deprivation in Punjab by the 1990s. With the rapid expansion of the agricultural sector and strong growth in the industrial and service sectors of the economy in the 1990s, came a steady rise in per capita income as can be seen in Table 10.3, per capita income in Punjab rose from Rs. 2,361 in 1981 to Rs. 5,477 by 1989, an increase of 131% over an 8-year period, and this financial success would continue into the 1990s. The state of Punjab once again achieved one of the highest per capita incomes in India, and their slight decline in social standing in India from the previous decade was eradicated. The unique aspect in the re-growth of economic wealth in Punjab by the early 1990s was that the financial benefits in this economic upswing trickled down to all segments and residents in Punjab society. The economic rejuvenation of the economy had re-established an equitable distribution of wealth in the state in particular, amongst the Sikh population.

Table 10.3. Per Capita Income in Punjab 1971-1989

Year	1971	1981	1989	% Change
Per Capita Income (Rs.)	1030	2361	5477	+431

Note. Adapted from "Ethnic Conflict in India" (p. 95), by G. Singh, 2000, New York: Macmillan Press Ltd.

The agricultural sector in Punjab by the early 1990s was economically viable once again, with all segments of Sikh farmers regardless of land size enjoying increased financial returns. Increasing profitability in agriculture allowed Sikh farmers to reinvest earnings into continued

mechanization in order to increase efficiency and production and ensure long-term competitiveness. Many Sikh farmers no longer feared for their futures and believed their farming operations were viable for the long-term. Young adults from farming households were not hesitant to enter agricultural production as they perceived it as a viable career and were willing to continue operating household farming operations knowing they could obtain decent standards of living.

The growth of the industrial and service sectors of the economy also allowed Punjab residents and the Sikh population specifically to obtain employment in non-farming occupations. The overall increase in non-agriculture employment assisted in reducing rapidly the vast unemployed rural Sikh population and provided them with meaningful employment. Many highly literate Sikh adults were now able to find employment in the professions in which they were trained and were able to achieve their career aspirations of obtaining a "white collar" profession. The Sikh population in Punjab by the early 1990s once again enjoyed a decent standard of living with an improving overall quality of life. Sikhs now had the ability to provide financially for their families the basic necessities of life but also some highly desirable consumer comforts/goods that were desired by many Punjab residents.

The Sikh population by the early 1990s had witnessed a complete reversal in their economic fortunes. They were now able through active employment to provide for their families and also ensure for their economic future through increased personal savings. The Sikh population during this period reflected on their status in Punjab society and believed what they were achieving economically corresponded with what they believed they should be entitled to. Their basic standard of living was consistent or matched their internal and social expectations of what Punjab society should be providing for them. They no longer felt a sense of disjuncture or feeling of relative deprivation, as the historical high standard of living Sikhs of Punjab had once been accustomed to was restored. The Sikh population was once again internally content that the Indian government was providing them with the economic conditions required to ensure their financial well-being and overall success.

The overall level of anger and dissent directed at the Indian government previously by the Sikh population was no longer prevalent. Sikh farmers no longer complained about the Indian governments agricultural polices as they were now enjoying economic success and increased industrial employment led to less criticism of the Indian government's limited industrial investment in the state. By the early 1990s, the anger, frustration, and resentment that had pushed some members of the Sikh population to use violence and participate in anti-state terrorism against the Indian state due to feelings of economic deprivation dissipated. Sikhs were no longer willing to

participate in terrorist violence as they believed violence was no longer ideologically justified. Rather, they were more inclined to participate in the Punjab labour force to improve their standing in Punjab society and to contribute productively to the state economy. The Sikh terrorist movement in Punjab in the 1990s would see their recruitment pool reduced rapidly as the level of discontent amongst Sikhs decreased and their desire instead to participate in more pro-social behaviour proved to be more internally fulfilling. The amelioration of economic conditions in Punjab and equitable distribution of wealth assisted in reducing the level of anti-state terrorism violence by Sikh terrorist organizations by 1995.

10.1.5. Decline of Sikh Anti-State Terrorism

An examination of terrorist violence in Punjab shows the overall total of terrorist violence accelerated rapidly after 1985, increasing from a total of 455 acts and reaching a peak in 1991 with a total of 5,845 acts (see Table 10.4). After 1991, the level of Sikh terrorism declined rapidly until its eventual demise by 1995. The number of annual casualties also mirrors the aforementioned trend, with the number of annual fatalities rising dramatically after 1985 from 73 and reaching a peak of 5,265 by 1991 (Table 10.5). The number of annual casualties then declined rapidly after 1991, as the Sikh anti-state terrorism movement faded.

Table 10.4. Sikh Terrorist Crime in Punjab from 1981 to 1995

Year	Murder/ Shootout Cases	Explosives Act	Arson Damage to Property	Robberies	Attacks on Nirankaris	Assault on Gov't Servant
1981	7	11	6	0	3	2
1982	5	24	15	1	9	21
1983	54	49	16	98	22	29
1984	275	81	184	285	11	39
1985	64	55	39	61	2	4
1986	357	26	26	255	6	2
1987	791	56	100	638	4	3
1988	1124	89	29	553	1	10
1989	846	73	18	229	1	7
1990	2116	188	59	511	3	1
1991	2107	187	43	340	3	0
1992	979	147	15	131	0	0
1993	47	78	2	14	0	0
1994	0	18	0	4	0	0
1995	0	9	0	2	0	0
Year	Seditious Activities	Act on Sacrilege	Arms Act	Police Encounters	Other Misc. Cases	Total
1981	0	1	0	0	34	64
1982	6	53	13	5	61	213
1983	9	30	17	3	59	386
1984	194	27	52	80	82	1310
1985	49	8	64	20	89	455
1986	77	5	441	109	362	1666
1987	202	3	1378	410	1274	4859
1988	81	2	1268	461	1413	5031
1989	21	0	1153	582	798	3728
1990	14	0	849	746	778	5265
1991	23	0	976	1282	884	5845
1992	24	0	750	1399	393	3838
1993	4	0	636	571	191	1543
1994	3	0	189	79	15	308
1995	1	0	77	27	4	120

Note. Adatped from Extremist/Terrorist Crime: Punjab, by South Asia Terrorism Portal, October 11, 2012, retrieved from http:// www.satp.org/.

Table 10.5. Annual Fatalities of Sikh Terrorist Related Violence in Punjab from 1981 to 1995

Year	Annual Civilian Fatalities	Annual Terrorist Fatalities	Annual Security Fatalities Forces	Total
1981	13	14	2	29
1982	13	7	2	22
1983	75	13	20	108
1984	359	77	20	456
1985	63	2	8	73
1986	520	78	38	626
1987	910	328	95	1333
1988	1949	373	110	2432
1989	1168	703	201	2072
1990	2467	1320	476	4263
1991	2591	2177	497	5265
1992	1518	2113	252	3883
1993	48	798	25	871
1994	2	76	0	78
1995	0	11	0	11

Note. Adatped from Annual fatalities in terrorist related violence, by South Asia Terrorism Portal, October 11, 2012, retrieved from http:// www.satp.org/.

By 1995, the Sikh terrorism movement had come to a dramatic conclusion. This rapid decline was in part directly related to the improving economic conditions in the state that substantially reduced the level of discontent prevalent during the period of high levels of unemployment. The reduction of social discontent and feelings of relative deprivation amongst Sikhs made them unwilling to participate in a terrorist movement for which they could no longer see any justification for the use of violence. The decline of the Sikh terrorism movement by 1995 reflected the economic improvement in the economy and improving economic conditions amongst the Sikh population. By the early 1990s, Sikh terrorist organizations were unable to recruit new members and, thus, slowly withered away. In addition to improving economic conditions the deterioration of the ideological underpinnings of the movement over time and the implementation of an effective counterterrorism strategy by the Indian central government also contributed to the decline of the movement.

With the death of Sant Bhindranwale in 1984, the terrorism movement in Punjab was fundamentally an altered movement. There was no longer a central figure to guide it, and the Khalistani movement was taken up by a number of independent Sikh terrorist organizations. These various terrorist leaders and groups jostled for control, but no one individual or

organization was able to establish firm control over the movement or successfully co-ordinate its violent actions. Over time, the moral and theological underpinnings upon which the movement was based deteriorated. By the early 1990s, members of Sikh terrorist organizations no longer understood what they were fighting for and why an independent state of Khalistan was important (Jaswal, 1996). Each terrorist organization espoused different objectives, revealing inconsistencies in their overall goals and the direction of the Sikh movement (Manhunda, 1990). The Sikh separatist movement eroded into criminal activity by the 1990s, leading to unjustified murders, rapes, and extortions of innocent members of the public (Chima, 2002). A considerable portion of individuals joining Sikh terrorist organizations were from the criminal element, lured to the movement by the promise of financial rewards, power, and access to liquor and women (Gill, 2003). They engaged in self-gratuitous behaviour and focused on self-enrichment. Many Sikh terrorist organizations splintered and engaged in violent conflicts between themselves, attempting to establish their dominance. Torture became common place as a strategy to elicit information from Sikh extremists and members of the public and was also used to eliminate members of their organizations (Unknown, 1993). The general support that the Sikh anti-state terrorism movement once enjoyed from the public disappeared by the early 1990s, as it alienated itself from its loyal and sympathetic followers who no longer saw the movement as relevant (Thandi, 1994).

The decline of the Sikh anti-state terrorism movement in Punjab by the 1990s was also facilitated by the implementation of a coherent and effective counterterrorism strategy by the Indian government, a strategy that became significantly more co-ordinated and provided a carte blanche to those responsible for repressing it. Civil liberties in the state were suspended or ignored and the state was saturated with security personnel, including divisions of the Indian army, paramilitary forces, and increasing numbers of Punjab police officers. Security forces commenced an active offensive counterterrorism strategy to locate members and supporters of the terrorist organizations. Members or supporters were arrested, and many were liquidated through the use of “fake encounters”. The counterterrorism operations in Punjab during the 1990s were effective in disrupting the support network for Sikh terrorist organizations and eliminating terrorists within these groups. The Indian government’s counterterrorism operations in Punjab by the mid-1990s were effective in assisting in the decline of the Sikh anti-state terrorism movement in Punjab. The Sikh anti-state terrorism movement came to an abrupt end by 1995 and peace was once again restored in Punjab.

11. Restoration of Economic Stability in the Punjab Agricultural Sector

11.1. Hypothesis II

> Hypothesis II: The likelihood of anti-state terrorism in Punjab is less when landowners in the primary agricultural sector are able to maintain financial stability.

An examination of the decline of the Sikh anti-state terrorism movement in Punjab reveals that an important factor was the gradual emergence of financial stability in the agricultural sector of the economy during the 1980s and early 1990s, a development that was dependent on a number of interconnected variables, including access to financial capital, increased crop yields, expansion of cropping intensity, stability of input costs, sale of agricultural products into free markets without restrictions, and favourable procurement prices received for food grain yields. All farmers, regardless of the size of their landholdings, were affected by the improved financial conditions in the region, including rural Jat Sikhs. As their financial situations improved and became stable, the animosity they had directed toward the central Indian state was greatly diminished.

11.2. Hypothesis II (i)

> Hypothesis II (i): Anti-state terrorism is less likely to occur when farmers have access to substantial financial capital in order to invest in agricultural production and efficiency.

In the late 1970s, the Indian and Punjab governments recognized that many farmers could not easily access the capital needed to adopt the new agricultural methods. To remedy this problem, they implemented a number of crucial reforms in the operations of agricultural credit cooperatives, and commercial and Primary Land Mortgage Banks, with the goal of making support of the agricultural sector the priority to facilitate increased credit flows to farmers. These reforms substantially improved farmers' access to agricultural credit, increasing the amount of capital available, and making major changes in rules and regulations for accessing that credit.

The increase in credit 1979 and 1990 is evidenced by the increase in short- and long-term loans advanced to the agricultural sector by formal lending institutions as a percentage of Net State Domestic Product (NSDP) as shown in Table 11.1. The level of short-term credit provided in 1979-1980 was 6.95% of net state domestic product, and long-term credit was 4.07% of NSDP for the same year (see Table 11.1). There was a substantial increase in agricultural financing by 1989-1990 as short-term credit increased to 9.28% and long-term credit, to 4.81% of NSDP (Dhesi, 2008).

Table 11.1. Punjab Short-Term and Term Loan Credit Trends (Decennial)

Year Ending	Short-Term Loans*	Term Loans
1979-1980	6.95%	4.07%
1989-1990	9.28%	4.81%

Note. * as percent of NSDP Agriculture; adapted from "Rural Development in Punjab: A success story going astray" (p.101), by Chand in Dhesi & Singh (Eds.), 2008, London: Routledge.

11.2.1. Primary Agricultural Cooperative Credit Societies

The primary agricultural cooperative credit societies in Punjab played an important role in providing credit for agricultural operations in the state. In 1978, the Punjab government proceeded to amalgamate the agricultural credit societies in the state, reducing the number from 10,942 to 4,259 (Table 11.2). The number of agricultural credit societies fluctuated after that time, but there was no substantial variation in the total numbers of agricultural credit societies in the state.

Table 11.2. Primary Agriculture Credit Societies Total Numbers and Membership

Year	Number of Societies	Membership (Lakh)
1970-1971	10,932	14.64
1971-1972	10,931	14.82
1972-1973	10,935	15.28
1973-1974	10,932	15.59
1974-1975	10,938	15.96
1975-1976	10,936	16.23
1976-1977	10,937	16.60
1977-1978	10,942	16.82
1978-1979	4,259	17.18
1979-1980	4,271	17.55
1980-1981	4,266	17.84
1981-1982	4,266	18.25
1982-1983	4,266	18.49
1983-1984	4,270	18.78
1984-1985	4,240	18.84
1985-1986	4,235	18.96
1986-1987	4,235	19.30
1987-1988	4,630	19.47
1988-1989	4,648	19.60
1989-1990	*	*
1990-1991	4,633	20.40
1991-1992	4,570	20.60
1992-1993	4,485	20.89
1993-1994	4,293	21.01
1994-1995	4,205	20.63
1995-1996	4,171	20.75
1996-1997	4,184	21.01
1997-1998	4,190	21.26
1998-1999	4,200	12.68
1999-2000	4,214	21.90

Note. * Not Available; adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1982, 1987, 1987, 1990, 1993, 1997, 2000), Chandigarh, Government of Punjab.

The reduction in the number of cooperative credit agencies was deemed necessary to increase their overall efficiency and to reduce the irregularities that were rampant in their administration (Gill, 1983). This reduction also facilitated the amalgamation of resources into a smaller number of cooperative agencies, boosting the amount of financial resources they had available. Previously, many agricultural cooperative agencies in the state had become financially

unstable because of the large number of outstanding loans they were holding and were unable to provide further loans to farmers. The concentration of financial resources into a smaller number of overall cooperative outlets made them financially more viable and capable of providing agricultural credit to more segments of farmers.

In addition to these reductions, the government instituted reforms to the internal culture of these agencies. The government demanded that employees in these agencies adopt more professional standards of conduct in their dealings with Punjab farmers and also that decisions about who received credit be based on objective standards and not on personal biases. This change was important because a bias exclusively favouring owners of large and medium farms was removed. In order to assist all segments of farmers to access agricultural credit, the cooperative system implemented a "check-book" system (Gill, 1983, p. 851). Under this system, members were provided with a photo-ID bank passbook designed to prevent people from obtaining credit under false pretences or accessing other farmers' credit allotments (Gill, 1983). A maximum limit was placed on the amount of cash each member was allowed to withdraw, thus, preventing a minority of farmers from monopolizing the total available credit available from any given society and ensuring that all members received their allotted amounts.

The agricultural cooperatives also adjusted their corporate philosophy relative to how credit was distributed and who was eligible. Political overseers of the program wanted to increase the scope of credit available to all segments of farmers in the state. In particular, it was recognized that small and marginal farmers needed to be allowed to become members of the cooperative societies and that their unique credit situations needed to be addressed through fair distribution of capital (Sandhu, 1974; Singh, 2001). In order to address this membership problem, the credit cooperatives within Punjab proceeded to actively increase the number of accredited members they would accept. An examination of membership figures of agricultural cooperatives in Punjab during this time shows that the overall number of members increased from 1,482,000 in 1971-1972 to 2,101,000 by 1993-1994, an increase of 639,000 members (see Table 11.3). The increase in membership by 639,000 farmers over two decades is substantial because it reflects the increased inclusiveness of the agricultural cooperative program: Farmers who were once excluded could now access the credit they needed to make investments in their farming operations. In addition, taking steps to increase membership and inclusiveness, the cooperative credit societies also modified the previously stringent loan conditions that determined eligibility for loans, initiating a process that used liberal evaluation criteria determining eligibility for credit. This change in loan eligibility policy benefited the whole spectrum of Punjab farmers, as they were now able to receive larger loan amounts, preventing gaps in credit that previously hampered agricultural production.

Table 11.3. Primary Agriculture Credit Societies Total Numbers and Membership

Year	Number of Societies	Membership (Lakh)
1970-1971	10,932	14.64
1971-1972	10,931	14.82
1972-1973	10,935	15.28
1973-1974	10,932	15.59
1974-1975	10,938	15.96
1975-1976	10,936	16.23
1976-1977	10,937	16.60
1977-1978	10,942	16.82
1978-1979	4,259	17.18
1979-1980	4,271	17.55
1980-1981	4,266	17.84
1981-1982	4,266	18.25
1982-1983	4,266	18.49
1983-1984	4,270	18.78
1984-1985	4,240	18.84
1985-1986	4,235	18.96
1986-1987	4,235	19.30
1987-1988	4,630	19.47
1988-1989	4,648	19.60
1989-1990	*	*
1990-1991	4,633	20.40
1991-1992	4,570	20.60
1992-1993	4,485	20.89
1993-1994	4,293	21.01
1994-1995	4,205	20.63
1995-1996	4,171	20.75
1996-1997	4,184	21.01
1997-1998	4,190	21.26
1998-1999	4,200	12.68
1999-2000	4,214	21.90

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1982, 1987, 1987, 1990, 1993, 1997, 2000), Chandigarh, Government of Punjab.

* Not Available

However, the most substantial change instituted with the cooperative credit agencies was their increased funding and the subsequent substantial increase in the amount of funds available to farmers (Gill, 1983; Singh, 2001). This increase in funding was driven by changes in 1978 in the Punjab bureaucratic structure that saw the Punjab Development Commissioner regain control over the Cooperative Department and Agriculture Department (Gill, 1983). This bureaucratic

adjustment was important because the Punjab Development Commissioner could now coordinate the trajectory of agricultural development in the state by providing the agricultural cooperative program with enough funding to assist farmers in investing in agricultural operations to increase production. As can be seen in Table 11.4, in the years following 1978-1979, with the Development Commission re-establishing control over the agricultural cooperative agency, the flow of agricultural credit from Punjab agricultural cooperatives began to increase. The total flow of agricultural credit increased from Rs. 16,895.78 Lakh in 1978-1979 to Rs. 102,496.73 Lakh by 1994-1995, a 606% increase. This administrative change that occurred in 1978 was substantial in that the Commissioner, in coordination with the state government, ensured that the cooperative system was well-funded and that Punjab farmers could purchase commercial inputs and access credit for investments in irrigation and mechanization.

