Exploring the Environment-Development Continuum: Examining an Integrated Approach Through a Case Study of Two Villages in Tamil Nadu, India

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Abstract

Current issues abound in relation to environmental practices and impacts, as well as to socio-economic inequality and inequity. Despite inherent linkages, these two fields of focus are often conceptualized as if they are separate, and treated with a trade-off approach, in which one is placed in a position of increased importance, to the detriment of the other. Alternatively, an integrated approach offers a perspective and practice in which environmental and socio-economic factors are managed holistically. In order to engage in a critical discussion of this relationship and positive alternatives to dominant perceptions, an ethnographic case study was undertaken primarily in the Pichavaram forest region of Tamil Nadu, India. I find that previous attempts at environmental management and socio-economic development had been dealt with as separate issues, and had largely failed to achieve desired results; however, following a shift to an integrated approach in the mid-1990s, both environmental and socio-economic indicators improved, and have proven resilient following both the 2003 project end, and the 2004 Indian Ocean tsunami devastation. Thus, this study's findings support the concept that inherent linkages between environmental and socio-economic factors require an equally interlinked approach in practice, which then allows for a mutually beneficial long-term relationship.

Keywords: Environment; Development; Sustainable Development; Sustainability; Socio-economic Development; Integrated Approach; India

Dedication

This paper is dedicated to all of those who graciously allowed me into their communities and their homes, and who shared with me their experiences, insights, opinions, laughter, and fresh mangoes. *Nandri.*

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Message in Tamil and English, painted on a shed across the river from Vadakku Pichavaram.

Photo Credit: Alicia Tallack

Section 1. Introduction

1.1. Overview and Significance of the Topic

The World Bank reports that, currently, humanity "faces urgent and complex challenges", with over one billion people globally living in poverty, while "rising inequality and social exclusion" accompany rising prosperity.[1] Oxfam buttresses these claims, stating that the majority of countries have seen an increase in economic inequality over the past three decades.[2] This has resulted in the current, extreme, situation of one per cent of the global population owning 46 per cent of the world's 240.8 trillion dollars, while 50 per cent of the population owns merely 0.71 per cent of this sum; this means that the bottom 50 per cent (approximately 3.5 billion people) now owns the same amount as the world's richest 85 people.[3]

Along with increasing inter- and intra-state socio-economic disparity, recent decades have also seen a significant toll taken on the environment. The World Bank reports an estimated 5.2 million hectares of forest were lost annually between 2000 and 2010, and more than 550 billion tons of CO_2 emitted globally during this same period, which experts recognize as having already led to "increased global temperatures and more frequent and intense floods, droughts, and storm surges."[4] Further, 25 per cent of the world's agricultural land is now degraded, while 87 per cent of the world's ocean

1 The World Bank. *The World Bank Group Goals: End Extreme Poverty and Promote Shared Prosperity* (The World Bank Group, 2013), 6. http://www.worldbank.org/content/dam/Worldbank/document/WB-goals2013.pdf

2 Oxfam International. "Working for the Few: Political Capture and Economic Inequality." *Oxfam Briefing Paper - Summary.* (20 Janurary 2014), 2. http://www.oxfam.org/sites/www.oxfam.org/files/bp-working-for-few-political-capture-economic-inequality-200114-summ-en.pdf

3 Oxfam, *Working for the Few,* 2.

4 The World Bank, *World Bank Group Goals,* 30.

fisheries are either over-exploited or depleted.[5] The Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report states, "warming of the climate system is unequivocal."[6] Recent literature argues that unless States take extreme mitigative action by "swiftly and substantially" reducing greenhouse gas emissions, in conjunction with adaptation strategies such as enhancing impact-alleviating infrastructure and bio-shields, current damages, already of a severe magnitude, will likely worsen over time.[7] Coastal flood damage due to rising sea levels is anticipated to be the most costly aspect of these consequences, which is estimated at over 100 trillion USD by the year 2100.[8]

Seeing environment and development issues as linked is not novel; indeed, since the 1972 Stockholm Conference on the Human Environment, this relationship has taken on increasing significance within the political and social realm. Since that time, there has been "vigorous public debate" regarding the topic and its various facets.[9] The significance of this relationship is heightened by the continuation of problematic practices, particularly considering the trans-boundary impacts of climate change that are recognized to exacerbate existing environmental issues, while being largely unprecedented and unpredictable, and politically charged.[10] Historically, economically poorer regions have felt environmental problems disproportionately.[11] Contemporarily this holds true, with climate change embodying a culmination of global inequities,

5 The World Bank, *World Bank Group Goals,* 30.

6 Intergovernmental Panel on Climate Change (IPCC). "Summary for Policymakers." *Climate Change 2013: The Physical Science Basis.* (2013), 2. http://www.climatechange2013.org/images/report/WG1AR5_SPM_FINAL.pdf

7 Global Climate Forum. "Climate Change Threatens to Cause Trillions in Damage to World's Coasts, if Coastal Regions do not Adapt to Sea-Level Rise." *Global Climate Forum: News*. Updated 4 February 2014. www.globalclimateforum.org/index.php?id=24&no_cache=1&no_cache=1&tx_ttnews[tt_news]=54&cHash=49f58d1fb209c06cb0152a91d58afbb8

8 J. Hinkel, et al. "Coastal Flood Damage and Adaptation Costs Under 21st Century Sea-Level Rise." *PNAS Early Edition* (2013): 2. www.pnas.org/cgi/doi/10.1073/pnas.1222469111

9 J. Antle and G. Heidebrink. "Environment and Development: Theory and International Evidence." *Economic Development and Cultural Change* 43, no. 3 (1995), 603.

10 G. E. Eckstein,"Water Scarcity, Conflict, and Security in a Climate Change World:
Challenges and Opportunities for International Law and Policy," *Wisconsin International Law Journal* 27, no. 3 (2010), 416

11 J. Agyeman, Robert D. Bullard and Bob Evans, "Exploring the Nexus: Bringing Together Sustainability, Environmental Justice and Equity," *Space & Polity* 6, no. 1 (2002), 78.

resulting in what is known as a “triple inequality”, consisting of: unequal responsibility for anthropogenic interference with the climate system; unequal costs for adaptation and mitigation; and, unequal distribution of impacts.[12] When considered in relation to the aforementioned large-scale socio-economic disparity and environmental degradation, these issues show that the relationship between environment and development is one which remains highly problematic. Thus, an important opportunity to examine dominant theories and practices surrounding environment and development exists. The purpose of this study is to examine this relationship, and the dominant forms of trade-off between the two foci, while considering holistic alternatives that facilitate a win-win outcome. Through examination of a case study, which utilizes an integrated approach, the findings of this study demonstrate that through integration of environmental and socio-economic factors, a holistic solution is possible, and can lead to a long-term mutually beneficial relationship.

1.2. Research Approach

Following consideration of the complexities outlined in the literature, in order to examine the potential for, and efficacy of, an integrated approach, a qualitative study utilizing ethnographic methods was undertaken, primarily within the coastal Pichavaram region of Tamil Nadu, India. Specifically, participant-observation, along with semi-structured, open-ended group and individual interviews, were conducted with participants recruited via a third-party recruitment form, in order to capture the lived experiences of those impacted by a project with clear intentions toward an integrated approach. Key themes, and reasons for challenges and successes, were then determined in order to understand the case within the wider context of the continuum, using both theoretical perspectives discussed in the literature review as well as personal narratives discussed in the research findings. The scope of this study excludes concrete claims of transferability or general representativeness, instead providing a micro-spatial example of a combination of issues (a coastal, forest-dwelling, marginalized, and

12 J. Timmons Roberts and Bradley Parks. *A Climate of Injustice: Global Inequality, North-South Politics, and Climate Policy*. (Cambridge: MIT Press, 2007), 7.

impoverished community, impacted by a natural disaster), which occur on a larger scale around the world, and are linked to the aforementioned triple inequality. This permits an examination of and potential insight into the lives and experiences of those in similar temporal and spatial circumstances, and the possibilities created through an integrated approach.

I perceive, and therefore frame within this study, the topics of environment and development as existing on one continuum. This implies that the socio-economic foci of humans at one end, and the health of the environment at the other, are inherently linked, with the conditions (positive or negative) of one inevitably impacting the other. In common practice, there is often increased attention placed on one end of the continuum, with the expectation that a trade-off is necessary or simply acceptable; this trade-off approach results in a zero-sum game between the two, in which gains in one mean losses in the other. However, the argument of this study is that, as they are intrinsically connected, a trade-off is detrimental to both in the long run, despite potential short-term win-lose relationships. The continuum framing also implies that while either end represents an imbalanced focus, the centre embodies a balanced, or integrated, equilibrium.

This study explores the subsequent research question: can the topics of environment and development be effectively and successfully approached without a trade-off, and instead embody a positive-sum, mutually beneficial relationship through an approach integrating both issues? Thus, in order to explore this question, the overarching intention of this study is to examine what this continuum means in theory and practice, and what a case study relating to an integrated, or middle of the continuum, approach, may look like. This study contributes to the existing literature on this relationship through providing an example of an integrated approach, which resulted in a win-win relationship, and the insight offered through the lived experiences of related individuals.

1.3. Framing and Definitions

As with the exploration of any topic, it is critical to recognise the importance of framing and the ways in which the structure of an investigation can bias or predetermine the answer. It is necessary to actively interrogate the dominant narrative frameworks associated with the topic at hand; in this way, the problem is situated within the larger theoretical landscape, and the assumptions inherent in their narratives can be laid bare. To this end, the present study explicitly recognizes the subjectivity of its framing, and the extent to which the questions have been tailored to illicit a desired answer, along with the acknowledgement that potentially valuable questions, approaches, solutions, and answers may have been overlooked in the process.

It is important at this point to clarify the definitions being utilized herein, as the overarching topics lend themselves to a variety of focused discussions. In this study, the term 'environment' is associated with the Oxford Dictionary definition, which is: "The natural world, as a whole or in a particular geographical area, especially as affected by human activity."[13] This study discusses environmental stewardship such as conservation, restoration and management, and other human activity in relation to the environment so defined, and further recognises the inherent value of the environment and its health. The frequently debated term 'development' refers to a wide range of processes emphasized in conventional socio-economic theories, policies, and practices. Pearce, Markandya, and Barbier define development simply as "some set of desirable goals or objectives for society";[14] however, it is often the motivation behind certain goals and objectives, how they are determined, by whom, and the ways in which implementation is attempted that is hotly debated. The final key aspect of the continuum is the integrated middle ground area; 'sustainable development' is contemporarily the most commonly associated term for this broad region of the development-environment continuum, with the most widely accepted definition coming from the Brundtland Commission's (formerly World Commission on Environment and Development) seminal 1987 report Our Common

13 Oxford Dictionaries, "Environment," *Oxford University Press.* Accessed 10 March 2014, http://www.oxforddictionaries.com/definition/english/environment

14 David Pearce, Anil Markandya, and Edward Barbier. *Blueprint for a Green Economy*. (London: Earthscan Publications Ltd., 1989), 1.

Future (also known as the Brundtland Report).[15] The given definition states that "[s]ustainable development seeks to meet the needs and aspirations of the present without compromising the ability to meet those of the future."[16] However, in practice this concept is widened, narrowed, and further complicated by numerous and often conflicting interpretations, critiques, and challenges.

In sum, this study utilizes the term environment to refer to the natural world and human interactions with it, while development represents the conventionally highlighted socio-economic processes of improving human wellbeing. An integrated perspective falls between these two poles, wherein the inherent linkages between environment and development are recognized and incorporated into both theory and practice.

The sections of this study are as follows: Section II provides an overview of key aspects of dominant literature along this continuum; Section III delves into the context and approach found in the central case study; Section IV provides details regarding the methodology utilized; Section V provides research findings of two villages; Section VI reflects upon the findings, and discusses limitations, results, transferability, and implications, and; Section VII concludes with an overview of this study's contribution, as well as future research recommendations.

15 World Commission on Environment and Development (WCED). *Report: Our Common Future,* 1987.
http://www.un-documents.net/our-common-future.pdf
16 WCED, *Our Common Future,* Para. 49.

Section 2. Literature Review

In order to engage with the continuum of environmental and developmental perspectives, a review of key literature will follow, encompassing select dominant theories and implications associated with three stylized points along the continuum. Perceiving the fields of environment and development as existing on one continuum allows this study flexibility in terms of which points along the continuum are brought into focus. This study does not aim to include all perspectives on these broad topics; instead, it offers an overview of key points of thought, in order to examine theories and assumptions in relation to their implications in practice. These three points include an emphasis on environment, emphasis on socio-economic development, and an integrated approach.

2.1. Environment

Bill Devall argued in 1980 that the latter half of the twentieth century had seen two dominant streams of environmentalism, a reformist focus on conservation and controlling degradation, and one that he argued is supportive of reformist goals while also being "revolutionary" in its ethical focus.[17] The latter, known as 'deep ecology', was argued to be revolutionary due to its critique of dominant socio-economic paradigms within which reformist environmentalism sought to work, such as limitless economic growth, or growth at any cost.[18] Arne Næss coined the term 'deep ecology' in 1973, and conceived this theory in contrast to reformist tactics, which he referred to as 'shallow ecology', and which he saw as being centrally concerned with the health of the environment and natural resources solely for the benefit of humans; specifically, he viewed the focus of 'shallow ecology' to be "the health and affluence of people in the

17 B. Devall. "The Deep Ecology Movement." *Natural Resources Journal* 20 (1980), 299.
18 Devall, *Deep Ecology Movement*, 299.

developed countries." [19] Næss cited Rachel Carson's popular 1962 book *Silent Spring*, along with the philosophical teachings of Baruch Spinoza, as fundamentally guiding his perspective on the topic.[20] This philosophy is argued to go "beyond a limited piecemeal shallow approach to environmental problems," and "attempts to articulate a comprehensive religious and philosophical worldview," in contrast with the dominant worldview which frames humans as fundamentally superior to, in charge of, and dominant over, the rest of Nature.[21] The concept of needing to shed the paradigm of human dominance gained further mainstream recognition through Daniel Quinn's 1992 novel *Ishmael* which, like Carson's *Silent Spring,* discussed in other words what Næss termed 'biospherical egalitarianism', or the concept of humans not being above any other part of Nature, but instead equal to all other parts as they are to each other.[22]

Arguably, due to deep ecology having strong philosophical, specifically metaphysical, roots, in practice numerous critiques arise, often through individual interpretation of the concept's vague implications surrounding an emphasis on the intrinsic over instrumental value of Nature. Ironically, deep ecology has been critiqued both for romanticizing the notion of non-technological societies and cultures,[23] while also being used as justification for similar communities either being literally pushed aside in favour of conservation, or simply losing access to the source of the livelihood upon which they depend.[24] This issue is illustrated in the following case study, demonstrating a win-lose relationship between environment and development, as marginalized, resource-dependent communities suffered through government attempts at environmental conservation.

