QUESTIONING THE TRANSFORMATIONAL POTENTIAL OF PAYMENT FOR ECOSYSTEM SERVICES IN FOREST CONSERVATION: A CASE FOR GREATER CONNECTIVITY IN MANAGING COMPLEX SOCIO-ECOLOGICAL SYSTEMS

by

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ABSTRACT

For over two decades complex socio-ecological problems such as climate change and deforestation have been analyzed by a broad cross-section of sustainability stakeholders. The resultant accumulation of research has undoubtedly increased societal understanding of the complex social and ecological interdependencies underlying these challenging issues; it has also fueled development of a range of possible interventions. Payment for ecosystem services (PES) tops the list of current policy proposals due to its celebrated problem solving potential. According to the theory of post-sustainable development (Morse, 2008), however, proposed sustainability interventions will fall short of expected deliverables unless they facilitate mutual learning via a process of self-reflective, pluralistic engagement. Post-sustainable development suggests that resolving complex socio-ecological problems requires acknowledging and engaging the plurality of ideas and beliefs which both create unsustainable conditions and which drive the development of sustainability solutions. This research uses an impact assessment meta-analysis of evaluations conducted for select PES initiatives in Costa Rica, Brazil and Ecuador to question the capacity of PES for pluralistic, self-reflective engagement. Does PES promote processes that encourage post-sustainable development, e.g. pluralistic stakeholder engagement built on self-reflective dialogue and mutual learning?

The PES impact assessment meta-analysis provides a first point of entry into an examination of the potential for pluralistic engagement which is then further

considered within the context of Trinidad and Tobago and an examination of the practicalities of self-reflective engagement as proposed by a Sustainability Assessment framework. In each of the three case study contexts, a plurality of perspectives was identified, with distributional trends varying according to socio-ecological contexts and the strength of a diversity of stakeholder input. The impact assessment meta-analysis concluded that contextual variability across the examined case study countries influences PES expectations and quite often determines initiative design, implementation strategy, and evaluation criteria. Perspectives plurality, therefore, is a function of localized social, economic and political histories and interactions. In terms of practicalities of pluralistic engagement, stakeholder examination of the sustainability assessment framework concluded that broad stakeholder participation in policy processes does not guarantee self-reflective engagement of a plurality of PES and sustainability ideologies. In summary, this research suggests that the PES policy as currently applied in case studies investigated has *not* demonstrated a capacity for promoting new, transformative stakeholder engagement processes. A model of socio-ecological connectivity is proposed to advance a sustainability conceptualization which acknowledges and accepts the complexity challenges raised by post-sustainable development theory.

Chapter 1

THE CHALLENGE OF SUSTAINABLE FOREST MANAGEMENT

"Forests play an essential role in mitigating climate change and providing products and ecosystem services that are essential to the prosperity of humankind. Forests and forestry play a central role in the development of modern civilization." (FAO, 2010:v)

The United Nations General Assembly (UN) declared 2011 the International Year of the Forests, "Forests for the People." This highly symbolic declaration and subsequent series of high-profile meetings and events that peppered the year of observance were part of a larger, decades-long international campaign to promote sustainable forest management practices designed to ensure that forest resources and the many benefits they provide to society are maintained. Forests currently cover over one third of the earth's terrestrial surface, are home to 300 million forest-dwelling people, and provide livelihood benefits to an additional 1.6 billion who rely directly on forest goods and services for their economic well-being (United Nations Food and Agricultural Organization [FAO], 2010). Forests are recognized for their essential role in climate change mitigation and adaptation (Stern, 2005). The global forest biomass is estimated to store upwards of 289 gigatonnes of CO_2 (FAO, 2010) and contribute between 11-17% of global CO_2 emissions (Intergovernmental Panel on Climate Change [IPPC], 2007). Tropical forests produce over 40% of the world's oxygen supply and house 80% of the planet's biological diversity (Rayner et al, 2010). Tropical forests are also estimated to have spawned over 25% of modern medicines worth an estimated US$100 billion annually (The Economist, 2010).