Table 11.4. Agricultural Flow of Credit to Punjab Farmers from Co-operatives and Commercial Banks

Year	Cooperatives (Rs. Lakh)	Commercial Banks (Rs. Lakh)	Total (Rs. Lakh)	Cooperatives Share (Percentage)	Commercial Banks Share (Percentage)
1970-1971	8410.45	1799.39	10209.84	82.83	17.62
1971-1972	9223.18	2750.96	11974.14	77.03	22.97
1972-1973	12573.92	3756.96	16330.88	76.99	23.01
1973-1974	8665.28	5327.86	13993.14	61.93	38.07
1974-1975	9633.62	6808.43	16442.05	58.59	41.41
1975-1976	8648.46	7497.11	16145.57	53.57	46.43
1976-1977	10979.58	9866.24	20845.82	52.67	47.33
1977-1978	12284.25	10943.76	23228.01	52.89	47.11
1978-1979	16895.78	11923.31	28819.09	58.63	41.37
1979-1980	22942.87	12935.47	35878.34	63.95	36.05
1980-1981	24058.45	14458.14	38516.59	62.46	37.54
1981-1982	29819.65	14228.31	44047.96	67.70	32.30
1982-1983	38280.76	13220.84	51501.60	74.33	25.67
1983-1984	42978.88	16120.20	59099.08	72.72	27.28
1984-1985	48652.19	16528.87	65181.06	74.64	25.36
1985-1986	44109.68	15406.13	59515.81	74.11	25.89
1986-1987	49140.08	17515.00	66655.08	73.72	26.28
1987-1988	45233.02	19784.09	65017.11	69.57	30.43
1988-1989	42918.79	23725.09	66643.88	64.40	35.60
1989-1990	57307.62	25767.76	83075.38	68.98	31.02
1990-1991	51358.30	27545.22	78903.52	65.09	34.91
1991-1992	66015.25	34311.88	100327.13	65.80	34.20
1992-1993	74724.07	39011.19	113735.26	65.70	34.30

Year	Cooperatives (Rs. Lakh)	Commercial Banks (Rs. Lakh)	Total (Rs. Lakh)	Cooperatives Share (Percentage)	Commercial Banks Share (Percentage)
1993-1994	84592.74	44359.61	128952.35	65.60	34.40
1994-1995	102496.73	53996.85	156493.58	65.50	34.50
1995-1996	106257.63	67240.12	173497.75	61.24	38.76
1996-1997	129843.44	79904.86	209748.30	61.90	38.10
1997-1998	154319.70	116179.80	270499.50	57.05	42.95
1998-1999	198170.74	136682.04	334852.78	59.18	40.82
1999-2000	221994.48	183243.25	405237.73	54.78	45.22

Note. Adapted from "Institutional Credit, Indebtedness and Suicides in Punjab", by P. Satish, 2006, *Economic and Political Weekly*, 41, p. 2755.

In addition to increasing the funding cooperative agencies provided farmers, adjustments were made in the way the funding was processed and allocated (Gill, 2001). Green Revolution farming changed the manner in which funds were needed by farmers: greater outlays were needed at the beginning of a sowing season and the need for long-term capital to pay for major expenditures such as irrigation equipment and machinery increased. In order to adapt to these changes, the agricultural cooperative agencies, in the 1980s, implemented new procedures to substantially increase the amount of capital available to farmers at the beginning of the sowing season so that farmers could readily access capital to make their commercial input purchases. Also, substantial financial allotments were made to adequately fund the long-term loan programs relating to irrigation and mechanized equipment.

Commercial Banks

In addition to changes in the agricultural cooperatives, there were substantial changes during the 1980s in the commercial banking sector in Punjab. In the early 1980s, this sector began to change its overall philosophy regarding how it administered loans to the agricultural sector. In particular, commercial banks across India had come under extensive political pressure and scrutiny by the Indian government for failing to adhere to the government's objective of increasing accessibility and providing loans to all segments of farmers. The banks in Punjab transformed their banking philosophy in order to increase inclusivity and to treat the agricultural sector as a priority (Rao, 2005). To expand their reach, they increased the number of branches from 1,563 in 1980 to 2,133 by 1990, further ensuring ready access to all farmers, especially those in rural areas, to long-term credit.

Commercial banks in Punjab also modified banking practices by aligning standards with those of the agricultural cooperatives in relation to implementing more liberal evaluation criteria

when determining eligibility for credit (Singh, 2001). In addition, by increasing capitalization of their agricultural loan divisions, the banks increased the amount of capital available to farmers. An examination of the flow of agricultural credit from commercial banks in 1983-1984 shows that the banks in the state increased the total amount loaned to the farming sector (Table 11.4). In 1983-1984 they loaned a total of Rs. 16,120.20 Lakh and by 1993-1994, this had increased to Rs. 44,359.61 Lakh, an increase of 275%. This substantial increase of credit available to farmers contributed to the increased number of total loans being made available. This allowed many farmers to purchase the irrigation equipment and machinery they needed to pursue Green Revolution farming.

Primary Land Mortgage Bank

Primary Land Mortgage Banks in Punjab, which were the main agencies farmers used to acquire long-term loans for installation of irrigation and mechanized equipment, also underwent substantial changes in the 1980s. The Primary Land Mortgage Bank, which received a considerable amount of financing from the central government, modified its objectives in the 1980s. As previously stated, the central Indian government wanted to increase the accessibility of credit for all segment of farmers and instructed many of the agencies under its control to facilitate this objective. The Primary Land Mortgage Banks 1980-1981 saw an infusion of capital provided by the central credit agency (i.e., an agency that provided financial backing to state financial institutions) with loan distributions in Punjab increasing from Rs. 2,296.95 Lakh in 1979-1980 to Rs. 4,337.20 Lakh in 1980-1981, a 53% increase in a single year (Table 11.5). The total amounts of loans advanced would continue to increase exponentially from 1980-1981 from Rs. 4,337.26 Lakh to Rs. 12,636.36 Lakh in 1993-1994, a 291% increase. Membership in the Primary Land Mortgage Bank rose from 278,000 in 1979-1980 to 539,000 by 1993-1994, an increase of 261,000 members that demonstrates increased access and inclusivity. The number of branches increased from 43 in 1980-1981 to 64 by 1993-1994, increasing locations within Punjab, especially in high-demand areas that needed access to long-term agricultural credit (see Table 11.5). The loan restrictions that had been so prevalent previously were removed, prime land mortgage officials practised more liberal valuation norms on land when determining loan amounts, eligibility requirements to qualify for loans were lowered, and bank officials demonstrated an increased desire to establish stronger relationships with the small and marginal landowners whom they had previously ignored.

Table 11.5. Number of Primary Land Mortgage Banks in Punjab and Membership Levels (1970 to 1997)

Year	Number of Banks	Membership (Lakh)	Loans Advanced During the Year (Lakh Rs.)
1970-1971	34	1.15	1,956.61
1971-1972	35	1.36	1,519.58
1972-1973	41	1.67	1,626.52
1973-1974	42	1.97	1,583.65
1974-1975	42	2.09	1,599.52
1975-1976	42	2.20	1,697.51
1976-1977	43	2.46	2,799.01
1977-1978	43	2.59	1,850.70
1978-1979	44	2.68	2,245.88
1979-1980	43	2.78	2,296.95
1980-1981	43	2.97	4,337.20
1981-1982	43	3.13	4,976.53
1982-1983	44	3.27	4,566.19
1983-1984	45	3.47	5,196.68
1984-1985	46	3.65	4,495.28
1985-1986	47	3.83	5,100.40
1986-1987	51	4.10	6,566.83
1987-1988	52	4.24	6,256.79
1988-1989	52	4.48	5,613.31
1989-1990	*	*	*
1990-1991	57	4.84	7,397.32
1991-1992	61	4.94	8,816.48
1992-1993	64	5.19	9,375.23
1993-1994	69	5.39	12,636.36
1994-1995	71	5.72	18,657.91
1995-1996	72	6.00	23,512.66
1996-1997	74	6.11	29,370.22

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1987, 1990, 1996, 2000), Chandigarh, Government of Punjab.

* Not available

Credit Subsidy

Another change the state government instituted was increasing the credit subsidy provided to farmers to reduce the cost of undertaking loans. The rate of the credit subsidy increased from Rs. 43.12 per hectare of gross cropped area in 1980-1981 to Rs. 89.41 per hectare of gross cropped area by 1985-1986, signifying a Rs. 46.29 (107%) increase over 5

years. This credit subsidy translated to an average of Rs. 587.17 per operation holding by 1985-1986 an increase from Rs. 283.12 per operational holding in 1980-1981 (Singh & Kohli, 2005). The credit subsidy assisted all farmers, particularly those with smaller land holdings, to access crucial credit at affordable and favourable financial terms. The availability of the credit subsidy on an annual basis, provided farmers stability in the cost of loans allowing for consistency and predictability of established expenses (Rao, 2005). More importantly, this measure removed the constraints that inhibited farmers from fully participating in agricultural production.

11.2.2. Corollary Hypothesis II (i): Punjab Farmers Able to Access Agricultural Credit.

Hypothesis II (i) has been verified as all Punjab farmers were able to attain access to substantial financial capital in order to invest in agricultural production and efficiency. Increased access to financial capital in the 1980s and early 1990s assisted in bringing considerable stability to the agricultural sector in Punjab. Now farmers, regardless of the size of their farms, were able to access the necessary credit needed to purchase commercial inputs necessary to participate in the dominant agriculture system in the state and obtain an income. The increased availability of long-term credit allowed them to make investments in the irrigation and farm machinery needed to increase agricultural production and also ensure their long-term viability. Most importantly, increased access to agricultural credit particularly addressed the needs of small and marginal farmers in maintaining their farm operations and prevented many from joining the class of the landless unemployed labour that had contributed so substantially to the rise of anti-state terrorism violence in the 1980s.

11.3. Hypothesis II (ii)

> Hypothesis II (ii): The likelihood of anti-state terrorism is less when agricultural crop yields and cropping intensity increase over time ensuring food grain harvests provide sufficient return over cost to Punjab farmers.

It has been hypothesized that anti-state terrorism is less likely to occur when agricultural crop yields and cropping intensity increase overtime ensuring food grain harvests provide sufficient returns over costs to Punjab farmers. Throughout the 1980s and early 1990s, the conditions that had contributed to stagnation in crop yields and cropping intensity were ameliorated. Instead there were steady improvements in farming conditions that brought stability to farm operations and improved their financial viability. In particular, advancements in

agronomical technology and farming practices increased wheat and rice crop yields, and greater access to financial resources made it possible for all farmers to expand their cropping intensity.

During this period, the Punjab agricultural sector matured and was steadily revitalized by improved financial health. This improved health was in part driven by the increase in crop yields, especially wheat and rice, the dominant crop rotation. Wheat yields, as measured in kilograms per hectare, increased from 2,731 (Kg per hectare) in 1980-1981 to 3,714 by 1990-1991, a 983 kilogram per hectare or 36% increase (Table 11.6). Rice yields in Punjab also saw an increase from 2,733 kilogram per hectare in 1980-1981 to 3,229 kilograms per hectare by 1990-1991, a 446 kilogram per hectare or 16% increase (see Table 11.6). The increases in wheat and rice crop yields steadily improved in overall output during the mid-1980s and into the early 1990s (see Table 11.7). In particular, wheat production increased to 4,090 kilogram per hectare by 1994-1995. The agricultural index numbers in Punjab also confirm improving yields, with the index increasing from 138.73 in 1980-1981 to 189.76 in 1989-1990, a 51.03 base increase in a decade, representing a 5.103% per year average increase.

Table 11.6. Yield of Wheat and Rice in Punjab (Kilograms per Hectare)

Crop	1960-1961	1970-1971	1980-1981	1990-1991	1999-2000
Wheat	1,244	2,238	2,731	3,714	4,696
Rice	1,009	1,764	2,733	3,229	3,347

Note. Adapted from "Green Revolutions Reconsidered: The rural world of contemporary Punjab" (p.12), by H. Singh, 2001, Oxford: Oxford University Press.

Note. Adapted from "Production Conditions in Contemporary Punjab Agriculture", by H.S. Sidhu, 2005, *Journal of Punjab Studies*, 12(2), p. 202.

Table 11.7. Wheat and Rice Yields Kilograms Per Hectare (1970 to 1997)

Year	Wheat Yield (Kilograms per Hectare)	Rice Yield (Kilograms per Hectare)
1970-1971	2,238	1,764
1971-1972	2,204	2,045
1972-1973	2,233	2,007
1973-1974	2,216	2,287
1974-1975	2,995	2,071
1975-1976	2,372	2,553
1976-1977	2,432	2,611
1977-1978	2,537	2,910
1978-1979	2,517	2,937
1979-1980	2,797	2,604
1980-1981	2,731	2,733
1981-1982	2,932	2,955
1982-1983	3,007	3,144

Year	Wheat Yield (Kilograms per Hectare)	Rice Yield (Kilograms per Hectare)
1983-1984	3,015	3,063
1984-1985	3,289	3,073
1985-1986	3,531	3,200
1986-1987	2,966	3,331
1987-1988	3,506	3,164
1988-1989	3,668	2,770
1989-1990	3,593	3,510
1990-1991	3,714	3,229
1991-1992	3,802	3,257
1992-1993	3,776	3,391
1993-1994	4,011	3,507
1994-1995	4,090	3,382
1995-1996	3,883	3,131
1996-1997	4,203	3,396

Note. Adapted from "Green Revolutions Reconsidered: The rural world of contemporary Punjab" (p.58), by H. Singh, 2001, Oxford: Oxford University Press.

11.3.1. Factors Contributing to Increased Crop Yields

Increases in crop yields during the 1980s and 1990s were the result of a number of factors: improvement in seed technology, enhancements in agronomical practices, and the stability in input expenses. In comparison to the previous decade, when HYV seed technology failed to substantially increase food grain yields, the level of progress in the 1980s and early 1990s was substantial. Agricultural researchers at Punjab Agricultural University (PAU) and the Indian Agricultural Research Institute (IARI) in Delhi continued to innovate, particularly in wheat and rice strains specific to the agronomical conditions in the state. Scientific research led to the creation of multiple new strains of wheat and rice that were capable of processing agricultural inputs more efficiently and steadily increasing the level of output per plant. Agricultural scientists also continued to make advancements in designing crop strains that were substantially more disease- and drought-resistant, improving the hardiness of the plant varieties. The development of new strains of wheat and rice was aided by the importation of improved strains from throughout the country or internationally from the network of agricultural research laboratories (Singh, 2001). PAU and IARI scientists had considerable experience in genetic breeding and genotype development that allowed them to manipulate and adapt seed varieties in a manner that was conducive to agricultural conditions in Punjab (Singh, 2001). These scientists developed HYV strains that increased average yield (Kg/Ha), in particular, wheat varieties, bringing an increase, on average, from 49 Kg/Ha in the early 1980s to 55 (Kg/Ha) by the early 1990s. This technical

innovation in seed technology led to the continuous advancement in wheat and rice seed varieties, with an overall increase in agricultural food grain yields by 20% to 25% over a decade.

As can be seen in Table 11.8, innovation in wheat varieties increased wheat output capabilities on average per hectare from 2,498 Kg per hectare in the 1970s to 3,143 Kg per hectare in the 1980s, and to 3,884 Kg per hectare in the 1990s. There is a similar corresponding increase, but slightly lower average, for rice yields per hectare, from 2,478 Kg per hectare to 3,048 Kg per hectare in the 1980s, and 3,350 Kg per hectare in the 1990s. The increase in crop yields of wheat and rice in Punjab was also facilitated by the refinement of agronomical practices throughout the 1980s and 1990s. In the 1980s, PAU continued to re-evaluate Green Revolution farming practices and conducted extensive research into how to assist farmers in achieving optimal agricultural yields. This consistent research led to continual enhancements in technical management practices leading to more comprehensive instructions pertaining to crop-sowing time schedules, the degree of seed spacing needed, sowing depth, times to apply fertilizer or irrigation and the amount needed, and efficient insect-management practices (Singh, 2001). As a result of the university's improved dissemination of agronomical knowledge in the 1980s, Punjab farmers were able to adjust and refine agronomic practices to enhance wheat and rice production.

Table 11.8. Decennial Averages for Wheat and Rice Production

Decade	Average Production (Kilograms per Hectare)	Percentage Increase	Actual Increase (Kilograms per Hectare)
	Wheat		
1970s	2,498	-	-
1980s	3,143	25.82	645
1990s	3,884	23.87	741
	Rice		
1970s	2,478	-	-
1980s	3,048	23	570
1990s	3,350	9.9	302

Note. Adapted from "Green Revolutions Reconsidered: The rural world of contemporary Punjab" (p.65), by H. Singh, 2001, Oxford: Oxford University Press.

In addition to changes in agronomical practices, there was also a considerable shift among Punjab farmers in their technical understanding of Green Revolution farming. By the latter half of the 1980s, they had acquired substantially more experience and expertise as to which practices would facilitate optimal agricultural yields. In particular, they came to understand what levels of seed treatment needed to be applied, appropriate irrigation and fertilizer application practices, and effective use of mechanized equipment. This greater depth of understanding

allowed farmers to increase crop yields because they were now successfully executing the technical package of practices needed to make Green Revolution farming more effective.

Crop yields throughout the 1980s and early 1990s also saw continual advancements as input expenses stabilized and Punjab farmers were able to access capital needed to effectively implement Green Revolution farming. In the 1970s, the prices of crucial inputs had increased dramatically, leading many Punjab farmers to adopt cost-saving measures that resulted in inefficient agricultural practices and impacted crop yields. The stabilization of fertilizer and diesel prices throughout the 1980s and early 1990s allowed Punjab farmers to return to effective agricultural practices. Punjab farmers once again could apply the needed levels of fertilizer for appropriate plant growth, and stabilized diesel prices allowed them to irrigate and water crops in a timely manner, as well as to operate the equipment needed for crop maintenance tasks. During this time there was also a substantial increase in the level of credit available to Punjab farmers regardless of land size which produced greater equality in all farmers being able to purchase the necessary inputs and mechanized equipment needed to practise HYV farming effectively and ensure optimal crop yields.