19 A. Næss. "The Shallow and the Deep, Long-Range Ecology Movement." *Inquiry* 16, no. 1 (1973), 95. http://www.ecology.ethz.ch/education/Readings_stuff/Naess_1973.pdf

20 A. Næss. "Spinoza and ecology." *Philosophia* 7 (1977): 45–54. doi:10.1007/BF0237999

21 Bill Devall and George Sessions. "Chapter 38: Deep Ecology" In *Technology and Values: Essential Readings,* edited by Craig Hanks. (United Kingdom: Blackwell Publishing, 2010): 454

22 Næss, The Shallow and the Deep, 95.

23 W. Grey. "A Critique of Deep Ecology." *Journal of Applied Philosophy* 3, no. 3 (1986).

24 T. Reardon. "Links Between Rural Poverty and the Environment in Developing Countries: Asset Categories and Investment." *World Development* 23, no. 9 (1995), 1504. http://www.sciencedirect.com/science/article/pii/0305750X9500061G

Claiming roots in deep ecology, but going beyond the notion of biospherical egalitarianism to potential misanthropy, lies 'deep green resistance', a more recent and highly controversial concept put forth in the 2011 book *Deep Green Resistance: Strategy to Save the Planet.* The authors argue that this strategy is "about fighting back", through putting "our bodies and our lives between the industrial system and life on this planet" in order to completely eradicate industrial civilization in favour of non-technological, small-scale, egalitarian communities.[25] Like deep ecology, this has been critiqued for romanticizing what tend to be marginalized communities; however it is additionally criticized for proposing violent action to achieve extremist ends.

While deep ecology and deep green resistance seek to dispel the idea that humans should, or even truly can, control Nature, a further debated perspective known as 'environmental determinism' focuses on the ways in which Nature controls and shapes human activity; specifically, the ways in which physical geography determines, forms, or limits socio-economic development. Hrebiniak and Joyce discuss environmental determinism in relation to strategic choice, noting that these are often framed as "mutually exclusive, competing explanations of organizational adaptation."[26] They argue that these two perspectives should instead be seen as interacting in various ways, ranging from minimum choice (natural selection), to strategic choice ("adaptation by design").[27] Richard Peet argued in 1985 that environmental determinism, already a controversial topic for decades prior, could be seen as an environmental form of Social Darwinism, and a "quasi-scientific form [of] racism."[28]

Yet, more recently environmental determinism has still underpinned academic and mainstream perspectives advocate underlying environmental factors over decades of strategic choice in explaining current inequalities. For example, Acemoglu, Johnson, and Robinson argued in 2001 that disease environments encountered by colonialists are

25 Aric McBay, Lierre Keith, and Derrick Jensen. *Deep Green Resistance: Strategy to Save the Planet*. (New York: Seven Stories Press, 2011), Preface p.3.

26 L. Hrebiniak and W. Joyce. "Organizational Adaptation: Strategic Choice and Environmental Determinism." *Administrative Science Quarterly* 30, no. 3 (1985), 336.

27 Hrebiniak and Joyce, *Organizational Adaptation*, 336.

28 R. Peet. "The Social Origins of Environmental Determinism." *Association of American Geographers* 75, no. 3 (1985), 309.

directly linked to current income levels, as historical mortality rates determined the form of colonial institutions which attained in different geographic locations. Locations with low disease-related mortality rates resulted in settler institutions and higher modern incomes, as was the case in Australia, Canada, New Zealand, and the United States, whereas locations with high disease-related mortality rates developed extractive colonial institutions and low modern incomes, as was the case in much of Sub-Saharan-Africa.[29] Similarly, Engerman and Sokoloff argued in 1994 that initial factor endowments, such as soil, climate, and indigenous population size, led to the development of certain types of institutions, which are now linked to levels of poverty and wealth throughout the Americas.[30] These arguments (and numerous other similar contributions falling within the geography versus institutions debate among development scholars) relate to what Peet meant when comparing environmental determinism to Social Darwinist ideology, as it provides "a naturalistic explanation of which societies were fittest in the imperial struggle for world domination."[31]

While it is important to recognize the role that geography plays, it is also essential to recognize anthropogenic influence, social processes, and strategic choices (that can to some extent be guided by environmental factors) which can serve to naturalize contemporary socio-economic situations. Failure to do this can result in framing the question of inequality as one in which poverty and wealth are natural, determined not by human construction or strategic choice but solely by Nature itself. This can de-politicize what otherwise may be seen, and therefore dealt with, as socio-political issues formed through human influence, thus taking away responsibility, accountability, and important inter-regional linkages. Both academic literature and the mainstream paradigm reflect this, with an example being seen following the November 2013 Super-Typhoon Haiyan, also known as Typhoon Yolanda. This was one of the most powerful typhoons in recorded history, impacting several parts of Southeast Asia,

29 D. Acemoglu, S. Johnson, and J. Robinson. "The Colonial Origins of Comparative Development: an Empirical Investigation." T*he American Economic Review* 91, no. 5 (2001).

30 S. Engerman, and K. Sokoloff. "Factor Endowments, Institutions, and Differential Paths of Growth Among New World Economies: A View from Economic Historians of the United States." *NBER Working Pape*r 6 (1994).

31 Peet, *Social Origins*, 310

but the Philippines most drastically, and affecting approximately 14 million people, killing over 6000 people, and displacing an estimated 4.4 million people.[32] Typhoon Haiyan struck days prior to the 2013 United Nations Climate Change Conference in Poland; yet despite the linkage of the typhoon and climate change, numerous mainstream news sources reported an environmental determinist viewpoint, with headlines such as "Doomed by geography, Philippines is no stranger to major storms"[33], "Doomed by geography"[34], and "Geographically doomed and hobbled by poverty, Philippines buffeted by regular storms"[35].

As discussed in the aforementioned concept of 'triple inequality', it is true that certain places are geographically prone to natural disasters, and thus an unequal distribution of impacts; however, what these news stories disregard are the other two inequalities, including an unequal responsibility for anthropogenic interference with the climate system which exacerbates natural disasters, and unequal costs for mitigation and adaptation.[36] The framing of this discussion takes human agency out of the situation, leaving the issue as one in which Nature controls and determines socio-economic context despite other variables. As Clint Ballinger recently argued, environmental factors are an "indispensable part of explanation, playing a special role that has not been properly understood", particularly in the realm of development studies, and therefore

32 Oxfam International. *Philippines Typhoon Haiyan*. Updated 4 February 2014. http://www.oxfam.org/en/emergencies/typhoon-haiyan

33 CTV News. "Doomed by Geography, Phillippines is no Stranger to Major Storms." *The Associated Press.* Updated 10 November 2013. http://www.ctvnews.ca/world/doomed-by-geography-philippines-is-no-stranger-to-major-storms-1.1536059

34 Hindustan Times, Mumbai. *"Doomed by Geography."* Updated 11 November 2013.
http://paper.hindustantimes.com/epaper/viewer.aspx?issue=873320131111000000000001001&page=3&article=fa0b1bb5-bb99-44d2-856c-b715edeebb43&key=Sgcb8TM0gtfIWqlcde6dLA==&feed=rss

35 Fox News. *"Geographically Doomed and Hobbled by Poverty, Philippines Buffeted by Regular Storms".* Updated 10 November 2013. http://www.foxnews.com/world/2013/11/10/geographically-doomed-and-hobbled-by-poverty-philippines-buffeted-by-regular/

36 Roberts and Parks, Climate of Injustice, 7.

must be taken within the context of human action and choice in order for a practical approach to answer the right question.[37]

2.2. Development

The development end of the continuum largely entails approaches focused on the generation and accumulation of economic capital. Despite the increasingly widespread acknowledgement of the "fundamental importance" of incorporating environmental considerations into development planning, most economists "are surprisingly untrained" in this imperative relationship.[38] Over the past two decades, a debate in the literature relates this disconnect to the perception that environment and development inherently involve a trade-off, in which degradation occurs in the name of development until a point has been reached in which development can then contribute to restoration and management either through shifting incentive structures that place more value on healthier environments and alter behaviour or through technological fixes.[39] The Environmental Kuznets Curve (EKC) embodies this underpinning paradigm, thus offering a useful place to focus within this continuum.

The EKC posits an inverted-U relationship between environmental indicators and income per capita, illustrating the idea that environmental degradation first increases with rises in income, then declines in relation to income levels. In the short-run, the EKC acknowledges that costs to the environment are substantial, while in the long-run, following the expected peak, the environment begins to recover, or be re-invested in. This implies not only that economic growth does not ultimately threaten environmental sustainability and "that there are no environmental limits to growth", but also that growth

37 C. Ballinger. "Why Geographic Factors are Necessary in Development Studies." *MPRA Paper* No. 29750 (2011), 1.

38 Jeffrey Sachs, *The End of Poverty: Economic Possibilities for our Time* (USA: Penguin Press, 2005), 31.

39 S. Dinda. "Environmental Kuznets Curve Hypothesis: A Survey." *Ecological Economics* 49, no. 4 (2004), 432.

could actually be the solution to degradation.[40] This concept is in direct disagreement with the influential 1972 Club of Rome study *Limits to Growth*, which outlined substantial concerns regarding unlimited growth in combination with Earth's finite resources.[41] The EKC theory was first discussed in three major studies in the early 1990s: Grossman and Krueger's 1991 NBER working paper on the environmental impacts of NAFTA, which first noted the similarity between their findings of an inverted-U relationship between pollutants (SO_2 and smoke) and income per capita, as well as Kuznet's inverted-U relationship between income inequality and economic development;[42] the World Bank's 1992 World Development Report, which popularized the concept that increased economic activity would benefit the environment in the long-run;[43] and, the International Labour Organization's 1993 Development Discussion paper,[44] which first coined the term Environmental Kuznets Curve.[45]

The EKC has been widely critiqued for perpetuating a mentality of "business as usual", while being econometrically weak.[46] It is true that production of certain pollutants has been found to increase with development then decline once income per capita reaches a range of $5000 to $8000; however, this relationship does not hold true for all pollutants nor in all places over time, and has been challenged "both as a representation

40 D. Stern, M. Common, and E. Barbier. "Economic Growth and Environmental Degradation: The Environmental Kuznets Curve and Sustainable Development." *World Development* 24, no. 7 (1996), 1151-1152.

41 Donella H. Meadows, Dennis, L. Meadows, Jorgen Randers, and William Behrens. *The Limits to Growth*. (New York: Universe Books, 1972).

42 G. Grossman, and A. Krueger. "Environmental Impacts of a North American Free Trade Agreement. National Bureau of Economic Research." *NBER Working Paper* 3914 (1991). http://www.nber.org/papers/w3914

43 N. Shafik and S Bandyopadhyay. "Economic Growth and Environmental Quality: Time Series and Cross-Country Evidence." *Background Paper for the World Development Report,* The World Bank. (1992): http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/1992/06/01/000009265_3961003013329/Rendered/PDF/multi_page.pdf

44 T. Panayotou. "Empirical tests and policy analysis of environmental degradation at different stages of economic development." *ILO Working Papers* (1993): http://www.ilo.org/public/libdoc/ilo/1993/93B09_31_engl.pdf

45 Dinda, *Environmental Kuznets Curve Hypothesis*, 433-434.

46 D. Stern, "The Rise and Fall of the Environmental Kuznets Curve." *World Development* 32, no. 8 (2004), 1419.

of what actually happens in the development process, and as a policy prescription."[47] As shown by Stern, this relationship does not hold true for other environmental indicators; Stern's diagnostic statistical and specification tests found that the EKC was no longer an inverted-U, but rather a "monotonically rising" relationship between "emissions of most pollutants and flows of waste" and income.[48]

Similar to the ways in which perspectives on the environment end of the continuum are often true to a certain extent, but can be problematic in extreme form (such as the valid need for conservation resulting in marginalizing resource-dependent communities), this is also true of the EKC theory. This theory becomes problematic when used to legitimize ideas that go beyond expecting a small amount of degradation that can effectively be restored over time with rising income. For example, the EKC underpins the belief that "environmental degradation is a necessary outcome of economic growth"[49], and that in turn, economic growth is "a precondition for environmental improvement."[50] Beckerman elaborates, and posits that despite economic growth commonly leading to environmental degradation, "in the end the best – and probably the only – way to attain a decent environment in most countries is to become rich."[51] This conceptualizes development in a linear and deterministic fashion, in which increasing income is the sole desired path, and issues related to social, environmental, political, or other externalities are not given credence. Further, there is the ideological implication of degradation being justifiable, since in this view further economic development acts as a solution to environmental problems. Andreoni and Levinson elaborate on this, stating that many scholars and practitioners "have appealed to this

47 S. Dasgupta, B. Laplante, H. Wang, and D. Wheeler. "Confronting the Environmental Kuznets Curve." *Journal of Economic Perspectives* 16, no. 1 (2002), 147.

48 Stern, *Environmental Kuznets Curve,* 1420.

49 Antle and Heidebrink, *Environment and Development,* 603.

50 Dinda, *Environmental Kuznets Curve Hypothesis*, 433.

51 W. Beckerman. "Economic Growth and the Environment: Whose Growth? Whose Environment?" *World Development* 20, (1992), 491.

empirical relationship to argue that economic growth by itself is a panacea for environmental degradation." [52]

Andreoni and Levinson note two related problems with this position. The first problem is that "pollution-exporting" can contribute to a downward slope of the inverted-U relationship, resulting in the process of environmental improvement not being indefinitely replicable, as it relies on always having "even poorer countries to which they can export their pollution."[53] This means that, globally, the curve would not slope downward, as degradation becomes exported to other regions. The second problem is the "irreversible nature of many pollution problems" and other environmental indicators.[54] This is critical, as expounded by Lenton et al., as tipping points can be reached when "components of the Earth system [are pushed] past critical states into qualitatively different modes of operation", and result in large-scale and long-term consequences for human and ecological systems.[55] Thus, the assumption that environmentally degrading development will eventually lead to reductions in environmental harm is dangerous considering the pollution-exporting tendencies of multi-national corporations, as well as the delicate workings of ecological systems and their potential tipping points.

Further, the EKC provides a problematic perspective on those experiencing economic impoverishment, as "poor/rural people have been identified as agents of destruction, responsible for deforestation and desertification on the globe."[56] This perspective disregards the historical imbalance in responsibility for anthropogenic interference in the climate system, and "presents a rather deterministic view of the relationship between poverty and the environment, revolving around the negative impact

52 J. Andreoni, and A. Levinson. "The Simple Analytics of the Environmental Kuznets Curve." *Journal of Public Economics* 80 (2001), 2 http://econweb.ucsd.edu/~jandreoni/Publications/JPubEKuznets.pdf

53 Andreoni and Levinson, *Simple Analytics,* 2-4.

54 Andreoni and Levinson, *Simple Analytics,* 2-4.

55 T. Lenton, H. Held, E. Kriegler, J. Hall, W. Lucht, S. Rahmstorf, and H. Schellnhuber. "Tipping Elements in the Earth's Climate System." *PNAS* 105, no. 6. (2007), 1786.