This shortlist of forest goods and services represents but a fraction of the socio-economic benefits derived from forest ecosystems. And while the "Forests for the People" campaign potentially increased societal awareness of these benefits, it has had a negligible impact on forest management practices and trends in forest use. A similar assessment can be leveled against the effectiveness of international agreements, and conventions, standards and certification mechanisms that constitute the bulk of international initiatives to arrest global deforestation. In the decades following 1992 Rio Earth Summit and the inter-governmental adoption of the Statement of Forest Principles, international coalitions such as the International Tropical Timber Organization (ITTO), the Forest Stewardship Council (FSC), and the Intergovernmental Panel on Forests [which subsequently became the United Forests Forum (UFF)] developed and promoted sustainable forest management standards and certification metrics to encourage more sustainable forest management practices. Collectively these efforts undoubtedly raised further awareness of the benefits of improved forest management practices; however measurable impacts remain negligible. According to the FAO, global deforestation rates since the 1980s have varied between 13-18 million ha annually; and as much as one third of this loss is biodiversity-rich, multiple ecosystem service delivering primary forest (FAO, 2003, FAO, 2010). The tropical forests of South America have the highest annual net forest loss at 4 million ha annually, followed closely by those on the African continent which lose on average 3.4 million ha annually (FAO, 2010).

In 2005 a new policy driven by the increased awareness of the many social benefits derived from forest ecosystems emerged as a promising solution to the challenge of sustainable forest management. Payment for ecosystem services (PES) is

a conservation policy that directly acknowledges the vast array of goods and services provided by nature. The innovation of the PES policy is its proposal to capture that awareness through systems of economic valuation and ecosystem service exchange. The most prominent example of this push toward a commodity-based conservation strategy is the ongoing effort to establish forest carbon markets. Widespread interest in the role of forest carbon within the context of climate change mitigation piqued following the release of several prominent international promoting forest carbon offsets as efficient and cost-effective climate change mitigation strategy (Stern, 2005, IPCC, 2007, Eliasch, 2008). The heavy focus on forest carbon, however, loses sight of the trees. As a sustainable forest management strategy, the PES conservation strategy driven by largely by economics and the primacy of ecosystem service is likely to suffer from the same theory-praxis disconnect that its predecessor sustainable forest management proposals.

Several factors are proposed to account for this disconnect between theoretically sound sustainable forest management proposals and the measurable impact of sustainable forest management practices. First, the simplicity of these proposals (informational campaigns, international conventions, and resource management certification schemes) underestimates the complexity of variables impacting resource use decisions (Cash et al, 2006, McShane et al, 2010, Rammel et al, 2007, Putz and Romero, 2012). Nobel Prize winner Elinor Ostrom's work on resource governance institutions highlights the multi-layered, multi-scalar complexity surrounding natural resource management (Moran and Ostrom, 2005, Ostrom and Cox, 2010, Nagendra and Ostrom, 2011) and is shown in Figure 1.1. Ostrom is frequently credited with coining the term 'socio-ecological system,' a concept

promoting natural resource management as a function of: i) the biophysical resource, ii) established systems of governance, iii) overarching cultural, political and economic systems, and iv) and the multi-layered, multi-scalar interactions amongst these various system components (Anderies et al, 2004, Ostrom, 2009). An equally prominent communication of socio-ecological complexity is the 2005 Millennium Ecosystem Assessment (MA). This five-year United Nations (UN) initiative was a comprehensive assessment of the planet's biophysical resources base, analyzed by ecosystem type as well as by the multi-scalar anthropogenic activities impacting overall ecosystem functioning. Figure 1.2 illustrates the MA interpretation of the multi-scalar socio-ecological interactions contributing to the currently degraded state of global forest resources.