11.3.2. Cropping Intensity

As in the case of increased crop yields, Punjab farmers also made considerable advancements in cropping intensity in the 1980s and early 1990s. One of the major advantages of HYV farming technology was that it made possible the sowing of two crops during one growing season, thereby increasing food grain production and farmers profits. By the 1970s, the level of cropping intensity had increased, with many Punjab farmers adopting a wheat and rice rotation cycle. Nonetheless some, segments of Punjab farmers had difficulty increasing cropping intensity on their parcels of land and, therefore, the economic viability of their farming operations decreased. As can be seen in Table 11.9, the level of cropping intensity increased from 156% (6,535,000 Ha) in 1979-1980 to 176% (7,391,000 Ha) by 1989-1990, and increased a further 5% to 181% (7,623,000 Ha) by 1993-1994. In 15 years (1979-1994), cropping intensity increased by a cumulative 25% and brought an additional 1,088,000 hectares of land under double cropping. By 1993-1994, only 19% of the total cultivable agricultural land was not double cropped, demonstrating an intensification of agricultural production and expansion of HYV technology to all segments of Punjab farmers. The increase in cropping intensity during this period was a result of improving fortunes of Punjab farmers, in particular, small and marginal producers. It was inextricably linked to the changes discussed above: increased accessibility to financial credit and stabilization of input and market prices.

Table 11.9. Classification of Agricultural Area in Punjab (Thousands Hectares)

Year	Geographical Area in Punjab	Net Area Sown by Agriculture	New Sown Area as Percentage of Total Area	Areas Sown More Than Once	Total Cropped Area Sown More Than Once	Cropping Intensity Percentage
1965-1966	5038	3,803	76	1,086	4,889	128
1969-1970	5038	4,027	80	1,472	5,499	136
1971-1972	5038	4,076	81	1,648	5,724	140
1972-1973	5038	4,086	81	1,845	5,921	145
1973-1974	5038	4,113	82	1,924	6,037	146
1974-1975	5038	4,092	81	1,812	5,904	144
1975-1976	5038	4,158	83	2,097	6,255	150
1976-1977	5038	4,167	83	2,118	6,285	151
1977-1978	5038	4,171	83	2,219	6,390	153
1978-1979	5038	4,177	83	2,453	6,630	158
1979-1980	5038	4,182	83	2,353	6,535	156
1980-1981	5036	4,191	83	2,572	6,763	161
1981-1982	5036	4,210	84	2,719	6,929	164
1982-1983	5036	4,202	84	2,713	6,951	164
1983-1984	5036	4,212	84	2,765	6,977	165
1984-1985	5036	4,189	83	2,824	7,013	167
1985-1986	5036	4,197	83	2,961	7,158	170
1986-1987	5036	4,202	83	3,015	7,217	172
1987-1988	5036	4,157	83	3,169	7,326	176
1988-1989	5036	4,205	84	3,182	7,387	170
1989-1990	5036	4,191	83	3,200	7,391	176
1990-1991	5036	4,218	84	3,284	7,502	177
1991-1992	5036	4,215	84	3,303	7,518	178
1992-1993	5036	4,134	83	3,416	7,550	182
1993-1994	5036	4,214	84	3,409	7,623	181
1994-1995	5036	4,210	82	3,483	7,693	182
1995-1996	5036	4,136	84	3,576	7,712	186
1996-1997	5036	4,234	85	3,584	7,818	185
1997-1998	5036	4,218	84	3,284	7,502	177
1998-1999	5036	4,223	84	3,585	7,808	185
1999-2000	5036	4,266	85	3,605	7,871	184

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1982, 1987, 1990, 2000), Chandigarh, Government of Punjab.

11.3.3. Corollary Hypothesis II (ii): Crop Yields and Cropping Intensity Increase Sufficiently over time.

Hypothesis II (ii) has been verified as agricultural crop yields and cropping intensity increased over time ensuring food grain harvests provided sufficient returns over cost to Punjab farmers. It has been hypothesized that the likelihood of anti-state terrorism is less when agricultural crop yields and cropping intensity increase over time ensuring food grain harvests provide sufficient return over cost to Punjab farmers and providing financial stability. In summary, then, by the early 1990s, many farmers were producing greater crop yields and doubling the number of crops planted in one season. These circumstances meant they were realizing increased financial returns at a faster rate than the increases in their input expenses, enabling them to improve and sustain farming operations. Of particular importance was the marked improvement in conditions of the Jat Sikh farmers, who, along with all farmers in the region, regardless of the size of their landholdings, were becoming financially stable, able to provide for their families and hold onto their land. With these encouraging changes, the enmity and frustration this population held for the government dissipated. Increases in crop yields and cropping intensity had notably benefitted small and marginal farmers as they now could maintain their farming operations and not be forced join the landless working class.

11.4. Hypothesis II (iii)

> Hypothesis II (iii): Anti-state terrorism in Punjab is less likely to occur when input costs into agricultural production remain relatively stable over time.

It is hypothesized that anti-state terrorism is less likely to occur when input costs into agricultural production remain relatively stable over time. The 1970s and early 1980s in Punjab saw dramatic increases in input prices as a result of a number of compounding domestic and international events. These dramatic increases in input prices placed a substantial number of Punjab farmers into economic distress and led a portion to bankruptcy, default of their property, and loss of their agricultural livelihood. Later, during the mid-1980s, the price of agricultural inputs in Punjab started to stabilize, reducing the uncertainty that had once been so prevalent. The equalization of input expenses into Punjab farm production was the result of stabilization in world oil prices, technical innovation and adaptations, and mechanization.

11.4.1. Decline/Stability in Input Expenses

In the 1980s, Punjab farmers started to see stabilization in expenses associated with critical inputs needed for modern agricultural production. The international price of oil after 1981 began a gradual downward decline, with an abrupt 47% drop in 1985 from $27.56 to $14.43 per barrel by 1986 (see Table 11.10). The price of oil over the late 1980s and into the 1990s would continue to show stability, with only minor fluctuations and no major spikes in price. The stabilization of oil prices was critical for Punjab farmers because it made the cost of production substantially more predictable and helped reduce overall production costs. The decrease in the price of oil in the 1980s also assisted in the decline of fertilizer prices, providing Punjab farmers substantial financial relief. Finally, the drop in oil prices also led to a decline in the costs of the diesel fuel used by so many farmers to operate mechanical equipment and tube wells. In addition to the decline in oil prices, agricultural production in Punjab also enjoyed smoother functioning once fuel (diesel) shortages, which were so prevalent in the early 1980s, were no longer a factor. India had succeeded in securing a stable petroleum supply and an effective means of distribution of diesel to Punjab. As well, throughout the 1980s, the Indian government improved its supply chain of agricultural products to ensure that critical inputs were in stock at the cooperative societies to meet farming demand and to not hinder agricultural production. There is no indication in the literature of any substantial rises in the price of other inputs critical to Green Revolution farming in Punjab through the 1980s and early 1990s.

Table 11.10. Global Oil Prices per Barrel ($ U.S.)

Year	Oil Price Per Barrel	Year	Oil Price Per Barrel
1969	1.80	1985	27.56
1970	1.80	1986	14.43
1971	2.24	1987	18.44
1972	2.48	1988	14.92
1973	3.29	1989	18.23
1974	11.58	1990	23.73
1975	11.53	1991	20.00
1976	12.80	1992	19.32
1977	13.92	1993	16.97
1978	14.02	1994	15.82
1979	31.61	1995	17.02
1980	36.83	1996	20.67
1981	35.93	1997	19.09
1982	32.97	1998	12.72
1983	29.55	1999	17.97

Year	Oil Price Per Barrel	Year	Oil Price Per Barrel
1984	28.78	2000	28.50

Note. Adapted from "Historical Crude Oil Prices" by Charts bin statistics collector team , 2010. Retrieved October 30, 2012, from http://www.chartsbin.com/view/oau.

As a result of facing very challenging agricultural conditions in the 1970s, Punjab farmers in the following decade, proposed a number of adaptations and innovations to decrease agricultural input expenses. When oil prices rose so rapidly during the 1970s, the affected farmers began switching from diesel-powered tube wells to electric-powered ones, an important move as the per-hour cost to operate the electric tube wells was significantly lower. This transition to electric tube wells was also facilitated by the Punjab governments' decision to reduce the electricity rates on tube wells to Rs. 13 per base horse power (BHP) per month from the previous Rs. 19. This change in rates acted as a catalyst for farmers to adopt the more cost-efficient method of irrigation and contributed to financial stability (Gill, 1983). Farm equipment manufacturers in Punjab during the 1980s also started to produce smaller farm machinery based on demand from smaller farmers who, though needing mechanical equipment for important agricultural functions, did not need the large, expensive equipment suitable for large farm operations (Dhesi, 2008). This use of smaller equipment allowed smaller farm operations to purchase capital assets at a fraction of the cost they previously were paying.

Farmers in the state also started to question the need for particular capital investments, in particular, in mechanical equipment. In the initial stages of the implementation of Green Revolution farming, agricultural equipment was acquired without evaluation of how truly necessary it was for all sizes of farming operations. With increased knowledge and experience, farmers became more adept at determining when and under what circumstances the purchase of certain equipment was warranted and financially sound (Blyn, 1983). The emergence of farm equipment rental agencies in the 1980s allowed farmers to acquire equipment when needed and to not have to make considerable capital outlays for its purchase. The establishment of farm equipment rental agencies benefited small landholders considerablely as they could defer major expenses.

Agricultural input expenses in the 1980s also saw another substantial decline due to the increased adoption of mechanized equipment that could complete agricultural tasks more rapidly and efficiently, contributing to reduced production costs and, specifically, reducing the hours of labour required to complete farming tasks and functions (Chadha, 1984). The total annual labour requirements for wheat crops were 260 man-days per annum in 1970-1971, declining to 207 days in 1980-1981, to 180 days by 1990-1991, and reaching a low of 162 days per annum in 2000-2001 (Singh, 2006). This steady decrease in labour expenses reduced operating costs. Even

though wages for agricultural labourers increased during this period, farmers could absorb the cost with minimal impact, as production costs overall declined and market value on products rose.

11.4.2. Corollary Hypothesis II (iii): Input Costs into Agricultural Production Remain Relatively Stable over time.

Hypothesis II (iii) has been verified as input costs into agricultural production in Punjab by the 1990s had achieved relative stability. Punjab farmers were no longer facing drastic increases in input prices that led to declines in profit margins. They now had a degree of certainty on a year-to-year basis as to what they could expect for agricultural production costs, allowing them to plan accordingly. At the same time, farmers were receiving higher prices for their products, which allowed them to absorb any increases in input expenses and also maintain profitable farm operations. With input costs stable farmers could reinvest in technological innovation, increasing food grain production and, at the same time, agricultural efficiency, and reducing overall total expenditures. The stability of input expenses was accompanied by a reduction in the anger and vocal protest that had been so evident among the rural Jat Sikh population in the 1970s. Sikh farmers' earlier points of contention and criticism of the central government in relation to escalating input expenses faded as they were able to concentrate solely on making a living.

11.5. Corollary Hypothesis II (iv): Agricultural Producers in Punjab able to Sell Agricultural Products into Free Markets Without Restrictions.

> Hypothesis II (iv): Anti-state terrorism is less likely to occur when agricultural producers in Punjab are able to sell agricultural products into free markets to the highest bidder/purchaser without restrictions.

Hypothesis II (iv) has been verified as agricultural producers in Punjab were able to sell agricultural products into free markets without restrictions ensuring financial stability. It is hypothesized that anti-state terrorism is less likely to occur when agricultural producers in Punjab could sell their products in free markets to the highest bidder/purchaser without restrictions. The restrictions that the central Indian government had imposed on Punjab farmers during the late 1970s and early 1980s, with designation of the state as a single food zone, were removed fully by 1985-1986. The Indian government removed this barrier preventing the flow of agricultural food grain from Punjab because the levels of wheat and rice production had sufficiently increased in other states so that there were adequate food grain supplies stockpiled nationally by the Food Corporation of India (FCI) for the central pool (Singh, 1997). This decision was significant

because it eliminated a cause of protest and contention, particularly on the part of Jat Sikh farmers, who had perceived the food zone designation as discriminatory. Not only did the resolution of this grievance reduce Sikh farmer animosity toward the central government, but it also contributed to improving their financial well-being. Punjab farmers could, from 1985-1986, freely sell their agricultural surpluses to those offering the best prices without restrictions, thus increasing the potential profitability of their farm operations.

11.6. Hypothesis II (v)

> Hypothesis II (v): Anti-state terrorism in Punjab is less likely to occur when procurement prices for food grain yields are sufficient to offset input costs of farming and ensure sufficient profit for farmers.

It is hypothesized that anti-state terrorism in Punjab is less likely to occur when procurement prices for food grain yields are sufficient to offset input costs of farming and ensure sufficient profit for farmers. During the 1980s and early 1990s, the improvement in procurement prices during this period assisted in bringing stability to farming operations in the Punjab state. The favourable change in these prices resulted from the changes in political philosophy of the central Indian government and the Agricultural Price Commission (APC), both of which adopted more balanced and progressive approaches. Procurement price increases during the early 1990s were also driven by the Indian government's preparation for entry into the World Trade Organization. This change in policy in relation to procurement prices for food grains played an important role in the decline of the anti-state terrorism movement by contributing to the financial stability of rural Jat Sikh farmers in Punjab.

In 1980, the central Indian Congress government, led by Indira Gandhi, had just returned to political power after a 3-year absence. The central government was embroiled in a number of political conflicts across India and, in particular, was facing vocal opposition from Sikhs in Punjab who cited a litany of issues, stability of the agricultural sector of the economy being a prominent one. In the 1970s, the Congress (I) government had taken a very hard-line approach on agricultural issues, putting the needs of the consumer and the industrial sector ahead of those of agricultural producers, particularly in the setting of agricultural commodity prices. This was particularly true in the first year when the Congress (I) government regained political control in 1980; the government continued with the status quo in their agricultural policies by maintaining procurement prices for crops at stable levels while offloading considerable input expenses onto farmers. However, in the early 1980s, the Congress government modified its philosophy on agricultural pricing of commodities.

The result of this modification in agricultural pricing was a policy that was more reasonable and balanced the interests of all segments of society (Bhalla, 1983). This new approach looked to balance the economic interests of agricultural producers, on the one side, and the non-agricultural sector (consumers and business interests), on the other, to create a mutually beneficial environment where all parties' interests could be satisfied (Singh, 1997). The Indian government and the Agricultural Price Commission (APC) came to the realization at that time that two-thirds of the economy was dependent upon agriculture for labour and that 40% of the total national income was produced by this sector. It was reasoned that if the agricultural sector did not receive adequate remuneration for food grain commodities, then large segments of the population dependent on this sector would be adversely affected (Bhalla, 1983). As the Congress government during the 1980s wanted to shore up its political support in order to maintain power, this change in philosophy also had the political objective of not alienating large segments of the voting population, particularly those who were dependent upon the agricultural sector for employment.

Officials with the Indian government and the APC also critically examined the long-term stability of the Indian state and its economy. The Indian population was continuing to increase at a steady rate, and to meet growing consumption demands, measures needed to be implemented in order to reach target growth rates in food grain and total agricultural production. In order to achieve this objective, the agricultural sector needed incentives in the form of pricing that would bring greater returns on their crops and thus encourage further investments, increasing the efficiency and productivity of farm operations. In order to achieve these latter two goals, farmers' profits needed to be consistent. Also, during this time, the Indian government was at a critical stage in negotiations to join the World Trade Organization (WTO), which would entail an overall liberalization and globalization of the Indian economy. In order to enter this organization, the Indian government had to reform a number of its policies in relation to agriculture, including policies related to price supports and subsidies (Shergill, 2008). In particular, India would have to increase the domestic price of food grains to match international prices, as Indian prices of staple food grains tended to be considerably lower (Singh, 1997). The culmination of these factors influenced the alteration of the policy in relation to procurement prices throughout the 1980s and early 1990s.

The impact of the changing philosophy towards agricultural procurement prices initially became evident in the early 1980s and became more pronounced by the 1990s. The price of wheat increased from 117 (Rs.) per quintal in 1980-1981 to 215 (Rs.) per quintal by 1990-1991, a total 98 (Rs.) per quintal increase in a decade (see Table 11.11). This increase of 98 (Rs.) demonstrated an almost 84% increase in prices over a decade, with an average increase in

wheat prices of 8.4% annually. The procurement price of wheat did not stagnate in the early 1990s with India's entry into the World Trade Organization; instead, it increased from 215 (Rs.) per quintal in 1990-1991 to 350 (Rs.) per quintal by 1994-1995, a 135 (Rs.) increase or a rise of 63% in the procurement price for wheat.

Table 11.11. Procurement Prices for Wheat and Rice (Rs. Per Quintal)

Year	Wheat	Rice
1970-1971	76	51
1971-1972	76	51
1972-1973	76	***
1973-1974	76	***
1975-1976	105	74 (*+2.00)
1976-1977	105	74 (* + 2.00)
1977-1978	110	77 (*+2.00)
1978-1979	112.50	85 (*+2.00)
1979-1980	115	95
1980-1981	117	105
1981-1982	130	115
1982-1983	142	122
1983-1984	151	132
1984-1985	152	137 (*+3)
1985-1986	157 (*+5)	142
1986-1987	162	146
1987-1988	166	150 (*+17)
1988-1989	173	160
1989-1990	183	185
1990-1991	215	205
1991-1992	225	230
1992-1993	250 (*+25)	270
1993-1994	305 (*+25)	310
1994-1995	350	340
1995-1996	360	360
1996-1997	380	380
1997-1998	415 (**+60)	415
1998-1999	455 (**+55)	440
1999-2000	550	490

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1982, 1984, 1987, 1990, 2000), Chandigarh, Government of Punjab.

* Figures within brackets for wheat and paddy are prices paid by the State Government in addition to the procurement prices actually paid by the State Governments.

** Bonus Paid by the Central Government

*** Not Available

As see in Table 11.11, the procurement price for rice also increased substantially over the same period from 105 (Rs.) in 1980-1981 to 205 (Rs.) in 1990-1991, representing a 100 (Rs.) increase and a 95% overall increase within a decade. The price for rice also rose in the early

1990s, with procurement prices per quintal increasing from 205 (Rs.) in 1990-1991 to 340 (Rs.) in 1994-1995, a 135 (Rs.) or a 66% increase in prices received by farmers within 5-years. The impact of these dramatic increases of procurement prices on Indian and, more specifically, Punjab farmers were dramatic and reversed the negative trajectory of many farming operations.

11.7. Corollary Hypothesis II (v): Procurement Prices for Food Grain Yields are Sufficient to Offset Input Costs of Farming and Ensure Sufficient Profit for Punjab Farmers.

Hypothesis II (V) has been verified as procurement prices for food grain yields were sufficient to offset input costs of farming and ensure sufficient profit for Punjab farmers. In summary, the following advantages accrued from the increase in procurement process: Punjab farmers could cover operational input expenses and also obtain a positive rate of return from their farming operations; positive returns allowed farmers to reinvest into farm-operations allowing for acquisition of mechanized technology which increased agricultural production but, more specifically, allowed all segment of farmers to adequately adopt and practise Green Revolution farming to its true potential; and the rise in procurement prices was also substantial enough that the benefits permeated even to marginal and small farmers who had struggled mightily in the 1970s. The increase in procurement prices over the 1980s and 1990s allowed all farm operators, regardless of their land holding size, to enjoy the financial gains of the Green Revolution technology.