56 Wolfgang Sachs. "Environment." In *The Development Dictionary: A Guide to Knowledge as Power,* edited by Wolfgang Sachs, 26-37. (London: Zed Books, 1995), 29.

of the poor."[57] As Robin Broad argues, and as is seen in the following case study, people can move from being perceived as 'agents of destruction', to "not only positive agents vis-à-vis the environment, but environmental activists", and that this can happen not due to restoration being a push from the rich (as the EKC suggests) but from within that community itself as they face the impacts of degradation.[58] Moreover, the EKC theory can imply that impoverished communities have no choice but to degrade their environment, when in fact traditional environmental knowledge held by various communities is something to be respected, understood, and valued due to its insight and usefulness toward holistic wellbeing.[59] At the risk of romanticizing certain communities, it is important to note that a base level of income is not always a valid or necessary solution to improved practices, as there are many cases of economically 'impoverished' communities (those with an income per capita near or below the cited range of $5000 to $8000 needed to reduce degrading practices) living sustainably both environmentally and socio-economically.[60]

The EKC theory also arguably underpins the mainstream, fear-based, idea that societies "must choose between a healthy environment and a strong economy".[61] Innumerable mainstream blogs and websites discuss whether the environment or the economy (framed as the need for jobs in some countries, and the need for poverty reduction in others) should take precedence, and all result in perpetuating what an integrated perspective would deem to be a false dichotomy.

57 R. Broad. "The Poor and the Environment: Friends or Foes?" *World Development* 22 No. 6 (1994), 811.

58 Broad, *The Poor and the Environment,* 818.

59 Martha Johnson, ed. *Lore: Capturing Traditional Environmental Knowledge.* (NWT, CA: Dene Cultural Institute, 1992).

60 An example of this is embodied in the traditional satoyama practice in Japan, wherein socio-economic activities are intentionally aligned with natural resource processes. Satoyama as a concept refers to "harmonious human-nature interactions" which have been seen to "sustain landscapes over prolonged periods". See section 1.3 of the *Satoyama Initiative*: http://satoyama-initiative.org/en/about/#1.3

61 Page, D., and I. Davidson. "Pitting the Environment Against the Economy is Bad Business, Bad Politics." *Ecojustice: Blog.* Updated 31 December 2012. http://www.ecojustice.ca/blog/pitting-the-environment-against-the-economy-is-bad-business-bad-politics

All of these issues with the EKC are important, as they contribute to how development occurs in practice and how it is measured, with a resulting focus on economic capital and related indicators, over other forms of capital such as social, human, natural, physical, and cultural.[62] Development ideology has often followed the concept that the majority of people would benefit from a "trickle-down" effect resulting from growth in overall and per-capita Gross National Income (GNI) or Gross Domestic Product (GDP).[63] The merit of the trickle-down effect has been challenged through the reality of growing economic disparity despite overall increased economic gains.[64] This "growth without development" highlights a major flaw in the traditional approach, as an increase in growth does not necessarily reflect how that growth will be used, thus compromising the likelihood of the trickle-down effect occurring, and resulting in policies being made with false expectations.[65] Loss of biodiversity, increased health issues, or even loss of spiritual space can be accounted for as positive economic growth.[66] Thus, economic indicators alone are argued to be "inadequate" as all measurable production is considered in the same way, while not reflecting from where growth arises, or what was sacrificed for it to be achieved.[67]

Amartya Sen argues that economic indicators can be significant means in contributing to the end goal of development (which for Sen is defined by the expansion of freedoms and capabilities), but through the practice of these means becoming the dominant focus, economic growth has often become the end goal in itself.[68] The Human Development Index (HDI), first published in 1990 by the Human Development Report

62 Mark Roseland. *Toward Sustainable Communities: Resources for Citizens and their Governments.* (Canada: New Society Publishers, 2005), 12-13.

63 Michael P. Todaro and Stephen C. Smith, *Economic Development,* 10th ed. (Boston: Pearson Addison Wesley, 2009), 14.

64 Todaro and Smith, *Economic Development,* 51.

65 Todaro and Smith, *Economic Development,* 51.

66 An example of this is the destruction of forests in which religious ceremonies take place (i.e., worship of trees believed to contain ancestral spirits), which is reflected positively in terms of economic growth, but is clearly negative for those losing spiritual, cultural, and social, space. See M.G. Chandrakanth and J. Romm, "Sacred Forests, Secular Forest Policies and People's Actions." *Natural Resources Journal* no. 31 (1991), 741.

67 Michael Redclift, *Sustainable Development: Exploring the Contradictions.* (London: Methuan & Co., 1987), 16.

68 Amartya Sen, *Development As Freedom* (New York: Anchor Books, 2001), 53.

(HDR), was created in an attempt to embody Sen's perspective of development through three key indicators: health (life expectancy), education (adult literacy and primary, secondary, and tertiary enrolment), and GNI per capita (measured by purchasing power parity income).[69] While the HDI is rooted in an idea of development as freedom, and certainly provides a "powerful alternative" to traditional economic indicators, it also has clear limitations.[70] It fails to include numerous aspects of development that are central to freedom: employment (availability and accessibility), political freedoms and participation, freedom to experience and enjoy cultural diversity, freedom from violence and insecurity, freedom from gender- or racially-based inequalities, and – most pertinent to this study - freedom to experience and enjoy biodiversity and environmental security. Nor is it adjusted for distribution across individuals and groups. The HDR strives for inclusivity, and accounts for inequality-adjusted HDI, the gender-inequality index, and the multidimensional poverty index; however, many aspects of freedom, such as human rights, democracy, and any sustainability indicators, are still lacking.[71]

Pearce, Markandya, and Barbier argued that "environmental problems are often treated as if they are some minor deviation in the working of an economic system. But the most essential feature about environments is that their workings are pervasive in the economic system."[72] As such, it is important for socio-economic development choices to be understood in relation to environmental factors temporally and spatially, in order to dispel the problematic and inaccurate notion of a dichotomous relationship.

2.3. Integrated Perspective

The middle of the continuum signifies a point of integration of the environment and development perspectives. As each aforementioned end of the continuum

69 United Nations Development Programme (UNDP). "Beyond Scarcity: Power, Poverty and the Global Water Crisis." *Human Development Report* (2006), 263, http://hdr.undp.org/en/media/HDR06-complete.pdf, 263.

70 United Nations Development Programme (UNDP). "*Human Development Reports: Human Development Index."* Accessed 3 February 2014, Para 18. http://hdr.undp.org/en/statistics/hdi/

71 UNDP, *Beyond Scarcity,* 263.

72 Pearce, Markandya, and Barbier, *Blueprint for a Green Economy*, 9-10.

essentially emphasizes one end over the other, and can result in problematic trade-offs between the two, an integrated perspective seeks to engage both as equals; however, it too entails challenges that can be problematic in practice. Contemporarily, the dominant integrated perspective - 'sustainable development' - "reflects and evokes a latent shift in our vision of how the economic activities of human beings are related to the natural world" and involves "replacing the economic norm of quantitative expansion with that of qualitative improvement."[73] Sustainable development as a concept has become pervasive over the past two decades, yet the term has been criticized as being "dangerously vague", and there is significant disagreement as to what exactly it means, and how exactly it should look in practice.[74] Indeed, over 80 different, "often competing and sometimes contradictory" definitions have been identified in this "rapidly expanding field."[75] Thus, key viewpoints on sustainable development theory, practice, and challenges, and how they pertain to an integrated approach, provide a useful place within the continuum on which to focus.

The Brundtland Report states that the *"[e]nvironment and development are not separate challenges; they are inexorably linked. Development cannot subsist upon a deteriorating environmental resource base; the environment cannot be protected when growth leaves out of account the costs of environmental destruction. These problems cannot be treated separately by fragmented institutions and policies. They are linked in a complex system of cause and effect."*[76] The Report posits that sustainable development provides "a framework for the integration of environment policies and development strategies", and that despite 'development' often referring only to low-income countries, this is pertinent in all countries. [77] This definition argues that instead of counter-posing the issues, they must instead be juxtaposed; this includes unifying environmental and socio-economic issues, as well as intra-generational inequalities and inequities.

73 Herman Daly, *Beyond Growth: The Economics of Sustainable Development* (Boston: Beacon Press, 1996), 1.

74 Daly, *Beyond Growth*, 1.

75 C. Williams and A. Millington. "The Diverse and Contested Meanings of Sustainable Development." *The Geographical Journal* 170, no. 2 (2004), 99.

76 WCED, *Our Common Future*, Para. 40.

77 WCED, *Our Common Future*, Para 48.

Watts and McCarthy have critiqued sustainable development from the perspective of power relations and dynamics, arguing that the global focus of sustainable development discourse draws attention away from underlying interests and issues, thus "sustainable development emerges then to save the global eco-system according to a perception of those who rule it."[78] Redclift has argued that sustainable development is often prescribed to "the context of developing countries sustainability, without attention given to the international structures within which such countries are located."[79] This relates to the criticism of sustainable development as a form of 'shallow ecology', in which humans and Nature are placed hierarchically, with an objective of being concerned with Nature insofar as its degradation adversely impacts the lives of humans. Arguably even then, it is concerned with only the lives of those in "the developed countries",[80] as the dominant discourse of sustainable development does not acknowledge the underlying Western ideologies regarding Nature which created, and continue to exacerbate, environmental crises.[81] Considering these issues, Anand and Sen argued in 1994 for the alternative concept of 'sustainable human development', positing that since the guaranteeing of inter-generational resource equality is the central pillar of contemporary environmental arguments, sustainable development can "overlook the pressing claims of the less privileged today", and that we must not "ignore the deprived people today in trying to prevent deprivation in the future."[82]

Further criticism has arisen in relation to the statement that "[f]ar from requiring the cessation of economic growth", sustainable development requires "a new era of growth", in which developing countries in particular "reap large benefits."[83] While this lends itself to the concept of differentiated responsibilities and outcomes, it has sparked

78 Michael Watts and James McCarthy. "Nature as Artifice, Nature as Artefact: Development, Environment and Modernity in the Late Twentieth Century." In *Geographies of Economies,* edited by R. Lee and J. Wills (London: Arnold, 1997), 75.

79 Redclift, *Sustainable Development,* 17.

80 Næss, *The Shallow and the Deep,* 95.

81 M. Jacob. "Sustainable Development and Deep Ecology: An Analysis of Competing Traditions." *Environmental Management* 18, no. 4 (1994), 478. http://link.springer.com/article/10.1007/BF02400853

82 S. Anand and A. Sen. "Sustainable Human Development: Concepts and Priorities." *Human Development Occasional Papers* (1994), 2.

83 WCED, *Our Common Future*, Para. 49.

criticism from those perceiving the term sustainable development to fundamentally be an oxymoron, and who instead ascribe to the 'de-growth' philosophy, which proposes that throughput cannot be reduced through economic growth, and a "smaller and qualitatively different economy" is necessary.[84] Herman Daly has discussed sustainable development in relation to the alternative concept of steady-state economics, which relates to the Club of Rome report *Limits to Growth*, and the recognition of a paradox found in unlimited growth on a finite planet. Daly argued that for sustainability to be long-term, there must be a transition to a steady-state economy, in which physical "throughput" (matter and energy used throughout all stages of production and consumption) are maintained at a certain level;[85] this is in specific contrast with the dominant "regime of economic growthmania."[86]

Debate surrounds sustainable development in practice in numerous ways, with particularly challenging dispute being found in national commitments to (and definitions of) sustainability indicators. This is seen during every Conference of the Parties (COP) meeting to the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC was first negotiated at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit, in 1992, and was entered into force on 21 March 1994 with 187 (now 192) signatory states.[87] While the aforementioned EKC theory posits that economic indicators should be placed in priority over environmental indicators, developing states have argued that placing limitations and the burden of sustainability on them, while they are not the ones historically responsible for anthropogenic interference in the climate system, can be seen as reversing this trade-off and placing environmental indicators in priority, to the detriment of developing countries. However, the UNFCCC states that a key element is that of protecting the climate system on the basis of "equity and of common but differentiated

84 G. Kallis. *In Defense of Degrowth. Ecological Economics* 70. (2011), 874.

85 Herman Daly. *Steady-State Economics*, 2nd edition. (Washington, DC: Island Press, 1991), 17.

86 Daly, *Steady-State Economics*, 183.

87 United Nations Framework Convention on Climate Change (UNFCCC), *Handbook*, 2006. http://unfccc.int/resource/docs/publications/handbook.pdf

responsibilities", due to the differing contributions to global environmental degradation. [88] Yet varied "political and economic forces", as well as underpinning worldviews, have led to challenges within practices to this common goal.[89] Roberts and Parks have argued that the language of 'common but differentiated responsibilities' simply masks "profound disagreement on the issue of actual obligations", notably stemming from the countries historically responsible for greenhouse-gas emissions.[90]

Often, even those who frame their position as one in which environment and development should be looked at concurrently in theory can be seen as failing to shake off the idea that one must be placed in priority over the other in practice. For example, the World Bank, which as mentioned is known for having popularized the concept in the early 1990s that degradation is justified through growth acting as the means to subsequent improvements,[91] has in the past decade tried to "reinvent itself as the global climate crusader."[92] The World Bank now states that economic growth has "too often come at the expense of the environment and poor communities" and claims to have a goal of all growth occurring through sustainable practices.[93] Yet, the World Bank has gained widespread criticism from the Institute for Policy Studies, among many others, for continuing "to be among the world's largest multilateral financiers of greenhouse-gas-emitting projects" globally, illustrating a significant rift between their theoretical rhetoric and their practical approach.[94]

The integration of socio-economic development and environmental stewardship in practice faces significant challenges, particularly on the international stage; however, numerous arguments have been made that it is both necessary (due to inherent

88 UNFCCC, *Handbook*, 23.

89 Redclift, *Sustainable Development*, 21.

90 Roberts and Parks, *Climate of Injustice,* 3.

91 Stern, *Environmental Kuznets Curve,* 1419.

92 Redman, J. "Brilliant Plans to Destroy the Planet: The World Bank Tackles Climate Change." *Institute for Policy Studies: Op-Ed.* Updated 11 July 2008: Para 7. http://www.ips-dc.org/articles/brilliant_plans_to_destroy_the_planet_the_world_bank_tackles_climate_change

93 The World Bank. *Sustainable Development Overview: Context.* The World Bank Group, 2014. http://www.worldbank.org/en/topic/sustainabledevelopment/overview

94 Redman, *Brilliant Plans,* Para 7.

linkages, as well as pressing climate issues) and feasible. [95] Considering the environmental and developmental tribulations facing the contemporary world, and the challenges associated with the concept of sustainable development, the feasibility of a win-win relationship through an integrated approach provides an interesting question. The MS Swaminathan Research Foundation (MSSRF) offers a useful case study in this regard, as they have worked toward an integrated approach to contextual issues within India, particularly in their Joint Mangrove Management (JMM) project, deemed to be "visionary" in its holistic framework.[96] Considering the variety of theories, approaches, and challenges associated with all points along the continuum, delving into an integrated approach offers insight into the opportunities associated with utilizing a cohesive perspective, and perhaps most interestingly, the reality of the associated lived experiences.

95 Pearce, Markandya, and Barbier, *Blueprint for a Green Economy,* xiv.

96 Prakash Rao. "Building Climate Resilience in Coastal Ecosystems in India: Cases and Trends in Adaptation Practices." In *Climate Change and Disaster Risk Management*, edited by Walter Leal Filho, (London: Springer, 2013), 344.