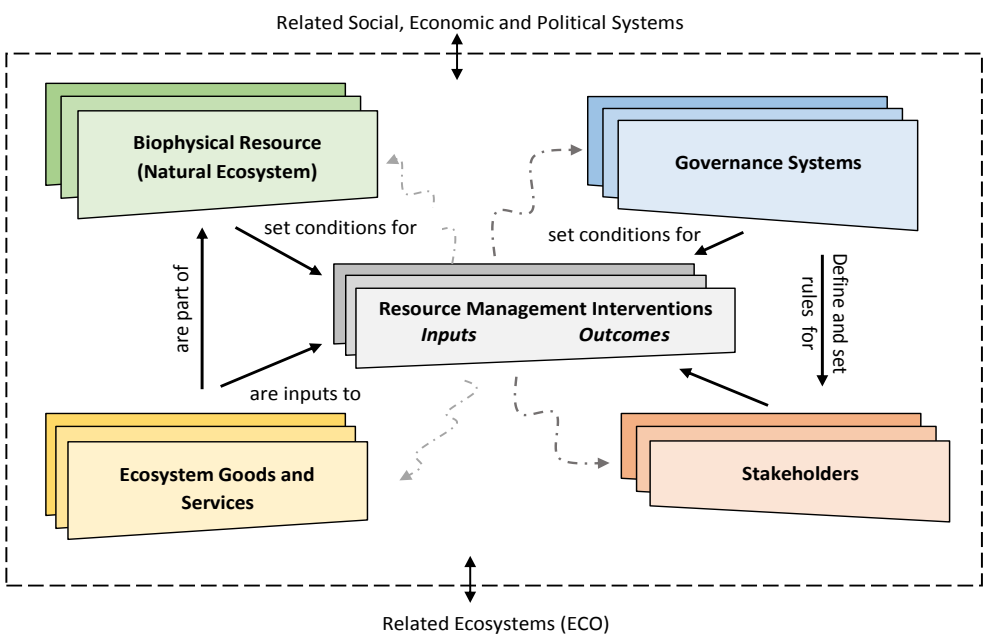

Figure 1.1: Socio-ecological complexity from the Institutional Analysis and Development Framework (Ostrom and Cox, 2010)

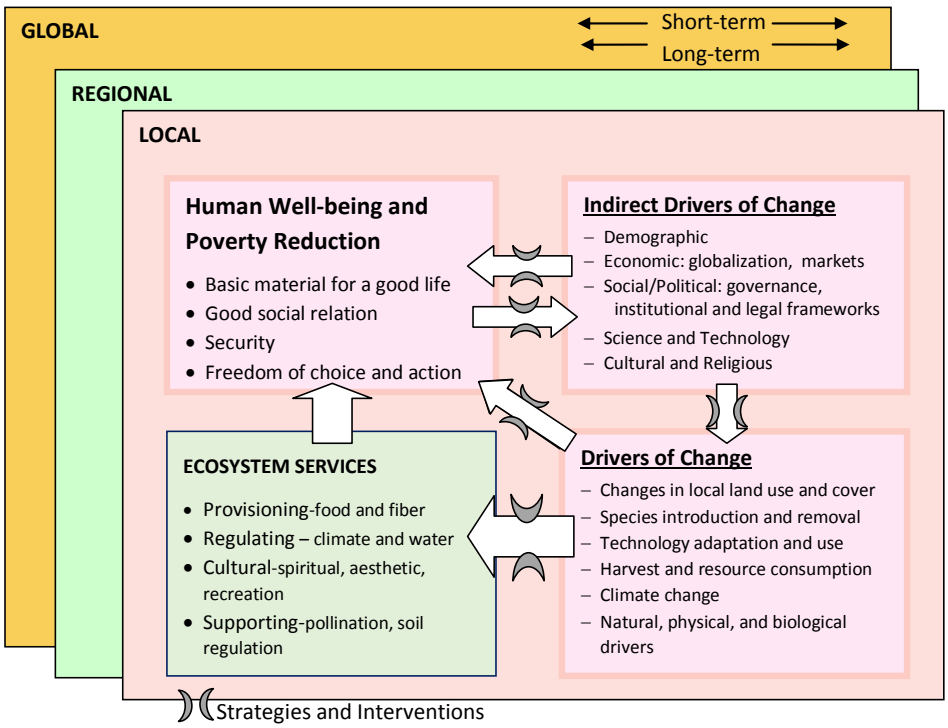

Figure 1.2: Socio-ecological complexity as interpreted by the Millennium Ecosystem Assessment (MA, 2005)

Socio-ecological complexity as proposed by these two models - of which there are undoubtedly more -- is akin to the political economy framework popular within disciplines of economics, sociology, political science and human geography (Zimmerer and Bassett, 2003, Robbins, 2004, Walker, 2005, Swyngedouw, 2009). From a geography lens, socio-ecological complexity is more frequently analyzed from a political ecology framing that stresses the co-evolutionary character of social and environmental interactions while additionally emphasizing the influence of multi-scalar political and economic variables. Political ecology acknowledges contextual variability, geographies of difference, and the role 'place' plays in creating a particular

socio-ecological context (Zimmerer and Basset, 2003). And while each interpretation of socio-ecological complexity highlighted above acknowledge multi-scalar variables, it could be argued that socio-ecological analytical frameworks as proposed by the MA and Ostrom's Institutional Analysis and Development (IAD) Framework draws a tighter boundary around the scale of analysis, concentrating predominantly on the social, cultural, economic and political systems that engage directly with a clearly defined and bounded biophysical resource. In contrast, political ecological analysis expands its frame of analysis beyond a biophysical boundary and gives additional consideration to externally influential political, economic, and cultural variables operating at broader scalar dimensions such a regional, national, and global. The MA interpretation of socio-ecological complexity adds spatial and temporal considerations to its model; however, these considerations appear to be secondary to a more localized level of analysis. Although a focus on the identification of scalar-designated influences can be problematic (Marston et al, 2005), attention to multi-scalar influences beyond a narrowly bounded landscape can offer additional insight into the perpetuating causes of a sustainable forest management theory-praxis disconnect.