Returns on major crops in Punjab substantially improved during the 1980s and into the 1990s. An analysis by Gurjinder and Joginder Singh (2006) examined decennial data on the returns over operational costs for wheat and rice crops, with data being accessed from official Indian government reports (Table 11.12). Their analysis found that returns of operational costs for wheat and rice crops, over a 3-decade period, increased exponentially. The return over operational cost (Rs./Ha) increased for wheat from Rs. 2,300 in 1980-1981 to Rs. 7,608 in 1991-1992 signifying a Rs. 5,308 or 230% increase. This pronounced increase of return over operation cost for wheat continued into the 1990s, with wheat returns increasing form Rs. 7,608 in 1991-1992 to Rs. 23,771 in 2001-2002, a Rs. 16,163 or a 212% increase in a decade. The return over operation cost for rice (paddy) also increased from Rs. 2,973 in 1981-1982 to Rs. 7,055 in 1991-1992, an increase of Rs. 4,086 or 137% increase in a decade. This upward price trend would continue, with rice returns over operational costs increasing from Rs. 7,055 in 1991-1992 to Rs. 22,023 in 2001-2002, an increase of Rs. 14,968 or a 212% in a decade. These returns over

operational costs for wheat and rice for Punjab farmers during the 1980s and 1990s were enough to stabilize farmers' incomes and bring them positive financial returns.

Table 11.12. Return Over Operational Cost Wheat and Rice (Rs./Ha)

Year	Wheat	Rice
1970-1971	1,056	343
1981-1982	2,300	2,973
1991-1992	7,608	7,055
2001-2002	23,771	22,023

Note. Adapted from "Green Revolution and economic plight of agricultural labour in Punjab", by G. Singh & J. Singh, 2006, *The Indian Journal of Labour Economics*, 49(4), p. 852.

A similar analysis was completed by Joginder Singh (2007) who examined the net return for wheat and rice crop production between 1970 and 2000. The author provided a 3-year average cost return analysis as a means of controlling for year-to-year fluctuations in yields and prices (see Table 11.13). The analysis showed that over the three-decade period, the profitability of wheat and rice increased considerably, and the profit margins widened substantially enough that farmers did not have to worry about negative returns or a loss. When examining the returns from wheat, we can see that during the 1970s, returns were constantly fluctuating, with the impact of input expenses increasing dramatically during this time. The net return for wheat increased from 237 Rs./Ha for the triennium ending 1978-1979 and increased to 1,634 Rs./Ha by the triennium ending 1990-1991, a 1,397 Rs./Ha or 589% increase in return in over a decade. In the next 3-years, the net return for wheat would rise to 3,614 Rs./Ha, a further increase of 1,980 Rs./Ha for the triennium ending 1993-1994, representing a further 121% increase.

Table 11.13. Economics of Wheat Crop in Punjab (Rs./Ha)

Year	Net Return (Rs./ Ha)
Triennium Ending	-
1972-1973	324
1975-1976	559
1978-1979	237
1981-1982	475
1984-1985	794
1987-1988	1,063
1990-1991	1,634
1993-1994	3,614
1996-1997	3,355
1999-2000	7,145

Note. Adapted from "Globalization and Punjab economy: Issues in agriculture and small-scale industry" (p.32), by Singh in Bawa, Raikhy, & Dhindsa (Eds.), 2007, Amritsar: Guru Nanak Dev University. Original source CACP reports, Government of India.

The net return for rice would also show dramatic increases, with the net return increasing from 844 Rs./Ha for triennium ending 1978-1979 to 1,764 Rs./Ha for the triennium ending 1990-1991, signifying a 920 Rs./Ha or a 100% increase in net return for rice (Table 11.14). Within the next 3-years, the net return for rice would increase sharply again, rising from 1,764 Rs./Ha in the triennium ending 1990-1991 to 3,642 Rs./Ha in the triennium ending 1993-1994, an increase of 1,878 Rs./Ha in a 3-year period: a further 106% increase in net return for rice. These positive net returns would continue toward the latter half of the 1990s, with net returns showing steady increases. This analysis by Joginder Singh confirms that the profitability of rice increased substantially over a decade, ensuring the stability of farm operations and healthy financial returns for cultivators.

Table 11.14. Economics of Rice Crop in Punjab (Rs./Ha)

Year	Net Return (Rs./ Ha)
Triennium Ending	-
1974-1975	-434
1978-1979	844
1981-1982	1,132
1984-1985	955
1987-1988	1,466
1990-1991	1,764
1993-1994	3,642
1996-1997	3,396
1999-2000	4,970

Note. Adapted from "Globalization and Punjab economy: Issues in agriculture and small-scale industry" (p. 34), by Singh in Bawa, Raikhy, & Dhindsa (Eds.), 2007, Amritsar: Guru Nanak Dev University. Original source CACP reports, Government of India.

11.8. Corollary Hypothesis II: Landowners in the Primary Agricultural Sector are Able to Maintain Financial Viability.

Hypothesis II: The likelihood of anti-state terrorism in Punjab is less when landowners in the primary agricultural sector are able to maintain financial stability.

Hypothesis II has been verified as landowners in the primary agricultural sector were able to maintain financial stability. By the mid-1990s, Punjab farmers had seen a dramatic transformation in agricultural production with the implementation of Green Revolution farming. The negative economic conditions that had been so prevalent in the 1970s and had such a detrimental impact on specific segments of Punjab farmers had all but dissipated by the early 1990s. A majority of Punjab farmers could access financial capital to invest in agricultural production and efficiency, crop yields and cropping intensity increased over time, ensuring food grain harvests provided sufficient return over cost to farmers, input costs into agricultural production remained stable over time, procurement prices for food grains were sufficient enough to offset input costs of farming and ensure sufficient profit, and Punjab farmers were able to sell agricultural products into free markets to the highest bidder without restrictions.

Previously, the Index of Parity had been used by this writer to demonstrate the financial viability of farming operations within Punjab; however this index is not available as it was discontinued in 1980. To demonstrate financial viability of farming operations in Punjab, trends in farm household income will be used as an alternate measure. As shown in Table 11.15, total farm household income increased from Rs. 11,846 in 1980-1981 to Rs. 39,449 by 1990-1991, an increase of Rs. 27,603 in a decade and a tripling of total income. Total income would continue to increase in the next decade, with farm household income reaching Rs. 50,124 by 2000-2001. The income per hectare also tripled from Rs. 4,261 per hectare in 1980-1981 to Rs. 13,556 per hectare by 1990-1991 and showed continual increase through the latter half of the 1990s. Farming operations in Punjab by the 1990s had become financially viable, with all segments of farmers enjoying positive financial returns and thus reducing discontent with the Indian central government. Agricultural cultivators in Punjab finally had stability, allowing them to maintain decent standards of living and to meet the basic necessities of life. Also, young adults taking over family operated-farming operations had a viable future career with positive financial returns.

Table 11.15. Decennial Trends in Punjab Farm Household Income

Year	Total Farm Income	Income (Per Hectare)	Income (Per Capita)
1970-1971	Rs. 4,594	Rs. 1,830	Rs. 752
1980-1981	Rs.11,846	Rs. 4,261	Rs. 2,039
1990-1991	Rs. 39,449	Rs. 13,556	Rs. 6,404
2000-2001	Rs. 50,124	Rs. 15,762	Rs. 8,072

Note. Adapted from "Farm Household Income, Investment and Consumption" by A. Joshi, 2004, *Economic and Political Weekly*, 39(4), p. 321.

12. Stability in the Punjab Secondary and Tertiary Sector

12.1. Hypothesis III

> Hypothesis III: Anti-state terrorism in Punjab is less likely to occur when the secondary and tertiary sectors of the Punjab economy are able to absorb unemployed skilled and non-skilled workers providing them meaningful employment.

It is hypothesized that anti-state terrorism in Punjab is less likely to occur when the secondary and the tertiary sectors of Punjab's economy are able to absorb unemployed skilled and non-skilled workers, providing them meaningful employment. In the early 1980s, the Punjab economy overall was going through a period of dramatic change, with disruptions in the agricultural sector and weak secondary and tertiary sectors of the economy still rebuilding from re-alignment. During this period, a substantial portion of rural Jat Sikh males found themselves unemployed and unable to secure employment in either the agricultural sector or the industrial and service sectors. The inability to secure employment, in association with other social factors, propelled some rural Jat Sikhs to participate in anti-state terrorism violence against the Indian state because of a decline in their economic status within Punjab society. This section will analyze the transformation of the secondary and tertiary sectors of Punjab's economy during the 1980s and early 1990s. This transformation culminated in increased employment in these sectors of the economy and contributed to the decline of anti-state terrorism violence. In examining the transformation of the secondary and tertiary sectors of Punjab's economy, the role of government economic policy, growth of the agricultural sector, development of the rural Punjab economy, and government allocations, as well as the impact of these factors on reforming these sectors, will be discussed.

12.1.1. Punjab and Indian Government Industrial Policy (1970 to 1990)

As has been previously described, during the late 1960s and through the 1970s, the Punjab government paid only limited attention to the industrial and service sectors of the

economy. The government's limited focus on these sectors was a result of the constitutional division of powers that brought the industrial sectors and their development under the almost exclusive control of the Indian central government, while the state government maintained exclusive economic control over the agricultural sector (see Chapter 7 for details). As a result of these divisions of powers, the Punjab government focused explicitly on developing the agricultural sector of the economy and failed to articulate any substantive formal industrial policy or allocate financial resources to assist in the development of this sector. However, in the late 1970s, the Punjab coalition government altered its approach on economic development slightly and examined ways to develop other sectors of the economy to reduce exclusive dependence on the agricultural sector for economic growth.

The election of the Akali Dal and Janata Party coalition government to the state assembly contributed to the shift, in 1977, toward adopting measures to improve performance of the secondary and tertiary sectors. In order to form a majority state government that year, the Akali Dal had formed a coalition with the Janata Party even though the parties were diametrically opposite and had two very different constituent bases with contrasting political goals. The Akali Dal was primarily a Sikh party representing the interests of the rural agricultural sector. The Janata party was a Hindu party that represented the interests of urban Hindu business owners (industrial and service) and labourers. In order to maintain the coalition government, both parties consistently compromised on assorted policies to achieve objectives representing the interests of their political support base. The Janata party believed it critical that the government develop a formal industrial policy to promote economic growth within that sector (Singh, 1995).

Industrial Policy Statement (1978)

In 1978, the Punjab government formulated its first comprehensive “Industrial Policy Statement”, clearly outlining its goals for the industrial sector and measures that would be implemented to promote growth in this segment of the economy (Johar, 1983, p. 251). The Akali Dal/Janata coalition government saw that even though the economy was progressing rapidly through agricultural development alone, the pace of this was unsustainable (Singh, 1995). In order to maintain and accelerate economic progress, it was deemed that further industrialization of the state economy was needed and that the government would have to play a more prominent role in providing the infrastructure needed to promote industrial expansion. Through development of a formal industrial policy and implementation of specific measures, the Punjab government could assist and encourage private entrepreneurs to establish new industrial units (Singh, 1995).

Industrial Policy Objectives

In developing a formal industrial policy, the government had a number of broad objectives it wanted to achieve. Foremost was generating increased employment opportunities through increased economic coherence between the sectors. The state had abundant agricultural resources and raw materials, but it did not have the associated refinement industries for processing them. Facilitating the development of agro-resource-based industrial units was encouraged, with particular focus on developing small-scale industrial units over which the state had some legislative control. Emphasis was also given to the development of new markets to increase exports of industrial products. Because a majority of industries were concentrated in the major urban areas of Ludhiana, Jalandhar, Amritsar, and Patiala, with only limited industry in rural and outlying border districts of the state, the government also wanted to assist in spreading industries throughout the state to promote regional balance. However, most importantly, the new industrial policy was designed to provide incentives to attract entrepreneurs to establish operations in the state and promote technical innovation in production (Johar, 1983; Maini, 2004).

Industrial Incentives

To assist entrepreneurs to establish businesses and to facilitate the diffusion of industry throughout the state, specific emphasis was given to providing incentives for entrepreneurs to establish operations in regions where there was little industry, particularly, in border and sub-mountainous districts where employment was direly needed. The state government was willing to provide interest-free loans for a period of 5 to 10 years, with a maximum loan amount of Rs. 7 Lakh, including a capital subsidy of 15% to firms willing to locate in these underdeveloped regions (Johar, 1983). In order to attract new entrepreneurs to the state and encourage pre-existing businesses to expand operations, the government also put in place a number of gradual incentives designed to aid in the start-up and maintenance of operations in the following years (Maini, 2004). For example, the government was willing to provide loans to private industries considering locating in the state at standard interest rate levels of up to 75% of the cost to conduct feasibility studies to examine the viability of establishing operations in a particular location (Johar, 1983). To aid initial industrial start-ups, a land subsidy on the purchase cost of land of up to 75% of the price was provided, but the amount of the subsidy depended on the location, which was primarily limited to industrial zones established by the government. Foreign firms looking to establish themselves in Punjab were given specific priority in the allotment of land in specified industrial zones.

In another of their efforts to increase industrial activity and development, the government created a number of state-operated financing organizations designed to provide industrial start-

ups access to investment capital. Depending on the size of the industrial unit, firms were eligible for interest-free loans for up to Rs. 5 Lakh to Rs. 7 Lakh to be repaid after 13 years. The government also was willing to provide interest-free loans to a maximum of Rs. 25 Lakh to specific priority industries (Johar, 1983; Maini, 2004). Newly created industrial units were to be provided continual financial assistance through provisions allocating a subsidy of up to 25% on power expenses for 5 years, and new units were also exempted from paying electrical duty for a period of 5 to 10 years, depending on the location of the enterprise. Once industrial units were established and had initiated production, they were also exempted from paying the Octroi terminal tax placed on the import and export of products/materials, again, for 5 to 10 years, depending on the location of the business (Johar, 1983).

The Punjab government's establishment of industrial policy in 1978 was a critical step in initiating the process of industrial development in the state and provided a strong incentive for entrepreneurs to establish operations. The pace of industrial growth gradually grew in the early 1980s as the policy took hold and difficulties pertaining to implementation of new procedures and practices, which initially impeded the overall effectiveness of the program, were resolved (Johar, 1983). In 1987, the Punjab state government conducted a thorough re-examination of the performance of the industrial sector and re-evaluated the success of its industrial policy. The government realized that the performance of the industrial sector still had not been overly spectacular as the a majority of its resources continued to be focused on agriculture, and the central government was unwilling to allocate funds for industrial development, which impeded overall industrial growth (Maini, 2004).

New Industrial Policy (1987)

Punjab was seeing the initial signs of a burgeoning industrial sector by the mid-1980s, particularly in small-scale industrial units, but refinement of the state's industrial policy was needed in order to consolidate gains and accelerate the pace of economic development (Singh, 1995). In 1987, the Punjab government introduced its new industrial policy aimed at further enhancing industrialization through more effective streamlining of procedures and focusing resources on specific initiatives to assist entrepreneurs' industrial ventures. Emphasis was to be given to attracting large- and medium-scale industry to the state and enhancing the continued growth of smaller industrial units (Maini, 2004).

Incentives and Subsidies

On April 1, 1987, the new industrial policy that was designed to invigorate the growth of the sector and address the shortcomings of the previous policy came into effect. The new policy

divided the state into four clearly distinguishable areas (growth zones) in which specific incentives or benefits were to be provided (Maini, 2004). The creation of four growth zones was deemed necessary in order to bring balanced industrial development to Punjab because some regions continued to languish (Bawa, 2000). The growth areas were categorized by as *A, B, C, or no incentive* area, with grade A areas requiring the most intervention through increased incentives and no incentive areas requiring limited incentives or subsidies under this program. The composition of growth areas was as follows: Grade A area was composed primarily of the border districts of Amritsar, Gurdaspur, Ferozepur, Tanda Block of Hoshiarpur, Bhinwanigarh block of district Angrur, Rampara block in Bhatinda; Grade B included the districts of Hoshiarpur, Sangrur, Bhantinda, Kharara Tehsil in Ropar, Faridkot Tehsil of Faridkot district, and areas designated as backward or sub-mountainous by the state government; Grade C growth areas were focal points that were not located in either category A or B areas or within Ludhiana and Jalandhar; no incentives areas comprised areas located in Ludhiana and Jalandhar and 10 kilometres outside of the city limits (Singh, 1995).

Incentives and subsidies under this new industrial policy were highly graded in favour of underdeveloped industrial districts and specialized areas (Maini, 2004). To assist in the establishment of new industrial units, the government offered a range of capital subsidies designed to lower new entrepreneurs' initial start-up costs: those locating into A growth areas received a 25% capital subsidy, to a maximum of Rs. 25 Lakh; in B areas, a 15% capital subsidy, to a maximum of Rs. 15 Lakh; and in C areas, a 10% capital subsidy, up to a maximum of Rs. 10 Lakh (Singh, 1995). Land subsidies were also used to attract investors specifically into underdeveloped districts located either in A, B, or C growth areas; they received a 75% subsidy on the portion price of land "in excess of the ceiling price of Rs. 25/-per square meter for development plots, and Rs. 61/-per square meter for under developed plots" (Singh, 1995, p. 303). To ensure developers went forward with development proposals, these subsidies would only be granted when 50% of the project was completed (Singh, 1995).

One issue the government identified in its review of its policies was that industrial policy also understood that industrial growth had been hindered previously by the inability of new operations to obtain electrical power connections. In order to remedy this problem, the Punjab State Electricity board was instructed to provide immediate power connections to any newly established industry in these specified growth areas. In addition, new industrial operations in A, B, and C growth centres were granted exemptions from electrical duties for 5 years.

In order to further entice industrial units to establish operations in underdeveloped regions in the state, the Punjab government, in conjunction with the central government, put

forward tax incentives for new entrepreneurs, reducing federal and state sales taxes to 1% on fixed capital investments (e.g., investments in land, new buildings, machinery, installation expenses) investors incurred in establishing their operations (Singh, 1995). The sales tax incentive would remain in effect from the date production began for a specific time depending on the location (i.e., A = 6 years, B = 5 years, C = 4 years). The amount of the sales tax incentive on the total amount of the fixed capital investment (FCI) differed depending on the size of the new industry (i.e., small-scale industries: A = 100% of FCI, B = 80% of FCI, C = 60% of FCI and large and medium industries: A = 90% of FCI, B = 70% FCI, and C = 50% of FCI) (Singh, 1995).

The adoption of formal industrial policies in 1978 and 1987 contributed to increased growth in the industrial sector in Punjab during the 1980s and early 1990s by providing an overarching strategy to diversify the Punjab economy and end its exclusive dependence on agriculture. More critically, the policies implemented through incentives and subsidies were necessary to assist industrial entrepreneurs establish industrial units and increase employment opportunities for workers within the state. They also encouraged industrial development through access to capital and dispersed industry more equally across the state into historically non-industrial rural areas, creating a more favorable financial environment for a wider array of the state's population with a net benefit to all segments of society.