Section 3. Case Study

3.1. Context

Countless factors have contributed to the environmental and developmental landscape of India, yet it has been argued that in regard to environmental change specifically, over the last 200 years the degree of change would be "difficult to overstate". The result of these changes, attributed to industrial expansion, population increase, intensive agriculture, and resource-intensive state development policies, has been severe degradation or depletion of natural resources.[97] More recently, climate change has begun to play an increasing role in impacting natural resources upon which many people directly rely. This is particularly true of the coastal region of India, which is "perhaps one of the [country's] most productive and ecologically diverse landscapes", and covers over 7,500 km of coastline.[98]

While certain voices are dominant in related decision-making, other voices are markedly not. Throughout the "official discourse of development", the "voice and agency of rural people, women, and forest dwellers […] is often lost."[99] This case study therefore aims to provide micro-spatial insight into the lived experience of those whose voices are systematically 'lost', within the context of a country whose environment-development relationship is fundamentally linked to its overarching changes in the past two centuries. That is not to suggest that this situation is unique, however, as the voices of marginalized people being lost, while environmental and developmental changes drastically alter the context within which they exist, has certainly not been restricted to India alone.

97 S. Sinha. "The 'New Traditionalist' Discourse of Indian Environmentalism." *The Journal of Peasant Studies 24,* no. 3 (1997), 65.

98 Rao, *Building Climate Resilience*, 337.

99 Sinha, *New Traditionalist,* 66.

The specific context of this study is interesting in three ways, particularly considering the multifarious issues outlined in Section 1.1 and throughout Section 2. First, the Pichavaram region of the coastal areas of the south-eastern state of Tamil Nadu, India, offers a clear example of traditionally marginalized peoples directly experiencing both environmental and developmental issues. Second, this case illustrates an integrated approach to the issues, through a project entitled Joint Mangrove Management (JMM). This was undertaken by the aforementioned MS Swaminathan Research Foundation (MSSRF) between 1996 and 2003, and was implemented in six sites within three states in east India; however, MSSRF has not conducted any follow-up data collection regarding socio-economic impacts subsequent to the 2003 project end date. Third, this case includes an added dimension that relates to the 'triple inequality' issue, due to the 26 December 2004 Indian Ocean tsunami that greatly impacted this coastline, among others, following the end of the JMM project. Thus, primary research into the current situation allows a unique look into a longer-term, post-project and post-disaster context, and the resiliency of an integrated approach in a socially and environmentally vulnerable region, through personal narratives of those directly involved.

3.2. Tsunami Impacts

The 2004 Indian Ocean tsunami was triggered by the Sumatra-Andaman earthquake, is widely considered to be one of the most deadly natural disasters in recorded history, and is argued to be the world's "first truly global" natural disaster.[100] The energy released by the earthquake and tsunami on the Earth's surface alone was estimated as being equivalent to over 1500 times that of the Hiroshima atomic bomb, while the total energy released underground is equivalent to 550 million times that of the Hiroshima atomic bomb.[101] The coasts of 13 countries bordering the Indian Ocean were

100 P. Athukorala and B.P. Resosudarmo. "The Indian Ocean Tsunami: Economic Impact, Disaster Management, and Lessons." *Asian Economic Papers* 4, no.1. The Earth Institute, MIT Press. (2006), 1-2.

101 U.S. Geological Survey (USGS). *FAQ: Everything You Want to Know About this Earthquake & Tsunami.* USGS: Earthquakes, Website. Accessed 2 December 2013. http://earthquake.usgs.gov/earthquakes/eqinthenews/2004/us2004slav/faq.php

inundated, and over 350,000 people were killed.[102] India was among the four hardest-hit countries (with estimates of people killed ranging from 11,000 to 18,000 among various sources) along with Indonesia, Sri Lanka, and Thailand, although serious damages and deaths occurred as far away as South Africa. Not only the Eastern coast of India was impacted; in fact, this tsunami diffracted around the landmass of India and impacted the state of Kerala, on the western coast of India (the western coast of Sri Lanka also experienced this). This was also an economic disaster, which resulted in damage and income loss of approximately 6 billion USD in these 13 countries.[103] Of course human lives and economies were not the only ones to be impacted; the ecological impact of this occurrence was huge, with ecosystems (including mangroves, coral reefs, coastal wetlands, and forests), and animal and plant biodiversity being significantly affected.[104]

In the Cuddalore district of Tamil Nadu, within which the Pichavaram region lies, damage from the tsunami was found to be highly linked to the existence, or lack of, mangroves (as is true of other impacted regions within and outside of India); areas with coastal vegetation such as mangroves "were markedly less damaged than areas without."[105] The coastal communities that were living behind mangrove forests "largely escaped from the fury of the tsunami", while the villages directly on the coast, in front of the mangroves, were destroyed, hundreds of deaths occurred, and approximately 3.5 million USD was lost in the district overall.[106] The death toll in this area was linked to a thorny plant species which is abundant close to the shore, and caused severe wounding to the body, leading to death; of the deaths in this district, 53% were women, 27% were children, and 20% were men.[107]

102 Athukorala and Resosudarmo, *Indian Ocean Tsunami,* 1.

103 K. Kathiresan and N. Rajendran. "Coastal Mangrove Forests Mitigated Tsunami." *Estuarine, Coastal and Shelf Science* 65, no. 3 (2005), 601.

104 UN Atlas of the Ocean. "Impact of Tsunamis on Ecosystems." *UN Atlas of the Oceans: Website*. Accessed 1 March 2014. www.oceansatlas.org/servlet/CDSServlet?status=ND03MTY4NyY2PWVuJjMzPSomMzc9a29z

105 F. Danielson et al. "The Asian Tsunami: A Protective Role for Coastal Vegetation." *Science* 310, no. 5748. (2005): 643. DOI: 10.1126/science.1118387

106 Kathiresan and Rajendran, *Coastal Mangrove Forests,* 601-602.

107 Kathiresan and Rajendran, *Coastal Mangrove Forests,* 602.

3.3. Overview

3.3.1. MS Swaminathan Research Foundation

The work of MSSRF is vast, impressive, and goes far beyond the scope of the JMM project. Registered in May of 1988 in New Delhi, this non-governmental research institute was the vision of Professor MS Swaminathan, who provided the initial funding after receiving a monetary award for winning the first World Food Prize and was a founding trustee along with Professor VL Chopra and Professor VK Ramachandran. The vision of MSSRF involves creating a home for "creative and socially relevant work", which can "impart a pro-nature, pro-poor, pro-woman and pro-sustainable livelihood orientation to technology development and dissemination."[108] Mangrove ecosystem conservation has been central to the work of MSSRF since the beginning in various ways; however, the scope of their work has ranged from 'Voicing Silence', a women's theatre project, to a 'Touch and Smell Garden' for visually impaired children.

3.3.2. Joint Mangrove Management Project

The focus of this research is a case study of two sites situated within a much larger JMM project undertaken by MSSRF, which is in fact India's largest mangrove forest restoration programme, covers six sites in Tamil Nadu, Andhra Pradesh, and Orissa, has restored over 1,475 ha of degraded mangrove forests, and partnered with 5,240 families to plant 6.8 million saplings between 1996 and 2003. Mangroves were chosen by MSSRF as the focus due to the significant role that they play locally and globally, combined with their status as one of the "most threatened" valuable habitats in the world.[109] Mangroves cover approximately 70,000 sq. km worldwide, with seven per

108 MS Swaminathan Research Foundation (MSSRF). *Twenty Years Of MSSRF: An Adventure In Science And Sustainable Development.* (MS Swaminathan Research Foundation, 2009), 1. http://www.mssrf.org/mssrfdoc/TwentyyearsofMSSRF.pdf

109 MS Swaminathan Research Foundation (MSSRF). *Mangrove Decade and Beyond: Activities, Lessons, and Challenges in Mangrove Conservation and Management,* 1990-2001. (MS Swaminathan Research Foundation, 2002), 6. http://www.mssrf.org/csr/csr-pub/03-Mangrove%20decade%20and%20beyond.pdf

cent (4,900 sq. km) of that being along eight per cent of India's coast.[110] Perennial plants that grow on coastal wetlands of tropical areas, mangroves are found in intertidal zones of coastal ecosystems. Mangrove forests are considered to be "the most productive and biodiverse wetlands on earth", an important biodiversity reserve, and a critical "bridge" between land and marine ecosystems, able to withstand extreme conditions of salinity, wind, and conditions that would be considered hostile for solely land-based plants.[111] Through remote sensing pictures, maps show that mangrove areas in Tamil Nadu increased from 2,100 ha in 1993 to 4,050 in 2006, with community interest in contributing to the project seeing a significant increase following the 2004 tsunami.[112]

3.3.3. Integrated Approach

MSSRF utilized an integrated approach to forest restoration and community socio-economic development, due to their recognition of inherent linkages between the environmental and developmental underpinning issues. The goal of the project reflects this, as it was to "ensure a symbiotic link between the livelihood security of the coastal communities and the ecological security of coastal areas."[113] This was accomplished through forming a tripartite relationship between the local Forest Department, the primary-user mangrove communities, and MSSRF scientists and other staff. This "science-based, people-centered, and process-oriented approach" of JMM has since been replicated by other agencies, including the Indian government, in other areas of India.[114] The JMM integrated approach involved seven steps, including situational analysis, project site selection, Participatory Rural Appraisal (PRA), formation of Village-Level Mangrove Council (VMC), identification of Mangrove Management Unit (MMU), preparation of annual micro-plan, and implementation, monitoring, and evaluation (implementation and monitoring occurred throughout the project life, however this

110 MSSRF, *Mangrove Decade,* 6.
111 MSSRF, *Mangrove Decade,* 5.
112 MSSRF, *Twenty Years Of MSSRF*, 9-10.
113 MSSRF, *Mangrove Decade*, 16.
114 MSSRF, *Twenty Years Of MSSRF,* 9.

research study is the first to conduct evaluation post-project, other than informal visitations). [115] For a more detailed list of these steps, refer to Appendix A.

115 V. Selvam, K.K. Ravichandran, V.M. Karunagaran, K.G. Mani, and G.E.J. Beula. *Joint Mangrove Management in Tamil Nadu: Process, Experiences, and Prospects. Part 1: Situation Analysis – Pichavaram and Muthupet Mangrove Wetlands* (Chennai: MS Swaminathan Research Foundation, 2003), 12-13.

Section 4. Methodology

4.1. Case Study Site Selection

In Tamil Nadu, MSSRF conducted JMM in two project sites, Pichavaram and Muthupet, each of which consists of four project villages. These were chosen by MSSRF as JMM project sites as they are primary-user communities, meaning that the primary livelihood activities of the communities are founded in the mangrove forests. For this study, I chose two villages within Pichavaram as the focus.

The decision to focus on Pichavaram was two-fold: Firstly, the project was first implemented in Pichavaram, and in fact people from this site were taken to places such as Muthupet to share their knowledge during the project phase; thus, Pichavaram provides the most long-term and thorough perspective. Secondly, logistically Pichavaram made the most sense, as the MSSRF Coastal Research office happens to be located nearby, making discussions with staff easy, while Muthupet is several hours away from this office.

The decision to focus on two villages (Vadakku Pichavaram, and MGR Nagar) within Pichavaram was largely based on what Dr. Selvam (former JMM Project Director, and current Coastal Systems Research Director) felt would best reflect the overall experience of the majority. Of the four project sites in Pichavaram, three are fishing villages and one is a farming village. Vadakku Pichavaram was chosen largely because it is the farming village, thus offering a perspective that the other three might not offer, as it is less economically dependent on the mangrove forest than the fishing villages. MGR Nagar was chosen, as out of the three fishing villages, it is the only tribal village; this means that it is the most marginalized and vulnerable group, and therefore had the greatest barriers to success. As Dr. Selvam said, if I found success there, it is even more likely that success has also occurred in the other sites.

4.2. Methods

The ethnographic approach undertaken in this study involved participant observation, along with semi-structured, open-ended, group and individual interviews. [116] This allowed for "thick description" to occur, with attention being paid to narratives provided, which were interpreted and enhanced through additional layers of meaningful details, contexts, and emotions.[117] This approach is beneficial to this study as it allows for critical and informed analysis based not only on given narratives, but also on a deeper understanding of social norms, beliefs, and behaviours, which all potentially contribute to the ways in which environment and development factors are conceptualized and treated. This study was conducted between May and July of 2013 in Bangalore (state of Karnataka), and Chennai, Chidambaram, and two villages in the Pichavaram region, (state of Tamil Nadu). All participants were recruited via a third-party recruitment form, and were not approached directly.

In Bangalore, Chennai, and Chidambaram, I undertook individual semi-structured, open-ended interviews, which focused on theory and practice of this topic with professionals related to this field of study. Participants included: one key Forest Department official that acted as the primary link between MSSRF and the government department throughout the JMM project; two key MSSRF staff that created and led the JMM project, and; four non-governmental organization (NGO) workers in the environment-development field, unrelated to the JMM project, who provided contextual perspectives regarding the overall topic.

In the Pichavaram region, I undertook both group and individual semi-structured, open-ended interviews with community members in the villages of Vadakku Pichavaram and MGR Nagar, focusing on: the ways in which this project and its approach has impacted people's lives individually and as a community; their thoughts on its successes and challenges; and, potential consequences of different (trade-off based) approaches

116 W. Newton Suter. "Qualitative Data, Analysis, and Design: Chapter 12." In *Introduction to Educational Research, A Critical Thinking Approach*. (Sage Publications, 2012), 367-368.

117 C. Geertz. *The Interpretation of Cultures.* (USA: Basic Books, 1973), 27.

rather than the integrated approach actually taken. In Vadakku Pichavaram, a group discussion was held with 18 key community members (10 men and 8 women); I also held individual interviews with five of these community members (three men and two women). In MGR Nagar, a group discussion was held with 20 key community members (11 men and 9 women); I held individual interviews with four of these community members (two men and two women).

Both village communities decided among themselves if they were open to this study, and who would then attend the group meetings, according to who they felt could best relay points and the overall experience. Following the group discussions, they decided who would speak to me individually, according to who they felt most accurately represented the group experience. Both villages chose one person from each socio-economic sector of the community, which provided a thorough range of experiences. Therefore, participants included landowners, non-landowners, political leaders, people with a range of formal education years, and a range of involvement levels in the project.

In both villages, the interview process began with the groups having open discussion regarding what they felt were the most important positive and negative aspects of the project, which were similar but slightly different for the two villages. This was followed by me asking open-ended questions to the group as follow-up to what they discussed, in order to gain clarification and elaboration on key points. These group discussions lasted several hours, and in most cases entire days. Individual interviews, mostly lasting one hour or slightly more, contained a set of questions, including survey type information, and contextually appropriate open-ended questions. See Appendix B for the list of questions.