Multi-layered, multi-scalar socio-ecological complexity provides, however, only partial explanation for the theory-praxis disconnect in sustainable forest management goals and outcomes. Equally critical and equally overlooked is what this research labels as perspectives plurality. Perspectives plurality is why the IAD, MA and political ecology frameworks can each provide a unique explanation for socio-ecological complexity. While the intent of each concept is to highlight the multi-layered, multivariate contextual variables which impact nature and society interactions, through choice of included components and scale of analysis, each adopts

a unique lens for framing that explanation. Quite simply, a perspective is the lens chosen for understanding a given issue. Perspectives plurality is equally identifiable in attempts to define and measure sustainability (Bell and Morse, 2003). A science-based perspective perceives sustainability predominantly as ecological resilience, ensuring resource extraction rates do not exceed those of regeneration and waste disposal rates do not exceed absorptive capacities. A science-based sustainability perspective focuses on measuring biophysical characteristics. A social orientation to sustainability recognizes biophysical limits but understands the problem of unsustainable resource more as a function of socio-economic inequity; proposing interventions geared toward enhancing well-being and equity. A socially driven sustainability perspective measures changes in physical infrastructure and human capital. An economic understanding of sustainability accepts biophysical and social concerns but focuses on efficient resource use and allocation as the appropriate intervention. While allocation has an inherently ethical component, economically-determined sustainability does not seek to address that element of efficiency and instead measures easily quantifiable indicators such as increased the forest cover or water quality improvements that result from a given sustainability intervention. A composite set of metrics can sometimes capture the collective of these disparate perspectives, yet a challenge remains in reconciling the often competing interests of ecological resilience, social well-being, and economic efficiency within a singular policy objective. This challenge highlights a third contributor to sustainable forest management theory – praxis disconnect, an ability to mediate the value conflicts which underpin perspective plurality.

The widely recognized definition of sustainable development, development which meets the needs of the present without compromising the ability of future

generations to also meet their needs (Brundtland, 1997), can be considered a sound theoretical attempt to consolidate ecological, social and economic perspectives into one singular objective (Harris, 2003). The concept is 'superficially simple' yet capable of carrying a wide range of meanings and interpretations which translate into highly variable actions and expectations (Redclift, 2005). From one perspective sustainable development as defined by the Brundtland Commission is considered an ecocentrist concept which demands changes in societal attitudes toward nature. Alternatively, it can adopt a more technocratic approach and seek improvements to social and ecological conditions via technical and managerial solutions. A third, socio-political perspective proposes the need to re-structure the overarching social and economic institutions. Here again, however, simplicity trumps reality. Theory remains disconnected from practice.

The exceptionally broad and, possibly deliberately, vague definition of a multi-perspective sustainability ideal provides little direction on *how* the goal of sustainable development might be achieved, or *how to negotiate* between three competing and potentially conflicting sustainability goals of ecological resilience, social equity, and economic growth (Redclift, 2005). While the theoretical ideal of satisfying these three agendas is attractive, it has been critiqued for being operationally impossible (Sachs, 1999, Harris, 2003, Sneddon et al, 2006). Nasi and Frost (2009) examine the impossibility of satisfying diverse and conflicting perspectives within the context of sustainable forest management which is also vaguely defined as "forest resources and forests lands managed in a manner that would ensure the social, economic, ecological, cultural and spiritual needs of present and future generations" (Schneider, 2006, FAO, 2010). Recognizing the challenge of negotiating between conflicting perspectives,

Nasi and Frost (2009:4) advocate for a reconceptualization of sustainable forest management that moves away from static goals and fixed targets and moves toward sustainable forest management as a co-evolutionary process that understands the complexity of socio-ecological interactions and acknowledges a multiplicity of agendas through a mix of "*top-down and bottom-up approaches in which local as well as expert knowledge is recognized, valued, and used*."