Promotional Agencies

In addition to providing subsidies and incentives, the government also created a number of publicly operated promotional agencies designed to assist industrial growth. Many of the promotional agencies developed by the Punjab government had been first established in the earlier decades, but due to a lack of direction and clear objectives, these had been relatively ineffective. During the 1980s, the functioning of these agencies improved, and their cumulative impact in the gradual expansion of the industrial sector would be seen towards the latter half of the 1980s. The following discussion focuses only on agencies that made a considerable impact in increasing industrial development in Punjab. The initial key agencies to be examined are the state-operated financial corporations that assisted in increasing the amounts of capital available to industrial entrepreneurs.

Punjab Financial Corporation (PFC)

The Punjab Financial Corporation (PFC) acted as a term lending institution providing medium- and long-term loans primarily to small and medium businesses (Bawa, 2000). During the 1980s, the PFC, which was receiving increased funding from the state, increased the number of loans it provided to new entrepreneurs and also the maximum amount of these loans to Rs. 60 Lakh (Singh, 1995). The loans acquired were primarily used for the acquisition of or investment

in fixed assets such as land, buildings, plant capacity, and machinery (Bawa, 2000). The Punjab Financial Corporation also began assisting new industrial operators to access federal government funding under the Social Capital Assistance Scheme for IDBI (Industrial Development Bank of India) by providing resources to assist in the application procedure (Singh, 1995).

Punjab State Industrial Development Corporation (PSIDC)

The Punjab State Industrial Development Corporation (PSIDC) began to take a more prominent role in the 1980s and acted as a catalyst for increased promotional activity specifically geared towards medium and large industry (Maini, 2004). During this time, the government understood the importance of attracting more medium- and large-scale industries to the state, as these industries employed more workers and also promoted industrial growth through the creation of smaller, ancillary spin-offs needed to support these larger operations. The number of loans issued by this corporation continued to grow over the 1980s, and the total maximum development loan available to medium and large industries increased to Rs. 90 Lakh (Singh, 2005). In addition to providing loans to large and medium entrepreneurs through state-provided financial resources, the Punjab State Industrial Development Corporation also extended term loans under a number of Industrial Development Bank of India (IDBI) loan refinance schemes (Bawa, 2000). Assisting industrial entrepreneurs to gain access to another level of financing attracted larger industrial operations to the state and ensured the healthy capitalization of industrial start-ups.

The internal working of PSIDC and its overall strategy also changed over time, with the agency taking a more pro-active stance in its duties and responsibility for encouraging industrial growth. To assist in establishing industrial operations in the state, the corporation took an active two-pronged approach. It began working with industrial entrepreneurs by assisting them to identify potential projects in the state and guiding them through the administrative process of obtaining a letter of intent for the procurement of industrial loans and registration of operations with the government of India (Bawa, 2000; Maini, 2004). This active lobbying and administrative assistance was essential for removing the bureaucratic red tape that was hindering the approval of new industrial units. PSIDC also became more pro-active in identifying and investigating projects that it deemed essential for industrial development across the state and in areas lacking development (Maini, 2004). During this process, PSIDC identified particular industries not found in Punjab that would perform well in this economy and proceeded to seek approval for their establishment. They established a number of industrial operations under their sole operational authority or through joint public/private sector agreements where they maintained a minority equity share (Bawa, 2000). These measures assisted in attracting large- and medium-scale industries to the state, leading to increased industrial growth and job creation.

Punjab Small Industries and Export Corporation Ltd. (PSSIC)

The Punjab Small Industries and Export Corporation Ltd (PSSIC) also played a more active and broader role in facilitating small-scale industrial development during the 1980s and early 1990s. PSSIC continued to acquire large tracts of land in order to develop new industrial parks-(focal points) across the state, specifically in rural and urban areas that were underserviced by industrial development (Singh, 2001). They also committed financial capital to improving and expanding pre-existing industrial parks by increasing the density of business operations in well-serviced areas. The significance in the development of industrial parks was that it brought large, medium, and small industries together in a defined space, promoting increased growth through the integration of business operations (Johra, 1983). The development of industrial parks attracted industry by providing them access to developed land (5,000 sq. metres to 20,000 sq. metres) at a subsidized rate with the necessary infrastructure (i.e., water, electricity, drainage, roads, and communication networks) needed to ensure successful industrial operations (Singh, 2001). The expansion and growth of industrial parks assisted in the establishment of new industrial operations and the expansion of employment across the state. The corporation also continued to provide marketing support to small-scale entrepreneurs by procuring finished goods and marketing them to various vendors internationally and domestically. Finally, the corporation increased the amount allocated for loans for small industry and increased the total number of loans of various lengths to new entrepreneurs (Singh, 1995).

The state government also had established a number of other promotional corporations in the late 1970s but their administration and function was refined in subsequent years to increase their functioning and to achieve their objective of promoting growth in specified areas. Through the Department of Industry, the government created a number of corporations including Punjab State Electronic Development and Production Corporation, Punjab State Hosiery and Knitwear Development Corporation, Punjab State Handloom and Textile Development Corporation, Punjab State Leather Development Corporation, and Punjab Goindwail Industrial and Investment Corporation (Singh, 1995). The role of these corporations was multi-faceted, but the overall objective was to develop specialised industrial sectors that were competitive, technically efficient, and continually enhancing production and promoting employment growth. These corporations provided a range of services including initially assisting entrepreneurs to establish operations by providing administrative assistance and guidance. These corporations assisted many industrial producers to access input materials and also to acquire equipment or machinery needed for production. They provided technical assistance by demonstrating new technologies that would enhance production and increase quality while decreasing production costs. They provided technical training in new technology or instruction on new methods of

production, to improve production capabilities and skill sets. Consultancy was another area of assistance provided to entrepreneurs whereby they received advice about the design and finishing of products. Finally, the most important help these corporations provided was marketing producers' goods, both domestically and internationally, and selling them to commercial vendors (Bawa, 2000; Singh, 1995). These corporations were beneficial in that they assisted in the development of various specialized industrial sectors and facilitated increased production growth.

Punjab Government Streamlining of Investment Procedures

Another step the Punjab government took in the 1980s was to implement new procedures that streamlined the investment process so that it became less cumbersome to obtain licensing approval and to establish operations in the state (Singh, 1995). In each district of the state, an industry center was established where industrial entrepreneurs could get assistance obtaining regulatory approval for their enterprises. The centers would aid entrepreneurs to complete the necessary documents and feasibility reports and obtain the financing they needed. The government also established a one-window “Udyog Sahayak” industrial promotion office where prospective entrepreneurs could get assistance and guidance in relation to future industrial endeavours in the state (Singh, 1995, p. 307). This service was also available to interested foreign firms and entrepreneurs.

Technical Assistance Punjab Government

The Punjab government reasoned that for industrial development to progress, technical assistance needed to be provided to key industries. This assistance would involve the promotion of technological innovation and adoption of more efficient technology to enhance industrial production (Singh, 1995). The Department of Industry developed a number of specific research and development and testing facilities for upgrading technology. The work of these facilities was conducted either by government personnel or by private enterprise, which would be granted access to develop and test new technological equipment specific to their own industrial operations (Bawa, 1983). The employees of these facilities would also provide consultation and technical assistance in developing new technologies. A number of facilities were constructed including the following: Tool Room at Ludhiana (provided tooling, design, and manufacturing facilities); Hand Tool Design Institute in Jalandhar (upgraded hand tools for small-scale industry); Machine Tool Design and Development Centre Batala (developed, designed, and tested new machine tools); Research and Development Centre for Bicycles Ludhiana (designed prototypes, provided production and consultancy services); Sewing Machine Development Centre Ludhiana (developed new sewing machine models and technology); and Punjab Test House Ludhiana (provided testing to any industry in Punjab) (Johar, 1983; Singh, 1995). These facilities helped

innovate new industrial technology, assisted in increasing the production and quality of goods, and gave industrial producers access to research and development facilities for solutions to technical problems they were facing.

12.1.2. Punjab Government Budget Allocations for Industry (1980 to 1990)

During the 1980s and early 1990s, the Punjab government continued to pursue a primarily agricultural-growth agenda, with minimal financial resources allocated to the industrial sector as reflected in its budget outlays to this specific sector. An examination of Table 12.1 shows the expenditures of the Five Year Plans (Five Year Plans refers to financial resources to be allocated by the state government to a particular sector over that time frame) on industry and the trend of limited budget allocations toward this sector in the sixth (1980-1985) and seventh (1985-1990) plans. In the sixth plan (1980-1985), the Punjab state government only allocated 3.93% of the total budget to industry and, in the seventh (1985-1990), only 4.20% of the total budget was allocated to the industrial sector. However, the critical point is that although the percentage of the Punjab state budget directed towards industry continued to hover near 4%, the actual expenditure on industry in both these plans increased. The sixth plan spent Rs. 7,413.48 Lakh on industry, which was a 50% increase over the previous plan, and in the seventh plan (1985-1990), Rs. 14,901.46 Lakh was spent on industry, a further approximately 50% increase over the previous budget. These increases in funds allocated to the industrial sector correspond to changes in how the government viewed the need for greater financial investment to promote growth and development. This trend was also apparent in the total amounts spent on large and medium industries and village and small industries in the state (see Table 12.2).

Table 12.1. Expenditures of Five Year Plans in Punjab on Industry

Plans	Actual Expenditure (Rs. Lakh)	Percentage of Total Budget Expenditure
Fourth Plan (1969-1974)	1,125.95	2.64
Fifth Plan (1974-1979)	3,756.12	5.22
Sixth Plan (1980-1985)	7,413.98	3.93
Seventh Plan (1985-1990)	14,901.46	4.20

Note. Adapted from "The giant awakens: Punjab industry and growth (p. 218), by G. Maini, 2004, New Delhi: India Research Press. Original "Statistical Abstract of Punjab," by Economic adviser to government Punjab, 1997, Chandigarh, Government of Punjab

Table 12.2. Yearly Expenditures by Punjab Government on Large/Medium Industries and Village/Small Industries

Year	Large and Medium Industries (Rs. In Lakhs)	Percentage of Total Budget Expenditure	Village and Small Industries (Rs. In Lakhs)	Percentage of Total Budget Expenditure
1969-1970	18.83	0.31	145.74	2.43
1970-1971	95.50	1.46	119.04	1.82
1971-1972	80.60	1.03	74.20	0.94
1972-1973	184.18	1.85	81.67	0.82
1973-1974	4.87	0.04	329.78	2.67
1974-1975	*	*	*	*
1975-1976	570.24	3.43	115.65	0.70
1976-1977	918.02	4.13	195.62	0.88
1977-1978	878.55	4.31	236.19	1.16
1978-1979	790.46	3.58	340.78	1.54
1979-1980	1,533.04	5.59	230.89	0.86
1980-1981	972.64	3.25	247.26	0.82
1981-1982	1,211.75	3.54	311.09	0.90
1982-1983	707.79	1.84	266.59	0.69
1983-1984	1,176.51	2.74	522.48	1.21
1984-1985	1,215.01	2.76	480.99	1.09
1985-1986	1,419.00	2.87	487.21	0.99
1986-1987	2,855.27	4.21	539.84	0.80
1987-1988	1,915.00	2.55	713.00	0.95
1988-1989	2,785.00	3.28	799.55	0.94
1989-1990	2,325.08	2.67	342.11	0.39
1990-1991	*	*	*	*
1991-1992	*	*	*	*
1992-1993	*	*	*	*
1993-1994	*	*	*	*
1994-1995	2,742.00	1.93	1,293.89	0.91
1995-1996	1,714.03	1.08	399.58	0.25
1996-1997	1,400.00	1.12	534.26	0.43
1997-1998	4,615.00	2.20	533.56	0.25

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1982, 1987, 1990, 1997, 2000), Chandigarh, Government of Punjab.

* Not Available

In contrast to the years preceding implementation of the formal industrial policies of 1978 and 1987, figures after those dates show consistent increases in expenditures to these sectors of the economy, with minor fluctuations in some years, to support the policy measures that were

implemented. The budget outlays to the industrial sector of the economy during the 1980s and early 1990s did not increase substantially, but the increased financial resources to this sector assisted in strengthening and aiding in their expansion. Allocations of greater financial resources to these areas, made possible the increased subsidies and incentives that attracted industrial entrepreneurs, the development of promotional programs that assisted industries in the state, and the development of infrastructure in the form of industrial parks and other related projects that facilitated the expansion in the number of industrial operations.

12.1.3. Indian Government Industrial Policy in Punjab (1980 to 1994)

The Indian government's policy in relation to industrial development in Punjab did not alter substantially during the 1980s and early 1990s. The government continued to pursue a balanced economic growth agenda in which states with low levels of overall economic development (i.e., Bihar, West Bengal, Orissa, and Madya Pradesh) received the bulk of public funding and preferential treatment through rapid approval of industrial development licenses for new industry and continued encouragement of private sector investment to establish operations in specified regions consistent with the central government's economic development policy. Because Punjab continued to have strong economic growth during this period, and its residents had one of the highest per capita incomes in the nation, the Indian government could not justify financial support for increased industrial development within that state.

The Indian government hesitated to commit to industrial development in Punjab due to renewed concerns about conflict with Pakistan and Punjab's proximity to the border, the lack of mineral resources, and the high level of anti-state terrorism plaguing the state. Regarding the central government's share of investments in projects in Punjab, the trend of limited investment continued: in 1980-1981, Punjab received a total of 2.3% of central government investment, and this percentage decreased gradually through the 1980s and early 1990s to under 1% (Table 12.3). This paucity of investment confirms the Indian government's unwillingness to invest substantial public capital into developing Punjab's industrial sector, specifically large- and medium-scale industry.

Table 12.3. The Central Indian Government's Yearly Share of Industrial Investment in Punjab

Year	Share of Public Investment in Industrial Sector in Punjab (%)
1963-1964	2.8*
1964-1965	2.6*
1965-1966	2.4*

Year	Share of Public Investment in Industrial Sector in Punjab (%)
1966-1967	2.0*
1967-1968	1.8*
1968-1969	1.2
1969-1970	1.1
1970-1971	1.0
1971-1972	0.9
1972-1973	0.9
1973-1974	0.8
1974-1975	0.8
1975-1976	1.2
1976-1977	2.2
1977-1978	2.1
1978-1979	2.0
1979-1980	2.7
1980-1981	2.3
1981-1982	2.3
1982-1983	2.0
1983-1984	1.7
1984-1985	1.2
1985-1986	1.0
1986-1987	**
1987-1988	**
1988-1989	0.83
1989-1990	0.74
1990-1991	0.67
1991-1992	0.62
1992-1993	0.70
1993-1994	0.60
1994-1995	0.61

Note. Adapted from "Federalism, nationalism and development" (p.143-144), by P. Singh, 2008, London: Routledge. Original from Bureau of Public Enterprises Annual Reports on the Working of Industrial and Commercial Undertaking of the Central Government, Government of India

* Punjab and Haryana Totals

** Not Available

Although, the central government's unwillingness to invest in Punjab's industrial sector was primarily an outcome of its policy of a balanced approach to national economic development, there was also an underlying political motive. Maintaining political control and establishing positive working relationships with opposition parties' vis-à-vis the Punjab had historically been difficult for the Indian government, in general, and for the Congress party, in particular. The Akali

Dal had continued to place considerable social and political pressure on the central government, criticizing many of the policies it had implemented in Punjab. This criticism was disguised in communal language and backed by the use of strategic political violence in order to obtain political concessions or make political gains. The culmination of political and social factors led to the rise of Sikh anti-state terrorism during the 1980s, when Sikh fundamentalists sought Punjab's independence from the Indian union. Political conditions deteriorated rapidly with the eventual assassination, in 1984, of Indira Gandhi by her Sikh bodyguards. The military action against the Golden Temple, which was designed to root out Sikh terrorists within its confines, precipitated her assassination.

Rajiv Gandhi (son of Indira Gandhi) succeeded Indira Gandhi as Prime Minister and governed India until 1989. Rajiv Gandhi and the Congress party continued to face substantial political difficulties and violent terrorist incidents in the Punjab directed at the Indian state during this period. Rajiv Gandhi and the Congress government, for reasons related to the assassination of Indira Gandhi, found it difficult to change their stance on Punjab's industrial development, which would bring increased prosperity to a Sikh population that had inflicted considerable harm on the Indian state. Political opinions about Punjab would change with subsequent Indian national governments in the early 1990s, but this was a gradual process.

Overall, from an examination of the Indian government's economic policy in Punjab and the statistics showing its investments in industrial development there it appears that little progress was made during the 1980s and early 1990s. However, there were a number of minor variations in policy and procedure that did benefit the Punjab industrial sector, specifically leading to the growth of large- and medium-scale industry.

On two occasions (1983 to 1985 and 1987 to 1992) during the 1980s, Punjab was under "Presidents Rule", that is, the state was under direct political governance of the central government through an appointed governor (Maini, 2004, p. 157). The caretaker governments in Punjab throughout the latter part of the 1980s did proceed with measures in the best interest of the state and its population, as was demonstrated with the drafting and the implementation of industrial policy in 1987. Political and bureaucratic elite in Punjab's civil service who were appointed to oversee governance of the state during this period were aware that, in the long-term, the state needed increased industrial development to diversify the economy and financial resources to accomplish this objective. Through their lobbying, they made incremental but essential progress in persuading the central government to increase financial resources to the state and to grant increased approvals of large and medium industrial operations. Table 12.4, shows that after 1987, the total amount of gross capital investment in Punjab grew annually,

consistent with the implementation of a new industrial policy by the centrally controlled caretaker government in Punjab, which needed increased financial resources to achieve their objective of greater industrial growth. The central government's willingness to gradually approve more industrial units was facilitated by the fact that the caretaker government in Punjab did not have an adversarial relationship with it and, thus, there was a stronger political will to grant approval to industrial units.

Table 12.4. Investment Amounts by Indian Government in Punjab's Industrial Sector (1984 to 2000)

Year	Punjab Gross Amount Allocated (Rs. Crores)
1984-1985	563.62
1985-1986	602.78
1986-1987	*
1987-1988	*
1988-1989	802.35
1989-1990	836.51
1990-1991	875.57
1991-1992	941.49
1992-1993	1,230.89
1993-1994	1,200.56
1994-1995	1,393.24
1995-1996	1,723.07
1996-1997	2,077.85
1997-1998	2,435.05
1998-1999	2,950.33
1999-2000	3,004.01

Note. Adapted from "The giant awakens: Punjab industry & growth" (p.175), by G. Maini, 2004, New Delhi: Indian Research Press.

* Not available

During the 1990s, industrial conditions began to improve for Punjab as the Congress-led government of Rao, in 1991, re-oriented India's economy and reduced the level of industrial protectionism (Maini, 2004). In order to attract foreign investment, the number of industries requiring licensing was reduced to 15, with public sector control maintained exclusively on 6 industries (Maini, 2004). Private investment was focused on 35 priority industries, allowing foreign investors to obtain 31% ownership shares. These changes would have an impact on industrial development in Punjab in the mid and latter half of the 1990s and would contribute to increased industrialization in the state. The impact of this policy can be directly observed in Table 12.4, as, after 1991, with the introduction of the liberalized economic policies, there is a substantial rise in the gross amount invested in Punjab by the central government.