In total, the voices of 45 participants are reflected in these findings. Additionally, a translator (Sophia) accompanied me throughout all interviews in Tamil Nadu, as the primary language is Tamil; she was not present during interviews in Bangalore, as the participants spoke fluent English. Sophia was critical to my understanding language-based discussions and non-verbal aspects of communication, as well as the social and cultural contexts in which they took place.

All interviews were recorded, following verbal or written consent of the participants depending on their preference, as per the requirements of the University Research Ethics Board, and were then transcribed. All answers were entered into matrices (one for all group discussions, and one for all individual interviews, which were then cross-referenced between and across villages), from which I gleaned key themes and concepts related to the project, process, and theory. The result was such that each group had several key topics, which were largely expanded upon during individual interviews. These key themes will be outlined in the findings and expounded upon using individual experiences, with information from the theoretical and project-based discussions inserted as appropriate. Key topics emerging from the group discussions from Vadakku Pichavaram include gender relations, access to institutions, and the efficacy of the integrated approach, and from MGR Nagar, include social relations, alternative livelihoods, and the efficacy of the integrated approach.

Section 5. Research Findings

5.1. Vadakku Pichavaram

Vadakku Pichavaram is one of four villages in the Pichavaram Village Panchayat, in the Chidambaram Taluk. The closest town (and market), Chidambaram, is 12 km east. As of 2003 (according to the latest statistics available, through MSSRF), this village had 181 households with a population of 963.[118] The group reported that these numbers have grown slightly since then, but not significantly. The majority of the village is constituted by Vanniyar caste, who belong to the 'Most Backward Class' (96% as of 2003), while the other 4% is constituted by Irular Caste, belonging to the 'Scheduled Tribes' group (as recognized by the Government of India). Vanniyar families are primarily agriculturalists, while Irulars are non-traditional fishers. This means that their ancestors did not fish, thus they do not have traditional fishing methods or materials passed down. Their ancestors were rat and snake hunters, but were pushed from various fields by landowners, until finally settling only one generation ago in this village. The Vanniyar members had a percentage of 82% small-land (less than 2.5 acres) owners, by the end of the JMM project, which the group said was a great increase in relation to before the project. This signified a drastic socio-economic shift for the community. Prior to the project, many of the agricultural community members worked as bonded labourers for nearby land owners; the group referred to those in this position as having been slaves under this system, from which they are all now free.

For my first meeting with the Vadakku Pichavaram community, I was advised by Dr. Selvam to arrive by boat across the river, instead of by jeep, which would have been

118 V. Selvam, K.K. Ravichandran, V.M. Karunagaran, K.G. Mani, and G.E.J. Beula. *Joint Mangrove Management in Tamil Nadu: Process, Experiences, and Prospects. Part 2: Participatory Rural Appraisal in Mangrove-User Villages.* (Chennai: MS Swaminathan Research Foundation, 2003), 90.

faster. The rationale was that arriving in a jeep gives the impression that we only wanted to be there for a short amount of time, and are not committed to what we were there to discuss. As the group laughingly told me, they are used to NGO workers coming and going as they please, only to drop things off, whether it is information, opinions, or resources. They have a great respect for MSSRF, as they feel that MSSRF is dedicated to contributing the time necessary in creating relationships and mutual understanding. Taking the boat across signified that I understood the value of this.

5.1.1. Gender Relations

The first major theme identified during the group discussion was that of gender relations, which continued to be an important topic throughout individual interviews. As we sat in a circle on the floor of their community building during our first meeting, three different women asked questions regarding my purpose there before a man spoke. Sophia noted that it is uncommon for women to speak first, and particularly so freely, among men. This sparked a discussion amongst both the men and women, who agreed that prior to the JMM project, the women would stay in their houses during community meetings or when NGOs would visit. They attributed this change to the way in which the project involved women in several ways.

The community had originally identified gender inequality to MSSRF as an issue during step 3 of the project, Participatory Rural Appraisal (PRA). This led to the Village-Level Mangrove Council (VMC) being made up of one man and one woman from each household, which encouraged all genders to participate equally in all further decisions. One key decision that was made early on was the formation of Self-Help Groups (SHGs) for both men and women. The SHGs were mentioned frequently as being significant catalysts for positive change and opportunity. The women in the group meeting mentioned numerous times that they are more “courageous” because of this process of involvement in the VMC, and because of the opportunities offered to them through the SHGs, which did not previously exist.

Ganana Sundari, a 42-year-old groundnut and paddy farmer, became involved in an SHG despite initial resistance from her husband. She gained the confidence to join

due to the number of other women joining, and the positive impacts she saw. She participated in several training programs, and while she had finished school after tenth class (typical for both genders of the Vanniyar people of this village), she became inspired through these trainings to support her children in pursuing education further than that which she had received. Now, all three of her children (two girls and one boy) have completed university, due both to her and her husband's new comfort level with institutions, and their access to savings and loans institutions. Ganana Sundari explained that the success of the SHGs is directly related to the success of the restoration of the forest, as community members are better able to contribute savings earned from increased fish catch and improved crops, as a virtuous cycle of savings and loans used for livelihoods has occurred, and the root cause of degradation has been addressed as people no longer need to over-fish and over-harvest.

Both the men and women discussed at length the benefits of having an increased level of gender equality, which they agreed now exists both in the home and public sphere. An example given by the group was Ganana Sundari's contribution during an early VMC meeting, wherein she suggested they dig a borewell and buy motors, in order to better access water for agriculture. This has significantly impacted their crops, and they have now built three borewells, each with a motor. Ganana Sundari explained to me that before gaining confidence through her experience with the SHG, she did not feel comfortable attending, and especially speaking at, village meetings.

When asked directly, the men acknowledged that at first they had been resistant to the women being a part of the VMC, but as MSSRF held discussions with them on the benefits of including the village's women, they agreed to try it, and were pleased with the results. The women noted that they too had at first been wary of joining in community discussions, as Ganana Sundari had explained, but they now feel that it has greatly enhanced their quality of life at home and in the community overall. When asked whether there are any differences between how the men use SHG savings in comparison to how the women use them, they both replied that they use it primarily for their children's education; however, they all agreed that the men also often use it for agricultural supplies, which helps in having reliable crops.

5.1.2. Access to Institutions

A second major theme discussed by the group was the significance of gaining access to institutions, primarily financial and political, which is greatly linked with the topic of gender relations. During an individual interview, Kamala, a 55-year-old homemaker, elaborated on this relationship. Despite criticism from family members, particularly her mother-in-law who believed she should work only within the household, Kamala took part in the VMC as treasurer for 8 years, eventually gaining the approval of her husband and son. Her husband has suffered from depression for 10 years, leaving him unable to work, thus they rely on their son to provide for them. Through her role with the VMC, she represented the village in interactions with local banking institutions. This new relationship with institutions was also discussed in depth during the group discussions as being highly significant in changing the quality of life but within the village overall. Kamala illustrates this point, particularly for women, saying that before this project:

"We needed to be dependent on family for everything. Even to borrow 500 rupees, we needed our husbands for that. Now, we know how to mobilize resources on our own. If there are any needs in the village, we go approach the bankers, or the Taluk level officials, or we mobilize women and go and represent our needs, and sort out our issue."

The group agreed on this point, saying that levels of awareness and self-confidence were raised for all community members through the exposure to external institutions. Members such as Kamala relayed their experiences with institutions to the group as a whole following each trip, thus allowing everyone to gain insight and confidence in these interactions and related processes.

Baskar, a 38-year-old single man from a farming family, described how gaining access to institutions has impacted his life. Baskar is in an interesting position, because in many ways he represents a mid-point generation between the majority of those in the group meeting, who were already adults when MSSRF arrived, and the younger generation who is now growing up in the village post-project. Baskar grew into adulthood during the beginning of the project, and perhaps because of that, took full advantage of

all community development aspects. Baskar explained that, prior to the project, his family had been agriculturalists on other people's land, which was the case for the majority of people in this village:

"Before 1997, the daily wage was very important. My Father would work all day, and bring money home at 10pm. Then, we would go to buy rice, and eat the rice by 12am. Now, it has changed."

His family now owns their own small portion of land for agriculture, which they gained through their own savings and the help of an SHG, and they employ five people. Baskar joined an SHG in the beginning, and became a Group Leader. Through this, he gained exposure to local institutions and other local leaders, which he says put him in a more confident position. He first gained the political position of Ward Member of the Constitutional Panchayat, was then voted to become Vice President of the Panchayat, and is now the Union Counsellor covering four Panchayats. Baskar is an example of the ways in which the project helped to extend social inclusion through access to institutions, in Baskar's case this being political institutions. The group told me that there is a woman from this village with a very similar story, who is now a political leader, but she was working outside of the village at that time, so I was unable to speak directly with her.

5.1.3. Efficacy of the Integrated Approach

The third major theme identified was the efficacy of the integrated approach, a topic that turned out to be a common thread through all points of discussion. I did not raise this discussion point explicitly, but asked the question of what made this project successful in their eyes, after it had become clear to me that they felt this project had positively impacted them overall. There was an emphatic and unified response that the project would have failed had it approached either the mangroves or community development aspects with increased importance over the other, and that the lasting success was due to these being dealt with as one issue. One man responded that "neither is more important, they need each other", with which all group members agreed.

During my discussion with Baskar I had raised this point, and asked how he thought his life would be different if only the development, and not environmental,

aspects of the project had occurred, since that is what seems to have impacted him so greatly. He explained that if the forest had not been restored, or even if it had, but without the participation of the community, there would be the issue of re-degradation or continued degradation (along with the more obvious fact that they would have been devastated during the tsunami). He said that being a part of the restoration enabled him, and the community, to gain experience with forest management, and without that, the forest would not be healthy; additionally, the SHGs would not have money to lend, which would impact the cycle of improved livelihoods and the lives they see now. Overall, he felt that the community involvement in environmental restoration is what has led to the long-term benefits economically, which have been utilized for social benefits, such as those he has experienced.

Many of the stories that were told, such as Baskar's, led me to believe that it was the process of inclusion that had so greatly impacted the community members, perhaps more so than the integrated approach itself. However, an individual interview with a 60-year-old fisherman named Thangarasu, who is part of the Irular Caste minority in the village, and who had chosen to not be involved in the JMM process directly, allowed deeper insight into the significance of the integrated approach. Due to the project being created in such a way that the restoration process was linked to the community development, employment opportunities were created for the community members through canal digging, de-silting, and planting. MSSRF gave the VMC a small budget, which grew through the SHG savings plans, and was then controlled solely by the VMC, which then distributed employment wages.

Prior to this, Thangarasu had been earning his living through a fishing method known as hand-picking, or groping. This commonly used method has extreme health risks, as it involves fishers moving through shallow waters on their knees, and running their hands through the mud until they find fish or prawns, which are then placed into a pouch attached to the fisher. Thangarasu explained the various associated health issues, including cuts in hands and feet from sharp shells, and the most dreaded risk, accidentally touching the venomous spine of a catfish, which results in a painful swollen hand, potentially lasting for 2-3 months, rendering the fisher unable to work for that significant amount of time. After working as a canal-digger, Thangarasu (along with

many others) gained access to canoes purchased by the VMC. He explained that the canoes, in conjunction with improved fish catch due to the restoration process, resulted in a greatly increased quality of life for himself and his family through improved income, reduced health hazards, and the empowerment of knowing that he and his community care for and protect their invaluable forest. Additionally, conflict with neighbouring fishers has been reduced, as a result of improved catch for everyone, and the respect that his community has gained (particularly post-tsunami) as forest stewards.

Every person with whom I spoke individually stressed the importance of the ways in which the environmental and developmental aspects were intertwined, after I asked how the results would have been different if the approach had not integrated the two. The group stated that the positive results (forest restoration and improved livelihoods) gained throughout the process did not revert back after MSSRF ended their involvement, because their livelihoods, and to some extent, even their sense of self-worth and social standing among neighbouring villages, is so greatly tied to the health of the forest. Even after being pressed on this topic, to see if perhaps they felt this was what I wanted to hear, each individual held strongly to the point that if these areas had not been interlinked, both aspects would have only had short term success; this is a sentiment which was undoubtedly enhanced due to the tsunami, and the ways in which the restored forest protected their community, while so many others were lost.

Krishnamoorty, a 65 year old groundnut farmer who was the VMC President for three years, and is still the village's political leader, as he was when MSSRF first arrived, pointed out that the protection afforded by the mangroves occasionally results in negative impacts, saying:

"everyone knows that our village is protected by the forest. Even officials know that we are protected, and so they might not send government help after heavy rains and winds."

I asked him if there are any other negative elements to the project, and he explained that while they sometimes wish for increased help from the local government, he knows that his village is now in a position to help itself restore any damaged infrastructure or take any other necessary action after harsh weather, which they

experience fairly regularly throughout monsoon season. He said that he knows many other villages in his region still face many barriers to internal response, and is glad that his village is now in a position in which their environment, their local economy, and the community as a unit, is resilient.

5.2. MGR Nagar

MGR Nagar is one of 12 villages within the Killai Town Panchayat, located 16 km east of the town of Chidambaram. As of 2003, there were 136 households with a population of 494,[119] which the group said has increased slightly but not significantly. All of MGR Nagar belongs to the Irular Caste, recognized by the Government of India as part of the 'Scheduled Tribes' group, and is one of 645 recognized indigenous tribes (also called *Adivasis)*, known as historically disadvantaged and currently marginalized.

When MSSRF first visited the village, the village members were uninterested in forming a relationship and untrusting of the intentions of MSSRF. The project leaders persisted for an entire year, holding numerous public question and answer sessions. The group explained to me that after this period of one year they gained a rapport, which eventually turned into a positive relationship. Dr. Selvam and Dr. Ravichandran of MSSRF fondly and laughingly remembered this experience as one through which they have now formed a lasting bond with the community members. Significantly, during this process MSSRF recognized that a drastic shift in objectives was necessary. Moving from their original intent of mangrove restoration only, Dr. Selvam explained the realization that "without the stakeholder and community participation, we could not achieve the results; so we changed our objectives." Dr. Selvam and Dr. Ravichandran attribute their ability to undertake this shift to the mandate of MSSRF involving "science for society", which allowed for flexible funding and a change of means for a similar end. Dr. Ravichandran elaborated on the need for community participation, stating that the communities (from all project sites, not only MGR Nagar) provided two key things: they already knew where the degraded and non-degraded areas were, and how to most

119 V. Selvam, et al., *Joint Mangrove Management: Part 2,* 19.

easily access the areas; and they knew the topography – where the water flows, which direction, and so on – allowing for significant contribution in canal design. Through recognizing the significant contributions of the communities, and the ways in which their livelihoods were engaged in a cyclical relationship with the health of the forest, MSSRF chose to utilize an integrated approach focusing on environmental restoration in conjunction with socio-economic development, as opposed to the restoration-based focus they had planned for originally.