This dilemma of shared aspiration within a realm of conflicting operational proposals is captured in the little known theory of Post-Sustainable Development (Morse, 2008). The theory of post-sustainable development highlights these sustainability and sustainable forest management challenges, addressing historical policy failures caused by a limited recognition of divergent social values, or spatially and temporally variable social 'needs' (Moran, 2010). "*Discussions about what matters and why are at the heart of resolving the sustainability dilemma*" (Fish, 2011:678).

Morse's theory argues that the overarching principle behind the Brundtland Commission definition of sustainable development – *an equitable, just and sustainable world in which the rights and interests of all are incorporated* (p. 28) – has near universal agreement. Disagreements emerge, however, over how to operationalize this principle. The theory of post-sustainable development emerges from a desire to give voice to the post-development argument that 'sustainable development' as practiced is nothing more than the expansion of a Post-World War II capitalist ideal in which wealthier 'developed' nations seek to 'create a world in their image.'

> *Sustainable development is seen by post-developmentalists at best as simply yet another example of Western hegemony and at worst a cruel deception: nice sounding words and ideals, but in fact nothing more than business as usual given that 'progress' equates to consumerism, industrialization and inevitable pollution (Morse, 2008:343).*

Post-sustainable development theory acknowledges the contribution of the post-development critique to the sustainable development debate, most notably it's questioning of whose agenda and whose discourse is driving sustainable development action. Addition of the 'post' prefix to sustainable development, however, proposes a focus on the shared principle of a just, equitable and ecologically resilient world and the mediation between divergent beliefs on how this principled ideal might be achieved. Morse advocates mediation between post-development appeals for more localized control and the expert-driven global agenda of sustainable development because neither position is uniquely ideal or necessarily mutually exclusive. Where local voices provide insight to context, expert knowledge can holistically consider the impacts of sustainable development proposals across broader spatial and temporal scales. The study of climate change highlights clearly the intimate relationships between local (state and regional) actions and wider global impacts, as well as the immediate and long term effects of chosen development patterns. Within the context of post-sustainable development, therefore, 'post' does not suggest an 'anti' position, instead it advocates for the inclusion of all. It further advocates for self-reflective inclusivity to provide a better understanding of decision-making rationale.

> *While post-sustainable development would share with post-development the need for grassroots participation, analysis of discourse, and embracement of diversity, it would also include the voice of the expert and accept that within this analysis some local voices may simple be wrong and the expert may be right…It means an increased emphasis on process by encouraging self-reflection by all*

> *involved to help with setting end-points and approaches but also to facilitate an appreciation of why decisions are being made (Morse, 2008:349).*

Post-sustainable development acknowledges that values and beliefs represented by grassroots and expert voices from local to global perspectives form the basis of sustainability recommendations operating at any scale. Achieving post-sustainable development, therefore, depends on engaging in the difficult process of uncovering and mediating between these diverse socio-ecological values, perspectives and beliefs. The base action of a post-sustainable development framework is creating a process of pluralistic, self-reflective engagement. In this context, self-reflection is the outcome of the identification, exposure, and engagement of socio-ecological ideals and beliefs within the problem identification and solution visioning processes. Pluralistic, self-reflective engagement creates opportunities for mutual learning in which all stakeholder perspectives are to some degree transformed as opposed to forcing compromise and consensus on more dominant ideologies. A post-sustainable development agenda, capable of affecting meaningful and desired socio-ecological change, requires making transparent dominant, hegemonic beliefs just as openly as it requires engaging the disenfranchised and marginalized. The fundamental procedural requirement of a post-sustainable development agenda was quite eloquently stated by Funtowicz and Ravetz (1993) over twenty years ago:

> *Only a dialogue between all sides, in which scientific expertise takes a place at the table with local and environmental concerns can achieve creative solutions to such problems which can then be implemented and enforced. Otherwise either crude commercial pressures, inept bureaucracies, or counterproductive interests will dominate to the eventual detriment of all concerned (Funtowicz and Ravetz, 2003:751).*

Socio-ecological complexity, perspectives diversity, and a limited acknowledgement of divergent social values have been highlighted as contributors to the continued failure of sustainable forest management initiatives to effectively reverse the global trends of deforestation and forest degradation. There is a growing recognition within the sustainable development and sustainable forest management literature that future resource management proposals need to acknowledge these realities and embrace the post-sustainable development operational practice of self-reflective engagement of the diversity of perspectives operating within a given socio-ecological context (Meppem and Gill, 1998, Adger et al, 2003, Harris, 2003, Nasi and Frost, 2009. Rayner et al, 2010, Polasky et al, 2011). This research adopts this expectation as the basis for examining the transformational capacity of the natural resource management proposal increasingly promoted for its ability to accommodating socio-ecological complexity, the payment for ecosystem services conservation policy.