12.1.4. Punjab Secondary and Tertiary Sector Growth (1980 to 1994)

The secondary and tertiary sectors continued to go through rapid changes in the 1980s and early 1990s as they became entrenched in Punjab's economy. The success of the secondary and tertiary sectors was heavily linked to and dependent upon the strength of the agricultural economy, which continued to show strong growth through the 1980s, with substantial increases in financial returns and a continued rise in per capita income in agricultural households. As can be seen in Table 12.5, the agricultural sector from 1980 to 1994 continued to be the dominant sector in the economy, contributing from a low of 42.20% to a high of 48.28% annually to the net state domestic product of the state. The tertiary service sector's share of the net state domestic product decreased slightly from 34.50% in 1980-1981 to 31.72% in 1993-1994. The secondary (i.e., industrial) sector of the economy also saw a decrease in its share of the net state domestic product decreasing from 21.41% in 1980-1981 to 20% in 1993-1994.

Table 12.5. Percentage Distribution of Net State Domestic Product by Sectors in Punjab

Year	Primary Sector	Secondary Sector	Tertiary Sector
1973-1974	62.77	13.69	23.54
1974-1975	60.62	14.94	24.44
1975-1976	56.68	16.61	26.71
1976-1977	56.79	15.84	27.37
1977-1978	55.47	16.65	27.88
1978-1979	54.13	17.47	28.40
1979-1980	47.43	20.45	32.12
1980-1981	44.54	21.41	34.50
1981-1982	45.54	21.44	32.92
1982-1983	43.20	22.22	34.58
1983-1984	42.20	22.98	34.82
1984-1985	44.35	20.85	34.80
1985-1986	44.46	20.87	34.67
1986-1987	43.36	21.47	35.17
1987-1988	45.48	21.07	33.45
1988-1989	44.76	21.62	33.62
1989-1990	45.28	21.71	33.01
1990-1991	44.62	22.41	32.97
1991-1992	47.01	20.23	32.76
1992-1993	47.25	20.62	32.13
1993-1994	48.28	20.00	31.72
1994-1995	47.27	20.64	32.04
1995-1996	45.24	22.32	32.44

Year	Primary Sector	Secondary Sector	Tertiary Sector
1996-1997	46.25	20.21	33.24

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1982, 1984, 1987, 1990, 1996, 2000), Chandigarh, Government of Punjab.

The growth of the agricultural sector of the economy was important to the secondary and tertiary sectors because of a strong interconnectedness (Schumacher, 1997). An increase in agricultural productivity will, in most cases, lead to increased income and have an "employment multiplier" effect in the agricultural and the secondary and tertiary sectors of an economy (Schumacher, 1997, p. 247). As the agricultural sector in Punjab matured through the 1980s and profitability returned, the demand for outputs produced by other sectors increased and stimulated the development of many ancillary services needed to maintain agricultural production. Strong agricultural growth in Punjab during the 1980s and 1990s drove the demand for other sectors for agro-input (e.g., seeds, fertilizer, plant protection), agro-engineering (e.g., agricultural equipment), agro-processing and marketing products (e.g., food processing, cotton textiles, paper mills, oil mills, paper industry, flour mills, sugar), and specialized agro-services (e.g, repair shops, machining shops, and speciality agricultural services) to maintain functioning of this sector (Schumacher, 1997). In the 1980s and early 1990s, agricultural sector growth brought broad-based financial prosperity to a majority of Punjab farmers, including small and marginal farmers. The increased incomes and standards of living led to demands for consumer goods and services, furthering economic growth in the secondary and tertiary sectors (Randhawa, 1977). Increased consumer demand also had a positive net effect on the agricultural sector, as consumers demanded agricultural products for consumption, stimulating further agricultural growth.

An examination of sectoral rates of growth during the 1980s and 1990s (Table 12.6) shows that the agricultural sector, between 1980-1981 and 1990-1991, grew at a strong 4.87% per annum, with growth declining between 1991-1992 and 1998-1999 to 0.37%. The growth of the agricultural sector in the 1980s was fuelled by improvements in agricultural conditions in Punjab and the successful adoption of Green Revolution farming methods and techniques. The secondary sector of the economy continued to show strong growth, with manufacturing averaging 9.12% from 1980-1981 to 1990-1991 and, in the following decade, 8.49% per annum from 1991-1992 to 1998-1999. The tertiary sector of Punjab's economy also continued to show strong growth, with particular areas in this category performing better than others from 1980-1981 to 1990-1991: banking and insurance (12.04%); electricity, gas, and supply (11.46%); public administration (7.60%); transport, storage, communication (6.92%); trade, hotel, restaurant (2.93%); real estate (2.96%), other services (2.39%); and construction (0.46%) showing weaker growth. In the following decade, the positive growth in the tertiary sector continued to be strong

in considerably more sectors within this category. During the period between 1991-1992 and 1998-1999, transport, storage, and communication (11.64%) and banking and insurance (10.50%) showed the strongest per annum growth, buoyed by agricultural and manufacturing sector growth. Public administration was growing at a rate of 8.11% per annum during the aforementioned period as a result of the decline of anti-state terrorism and the re-establishment of government institutions. The remaining sectors of the tertiary sector between 1991-92 and 1998-99 also continued to show positive growth per annum including electricity, gas, and water supply (6.32%); construction (6.19%); trade, hotels, restaurant (4.31%); other services (2.55%); and real estate (0.65%). Strong growth in the agricultural sector during the 1980s and early 1990s led to major advances in the secondary and tertiary sectors of the economy. Although statistically not evident in changes in the contribution in the net state domestic product, the secondary and tertiary sectors of the economy made substantial strides in the number of new businesses established, employment numbers, increases in fixed investment and production output.

Table 12.6. Sectoral Rates of Economic Growth in Punjab (1980 to 1999)

Sectors	1980-1981 to 1990-1991	1991-1992 to 1998-1999
	Growth Rate Per Cent Per Annum at 1980-81 Prices	
Agriculture	4.87	0.37
Livestock	5.70	5.10
Forestry and Logging	-0.11	5.10
Fishing	15.30	18.54
Mining and Quarrying	9.60	-40.07
Manufacturing	9.12	8.49
Electricity, Gas, Water Supply	11.96	6.32
Construction	0.46	6.19
Trade, hotel and Restaurants	2.93	4.31
Transport, Storage and Communication	6.92	11.64
Banking and Insurance	12.04	10.50
Real Estate Ownership of Dwellings and Business Services	2.86	0.65
Public Administration	7.60	8.11
Other Services	2.39	2.55

Note. Adapted from "Deceleration of economic growth in Punjab: Explanation, and a way-out", by L. Singh & S. Singh, 2002, *Economic and Political Weekly*, p. 581.

12.1.5. Secondary and Tertiary Sector Employment Growth (1980 to 1994)

Small-Scale Industry Punjab

The driver of industrial growth in Punjab during the 1980s and early 1990s was small-scale industry, which was fuelled by growth in agriculture. The Punjab government also had more control and legislative influence over small-scale industry that allowed it to implement measures to promote growth. The number of small-scale units rose from 33,716 in 1979-1980 to 184,875 by 1993-1994, an increase of 548% (Table 12.7). In a span of 14 years, small-scale industry was able to add 151,154 industrial units, dramatically eclipsing the increase of only 25,693 units that were added from 1967-1968 to 1979-1980. The level of fixed investment in the small-scale industry also rose dramatically from only Rs. 273 crore in 1979-1980 to Rs. 1,764 crore in 1993-1994, a 646% increase that demonstrated the growing business confidence in the Punjab economy and the willingness of entrepreneurs to invest capital in the small-scale industrial sector. The level of production also saw a dramatic increase, with the total value of produced goods rising from Rs. 924 crore in 1979-80 to Rs. 7,075 crore in 1993-1994, an increase in the value of production by Rs. 6,151 crore or 665%. However, the most substantial increase was in the level of employment, as the number of individuals employed in small-scale industry increased sharply from 223,979 in 1979-1980 to 755,883 in 1993-1994, an addition of 491,014 critically needed jobs. The growth of small-scale industry in Punjab parallels the major policy initiatives taken by the state government 1978 and 1987. An examination of the previously discussed rises in the number of small-scale industrial units, investment, production, and employment shows that they begin to rise dramatically after 1978, when the first industrial policy and measures were implemented, and experienced a subsequent boost in 1987, with the introduction of Punjab's second industrial policy. The development of formal industrial policy by the state provided clear direction to the industrial sector, and through government assistance of incentives and capital, entrepreneurs were enticed to invest in and establish small-scale industrial units in Punjab.

Table 12.7. Selected Statistics of Small-Scale Industries in Punjab 1966 to 2001

Year	Number of Industrial Units	Employment (No.)	Fixed Investment (Rs. Crore)	Production (Rs. Crore)
1966-1967	8,023	56,000	60	200
1974-1975	18,114	122,162	134	484
1975-1976	20,271	136,334	153	568.3
1976-1977	22,298	152,638	169	633
1977-1978	24,231	163,134	195	702

Year	Number of Industrial Units	Employment (No.)	Fixed Investment (Rs. Crore)	Production (Rs. Crore)
1978-1979	27,509	186,197	225	779
1979-1980	33,716	223,979	273	924
1980-1981	43,338	264,869	332	1,118
1981-1982	54,021	304,155	402	1,343
1982-1983	64,091	339,972	492	1,586
1983-1984	76,588	378,846	572	1,786
1984-1985	88,271	424,478	656	1,958
1985-1986	97,517	464,809	739	2,151
1986-1987	108,913	503,397	830	2,359
1987-1988	119,888	545,560	943	2,682
1988-1989	132,962	594,354	1,064	3,109
1989-1990	146,443	633,964	1,218	3,504
1990-1991	160,388	668,845	1,349	4,050
1991-1992	176,378	711,417	1,499	4,437
1992-1993	181,563	732,580	1621	5,345
1993-1994	184,875	755,883	1,764	7,075
1994-1995	188,241	776,763	1,973	8,737.8
1995-1996	191,025	802,329	2,216.1	9,713.9
1996-1997	193,332	821,170	2,491.3	11,106.2
1997-1998	195,383	840,568	2,859.9	13,057.7
1998-1999	197,344	864,592	3,360.7	14,444.5
1999-2000	199,071	883,005	3,793.7	16,610.8
2000-2001	200,603	897,417	4,250	19,525

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1984, 1987, 1990, 1996, 2000), Chandigarh, Government of Punjab.

Large and Medium Industry

Large and medium industry also experienced a revival during the 1980s and early 1990s, but not at the same level as small-scale business. The growth in these industries was also driven by growth in the agricultural sector and a state government's stronger commitment to industrial growth through the implementation of formal industrial policies in 1978 and 1987, which stimulated this development and created a more positive business environment essential for luring industrial development to the state. Specifically, the state government's pro-active approach in providing capital and incentives to new industrial start-ups encouraged industrial development, but government agencies' assistance to entrepreneurs in securing industrial licenses from the central government was key in promoting growth in this sector. The number of

large- and medium-scale industrial units increased from 203 in 1979-1980 to 440 in 1993-1994 an increase of 237 units (see Table 12.8).

Table 12.8. Selected Statistics on Large and Medium Industries in Punjab 1966 to 2001

Year	Number of Industrial Units	Employment (No.)	Fixed Investment (Rs. Crore)	Production (Rs. Crore)
1966-1967	122	42,735	104	93
1974-1975	132	57,891	109	308
1975-1976	144	63,291	196	385
1976-1977	160	69,942	257	471
1977-1978	175	77,971	310	607
1978-1979	188	91,551	379	711
1979-1980	203	97,533	629	869
1980-1981	228	107,767	727	1,141
1981-1982	237	109,081	835	1,529
1982-1983	243	120,925	962	1,826
1983-1984	254	124,819	1,099	1,993
1984-1985	273	131,381	1,252	2,071
1985-1986	292	132,174	1,490	2,535
1986-1987	306	142,381	1,401	3,185
1987-1988	322	151,990	2,067	3,778
1988-1989	335	160,609	2,452	4,379
1989-1990	355	169,801	3,083	5,458
1990-1991	373	187,311	4,003	7,164
1991-1992	395	193,789	4,552	7,709
1992-1993	414	188,034	5,194	9,335
1993-1994	440	200,000	5,800	11,000
1994-1995	475	206,722	6,420	13,500
1995-1996	526	210,448	8,744.1	16,656.1
1996-1997	586	219,383	9,744.6	21,387.1
1997-1998	620	221,154	11,720.1	25,406
1998-1999	602	227,929	14,038.1	25,376
1999-2000	611	235,993	14,765.8	23,720.1
2000-2001	638	251,890	17,000	35,600

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1984, 1987, 1990, 1996, 2000), Chandigarh, Government of Punjab.

This increase in the number of large and medium industrial units of 237 between 1979-1980 and 1993-1994 was quite an improvement from the preceding decade when only 81 units were added between 1967-1968 and 1979-1980. The work of promotional agencies in

combination with incentives and access to capital was successful in luring increased investment into large and medium industries. The level of fixed investment in the state saw an increase throughout the 1980s and increased from Rs. 629 crore in 1979-1980 to Rs. 5,800 by 1993-1994, an increase of Rs. 5,171 crore or an increase of 822% in investment in large and medium industry. Increased investment in these industries in the state and increased industrial units led to a sharp rise in the value of production from Rs. 869 crore in 1979-1980 to Rs. 11,000 crore in 1993-1994, an increase in the value of produced goods by Rs. 10,131 crore (1,165% increase). Critically, the number of individuals employed by large and medium industries increased by 102,467 individuals from 1979-1980 to 1993-1994. This increase in employment was essential for the Punjab economy, reducing dependence solely on agricultural employment and diversifying the employment options in the state.

Tertiary Sector

The tertiary (service) sector of the Punjab economy during the 1980s and 1990s also saw positive gains with specific subsectors in this category showing strong growth. The agricultural sector and industrial sector drove demand for specialized services from business in order to maintain functioning leading to growth of the service sector of the economy. The rising per capita income and disposable income in Punjab during the 1980s led to the rise in demand for consumer goods and increase in consumer spending promoting further growth of the service sector of the economy. The level of data available on the tertiary sector of Punjab's economy is relatively limited with few data series showing detailed change in this specific sector of the economy. However, the level of employment growth can be inferred by the limited data available supporting the argument that by the early 1990s, positive advancements had been made in this area. Table 12.9 shows the number of shops, commercial establishments, hotels and restaurants and number of persons employed therein. In 1980, there were 172,831 shops in the state and this increased to 239,717 shops by 1994, an increase of 66,886. The number of employees employed in these shops increased from 42,764 to 54,958, an increase of 12,194 employees. It must also be factored in that substantial numbers of shops were operated solely by business owners; thus, it can that inferred that there is, potentially, an increase of another 66,886 owner/operators who obtained gainful employment. The number of commercial establishment in the state increased from 40,736 in 1980 to 54,702, an increase of 13,966. The number of employees in these commercial establishments during this time increased by 24,042 employees, and there is also a strong likelihood that many commercial establishments were solely owner-operated, thus, the potential for a further 13,966 jobs being added to the Punjab economy. The number of hotels and restaurants in Punjab increased from 10,773 in 1980 to 11,818 in 1990, an increase of 1,601 operations. The number of hotel and restaurant employees increased from

15,546 in 1980 to 16,924 in 1990, an increase of 1,378 employees. When summarizing the data on commercial and hotel/restaurant establishments, it was decided to cover only to the year 1990 because it appears there was a change at that time in the way items were measured by the Statistical Abstracts of Punjab.

Table 12.9. Number of Shops, Commercial Establishments, Hotels and Restaurants and Persons Employed

Year	Number of Shops	Number of Employees	Number of Commercial Establishments	Number of Employees	Number of Hotel and Restaurants	Number of Employees
1970	126,106	43,079	40,344	52,842	5,816	8,809
1971	131,274	45,577	38,911	52,507	5,150	8,089
1972	131,574	45,630	39,118	52,647	5,170	8,119
1973	102,531	35,504	30,013	49,761	5,970	10,838
1974	111,057	37,914	28,536	51,630	6,702	12,044
1975	115,729	40,484	30,217	54,499	7,454	13,066
1976	130,694	35,078	29,873	65,113	7,909	11,936
1977	143,182	35,660	33,260	72,033	8,705	12,952
1978	154,533	37,246	36,615	75,591	9,614	13,142
1979	163,870	40,761	38,965	79,475	10,217	14,561
1980	172,831	42,764	40,736	83,063	10,773	15,546
1981	189,075	47,243	43,306	83,689	10,357	15,852
1982	201,682	49,827	45,882	86,736	11,003	16,911
1983	208,738	50,898	48,214	90,878	11,382	17,107
1984	214,452	50,541	48,845	92,103	11,498	17,320
1985	219,749	51,585	49,570	92,908	11,664	17,577
1986	226,318	56,738	49,979	99,978	11,754	16,762
1987	231,172	58,322	50,951	103,505	11,909	16,702
1988	232,194	59,821	54,071	105,565	12,249	17,234
1989	241,973	57,342	53,738	108,326	12,293	17,397
1990	247,729	59,912	54,702	107,105	11,818	16,924
1991	214,754	45,350	33,734	74,795	8,384	12,900
1992	225,006	51,099	34,712	77,936	7,652	14,066
1993	232,867	53,714	35,012	64,706	7,839	14,420
1994	239,717	54,958	35,118	65,267	8,163	14,791
1995	249,583	58,537	36,968	85,374	7,945	14,065
1996	248,083	59,568	38,295	91,244	7,991	15,048
1997	249,549	59,904	37,854	90,628	8,079	15,592
1998	252,236	62,028	37,884	90,835	8,214	15,601
1999	256,363	63,593	38,656	95,112	7,727	15,603

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1979, 1980, 1982, 1984, 1987, 1990, 1993, 1997, 2000), Chandigarh, Government of Punjab.

Another measure that demonstrates the growth in the service sector is the Statistical Abstracts of Punjab data on the number of employees in nine major working categories in the state. These data are available for the years 1971 and 1991 and show a sharp contrast in

employment numbers in the state over a two-decade period. It would have been beneficial to have had data for the year 1981, but this data could not be found in the Statistical Abstracts of Punjab publication. An examination of these data (Table 12.10) over the two decades shows that the number of individuals participating in construction rose from 77,536 in 1971 to 156,045 in 1991, an increase of 78,509 employees. The number of individuals engaged in trade and commerce increased from 321,511 in 1971 to 643,254, an increase of 321,793 employees over a 20-year period.