5.2.1. Social Relations

The first major theme discussed by the group focused on social relations. During the year of relationship building, MSSRF learned that the prevailing adversarial relationship between the village and the Forest Department posed a significant issue for MGR Nagar, and had for decades. Beginning 40 years ago, this group of then-scattered families were working as bonded labourers on nearby farms. After petitioning a local actor and political leader, MG Ramachandran, for a small portion of land, then settling their own village (and naming it MGR Nagar out of gratitude), they faced new barriers. With a history of bonded labour and skills related to rat and snake hunting, they began fishing in the mangrove area using non-traditional methods such as hand-picking. In addition to the health hazards this method posed, they faced a new hazard, in the form of the Forest Department officials tasked with conservation. They vacillated between fishing and returning to the fields to hunt, but were faced with a new wildlife protection act prohibiting this, thus facing dangers from either livelihood activity. MSSRF chose to deal directly with the relationship between the community and the Forest Department; village leaders and the head of the Department were invited to several meetings together, and over time, a new relationship emerged.

I gained insight through an interview with Kuppamal, a 50-year-old widow who quit fishing several years ago after her husband passed away, and now works in town as a waste collector. Kuppamal, a wonderfully vibrant woman, explained how drastically the relationship changed, and the significance of this change.

"When [MSSRF] came, they wanted to restore the mangroves; but, if that had continued as the only focus, none of us would have participated […] there was conflict between the Forest Department and our community, so even if we helped to grow the forest, we would not have had access to the resources. The effort that was put into bridging the relationship between the Department and us, that is why we are able to have access to resources and also to maintaining conservation now."

She explained that if the relationship had stayed negative, then even once the forest was restored, they would not have participated in conservation and management, the way that they do now. Through the new relationship with the Forest Department, the community members have gained the freedom to act as 'owners' of the health of the forest, and because of this responsibility, they have maintained the forest far better than the Department had been able to even when it was less inhabited. Kuldeep, Founder and CEO of Reap Benefit in Bangalore (an organization focusing on behaviour modification for adoption of sustainability practices), explained simply that "involving people in the solutions makes projects work", a statement that is clearly reflected in the success of this project from the perspective of those involved.

In order to further understand this relationship, I visited Siddique, the key Forest Department community liaison throughout the project, at his home outside of Chidambaram. Initially, Siddique was hesitant to detail the ways in which the relationship existed originally, and preferred to discuss only the positive aspects of the changes that occurred. After several hours of discussion, Siddique began to discuss the relationship more openly, stating that "*the community feared the Department, because of our power, and because of their illicit activities.*" Siddique initially explained that the community saw the Department as an "enemy", while the Department did not reciprocally see them as an enemy; however, he later admitted that he knows that many of his colleagues did in fact see the people as enemies, and treated them as such. When a village member would be caught fishing or felling trees, the Department Ranger would file a case against them at the police station, and they would be arrested or fined (either one potentially resulting in family members starving, as I was told by the community members). The fine depended on the offence:

"Whatever the loss to the government, times three, or sometimes up to 100, they would pay. If they couldn't pay, they would be put in jail [… the value owed] depended on the market value. If they would sell a bundle of twigs for firewood for 50 rupees at the market, they would be charged 150 rupees or more. It is a very high risk for people."

I felt that he was holding back in being honest about the consequences, until Sophia was able to make him laugh, relax, and speak more honestly. He told us that when someone was caught, the Ranger would often tell them that they must now be a spy for the Department, and relay information regarding who in their community was felling or fishing; alternatively, they could set up a "consciously-built extramarital affair", as Siddique delicately put it, between the Ranger and a woman from the village. This resulted in women being forced into exploitative relationships so that she or her husband could access necessary resources. Siddique was uncomfortable expanding on this topic, and added that his Department only had resources to place one Ranger in every 1000 to 10,000 hectares of forest, and if a higher official caught that Ranger letting off a "thief", the Ranger would be immediately fired; therefore, the Rangers were also in an undesirable situation, which Siddique explained as being partial incentive for their exploitative behaviour.

I asked why the Forest Department was interested in a tripartite relationship with MSSRF and the community members, considering their negative relationship. He explained that at first they were not interested, as they felt that their department "has all the power, it is their land." However, they allowed MSSRF to demonstrate their restorative techniques in a small area of forest, and after seeing the effectiveness of this, they became interested in the project. Once they understood the science that MSSRF was bringing, they began to see the value of a relationship, as they had been experiencing difficulty with restoration and management on their own. MSSRF at that point was committed to an integrated approach involving the community, and explained to the Department how this aspect was imperative to the long-term success.

As the group had explained to me, the relationship has changed over the years as the role of the community changed. Siddique ended the discussion by explaining how different things are now; for example, some Rangers are even invited to village

weddings, which was unheard of prior to the project. The community members bolstered this sentiment, as they feel that their role has drastically changed from one seen as "thieves", to that of respected forest managers and sustainable users.

5.2.2. Alternative Livelihoods

This new role of the community is linked to the second key topic discussed by the group - that of increased diversity of livelihood options. According to MSSRF, three aspects of socio-economics were focused on during the project: increasing profit from current income-generating activities; additional income-generating activities; and the adoption of sea fishing.[120] These were discussed by the group, which echoed the sentiment in Vadakku Pichavaram regarding the importance of the SHGs. The group discussed how the SHGs created the opportunity to safely borrow money in order to gain liberation from money-lenders, who offer an exploitative relationship resulting in the borrower having to sell their catch to the lender for a significantly reduced price compared to what they would receive at the market; as a result, the borrower can remain indebted to the lender for a considerable amount of time, thus restricting their ability to save or invest in themselves, keeping them in a situation of impoverishment. One member of the group explained:

"We used to borrow from the fisherman that would ill treat us, we had no choice. But now, we do not depend on them, because we don't need to borrow. And if we do, we have the funds [from the SHG], and when we want a huge investment we can approach outside investors. Before, even to have one meal per day, we had to borrow from them, but now, every bank account has about a minimum of a 2000 rupee balance. People used to be coming here every day shouting to get repaid, and now that doesn't happen."

The group all agreed that this was the norm for the community, and that both men and women have equal access to their bank accounts. Marripan, a 55 year old fisherman with four children, two of whom died of dysentery over 20 years ago, explained what it was like with money-lenders, and that it was even worse with situations

120 MSSRF, *Mangrove Decade,* 21-22.

of bonded labour. He said that when people were more scattered, not living together as a community, they had no alternative to taking a loan from a landowner.

"We [Marripan and his wife] might need only 30 rupees, but for this loan, we would become bonded […] We would take care of their land, irrigate and other things, and at night we would go for fishing, and earn our food this way. For one month of work, they would only give 10 or 15 rupees for a wage."

I asked for clarification on this wage as it is exceptionally low, and he stated again that it was in fact this low (while several men sitting around us nodded their agreement). Marripan elaborated on the significance and opportunities offered by alternative livelihoods for those that had been relying only on fishing. In terms of increasing profit from current income-generating activities, Marripan explained that this is possible through the SHGs, the VMC, and the restoration activities. The SHGs and VMC buy boats and nets for the community, allowing fishers to increase their catch and no longer rely on hand-picking, while the marine population has increased due to the health of the mangrove area and the creation of canals.

"Those days, the resources were minimal, and we rarely got a good catch. We used to make 50-100 rupees for one day, now we will get 500 rupees catch each day. So hazards are gone, and resources are increased. The canals enable breeding, for fish, crabs, and prawns."

I asked the group if they are ever restricted now, and they explained that through having gained construction, aquaculture, sea fishing, backwater fishing, and worm collection as alternative or additional income opportunities, they do not need to rely solely on forest resources. I asked what their livelihood relationship is with the forest now, and they stated that it is a positive one; they do not overfish or overfell the now-plentiful forest area, and instead they take part in monitoring and conserving the forest, while using it without fear.

5.2.3. Efficacy of Integrated Approach

The livelihood alternatives are a direct result of the integrated approach, which like in Vadakku Pichavaram was an overarching theme interwoven throughout all discussions. Despite income alternatives creating a reduced reliance on primary forest resources, the integrated approach has resulted in a continuing integrated perspective, wherein the community feels fundamentally connected with the forest. Like in Vadakku Pichavaram, the perspective has shifted from one of perilous and fragile livelihood dependence pre-project, to mutual positive growth throughout the project, now to one of profound mutual protection. Undoubtedly this was enhanced due to the tsunami, as well as the protection provided during cyclones and monsoon rains.

Indrani, a 40-year-old woman with four kids who, alongside her husband, runs a small store attached to the front of their house (which they bought using a loan from an SHG), explained the holistic manner in which they now relate to the forest:

"When we grow a child, we depend on them during a crisis or a problem. Likewise, the forest protects us. It's like taking shelter with my children […] we grew the forest like our children, we protected it like our children, and now it protects us like our children. It is a mutual care."

Verasami, a 45-year-old fisherman who is also the village's traditional healer, shared with me the devastation of what it was like for those without the protection of the forest, both from this community, and the hundreds of those from nearby areas who lost their lives during the tsunami. Verasami's family (wife, son, daughter-in-law, two grandsons, and one granddaughter) had been fishing near the village, where they had a fishing hut at which they would generally stay for a week at a time to fish. Verasami and his son returned to the village to pick up supplies, and when they realized that the tsunami was coming, it was too late to return to evacuate the family. When the storm was over, Verasami returned, as he knows how to swim, and was able to get out to the fishing area despite the high level of water. He heard his two grandsons calling out "Grandpa" to him, and he found them holding on to mangrove branches. They did not know how to swim, but had somehow been able to hold on through the storm, as they were taken high in the waves and dropped among the trees. He swam out trying to find

his wife, daughter-in-law, and granddaughter, but when he did, he found them stuck underneath a thorny bush near the shore. All three had died, with ripped saris tangled together, and his granddaughter still clutched in the arms of his wife.

No lives were lost among those who were in the village (or those in Vadakku Pichavaram), however all thatch housing was washed away in both places, and one other woman from MGR Nagar who had been fishing in the same area as Verasami's family also died, while her husband had gone to the market to sell crabs they had caught. Verasami sadly said that if he had not been able to swim, no one would have found the bodies of his family (which is why there is no exact number for lives lost in this area). His voice became gentle as he described the water filled with blood and thorns, and said that if the mangroves weren't there, the boys would have died too, along with their whole village; "this mangrove forest is lifesaving. This forest is our safety net."

Section 6. Analysis

6.1. Reflections

There were several aspects of the story that surprised me throughout the research process, and despite having read the literature on this project and the villages prior to visiting, there were two significant points of which I was unaware. I did not know that there had been an exploitative relationship between the village members and the Forest Department, and I did not know that the original intent of MSSRF had been that of science-based restoration only, with the integrated approach having arisen in response to the situation they encountered, and their ability to have flexible objectives. Essentially, I had assumed that since the outcome seemed (from MSSRF literature and word of mouth) to be such a clear win-win in terms of environment (environmental restoration and post-project management), and development (improved community livelihoods and socio-economic conditions), that either: a) The pre-project conditions were such that this outcome was relatively easy, in the sense that the circumstances lent themselves to a positive outcome; or b) that the long-term outcome was not as much of a win-win as the literature suggested, since it was all written during and toward the end of the project, before the tsunami.

Instead, I found that: a) the circumstances prior to the project were volatile, and lent themselves to an unfortunately common situation in which impoverished communities remain largely without alternative options while environmental degradation continues, in addition to being penalized for it; and b) the long-term result indeed is seemingly even more of a win-win than I expected, as I thought that perhaps the 'win' for community development would simply be economic improvements, yet what I found were improvements in various aspects of the community, such as gender relations, institutional relationships, and educational opportunities, in addition to improved economic livelihoods and environmental resiliency and management.

I also had not expected to find such a literal example of mutually beneficial care; I had not considered the (now glaringly obvious) fact that, this being a post-tsunami region, there were areas in which people quite literally died without the protection of a healthy environment, and that the areas where people were in fact protected, protection was a direct result of caring for that environment. On a macro-scale there is an obvious parallel in the relationship between environmental management and human wellbeing, with the impacts of climate change being revealed, and the increased need for environmental restoration and proper management in attempt to mitigate the effects. Additionally, these findings also highlight the skewed nature of this relationship, illustrated by the triple inequality, as those increasingly and disproportionately faced with 'natural' disasters, did not historically contribute to, or gain from, the degrading processes responsible.

6.2. Limitations

There are several aspects of the process that are important to note, prior to determining if the project and approach were 'successful', and what that might mean. For example, increased gender equality was discussed; however, in both villages, there were slightly fewer women present than males in all group meetings. I discussed this with Sophia, and her opinion was such that it was not that the women were less comfortable with public speaking, as I had asked, it was that they were busier than the men. I agree with this, particularly after learning about their schedules, which involves all of the same formal work duties as men, in addition to a significantly larger portion of the informal household work and childcare. During the group meetings with only men, no children were present, while during group meetings with the women, several children were either sitting alongside them, or playing in the room near us, and during co-ed meetings, the children tended to sit with the women. The same was true for individual meetings, in that my interviews with men usually involved just the individual man with other men sitting nearby, while the interviews with women all involved other women sitting closely around us with children. This is an important observation as it can be reflected upon in terms of what this means for social norms, and how that interplays with the information I was given. That is to say, while gender equality was discussed as

having greatly improved, qualitative issues such as this are relative to what was held as the norm prior to the situation changing, making it difficult to determine absolute levels of 'success', versus relative levels of improvement.

As MSSRF has not undertaken any post-project data collection regarding quality of life factors for the community, this study is limited by not having the quantitative data that might otherwise be available and potentially useful for determining pre- and post-project differences and therefore successes. For example, certain aspects of their lives such as literacy rates, health and illness rates, income levels, and so on, were relayed to me both through what I saw and what they told me; however, having data available would certainly have been beneficial in order to compare the rates to what I found.

It is difficult, if not impossible, to determine whether or not participants are being wholly honest, or are instead choosing to discuss only positive aspects of a project or its outcomes. The chief reason that I do feel confident that our discussions were as honest as could be hoped for is that, since 2003, MSSRF no longer works in either of these villages; this means that the respondents were not under any impression of losing or gaining funding, employment, or any other potential incentive for providing skewed opinions. To try to ensure this, it was elaborated at the beginning of each discussion (group and individual) that I was not there as an MSSRF representative, but as an independent researcher there to learn from them, with no opportunities to offer them in exchange.

There are numerous factors contributing to the current reality of the Vadakku Pichavaram and MGR Nagar community members, many of which were left out of this study, potentially to the detriment of insightful, holistic analysis. For example, this study could have focused on or discussed: caste relations; the science utilized by MSSRF; the effectiveness of mangroves for coastal, climate-change impact mitigation or alleviation; community resiliency, post-disaster; Indian politics and the economy; the Self-Help Groups, specifically, and their system of micro-financing within the community; or any number of other related topics that I have failed to identify as being important. To be sure, caste in particular is a topic I consciously avoided as a part of this study, as the villages within this study are largely homogenous in terms of caste, which in itself could

be a topic of lengthy discussion. I took the advice of Dr. Selvam, who during a discussion of caste, suggested that if I were to choose villages with numerous caste groups and wanted to know how caste-based issues have, or have not, related to the environmental issues, then I could expect to "get stuck on the caste issue and never have time to discuss what [I] am there to discuss." All other NGO workers with whom I also had this discussion echoed Dr. Selvam's opinion on this.