Payment for ecosystem services (PES) is a conservation strategy with the potential to raise awareness about the importance of sustainable resource use while simultaneously acknowledging socio-ecological complexity, and negotiating between diverse perspectives and competing interests to ultimately spur concrete action toward improved resource management (Pagiola et al, 2002, Pagiola et al, 2005, Eliasch, 2008, Wünscher et al, 2008, Emerton et al, 2009). Payment for ecosystem services is an incentive-based approach to natural resource management in which the *users* or beneficiaries of an identified *ecosystem service* provide compensation to ecosystem service *providers* or stewards of the source ecosystem in order to support and encourage provider actions which *maintain* ecosystem service delivery and promote socio-ecological resilience (Grieg-Gran et al, 2005, Arriagada and Perrings, 2009).

The PES concept is an increasingly attractive conservation policy option due to its perceived institutional simplicity and operational efficiency (Wunder, 2005b). An additional strength is its potential to generate new sources of conservation finance above and beyond traditional sources such as state funds, donor contributions, and/or loans from multi-lateral institutions (Pagiola et al, 2002, 2004, Pattanayak et al, 2010). Its multiple proposed benefits have been vigorously championed by international studies (TEEB, 2010) and are the subject of a steady stream of research reports and policy briefs prepared by development institutions (World Bank[1], International Institute for Environment and Development[2], Overseas Development Institute[3]) and conservation organizations (World Wildlife Fund[4], Conservation International[5], The Nature Conservancy[6]) with sustained financial backing from national governments (Norway, Germany, Australia).[7] It currently forms the basis of a major component of an emerging post-Kyoto climate change mitigation strategy in the form of REDD+

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[1] The World Bank is actively engaged in PES projects in Costa Rica, Nicaragua, Ecuador, Brazil, Mexico, and Panama (http://go.worldbank.org/ZJ6ABRH770).

[2] The UK-based IIED has been at the forefront of PES research and currently conducts research on PES through its Sustainable Markets Group (www.iied.org/group/sustainable-markets).

[3] The UK-based ODI supports research into expansion of the REDD+ mechanism (www.oid.org.uk/search/site/REDD).

[4] The Forest and Climate initiative of WWF Global supports research and information exchange on REDD+ (http://wwf.panda.org/what_we_do/footpring/forest?climate2/).

[5] The CI climate change initiative mobilizes international funding to support REDD+ initiatives (www.conservaton.org/learn/climate/soslutions/pagtes/solutions/.aspx).

[6] TNC has supported multiple PES initiative in Latin America (www.nature.org/ourinitiatives/regions/latinamerica.)

[7] See www.climatefundsupadate.org for more information on global forest and climate initiatives of the Norwegian, German, and Australian governments. As of Dec. 2013 a total of US$ 9 million funds have been pledged for climate mitigation and adaptation.

(Reducing Emissions from Deforestation and forest Degradation) (Hall, 2012, Visseren-Hamakers et al, 2012).

Experiences of ongoing PES initiatives, however, suggest that PES as a win-win-win conservation policy has more conceptual and operational contradictions than sustainability potential (Redford and Adams, 2009, Salafsky, 2011, Robertson, 2012). Critical voices from multiple disciplines, including those from geography, question how a conservation policy based on a utilitarian understanding of nature and a singular economic framing of value can transcend the perspectives plurality and value conflicts which challenge agreement on the concept of sustainability and plague its operationalization (McCauley, 2006, Norgaard, 2010, Gomez-Baggethun et al, 2010, Robertson, 2006, Dempsey and Robertson, 2012). Harvey (1996) argued long before the PES-driven process of assigning economic value to nature's services gained its current prominence that any conceptualization of fixed value must be accompanied by an understanding of the process of valuation. In suggesting a need to understand how and why 'permanences' are created, Harvey might be considered to have been advocating for a post-sustainable development process of self-reflection.