Table 12.10. Working Adults by Nine Major Categories in Punjab (1971 and 1991)

	1971	1991
As Cultivators	1,665,153 (42.56%)	1,917,210 (31.44%)
As Agricultural Labourers	786,705 (20.11%)	1,452,828 (23.82%)
Workers in livestock, Forestry, Fishing, Hunting, and plantation, Orchards and Allied activities	37,352 (0.95%)	49,295 (.81%)
Mining and Quarrying	535 (0.01%)	565 (0.009%)
Manufacturing, Processing and Repairs in Household Industry	124,102 (3.17%)	81,084 (1.33%)
Manufacturing, Processing and Repairs in other than Household Industry	317,968 (8.13%)	668,052 (10.96%)
In Construction	77,536 (1.98%)	156,045 (2.56%)
In Trade and Commerce	321,511 (8.22%)	643,254 (10.55%)
Transport, Storage and Communications	109,611 (2.80%)	233,787 (3.83%)
Other Workers/ Services	472,299 (12.07%)	896,255 (14.70%)
Total Main Workers	3,912,592 (100%)	6,098,374 (100%)

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1980, 1990), Chandigarh, Government of Punjab.

Transport, storage, and communication saw an increase in employment of 124,176 personnel from 1971 to 1991. Finally, the number of workers in the category "other services" increased from 472,299 in 1971 to 896,255 in 1991, an increase of 423,956 employees, showing strong employment growth. Although it is difficult to ascertain the exact increase in the number of

service-related businesses and employment levels from 1980 to 1994, it can be deduced from the overall upward trajectory of these figures that there was strong growth in the service sector during that time as well. The strong improvement in employment levels by the early 1990s reduced unemployment that was promoting social discontent.

Rural Employment

The overall rise in the level of employment in the secondary and tertiary sectors of the economy in Punjab by the early 1990s was substantial, and contributed to relieving the chronic levels of unemployment particular segments of Punjab society had faced. Although the overall increase in employment was beneficial, the location of the new employment opportunities was of greater significance: a good proportion of employment growth in the secondary sector was in rural areas. Businesses were being located in rural areas because they were dependent on the agricultural sector for access to the raw materials they needed to produce their goods and, as well, residents of these areas became consumer of their products (Singh, 2001). Entrepreneurs in the secondary and tertiary sectors were also attracted to establishing operations in rural Punjab due to other positive benefits. Land in these areas was substantially cheaper and other start-up costs were considerably lower in comparison to urban areas (Singh, 2001). The government's provision of capital subsidies and tax incentives were also attractors. Also, the state made substantial public investments in rural infrastructure such as roads, communications, power generation and transmission, transport, and technical institutions, all which served the dual purpose of facilitating both business growth and confidence (Bawa, 2000).

An examination of the location of small-scale industry in 1979-1980 shows that out of a total of 33,716 small-scale industrial units, 6,288 (18.6%) were in rural locations and 27,478 (81.4%) in urban areas (Singh, 2001). For the years 1993-1994, of the 184,875 small-scale units, 77,719 (42%) were now located in rural areas, whereas 107,156 (58%) were located in urban settings (Singh, 2001). Although comparable statistics for that period are not available for large- and medium-scale industrial units, an examination of a longer period demonstrates a movement of these industrial units to rural areas. Of the 65 large and medium industrial units existing in 1966, 10 (15%) were in rural areas and 55 (85%) were in urban locations (Singh, 2001). By 1998, of the total 607 large and medium industrial units, approximately 330 (54%) were in rural locations and 277 (46%) were in urban environments (Singh, 2001).

Statistics on the location of service sector businesses are not available, but it can be assumed that a large number of these enterprises also located in rural areas. The relocation of service sector businesses to the countryside was driven by economic growth that was occurring in rural Punjab and their strong dependence on the rural agricultural economy. This change in

the urban/rural ratio towards employment being located in the rural countryside in comparison to an urban setting assisted in bringing employment to the rural masses in the state of Punjab.

12.1.6. Corollary Hypothesis III: Strong Secondary and Tertiary Sector Employment Generation Present.

Hypothesis III has been verified as the secondary and tertiary sectors of the Punjab economy were able to absorb unemployed skilled and non-skilled workers providing them meaningful employment. It has been hypothesized that anti-state terrorism in Punjab is less likely to occur when the secondary and tertiary sectors of the Punjab economy are able to absorb unemployed skilled and non-skilled workers providing them meaningful employment. During the early 1980s, rural Jat Sikh males faced considerable difficulty in obtaining employment in all sectors of the economy. The agricultural sector of the economy was facing many challenges with segments of cultivators being unable to maintain financial stability and an agricultural sector overall that was incapable of absorbing any further labour capacity. The secondary and tertiary sectors in Punjab were weak from decades of federal and state government neglect and the impact of partition and state re-alignment that had left the state continually having to re-establish private business enterprises. However, by the early 1990s, there was a dramatic reversal in the conditions that had produced or compounded rural unemployment within the state.

During the late 1980s and early 1990s, secondary (industrial) and tertiary (service) sectors of the Punjab economy were able to absorb unemployed skilled and non-skilled workers providing them meaningful employment. The Punjab state and central Indian government implemented a number of incremental changes in policies that facilitated the growth of the industrial sector of the economy with positive spinoff benefits to the service sector. The agricultural sector in Punjab during the 1980s saw resurgence with increased prosperity among farming households which drove economic growth in the secondary and tertiary sectors of the economy. This employment growth was located more importantly in rural areas where chronic unemployment had been a problem in the previous decade (Singh, 2006).

In the 1980s and into the 1990s, the employment situation in rural Punjab changed substantially as previously, unemployed rural Jat Sikh workers, due to the establishment of business in the countryside, were able to obtain employment in the industrial or service sectors of the economy. Specifically, rural Jat Sikh workers who had been displaced from farm employment by the implementation of Green Revolution farming were able to secure meaningful employment. Farming households in the state were now more economically viable and were able to have household members participate in non-farm employment increasing their standards of living and

household incomes. Many educated rural Jat Sikh youth that once had such great difficulty in obtaining “white collar” careers now had more viable employment opportunities in professional sectors of the economy. Many of the social mores that existed previously with ethnic specific occupations disappeared as cultural values among the rural Sikh population changed based on economic necessity allowing for the acceptance of Jat Sikhs to participate in employment outside of agriculture (Koehn, 1991).

The ability of the rural Jat Sikh population to secure employment in the secondary and tertiary sectors of the economy substantially decreased the level of social discontent experienced by this segment of Punjab’s population. They were now able to maintain a basic standard of living and provide financially for their families. Many rural Jat Sikh youth saw a viable future within the state either through participating in the agricultural sector or pursuing a career in the secondary or tertiary sectors of the economy. The anger and frustration that once was channelled toward the Indian state government dissipated as the Jat Sikh population concentrated on their long-term future. The dissipation of social discontent reduced the willingness of the rural Jat Sikh population to participate in anti-state terrorism and made their recruitment by Sikh terrorist organizations very difficult.

13. Punjab Demographic Trends and Stability

13.1. Hypothesis (IV)

> Hypothesis IV: The likelihood of anti-state terrorism in Punjab is less when there are no substantial variations in the demographic trends of the population.

It has been hypothesized that the likelihood of anti-state terrorism in Punjab is less when there are no substantial variations in the demographic trends in the population. The state of Punjab in the 1970s and early 1980s was going through a period of rapid demographic transition in the area of adults of working age and the rates of literacy. These two demographic variables contributed to the rise of Sikh anti-state terrorism as there was an increase in the number of rural Jat Sikh youth of the age 15 to 30 who could not obtain meaningful employment and also a more literate Sikh population within the state with higher occupational expectations who remained unemployed. During the decline of anti-state terrorism in Punjab by the mid-1990s, the impact of these two demographic variables, although still prevalent, was minimized as the Punjab economy and employment opportunities grew.

13.1.1. Population Growth

An important catalyst for the rise of the Sikh anti-state terrorism movement was considerable demographic increases in the number of rural Jat Sikh male working adults (15 to 30) between 1971 and 1981 who were unable to secure employment due to the poor economic conditions. In the next decade between 1981 and 1991, the working adult population in the state of Punjab would continue to increase. The total number of workers in Punjab went from 16,788,915 in 1981 to 20,281,969 in 1991, an increase of 3,493,054 workers (see Table 13.1 & 13.2). The number of working males in Punjab also saw an overall increase by 1,890,824 from 1981 (8,937,210) to 1991 (10,778,034) (see Table 13.1 & 13.2). The rural male working population (ages 15 to 30), the majority of which was again Jat Sikh rose by 333,504 (19%) from 1,780,430 in 1981 to 2,113,934 in 1991 (see Table 13.3 & 13.4).

Table 13.1. Population in Punjab by Age Group (1981 Census)

Age Group	Males	Females	Total
0-14	3,261,548	2,907,320	6,168,868
15-19	1,003,527	879,445	1,882,972
20-24	873,845	766,102	1,639,947
25-29	678, 131	602,134	1,280,265
30-39	1,022,361	931,826	1,954,187
40-49	782,806	705,168	1,487,974
50-59	561,076	479,829	1,040,905
60+	745,054	572,724	1,317,778
Age Not Stated	8,862	7,157	16,019
Total	8,937,210	7,851,705	16,788,915

Note. Adapted from "Statistical Abstract of Punjab", by Economic adviser to government Punjab, 1987, p. 47, Chandigarh, Government of Punjab.

Table 13.2. Population in Punjab by Age Group (1991 Census)

Age Group	Males	Females	Total
0-14	3,737,666	3,296,110	7,033,776
15-19	1,124,802	967,607	2,092,049
20-24	1,019,582	917,651	1,937,233
25-29	876,664	797,666	1,674,330
30-39	1,398,385	1,278,203	2,676,588
40-49	1,035,925	899,400	1,935,325
50-59	659,700	583,882	1,243,582
60+	869,683	720,376	1,590,059
Age Not Stated	55,627	43,040	98,667
Total	10,778,034	9,503935	20,281,969

Note. Adapted from "Statistical Abstract of Punjab", by Economic adviser to government Punjab, 2000, p. 54. Chandigarh: Government of Punjab.

Table 13.3. Population in Punjab by Age Group Rural (1981 Census)

Age Group	Males	Females	Total
0-14	2,397,559	2,115,428	4,512,987
15-19	733,673	651,021	1,384,694
20-24	593,351	526,379	1,119,730
25-29	453,406	410,753	864,159
30-39	701,014	664,478	1,365,492
40-49	555,697	518,684	1,074,381
50-59	414,765	361,135	775,900
60 +	591,485	446,723	1,038,208
Age Not Stated	3,514	2,093	5,607

Age Group	Males	Females	Total
Total	6,444,464	5,696,694	12,141,158

Note. Adapted from "Statistical Abstract of Punjab", by Economic adviser to government Punjab, 1987, p. 47, Chandigarh, Government of Punjab.

Table 13.4. Population in Punjab by Age Group Rural (1991 Census)

Age Group	Males	Females	Total
0-14	2,652,327	2,337,784	4,990,111
15-19	805,771	699,252	1,505,023
20-24	708,915	643,037	1,351,952
25-29	599,248	539,397	1,138,645
30-39	928,848	864,405	1,793,253
40-49	706,857	639,454	1,346,311
50-59	469,117	422,403	891,520
60 +	666,370	549,009	1,215,379
Age Not Stated	31,970	24,580	56,550
Total	7,569,423	6,719,321	14,288,744

Note. Adapted from "Statistical Abstract of Punjab", by Economic adviser to government Punjab, 2000, p. 54. Chandigarh: Government of Punjab.

The overall impact of these growth changes in the characteristics of the workforce in Punjab in the 1990s had a distinctly different impact on the employment structure in the state than it did during the preceding decade. To begin with, rural males of working age in 1991 comprised a smaller percentage of the overall working population. In the 1990s, a majority of the rural Jat Sikh males between the ages of 15 to 30 was able to participate in the Punjab workforce. The overall economic health of farms in Punjab, regardless of their size, had greatly improved in a decade, and they were financially stable. Consequently, these Jat Sikhs could continue to work in family farms and maintain decent standards of living for themselves and their families. At a minimum, these men were financially secure and their basic necessities could be met through their farming profits. However, more importantly, they could also obtain gainful employment in sectors outside of agriculture. The preceding decade had seen a substantial expansion of the secondary (manufacturing) and tertiary (service) sectors of the Punjab economy, particularly in rural areas, which led to increased job opportunities for rural Jat Sikh adults who no longer had to depend on agricultural cultivation alone to make a living. They could supplement their incomes by obtaining employment outside of cultivation and improve their financial well-being and stability. Also, rural Jat Sikh adults who were landless had the opportunity to participate in the economy through employment in the private sector, in particular, small industry and the thriving service sector. The opportunities these Jat Sikh men now had to obtain employment and achieve financial stability meant they could provide a decent standard of living for themselves and their

families, reducing the overall level of discontent and frustration experienced by this population in the preceding decade.

13.1.2. Rise in Literacy Rates

As in the previous two decades, the Punjab government continued to invest in the educational system, producing a more literate and educated workforce. The rate of literacy in the state by 1991 had increased to 58.51%, from 40.86% in 1981, a 17.65% increase (see Table 13.5). Rural literacy rates also continued to improve, rising to 52.70% in 1991 from 35.21% in 1981. This continued investment in literacy was deemed necessary to produce the skilled workers who were needed for the state's expanding industrial and service sectors. As economic conditions continued to improve, Punjab households, in particular, rural Jat Sikh families, continued to ensure their children had the opportunity to obtain a basic level of education and also to pursue post-secondary education to achieve career aspirations, often outside of cultivation. In the 1990s, as the employment situation in the state continued to improve, many educated Jat Sikhs were able to obtain meaningful employment in their fields of study and fulfill their professional career aspirations.

Table 13.5. Rural and Urban Literacy Rates in Punjab (Decennial)

	1971	1981	1991
Rural	27.81%	35.21%	52.70%
Urban	52.49%	55.63%	72.09%
Total	33.67%	40.86%	58.51%

Note. Adapted from "Statistical Abstract of Punjab," by Economic adviser to government Punjab, (1980, 1987, 1990), Chandigarh, Government of Punjab.

13.1.3. Corollary Hypothesis IV: Minimal Impact of Demographic Changes.

Hypothesis IV has been verified as there was no substantial variation in Punjab demographic trends during the 1980s. The rise of Sikh anti-state terrorism in the previous decade had been facilitated by rapid demographic changes in the number of rural Jat Sikh workers between the age of 15 to 30 entering the workforce and unable to obtain employment and also a more educated Sikh population who were unable to achieve enhanced career aspirations because of employment stagnation in the state. The inability to obtain employment led to deeper and widespread social discontent amongst these groups and facilitated their recruitment by Sikh terrorist organizations. Rural unemployed male Jat Sikhs between the ages

of 15 to 30 were the primary recruits of the Sikh anti-state terrorism movement in the 1980s, and they became the main participants in Sikh terrorist violence against the Indian state.

In the 1990s, the particular demographic variables and the economic conditions that had contributed to the rise of the Sikh anti-state terrorism movement no longer prevailed. Although in the 1990s the number of rural Jat Sikh males between the ages of 15 to 30 grew and there was also a corresponding increase in the rates of literacy, a large majority of the Sikh population obtained gainful employment. The decline of Sikh anti-state terrorism in Punjab in the 1990s can be explained by the fact that Sikh terrorist organizations were unable to recruit individuals to participate in their organizations and movement because the discontent that was previously felt by this segment of the Punjab Sikh population against the Indian state no longer existed. Rural Jat Sikh males between the age of 15 to 30 and more educated Sikh adult's were no longer willing to participate in terrorist violence because they were able to maintain an adequate standard of living through gainful employment in the 1990s.

14. Conclusion

Since there have been no attempts to explain the rise and decline of the violent Sikh anti-state terrorism movement in Punjab in the late 20th century, this thesis has utilized Corrado's theoretical model. This model asserts that, when certain hypothesized economic conditions existed in Punjab, Sikh anti-state terrorism violence increased and, conversely, when these economic conditions changed, Sikh anti-state terrorism declined. While Corrado's original model generally assisted in understanding the precipitous rise of the Khalisanti national movement in the 1980s, it did not, however, provide a complete explanation. As discussed, in Chapter 1, the hypothesis dealing with the discrepancy between economic goals and means had to be further specified; it was argued that it was necessary to introduce two new specific hypotheses. First, in Punjab it appeared that financial instability in the farming sector was critical in explaining the beginning of the rapid rise in the Sikh anti-state terrorism movement (Chapter 7), and, conversely, as discussed in Chapter 11, when financial stability policies were introduced and took effect, the beginning of the decrease in this movement occurred. Second, as discussed in Chapters 8 and 12, this increase and decline pattern was also associated with secondary and tertiary sectors in the Punjab economy growing sufficiently to employ skilled and non-skilled workers.

Another limitation in the original Corrado model was the inapplicability of the degree of economic dependency experienced by the state hypothesis in relation to the Punjab Sikh anti-state terrorism movement. Corrado's hypothesis that a single powerful elite having near complete control over the modes of production in the Punjab economy is an important factor in influencing increased anti-state terrorism was not evident in the Punjab. To re-iterate, there was no single Sikh or non-Sikh dominant elite in this state, but rather several elite groups from Hindu, Sikh, and Muslim ethnic groups. However, each of these groups dominated sub-sectors of the economy: Sikhs dominated the agricultural sector, Hindus were primarily urban based and dominated the business sector, and the Muslim population was primarily limited to small urban businesses. Third, Corrado's model does not have any demographic-based hypotheses. However, as discussed in Chapter 9 and 13, working age population and literacy trends appeared to be strongly associated with the above Sikh anti-state terrorism pattern. Finally, as discussed in Chapter 6 and 10, it was argued that the key hypothesis involving the equitable distribution of wealth should be relocated: from hypothesis two to the first hypothesis. The rationale is that the pronounced financial discrepancy between the upper and lower segments of Punjab society,

which created a large disenfranchised Sikh population, results from the aforementioned collective hypotheses. In other words, this hypothesis involving relative deprivation is the most important because overwhelming historical evidence can be seen to culminate in much of the Sikh population perceiving an enormous economic relative deprivation compared to the Hindu and Muslim ethnic groups and within the Punjab Sikh social strata. In turn, when at its peak, it was argued that this relative deprivation was the basis for the dramatic increase in anti-state terrorism in Punjab. And, conversely, when this relative deprivation declined, so did anti-state terrorism.

14.1. Key Policies Identified to Prevent Anti-State Terrorism

The Corrado model does not specify policies related to its hypotheses but rather implies them. In this thesis, several key policies that appear to directly affect anti-state terrorism were identified. These policies, arguably, have potential implications for anti-state terrorist movements in other countries or jurisdictions with developing economies such as India's. Most importantly, it was argued that the introduction of Green Revolution farming into Punjab was one of the main contributing factors that led to social upheaval and created the disenfranchised Sikh farming population ripe for recruitment by Sikh terrorist organizations. Several, major but unattended policy mistakes occurred in how this new agricultural farming method was implemented (i.e., instead of enhancing production, the opposite took place, the deterioration of economic conditions). From a policy perspective, Green Revolution farming was introduced too rapidly, and, most farmers were unable to adapt. As discussed in Chapter 7, the inability to adapt was explained primarily by the absence of sufficient financing available to the farmers in obtaining the technology and agricultural inputs needed to make HYV farming successful.