A further complicating factor when considering success is that MSSRF is not the only organization to have worked within these villages. I was told by the community members that while MSSRF is still the only organization to have spent significant time there, and to have focused on relationship-building, many others (local and international) have donated boats or canoes over time, and even concrete housing in MGR Nagar post-tsunami, as the waves largely ruined their thatch houses. Therefore it is impossible to separate or isolate impacts of each project or organization's activity. Overall, the larger systems and processes within which these villages exist (such as the caste system, gender norms, and various other social or economic processes), as well as factors external to the JMM project (particularly the actions of other organizations in relation to these villages), may all contribute more or less to the current situation than that for which this study accounts.

6.3. Results

Following completion of the project in 2003, MSSRF determined that it had been successful according to six specific achievements. The village members throughout our discussions reflected on these six achievements, listed in Appendix C, stating that they continue to hold true beyond the project end date. These achievements combined to meet the goal of ensuring "a symbiotic link between the livelihood security of the coastal communities and the ecological security of coastal areas."[121] Through my discussions, I note that the community members strongly feel that their livelihood security has greatly increased, both through increased diversity of income streams and increased resource

121 MSSRF, *Mangrove Decade,* 16.

security. Through quantitative data on mangrove cover, it is evident that ecological security has improved as well; through remote sensing data, it can be seen that between 1986 and 2002, the Pichavaram mangrove forest cover increased by approximately 90%.[122]

Pertinent to this study is contemplation of success through reflecting on the integrated approach taken, and its relationship with the continuum. Through information gained from the literature focusing on theory and practice, and the narratives of those directly involved, together, the evidence is such that this project has successfully avoided utilizing a trade-off model, or placing either environment or development in a position of increased importance while the other is sacrificed. Both the health of the environment and the socio-economic factors of life within these two villages have improved, even following the end of direct project intervention. Indeed, the result is beyond simply having avoided a trade-off, and is instead a positive increase in ideological integration of the two, wherein there is a firm belief that if either issue had been the focus over the other, both would have suffered in the long run, as they had prior to intervention and conscious integration of the issues. This illustrates the benefits of MSSRF shifting to an integrated approach, and reflects a key aspect of the goal, in the "symbiotic link" between ecological and livelihood security being ensured.

Furthermore, when considered in relation to the EKC theory, three things are clear: a) the approach taken recognized that degradation had a negative relationship with livelihoods; therefore, instead of posing a question of how to gain socio-economically through increased degradation, it asked the question of how the quality of life could be improved while concurrently restoring the environment, leading to the answer of a mutually beneficial relationship; b) it was not the level of income that proved to be important in lowering degradation, as the EKC posits, but the critical linking of livelihoods and sustainable management, in addition to the formation of alternative or additional sustainable livelihoods, that proved successful in reducing degradation; and, c) simply expecting increased income to benefit the environment misses the issue of

122 V. Selvam, K.K. Ravichandran, L. Gnanappazham, and M. Navamuniyammal. "Assessment of Community-Based Restoration of Pichavaram Mangrove Wetland Using Remote Sensing Data." *Current Science* 85, no. 6 (2003), 794.

tipping points and environmental disasters, as disaster-related costs negatively impact economic levels, turning the inverted-U into a vicious circle. Degradation reduces the resiliency of environments while also contributing to climate interference, which results in disasters having increased frequency and more intense impacts; thus, degrading the environment for the purpose of economic gains ultimately moves from a win-lose to a lose-lose relationship, as the socio-economic win can later be negatively impacted by the environmental loss. For example, the global socio-economic costs of the Indian Ocean tsunami – more than 350,000 lives[123] and over 6 billion USD[124] lost – are dwarfed by expected future costs, including 100 trillion USD from coastal damage alone, and innumerable lives.[125]

MSSRF stated that the reasons behind previous failure to restore, or effectively conserve, the forest were threefold: a) the focus of the Forest Department was only on the forest component of the mangrove wetlands, with little attention paid to the hydrological and sedimentary processes; b) the inter-relationship between land and water use practices in adjacent lands and the health of the wetlands was neglected, and; c) there was a lack of recognition of the importance of community involvement and participation in conservation and enhancement.[126] This study found that these conclusions are accurate, as the shift in focus to include and utilize scientific restoration practices, as well as diversifying the communities' livelihood alternatives to reduce harmful land- and water-use practices, and overall community involvement and participation, were all noted by the communities as being critical to the ways in which the goals of this project have continued to be upheld, even a decade after the project ended.

I would add three further points to the reasons behind lasting success: a) flexible funding, which allowed for responsive goals (as the project shifted from restoration only to include socio-economic development alongside community participation in that restoration, and not all funding would allow for such a change); b) the long-term view of MSSRF and its staff (certainly implementing this project over more than seven years,

123 Athukorala and Resosudarmo, *Indian Ocean Tsunami,* 1.
124 Kathiresan and Rajendran, *Coastal Mangrove Forests,* 601.
125 Hinkel et al., *Coastal Flood Damag*e, 2.
126 MSSRF, *Mangrove Decade,* 16.

with an entire year dedicated to relationship-building in one village alone, is significant and largely unique), and; c) effective identification and relationship management between key stakeholders (the tripartite relationship between a science-based organization, the government department overseeing this issue, and the local communities directly involved, allowed for the necessary combination of expertise, responsibility, and accountability to occur through partnership). Overall, this approach integrated both the issues of environmental degradation and need for restoration, with the socio-economic needs of the local community, and quite luckily, did so prior to the tsunami, thus providing protection. While the communities undoubtedly still face struggles, it is clear that this approach has been a relative success. It is also clear that this success is largely due to the integration of the environment and development aspects, as the previous fragmented approach in which conservation and socio-economic livelihoods were in constant tension failed to see the improvements ultimately made following this critical shift.

6.4. Transferability and Implications

The usefulness and efficacy of this approach, and the JMM model specifically, have been officially recognized by the Tamil Nadu Forest Department, along with recognition of all village-level institutions (which, as the community members mentioned, has been a significant aspect of community empowerment and involvement). The Department has been replicating this model in other mangrove areas throughout the state, as has the Central Government Ministry of Environment and Forests. The Ministry formed a sub-committee to examine this framework, and upon finding it to be the best available model, has since included it as a key strategy in conservation and sustainable management of mangrove wetlands.[127] This is complementary to the Joint Forest Management (JFM) approach, outlined in the Indian National Forest Policy from 1988, as well as the Joint Forest Management Guidelines from 1990,[128] with controversial roots in West Bengal that arguably go back several decades, as I learned through discussions

127 V. Selvam, et al., *Joint Mangrove Management: Part 2,* 15.

128 FAO/ECE/ILO Committee on Forest Technology, Management and Training. *International Forest Fire News* 26 (2002), 29. http://www.fire.uni-freiburg.de/iffn/iffn_26/IFFN_26.pdf

with several NGO workers. Gaining insight into the lived experiences of those in different regions and different states would offer an interesting area of further research, particularly in relation to the ethnographic findings of this study, in order to determine differences and similarities in outcome and reasons for this.

When considering the limits to generalized transferability, the context of this case study is important to note. Specifically, I think the success of this project, and the ability for successful transfer to other areas, entails an element of conditional validity dependent upon two contextual points. First, this study examines a case involving restoration, yet proactive integrated solutions in areas of already healthy environments are also important. With current widespread global degradation, along with the need for environments to remain resilient following extreme weather events, it is not only areas of degradation that should be held accountable to attaining integrated solutions. This relates the larger overarching context, which goes beyond the scope of this study, of the ways in which capitalism currently predominantly functions; corporations and the political economy in which they exist are, by and large, organized in such a way that economic gains can be made through environmental degradation with various negative externalities, rather than through restoration or sustainable practices. While this case study illustrates that it was not restoration alone that increased income, and that it was largely livelihood diversification, this lesson does not translate easily to the format of large-scale corporate functioning.

Second, this case benefited from a lack of an ultra-powerful stakeholders existing with a different desired outcome. The Forest Department wanted conservation, MSSRF wanted restoration, and the communities wanted increased livelihood security and improved socio-economic outcomes; all of these were able to be met through the integrated approach. However, the outcome may have been very different if the most powerful stakeholder (economically and politically) had instead been a corporation. Indeed, I argue that this is the most significant limiting factor of this study, in trying to gain an understanding of the level of generalizability or transferability, as many situations that are similar in their issues of environment and development also involve an ultra-powerful stakeholder, often multi-national corporations, with differing interests from that

of the local community, resulting in natural resource exploitation to the detriment of local socio-economic indicators.[129]

Both of these points - the need for proactive solutions, and corporate power as a corrupting or disruptive influence - were noted by the NGO workers with whom I held discussions as being key problem areas in moving an integrated perspective into wider practice. As such, the conditions in which effective integrated solutions can occur within these particular contexts are important areas of further research.

Beyond the transferability of the JMM approach specifically, the clear implication from this study overall, as expounded upon in the literature review, is that traditional development can no longer rely on economic indicators alone, while environmental stewardship must take into account how people are impacted, and who is most vulnerable to the impacts. These areas must be conceived in conjunction for long-term win-win solutions. Admittedly, this is quite general; however, specific implications are both beyond the scope of this study, and arguably not as useful as a general conceptual underpinning can be, considering the diverse contexts encompassed in the issues of environment and development today, and the need for contextually appropriate policies that follow the goal of 'common but differentiated responsibilities'. However, Professor VK Ramachandran, a Founding Trustee of MSSRF, noted during an informal discussion on this topic, that when it comes to policy creation, "before making any decisions, one must first think of how it impacts the most vulnerable." Considering the implications of climate change and the related triple inequality, certainly the relationship between environment and development - and all related projects and approaches - should ask this question prior to conceiving solutions.

129 There are an unfortunate number of examples illustrating a trade-off for corporate gain over environmental and social exploitation, often resulting in violent conflict. Two infamous examples are seen through Shell in Nigeria, and Coca-Cola in India. See: A. Ikelegbe, The Economy of Conflict in the Oil Rich Niger Delta Region of Nigeria. *African and Asian Studies,* 5, no.1 (2006), 23-55. doi: 10.1163/156920906775768291, and: M. Burnett, and R. Welford. Case Study: Coca-Cola and Water in India: Episode 2. *Corporate Social Responsibility and Environmental Management* 14, no.5 (2007), 298—304 doi: 10.1002/csr.157

Section 7. Conclusion

The intention of this study has been to contribute post-project, and post-disaster, insight into the ways in which the integrated approach undertaken by MSSRF in their Joint Mangrove Management project has impacted people's lives and their environment within the two case-study villages. This study acts as a follow-up to enhance the existing information on this particular project, as no further data collection had previously occurred in this region. Moreover, the findings herein fit into the current overall literature through providing a micro-spatial example of an integrated approach, which effectively interlinks the environment and socio-economic development issues faced. Contrary to focusing on one end of the development – environment continuum, with the expectation that one must hold priority over the other and that associated trade-offs are necessary, the position of this study has been such that inherent linkages between environment and development not only allow for, but also demand, holistic solutions.

This study began by noting that the ways in which a question is conceptualized plays a large role in the proposed solutions; as seen through the various points along the continuum, it is clear that underlying perspectives become central to the approaches that are identified or deemed acceptable to stakeholders. Through this case study, it is seen that perceiving environmental and socio-economic issues as being interlinked allows them to be approached as such, and that this can lead to holistic long-term success. However, contextual challenges have also been noted, and as such, further research has been recommended to occur in three areas: a) narratives and lived experiences from different regions within India in which the JFM has occurred could be gained, in order to allow for comparison in terms of successes and challenges in implementation and outcome; b) identifying additional forms of integrated solutions and approaches in situations influenced by an ultra-powerful stakeholder placing emphasis on one end of the continuum, and; c) identifying proactive integrated solutions and approaches in

situations of healthy environments, in which restoration processes cannot be relied upon as part of the approach.

The findings of this study are not meant to imply that utilizing an integrated approach is a panacea for all temporal and spatial contexts, as this too would be problematic in its definitiveness. Rather, this study demonstrates that the integrated approach is a useful and effective lens with which to conceptualize these fundamentally interrelated issues, and through which an integrated approach can be considered accordingly. This focus moves forward with the question of what we can achieve through approaching environmental and socio-economic issues as inherently intertwined, and how we can approach them in a way that contributes positively to both, through holding the understanding that a positive relationship is necessary, and the expectation that it is possible.

Bibliography

Acemoglu, D., Johnson, S., and Robinson, J. "The Colonial Origins of Comparative Development: an Empirical Investigation." *The American Economic Review* 91, no. 5 (2001): 1369-1401.

Agyeman, J., R. D. Bullard, and B. Evans. "Exploring the Nexus: Bringing Together Sustainability, Environmental Justice and Equity." *Space & Polity* 6, no. 1 (2002): 77-90.

Anand, S., and Sen. A. "Sustainable Human Development: Concepts and Priorities." *Human Development Occasional Papers* (1994).

Andreoni, J., and Levinson, A. "The Simple Analytics of the Environmental Kuznets Curve." *Journal of Public Economics* 80 (2001): 269-286. http://econweb.ucsd.edu/~jandreoni/Publications/JPubEKuznets.pdf

Antle, J., and Heidebrink, G. "Environment and Development: Theory and International Evidence." *Economic Development and Cultural Change* 43, no. 3 (1995): 603-625.

Athukorala, P., and B.P. Resosudarmo. "The Indian Ocean Tsunami: Economic Impact, Disaster Management, and Lessons." *Asian Economic Papers* 4, no.1. The Earth Institute, MIT Press. (2006).

Ballinger, C. "Why Geographic Factors are Necessary in Development Studies." *MPRA* Paper No. 29750 (2011).

Beckerman, W. "Economic Growth and the Environment: Whose Growth? Whose Environment?" *World Development* 20, (1992): 481–496.

Broad, R. "The Poor and the Environment: Friends or Foes?" *World Development* 22 No. 6 (1994): 811 – 822.

Chandrakanth, M.G., and J. Romm. "Sacred Forests, Secular Forest Policies and People's Actions." *Natural Resources Journal* no. 31 (1991): 741-746.

CTV News. “Doomed by Geography, Phillippines is no Stranger to Major Storms.” *The Associated Press.* Updated 10 November 2013. http://www.ctvnews.ca/world/doomed-by-geography-philippines-is-no-stranger-to-major-storms-1.1536059

Daly, Herman. *Beyond Growth: The Economics of Sustainable Development.* Boston: Beacon Press, 1996.

Daly, Herman. *Steady-State Economics, 2nd edition*. Washington, DC: Island Press, 1991.

Danielson, F., Sorenson, M., Olwig, M., Selvam, V., Parish, F., Burgess, N., Hiraishi, T., Karunagaran, V., Rasmussen, M., Hansen, L., Quarto, A., and N. Suryadiputra. “The Asian Tsunami: A Protective Role for Coastal Vegetation.” *Science* 310, no. 5748. (2005): DOI: 10.1126/science.1118387

Dasgupta, S., Laplante, B., Wang, H., and Wheeler, D. “Confronting the Environmental Kuznets Curve.” *Journal of Economic Perspectives* 16, no. 1 (2002):147-168.