> *Once we come to appreciate how such processes operate, we can also better understand how and why certain kinds of permanence get constructed in particular places and times so as to form dominant social values to which most people willingly subscribe (Harvey, 1996:11).*

This research asserts that the 1992 *Statement of Forest Principles* and all subsequent post-1992 sustainable forest management proposals have failed to deliver on their sustainability objectives largely because of their failure to acknowledge socio-

ecological complexity, perspective plurality, and the ubiquity of value conflicts. It examines the potential of a PES conservation policy to transcend the scientific and economic framing characterizing most sustainable development and sustainable forest management proposals. *Does a payment for ecosystem services (PES) conservation policy have the potential to accommodate socio-ecological complexity, perspectives plurality, and negotiate between conflicting values?*

Payment for ecosystem services as a conservation strategy has been used in select, localized contexts for over a decade; however even within these relatively controlled contexts the policy's social and ecological impacts remain varied and uncertain. This uncertainty is a function of limited ex-post assessments (Caplow et al, 2011), as well as the varied metrics used in evaluation (Locatelli et al, 2008). It is not the intention of this research to analyze the strengths and weakness of PES in the specific delivery of social, ecological and economic benefits, but to instead investigate the validity of PES model's transformational claim. Is there evidence to suggest that PES applications might encourage an improved socio-ecological problem solving *process* that acknowledges socio-ecological complexity, perspectives diversity and value conflicts? Can PES succeed in fostering new thinking about sustainability that moves away from fixed metrics and universal standards to a co-evolutionary learning process that embraces socio-ecological complexity and its multiplicity of agendas? Does PES promote processes that encourage post-sustainable development, e.g. pluralistic stakeholder engagement built on self-reflective dialogue and mutual learning?

The transformational capacity of PES and its relationship with post-sustainable development aspirations of self-reflective engagement is examined from two angles of inquiry. The first involves a meta-analysis of the impact assessment literature for three unique PES case study contexts – Costa Rica, Brazil and Ecuador. A meta-analysis involves combining results from a variety of differently conducted studies on a particular topic in order to identify patterns and relationships not likely to be discernible from a single investigation. The contexts selected for the meta-analysis were chosen for their established history with PES-based conservation programs. Costa Rica is host to the longest running PES initiative, *Programa Pago por Servicios Ambientales*, a model which has spawned a next generation of PES initiatives including the international REDD+ climate change mitigation and adaptation initiative. Brazil has a slightly shorter history with PES, but is an important case study due to its jurisdiction over the vast majority of the Amazonian rainforest, a globally important forest ecosystem. Several of the Brazilian states which contain large tracts of Amazonian rainforest have adopted state-level PES conservation strategies. The inclusion of the Ecuador case study provides an opportunity to examine more localized PES initiatives as the country has the largest number of municipal scale PES initiatives, all of which are designed to improve water resource management.

Each of the selected case study contexts has varying social, political, economic and ecological conditions. The PES initiatives selected vary in terms of jurisdictional scale across the three contexts. And each of the investigated PES initiatives has a unique history in terms of developmental motive and operational structure. These many layers of variability are intended to expand analytical opportunities for understanding the transformational potential of PES.

Impact assessment is chosen as the point of entry within the meta-analysis for examining the transformational potential because choice of assessment measure can be considered reflective of goals and values (Ferraro and Pattanayak, 2006, della Porta and Keating, 2008). For example, impact assessment focused on metrics for cost-effectiveness or acreage of enrolled forests ultimately seeks to reinforce the underlying assumptions and expectations of the PES model; e.g. its capacity for cost-effective natural resource conservation. Assessments exploring improvements in socio-economic well-being and cost-benefit equity, however, challenge the model's 'win-win' effective and efficient promise. Investigations that examine how PES initiatives impact security of resource rights and tenure, or influence shifts in existing power hierarchies, dig into the realm of questioning how conservation policies influence the dynamics and interactions of socio-ecological systems. The choice of assessment metric, however, limits the scope of evaluation and produces a partial view of a policy's full impact. Each assessment, therefore, represents a unique perspective with uniquely focused analytical measures. In each of the selected case study contexts, the impact assessment literature is examined for trends in analytical priorities, trends which are then analyzed for evidence of perspectives plurality.