Another critically related policy mistake was the failure of the Indian and Punjab government to fully and rapidly develop the necessary physical infrastructure (e.g., roads, reliable water supply, and electrical power generation and transmission), and key financial institutions including credit co-operative societies and commercial banks. Without these assets, most Punjab farmers were unable to take advantage of the Indian government's policy of dispersing the HYV agricultural seed technology and technical farming methods to them. In retrospect, it is overwhelmingly evident that a successful implementation of Green Revolution required extensive policy planning and implementation. Specific policies, again, included substantial capital investment by government in the area of road infrastructure to allow for efficient movement of agricultural inputs to farmers and to assist the flow of agricultural outputs to markets, irrigation infrastructure needed to be developed to facilitate farmers' ready access to reliable sources of water for HYV crops, electrical power generation and transmission infrastructure needed to be

developed in order to power tube well motors. In addition to the necessary physical infrastructure requirements there was also a need to develop financial institutions to assist farmers readily access the capital needed to invest in mechanization and also credit needed to purchase input materials for agricultural production. There was also a need to develop institutions to adequately supply necessary farm inputs to agricultural producers and to create a reliable and efficient input network. More specifically, financial resources were dispersed over a large geographical area by government leading to the too gradual development of infrastructure and institutions needed by farmers to participate in this new mode of agricultural production. It was argued by this writer that, the inability of many Sikh farmers to fully participate in the agricultural economy was associated with increased economic instability and development of political grievances amongst the Punjab farming population. And it was these political grievances that provided the critical context for the rise of the Akali Dal political party and the more extreme Sikh anti-state terrorism movement.

For the Corrado model to be utilized as a basis for policies regarding anti-state terrorism, it is necessary that both more specific hypotheses be elaborated and specific policies related to these hypotheses be formulated. For example, the Indian government in its rush to increase agricultural output failed to fully develop in Punjab the above physical infrastructure and institutions needed initially to make Green Revolution (HYV) farming successful. Also, it is important that education and training policies be implemented that facilitate farmers in their transition from unsophisticated subsistence farming to a commercial, capital-intensive system dependent upon modern technology and farming techniques. In addition, all the above policies require systematic implementation time agendas; each policy being dependent on the proper sequencing in order to maximize the effective implementation of Green Revolution rather than the inconsistent policy implementation that resulted in enormous frustration and anger arising from unfulfilled expectations.

More specifically, in implementing Green Revolution farming, a phased approach appeared necessary in the Punjab. That would have allowed national, state, and local governments to concentrate financial resources into effectively developing or facilitating the development of crucial infrastructural components such as irrigation, roads, power transmission and generation, and associated supporting agencies (i.e., credit agencies, agricultural input networks, and food grain marketing facilities) that were needed to make HYV farming technology effective.

The rise of the Sikh anti-state terrorism movement also demonstrated the importance of monitoring the viability of farming operations during the implementation of Green Revolution

farming. Many nations in particular third world countries, in an attempt to develop their agrarian economies have turned to modern agricultural technology to facilitate development. The dominant mode of modern agricultural production continues to be based on Green Revolution technology, and its use of HYV genetically modified seeds. Nations implementing or introducing this mode of agricultural production need to be vigilant to ensure that this method of farming does not destabilize the local agricultural economy and possibly lead to civil unrest. In implementing Green Revolution farming, continual monitoring of agricultural operations is required to ensure financial viability. Particular focus needs to be given to ensuring farmers have access to sufficient capital to invest in agricultural production and efficiency so that there are steady increases in crop yields and cropping intensity over time through agricultural innovation, ensuring that input expenses remain relatively stable over time, to ensuring that farmers can sell their products in the free market without restrictions, and, finally, that farmers continue to receive adequate procurement prices to ensure profitability. Specific attention should be given to monitoring the financial viability of small and marginal farm operations, as this section of agricultural producers are the most vulnerable to the implementation of capital-intensive farming methods because of their limited financial resources and their smaller economic returns, both of which make them more vulnerable to even a minor deterioration in agricultural conditions. In monitoring the financial viability of the agricultural sector, national governments must identify any noticeable negative fluctuations in agricultural conditions and must intervene in a decisive and rapid manner to prevent substantial weakening in the agricultural sector. This intervention can come in the form of financial aid, legislative changes, and re-adjustment of policy measures pertaining to the agricultural sector.

It is important that national governments address economic grievances speedily, so that appropriate corrective action can be taken before conditions deteriorate to the point of a terrorist conflict arising. In the years preceding the outbreak of Sikh anti-state terrorist violence, there was a litany of complaints from Sikh cultivators in Punjab regarding the deteriorating economic conditions in the agricultural sector. Sikh farmers collectively brought forward a set of legitimate grievances over years regarding the inherent weaknesses in Green Revolution farming that were impeding agricultural development and inhibiting their ability to maintain farming operations. Many of the grievances were systematically ignored or limited action was taken to assist the Sikh cultivators. As economic conditions in the Punjab agricultural sector continued to deteriorate, many disenfranchised Sikh farmers with limited political avenues to address their negative economic plight turned to anti-state terrorist violence to ameliorate their economic conditions. The crucial lesson learned from the Punjab conflict is that national governments implementing Green Revolution farming must take formal steps to ensure any formal grievances or complaints brought forward by participants in the agricultural sector are investigated and addressed. As

grievances arise, formal steps should be taken by government agencies to rapidly address any concerns and prevent grievances from languishing for long periods of time. In attempting to resolve grievances, extensive measures should be taken by the state to develop a strong, fundamental understanding of how issues impact citizens at the grassroots and impact their daily realities, so that any resolution put forward are technically sound and comprehensive. The ability of national governments to detect problems early and minimize their negative ramifications is vital for preventing, the festering of discontent and anger amongst the population. It is advisable governments be pro-active in attempting to detect issues or problems and implement formal measures in order to prevent negative conditions from arising.

The role of government in implementing Green Revolution farming into a specific region should be limited or constrained. It is advised that national governments do not play a direct role in its establishment or be an active participant in its day-to-day functioning. The reason national governments need to take a secondary or supportive role is because any failures or grievances experienced by agricultural producers will be directly blamed on the state. This issue will be more pronounced or compounded in regions where the ethnicity in a specified agricultural region is different from the dominant ethnicity of those in government. This was particularly evident in Punjab where the Indian government directly controlled the distribution of agricultural inputs, regulated the prices of agricultural inputs, set agricultural food grain procurement prices, was the main purchaser of food grains from agricultural producers, and provided loans to farming operations. When economic conditions in the agricultural sector deteriorated the Hindu-dominated Indian central government was held directly responsible for the farmers' negative economic plight, given their control over all of the key components of the agricultural economy. It is essential that national governments take a secondary role in the development of the agricultural economy by allowing private industry to carry out crucial support functions and letting international markets dictate the price of agricultural inputs and outputs.

The importance of nations taking a balanced approach in developing their economy is indispensable for preventing terrorist violence. Nations with primarily agrarian economies looking to develop their agricultural sector through the implementation of Green Revolution farming must also take formal steps to jointly develop the secondary and tertiary sectors of the economy. Nations, when formulating development plans, need to also introduce formal policy and allocate funding to implement measures to promote joint growth in the industrial and service sectors of the economy. In developing a specific sector of the economy, it is imperative to promote associated growth of businesses in other sectors in order to drive overall economic development and growth. A balanced approach to economic development is preferred in order to reduce the dominance of

one sector of the economy and prevent the rapid rise in unemployment, as a result of an economic downturn impacting the largest sector of the economy.

In the Punjab conflict, the agricultural sector was the dominant sector of the economy, with a large portion of the state's population dependent upon it for their economic livelihood. The introduction of Green Revolution farming and poor agricultural conditions brought a great deal of instability to this sector. A large proportion of farmers were displaced due to poor financial returns and increased mechanization that substantially reduced labour requirements. This large displaced, unemployed agricultural population was unable to secure employment in the secondary and tertiary sectors of the economy leading to increased frustration among a growing disenfranchised population. In developing the Punjab economy, the national and state government should have made greater efforts initially to develop the secondary and tertiary sectors of the economy in conjunction with the agricultural sector allowing for increased job creation and diversifying employment opportunities available to residents in the state. Equitable economic growth and job creation in all sectors of the economy would have greatly assisted in preventing the creation of a large volatile and disenfranchised population in Punjab willing to participate in anti-state terrorism violence.

Finally, national and regional governments must understand the impact of changing demographic trends on the economy. The ability of governments to detect changes in demographic trends early on is crucial for obtaining a thorough understanding of what demands will be placed on government institutions and also the corresponding changes in societal expectations. The ability to identify emerging demographic trends will allow government institutions to coordinate effective responses through the introduction of targeted social and economic measures designed to minimize the impact of a considerable shift in the population. National governments must develop internal research agencies tasked with examining the possible social impact of changing demographic characteristics and formulate legitimate solutions to implement in order prevent the rise of civil disorder. During the initial rise of the Sikh anti-state terrorism movement in Punjab in the early 1980s, there was a dramatic spike in the number of young Sikh adults entering the labour force seeking active employment in order to achieve or maintain a decent standard of living. Simultaneously, amongst this young Sikh adult population in Punjab there were increasingly higher rates of literacy that heightened career aspirations amongst this population. When this large Sikh adult population was unable to even secure employment and achieve their career aspirations, it led to increasing levels of discontent and anger that was eventually directed at the Indian state, which was held directly responsible for their negative economic status. If the Indian and Punjab state government had been able to identify the shifting demographic characteristics of the Punjab population, they may have be able

to introduce specific social and economic policy measures designed to increase employment opportunities in the state and mitigate the effects of these changes.

14.2. Uniqueness of the Present Elaboration of Corrado's Economic Anti-State Terrorism Model

There has been relatively limited theorizing in the academic literature as to how economic conditions contribute to the rise of violent terrorist movements. A majority of the theoretical perspectives emphasize the supremacy of political factors, ideology, historical events, and rational motives with little credence being given to economic events. In presenting an elaboration of Corrado's economic terrorism model in the context of Punjab, this model moves away from the conventional approach to explaining and perceiving terrorist violence. This dissertation asserts that in order to reduce the most violence and extensive crime (e.g., state and anti-state terrorism), an economic model approach should be used as the primary explanatory variable but accompanied by a detailed analysis of key political policies, historical events, and ideological assertions that also influence the outbreak of terrorist violence. The ability to understand the central role of economic conditions in conjunction with its interdependence with other non-economic variables is essential for formulating an effective strategy to prevent or suppress terrorist violence.

There is still a considerable degree of underdevelopment amongst dominant economic theories of terrorism in their ability to explain specific terrorist conflicts. A majority of economic theories of terrorism continue to focus solely on broad macro-level variables. In particular, many of these theories tend to examine the role that deteriorating economic conditions have on producing feelings of relative deprivation which contributes to increased social discontent amongst society members and promotes an individual's participation in terrorist violence in order to ameliorate their negative economic conditions. In order to substantiate their claims many economic theorists provide a limited number of specific economic indicators to demonstrate the level of economic inequality within a society and to provide empirical evidence to justify their assertions. However, the critical weakness of the dominant economic theories of terrorism presently is their inability to provide a thorough explanation as to the exact process by which individuals come to be economically deprived and provide a detailed account as to the specific events or factors that facilitate this decline. There is clearly a lack of theorizing as to how negative economic conditions in conjunction with political policies, historical events, and social factors interact to produce an environment conducive to terrorist violence. This limitation prevents many theories including Corrado's, which is one of the most detailed and one of the

most advanced, from being able to explain anti-state terrorism in developing and complex contexts like Punjab, India. What the established theoretical models need is detail about economic conditions, political decisions, public policies, and historical events in order to justify their theoretical assertions, which Corrado and most other models do not utilize, in explaining key concepts such as relative deprivation in the above context.

Corrado's economic terrorism model represents a theoretical advance in the articulation of economic theories explaining terrorist conflicts. The elaboration of Corrado's economic terrorism model is unique in that it has been adapted to explain specifically the rise and decline of the Sikh anti-state terrorism movement in Punjab. The writer is unaware of any economic theories of terrorism that have been applied to a specific case study and provided a comprehensive explanation detailing how economic conditions in a particular region influenced the rise and fall of a terrorist movement. The ability of this model to explain both the rise and fall of a terrorist conflict demonstrates its theoretical comprehensiveness in explaining how changes in specific economic variables can alter the trajectory of terrorist violence, whether it will emerge or be subdued. Having a technical and intellectual understanding of the specific factors that led to the rise and decline of anti-state terrorist violence allows for the formulation of sound polices and measures designed to prevent the outbreak of violence and, more importantly, to re-establish peace in regions where terrorist violence is active.

The present economic model has been constructed in a manner that it moves away from just examining broad negative macro-level economic indicators in a region and, instead, chooses to follow a more rigorous and detailed approach by examining the specific negative economic conditions in Punjab that directly influenced the Sikh population to participate in anti-state terrorist violence. In order to accomplish this objective, it was necessary to delve into extensive detail explaining how specific negative economic conditions came to fruition as interplay between political decisions, public policy, social conditions, and historical events. It's this depth of understanding and detail that economic theories explaining terrorist violence need to achieve in order to provide a comprehensives theoretical explanation.

The presently elaborated Corrado economic terrorism models is also progressive in its theoretical comprehensiveness, in its ability to develop a conceptual link between the deterioration of economic conditions leads to feelings of relative deprivation which subsequently can influence participation in terrorist violence. A majority of the dominant economic theoretical models of terrorism fail to make the conceptual link of how negative economic conditions influence or initiate specific psychological processes that produce increased frustration or anger which can produce the necessary motivation for individuals to participate in terrorist violence. In

the present model emphasis is given to how the extreme economic disjuncture created by the inequitable distribution of wealth and the gap between individuals' economic expectations from society and what society is capable of providing to citizens, leads to the development of negative emotions contributing to behavioural dissent (i.e., terrorism). It is imperative to have a fundamental understanding of how economic conditions influence decision making and the specific economic conditions that motivate and drive individuals to participate in terrorist violence, and this thesis has addressed this concern as it relates to Sikh anti-state terrorism in Punjab.

Regarding the generalizability of the present model to other global terrorist conflicts, the model does incorporate the necessary variables into the present hypotheses to explain the rise and decline of anti-state terrorism in primarily agrarian based economies. The present model is organized with specific emphasis given to examining the predominant role of the agricultural sector of the economy, with the industrial and tertiary sectors playing secondary roles. In terrorist conflicts where the agricultural sector plays a limited role in the overall economic well-being of society, the model may need to be modified in order to demonstrate the significance of other sectors of the economy. The benefit of the present model is its flexibility to modify a specific hypothesis based on the presence or absence of specific conditions (i.e., economic or non-economic) in relation to a particular terrorist conflict. It is more appropriate to examine each conflict individually, and this model possesses the flexibility to incorporate particular theoretical perspectives, economic explanations, and/or sub-hypotheses that are unique to a specific conflict. The ability to obtain an understanding of the specific economic or non-economic conditions that influence the rise of a terrorist movement is essential for developing an effective response and to reduce or prevent terrorist violence from occurring.

Even though this thesis involves the utilization of the Corrado model in the case study of the Punjab, it can be argued that is also applicable to other developing contexts. Clearly, since the Punjab anti-state terrorist era culminated in the end of the 20th century, it has remained relatively quiescent. There are current concerns expressed by the Indian national government about the resurgence of the Khalistani terrorist-affiliated organizations among the diaspora Sikhs in countries like Canada. More radical Gurdwaras in Canadian cities such as Surrey, B.C., obviously have members who continue to support an independent Khalistanti state in the Punjab Suba. However, to date, Canadian Security Services have not confirmed the Indian government concerns. For example, there is no visible leader in the Punjab Suba and no terrorist incidents. Again, the central propositions in the Corrado model can be seen to apply to India, generally, and Punjab, in particular.

Most importantly, the Indian economy has grown at one of the fastest rates of any country in the last 20-years. India is considered one of the BRIC (Brazil, Russia, India, China) countries because of its unprecedented growth in its gross domestic product. The Indian high-tech sector and major manufacturing, for example, Tata motors and Arcelor-Mittal, are among the largest global companies. The Punjab state is strategically located in this dynamic growth economy because of its crucial agricultural sector. The Corrado model predicts that anti-state terrorism and state terrorism will decline in this dynamic growth context. For example, in the state of Rajasthan, there were horrific communal clashes which implicated the Hindu Nationalist state government. However, because of the perceived need by the state government to attract domestic and foreign investment in its economy, state political officials have been arrested and charged for their alleged involvement in state-sponsored terrorism against Muslims. Rajasthan is now among the fastest growing state economies, with no recent incidents of ethnic- or religious-based terrorism.

In contrast, India's most populous state, Uttar Pradesh, has a long-standing Marxist anti-state guerrilla/terrorist movement based in largely inaccessible rural areas that has engaged in consistent acts of warfare and terrorism against the police and paramilitary units, as well as opposition villages. Arguably, Corrado's model as modified above in this thesis, could be applicable to this state. Uttar Pradesh is divided into large urban areas that are experiencing more dynamic economic growth and very impoverished rural areas. The economies of the latter areas have poor or non-existent physical and agricultural infrastructures, financing, education, and weak local/state political institutions. One of the key political issues is why federal and state governments have not implemented the types of policies that were so effective in the Punjab. Without such policies, the more than 30-year-old Naxalite Communist guerrilla/terrorist movement has remained undefeated militarily, in large part, because of its ability to gain recruits, logistical support, and financing from politically disaffected farmers. This state parallels the conditions evident in the ability of one of the longest-standing guerrilla/terrorist organizations currently operating, the Liberation Revolutionary Army of Colombia (FARC) in rural Colombia. Very critically, several of the key policy negotiating position taken by FARC in their current negotiations with the Colombian government is access to agricultural land, infrastructure, financing, and other resource policies related to the Green Revolution central to this thesis. Colombia, too, has experienced substantial GDP growth, with a decline of the FARC anti-state terrorism.

Beyond India, therefore, there are several additional national contexts where the revised Corrado model is applicable. Beginning in 2011, one of the most repressive state terrorist regimes, the Myanmar (Burma) military junta regime has transformed itself into a multi-party political system, albeit, still with the military in a dominant political position. Nonetheless,

apparently the key reason for this unexpected radical change is the need to develop both the urban and rural economic sectors in this impoverished country. One concern by the military regime is Myanmar's traditional fear of economic domination by China. In addition to the ideological state terrorist rationale concerning democratic and Buddhist based political movements; the military regime has been engaged in long-standing state terrorist and military acts against major ethnic minorities in its peripheral regions, including the Shan, Shin, and Karin. Again, a major negotiating position of these ethnic dominated regions is the economic development themes of the Corrado model.

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