Devall, B. “The Deep Ecology Movement.” *Natural Resources Journal* 20 (1980): 299-322. http://lawlibrary.unm.edu/nrj/20/2/05_devall_deep.pdf

Devall, Bill and George Sessions. “Chapter 38: Deep Ecology” In *Technology and Values: Essential Readings*, edited by Craig Hanks. United Kingdom: Blackwell Publishing, 2010.

Dinda, S. “Environmental Kuznets Curve Hypothesis: A Survey.” *Ecological Economics* 49, no. 4 (2004): 431-455.

Eckstein, G.E. “Water Scarcity, Conflict, And Security in a Climate Change World: Challenges and Opportunities for International Law And Policy.” *Wisconsin International Law Journal* 27, no. 3, (2010): 409-461.

Engerman, S., and Sokoloff, K. “Factor Endowments, Institutions, and Differential Paths of Growth Among New World Economies: A View from Economic Historians of the United States.” *NBER Working Paper* 6 (1994): 1-45.

FAO/ECE/ILO Committee on Forest Technology, Management and Training. I*nternational Forest Fire News* 26 (2002). http://www.fire.uni-freiburg.de/iffn/iffn_26/IFFN_26.pdf

Fox News. “Geographically Doomed and Hobbled by Poverty, Philippines Buffeted by Regular Storms”. Updated 10 November 2013. http://www.foxnews.com/world/2013/11/10/geographically-doomed-and-hobbled-by-poverty-philippines-buffeted-by-regular/

Geertz, Clifford. *The Interpretation of Cultures.* USA: Basic Books, 1973.

Global Climate Forum. "Climate Change Threatens to Cause Trillions in Damage to World's Coasts, if Coastal Regions do not Adapt to Sea-Level Rise." *Global Climate Forum: News.* Updated 4 February 2014. www.globalclimateforum.org/index.php?id=24&no_cache=1&no_cache=1&tx_ttnews[tt_news]=54&cHash=49f58d1fb209c06cb0152a91d58afbb8

Grey, W. "A Critique of Deep Ecology." *Journal of Applied Philosophy* 3, no. 3 (1986): 211-216

Grossman, G., and Krueger, A. "Environmental Impacts of a North American Free Trade Agreement. National Bureau of Economic Research." *NBER Working Paper* 3914 (1991). http://www.nber.org/papers/w3914

Hindustan Times, Mumbai. "Doomed by Geography." Updated 11 November 2013. http://paper.hindustantimes.com/epaper/viewer.aspx?issue=8733201311110000000001001&page=3&article=fa0b1bb5-bb99-44d2-856c-b715edeebb43&key=Sgcb8TM0gtflWqlcde6dLA==&feed=rss

Hinkel, J., Lincke, D., Vafeidis, A., Perrette, M., Nicholls, R., Tol, R., Marzeion, B., Fettweis, X., Lonescu, C., and Levermann, A. "Coastal Flood Damage and Adaptation Costs Under 21st Century Sea-Level Rise." *PNAS Early Edition* (2013): 1-6. www.pnas.org/cgi/doi/10.1073/pnas.1222469111

Hrebiniak, L. and Joyce, W. "Organizational Adaptation: Strategic Choice and Environmental Determinism." *Administrative Science Quarterly* 30, no. 3 (1985): 336-349.

Intergovernmental Panel on Climate Change (IPCC). "Summary for Policymakers." *Climate Change 2013: The Physical Science Basis*. 2013. http://www.climatechange2013.org/images/report/WG1AR5_SPM_FINAL.pdf

Jacob, M. "Sustainable Development and Deep Ecology: An Analysis of Competing Traditions." *Environmental Management* 18, no. 4 (1994): 477-488. http://link.springer.com/article/10.1007/BF02400853

Johnson, Martha, ed. *Lore: Capturing Traditional Environmental Knowledge*. NWT, CA: Dene Cultural Institute, 1992.

Kallis, G. In Defense of Degrowth. *Ecological Economics* 70. (2011): 873-880.

Kathiresan, K., and Rajendran, N. "Coastal Mangrove Forests Mitigated Tsunami." *Estuarine, Coastal and Shelf Science* 65, no. 3 (2005): 601-606.

Lenton, T., Held, H., Kriegler, E., Hall, J., Lucht, W., Rahmstorf, S., and Schellnhuber, H. "Tipping Elements in the Earth's Climate System." *PNAS* 105, no. 6. (2007): 1786-1793.

McBay, Aric, Lierre Keith, and Derrick Jensen. *Deep Green Resistance: Strategy to Save the Planet.* New York: Seven Stories Press, 2011.

Meadows, Donella H., Dennis, L. Meadows, Jorgen Randers, and William Behrens. *The Limits to Growth*. New York: Universe Books, 1972.

MS Swaminathan Research Foundation (MSSRF). *Mangrove Decade and Beyond: Activities, Lessons, and Challenges in Mangrove Conservation and Management, 1990-2001.* MS Swaminathan Research Foundation, 2002. http://www.mssrf.org/csr/csr-pub/03-Mangrove%20decade%20and%20beyond.pdf

MS Swaminathan Research Foundation (MSSRF). *Twenty Years Of MSSRF: An Adventure In Science And Sustainable Development.* MS Swaminathan Research Foundation, 2009. http://www.mssrf.org/mssrfdoc/TwentyyearsofMSSRF.pdf

Næss, A. "The Shallow and the Deep, Long-Range Ecology Movement." *Inquiry* 16, no. 1 (1973): 95-100. http://www.ecology.ethz.ch/education/Readings_stuff/Naess_1973.pdf

Næss, A. "Spinoza and ecology." *Philosophia* 7 (1977): 45–54. doi:10.1007/BF0237999

Oxfam International. *Philippines Typhoon Haiyan.* Updated 4 February 2014. http://www.oxfam.org/en/emergencies/typhoon-haiyan

Oxfam International. "Working for the Few: Political Capture and Economic Inequality." *Oxfam Briefing Paper - Summary.* 20 Janurary 2014. http://www.oxfam.org/sites/www.oxfam.org/files/bp-working-for-few-political-capture-economic-inequality-200114-summ-en.pdf

Oxford Dictionaries, "*Environment*," Oxford University Press. Accessed 10 March 2014, http://www.oxforddictionaries.com/definition/english/environment

Page, D., and I. Davidson. "Pitting the Environment Against the Economy is Bad Business, Bad Politics." *Ecojustice: Blog.* Updated 31 December 2012. http://www.ecojustice.ca/blog/pitting-the-environment-against-the-economy-is-bad-business-bad-politics

Panayotou, T. "Empirical tests and policy analysis of environmental degradation at different stages of economic development." *ILO Working Papers* (1993): http://www.ilo.org/public/libdoc/ilo/1993/93B09_31_engl.pdf

Pearce, David, Anil Markandya, and Edward Barbier. *Blueprint for a Green Economy.* London: Earthscan Publications Ltd., 1989.

Peet, R. "The Social Origins of Environmental Determinism." *Association of American Geographers* 75, no. 3 (1985): 309-333.

Rao, Prakash. "Building Climate Resilience in Coastal Ecosystems in India: Cases and Trends in Adaptation Practices." In *Climate Change and Disaster Risk Management*, edited by Walter Leal Filho, London: Springer, 2013.

Reardon, T. "Links Between Rural Poverty and the Environment in Developing Countries: Asset Categories and Investment." *World Development* 23, no. 9 (1995): 1495-1506. http://www.sciencedirect.com/science/article/pii/0305750X9500061G

Redclift, Michael. *Sustainable Development: Exploring the Contradictions*. London: Methuan & Co., 1987.

Redman, J. "Brilliant Plans to Destroy the Planet: The World Bank Tackles Climate Change." *Institute for Policy Studies: Op-Ed.* Updated 11 July 2008. http://www.ips-dc.org/articles/brilliant_plans_to_destroy_the_planet_the_world_bank_tackles_climate_change

Roseland, Mark. *Toward Sustainable Communities: Resources for Citizens and their Governments.* Canada: New Society Publishers, 2005.

Sachs, Jeffrey. *The End of Poverty: Economic Possibilities for our Time* USA: Penguin Press, 2005.

Sachs, Wolfgang. "Environment." In *The Development Dictionary: A Guide to Knowledge as Power*, edited by Wolfgang Sachs, 26-37. London: Zed Books, 1995.

Selvam, V., Ravichandran, K.K., Gnanappazham, L., and M. Navamuniyammal. "Assessment of Community-Based Restoration of Pichavaram Mangrove Wetland Using Remote Sensing Data." *Current Science* 85, no. 6 (2003): 794-798.

Selvam, V., Ravichandran, K.K., Karunagaran, V.M., Mani, K.G., and G.E.J. Beula. *Joint Mangrove Management in Tamil Nadu: Process, Experiences, and Prospects. Part 1: Situation Analysis – Pichavaram and Muthupet Mangrove Wetlands.* Chennai: MS Swaminathan Research Foundation, 2003.

Selvam, V., Ravichandran, K.K., Karunagaran, V.M., Mani, K.G., and G.E.J. Beula. *Joint Mangrove Management in Tamil Nadu: Process, Experiences, and Prospects. Part 2: Participatory Rural Appraisal in Mangrove-User Villages.* Chennai: MS Swaminathan Research Foundation, 2003.

Sen, Amartya. *Development As Freedom*. New York: Anchor Books, 2001.

Shafik, N., and Bandyopadhyay, S. "Economic Growth and Environmental Quality: Time Series and Cross-Country Evidence." *Background Paper for the World Development Report, The World Bank.* (1992): http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/1992/06/01/000009265_3961003013329/Rendered/PDF/multi_page.pdf

Sinha, S. "The 'New Traditionalist' Discourse of Indian Environmentalism." *The Journal of Peasant Studies* 24, no. 3 (1997): 65-99.

Stern, D. "The Rise and Fall of the Environmental Kuznets Curve." *World Development* 32, no. 8 (2004): 1419-1439.

Stern, D., Common, M., and Barbier, E. "Economic Growth and Environmental Degradation: The Environmental Kuznets Curve and Sustainable Development. *World Development* 24, no. 7 (1996): 1151-1160.

Suter, W. Newton. "Qualitative Data, Analysis, and Design: Chapter 12." In *Introduction to Educational Research, A Critical Thinking Approach.* Sage Publications, 2012.

The World Bank. *Sustainable Development Overview: Context.* The World Bank Group, 2014. http://www.worldbank.org/en/topic/sustainabledevelopment/overview

The World Bank. *The World Bank Group Goals: End Extreme Poverty and Promote Shared Prosperity.* The World Bank Group, 2013. http://www.worldbank.org/content/dam/Worldbank/document/WB-goals2013.pdf

Timmons Roberts, J. and Bradley Parks. *A Climate of Injustice: Global Inequality, North-South Politics, and Climate Policy.* Cambridge: MIT Press, 2007.

Todaro, Michael P. and Stephen C. Smith. *Economic Development,* 10th ed. Boston: Pearson Addison Wesley, 2009.

UN Atlas of the Ocean. "Impact of Tsunamis on Ecosystems*." UN Atlas of the Oceans: Website.* Accessed 1 March 2014. www.oceansatlas.org/servlet/CDSServlet?status=ND03MTY4NyY2PWVuJjMzPSomMzc9a29z

United Nations Development Programme (UNDP). "Beyond Scarcity: Power, Poverty and the Global Water Crisis." *Human Development Report* (2006): http://hdr.undp.org/en/media/HDR06-complete.pdf

United Nations Development Programme (UNDP). "*Human Development Reports: Human Development Index."* Accessed 3 February 2014. http://hdr.undp.org/en/statistics/hdi/

United Nations Framework Convention on Climate Change (UNFCCC), *Handbook*, 2006. http://unfccc.int/resource/docs/publications/handbook.pdf

U.S. Geological Survey (USGS). *FAQ: Everything You Want to Know About this Earthquake & Tsunami.* USGS: Earthquakes, Website. Accessed 2 December 2013. http://earthquake.usgs.gov/earthquakes/eqinthenews/2004/us2004slav/faq.php

Watts, Michael and James McCarthy. "Nature as Artifice, Nature as Artefact: Development, Environment and Modernity in the Late Twentieth Century." In *Geographies of Economies,* edited by R. Lee and J. Wills, 71-86. London: Arnold, 1997.

Williams, C., and Millington, A. "The Diverse and Contested Meanings of Sustainable Development." *The Geographical Journal* 170, no. 2 (2004): 99-104.

World Commission on Environment and Development (WCED). Report: *Our Common Future.* 1987. http://www.un-documents.net/our-common-future.pdf

Appendix A.

Joint Mangrove Management project steps:

1. Situational analysis: Understanding biophysical conditions, resources, and use patterns of stakeholders.
2. Project site selection: Based on intensity of mangrove use, socio-economic conditions, and interest in active participation.
3. Participatory Rural Appraisal: Understanding the concerns of those involved in mangrove conservation and management, as well as those involved in socio-economic development.
4. Formation of Village-Level Mangrove Council: Forum for stakeholders to discuss issues and decide on actions in regards to concerns identified during participatory rural appraisal stage.
5. Identification of Mangrove Management Unit: Identify mangrove area traditionally used by community, areas of conflict, and activities to restore and conserve this area.
6. Preparation of annual micro-plan: Detailed plan of activities to be implemented by Mangrove Council, and identify funding sources.
7. Implementation, monitoring, and evaluation: Implementation and monitoring occurred throughout the project life; however, post-project formal evaluation was not completed.

Appendix B.

Interview discussion questions and topics:

- Survey-type information
  - Name
  - Age
  - Marital status
  - Primary occupation
  - Land ownership
  - Education level (of participant)
  - Education level (of participant's children)
  - Caste/tribe
  - Religion
- Discussion questions
  - What aspects of the JMM project were you involved with directly, and indirectly
  - In what ways, if any, has this project impacted your life
  - How do you define the concept of 'quality of life'
  - In what ways, if any, has this project impacted your ability to have the quality of life you desire
  - In what ways, if any, has this project impacted the overall quality of life within your community
  - In what ways, if any, would this project have been different if it had focused only on the environment
  - In what ways, if any, would this project have been different if it had focused only on development

Appendix C.

Joint Mangrove Management project achievements found by MSSRF:

1. A total area of 675 hectares (ha) has been restored, and healthy mangroves in 2,720 ha are being protected by the village-level institutions.
2. A total number of 5.5 million saplings have been planted by the community; average survival is 68%.
3. Eight village-level institutions having been formed, with 885 families as members, to plan and implement JMM and socio-economic development programmes.
4. A total of 85 self-help groups (50 of women and 35 of men) have been formed with 815 members belonging to the poor and the poorest sections of the mangrove-dependent community. These SHGs mobilized Rs 16 lakhs (approximately 26,500 USD) through savings, as well as through financial assistance under the District Rural Development Agency SGSY scheme.
5. 16 types of micro-enterprises – both group- and individual-based – covering 402 families, have been initiated.
6. Some 560 members of the village-level institutions and SHGs have been trained in leadership and membership qualities, functional aspects of SHGs, mangrove restoration, and a number of micro-enterprises, as well as agriculture- and fisheries-related activities.