The second line of inquiry examines the practical potential for reflective engagement via the use of a Sustainability assessment framework. The sustainability assessment framework is promoted by the impact assessment practitioner community as an assessment process in which diverse stakeholder groups participate in the entirety of the conservation policy cycle beginning with the front-end task of socio-ecological problem definition through to the design and delivery of monitoring systems and evaluation criteria. Similar to the biased picture which can emerge from

selection of analytical indicators, socio-ecological problem framing also limits and narrows the scope of potential interventions (Sayer et al, 2007, Greenwood and Holt, 2010). The intent of the sustainability assessment framework, therefore, is to ensure that diverse perspectives contribute to an understanding of the initial policy problem, as well as to determining appropriate intervention measures and evaluation metrics. The sustainability assessment framework promotes a deliberate practice of pluralistic or reflective engagement in which perspectives and ideologies are exposed and acknowledged as important considerations to the problem solving process (Hunsberger et al, 2005, Gibson, 2006, Chouinard, 2013, Bond et al, 2013). While the actual execution of a sustainability assessment is beyond the scope of this research, the potential for reflective engagement is explored via stakeholder examination of the sustainability assessment framework for emerging PES initiatives in Trinidad and Tobago.

Pluralistic engagement processes seek to identify and expose varying sets of values and beliefs for the express purpose of enhanced mutual learning. A distinction is made between the goals of multi-stakeholder engagement processes and those seeking to engage pluralistic perspectives. Multi-stakeholder processes are typically concerned primarily with broadening stakeholder participation, ensuring that all stakeholder groups are represented, and providing participation opportunities for frequently marginalized and vulnerable populations. Broadly defined, a *stakeholder* is an individual or entity with something to lose or gain from a particular process or project, whereas a perspective represents an attitude, framing or vantage point – a particular perception of reality (Reed et al, 2009). As will be illustrated in Chapter 6 (Trinidad and Tobago Field Exploration), multi-stakeholder processes are not

automatically synonymous with pluralistic engagement as a diversity of stakeholders can still share one articulated set of belief, or common perspective.

The concept of *perspectives* emerges from an acknowledgement that there is "*no value-free interpretation of society; that all intellectual, political and personal actions are guided by values and interests"* (Kenny, 1994:17 as quoted in Meppem and Gill, 1998:126). *"The [socio-ecological] environment to which managers respond is not a set of independently given, scientifically-observable facts but rather from a set of perceptions*" (Stacy, 1993:16 as quoted in Meppem and Gill, 1998:131). Shared mental models of issues and problems are based on historical traditions, cultural practices, and experiential learning (Meppem and Gill, 1998). Multiple perspectives are considered by some geography scholars as competing sources of situated and partial knowledge (Haraway, 1998, Squires, 1993). Prominent socio-ecological theories which highlight the existence of multiple perspectives include post-development, post-structuralism, and post-colonialism, all of which represent a revolt against a hegemonic interpretation (dominant perspective) of the world and a universal system for valuing natural resources. The theory of post-sustainable development, supported by a subset of feminist political ecology scholarship, stresses, however, that diverse perspectives and multiple ways of knowing represent little more than a starting point from which to understand how the world actually works (McDowell, 1995). The critique from this position of the above mentioned 'post' theories (post-structuralism, post-development, post-colonialism) is their unspoken intent to supplant what is viewed as northern hegemony with almost singular focus on the value of local input (Morse, 2008). Attempts to meaningfully embrace multiple perspectives acknowledge, in contrast, that "*no insider perspective is privileged, because all drawings of inside-*

outside boundaries in knowledge are theorized as power moves, not moves toward truth" (Haraway, 1998:576).

The above critiques of the previously mentioned dominant development discourses (post-development, post-structuralism, post-colonialism) additionally recognize that accepting the inevitability of perspectives plurality does not automatically require a directionless world of absolute relativism; it can instead lead to one of synthesis and connectivity, and of mediating between different knowledge creating communities and existing power differentials (Haraway, 1988, McDowell, 1995). The challenge, for theory and for practice, lies in figuring out how to acknowledge multiple, and in some cases conflicting, sources of knowledge; how to understand how these competing perspectives are created; and to develop a process through which multiple perspectives can align behind a shared vision (Haraway, 1988). From a post-sustainable development framework the challenge of engaging perspectives plurality requires policy processes capable of exposing inherent and unstated pluralistic values and beliefs and then bringing them together to collectively craft a shared socio-ecological vision.

Exposing the pluralism of values and beliefs found within an identified context is no simple task. Discourse analysis has been utilized by multiple disciplines to uncover the existence of multiple 'realities' (Harvey, 1996, Fletcher, 2010, Hardin, 2011) and has been used to identify varied attitudes toward complex socio-ecological issues such as deforestation and climate change (Munda, 2004, 4008, Bäckstrand and Lövbrand, 2006). Discourse analysis is effective in i) defining a shared perspective on a particular phenomenon, ii) exposing embedded power regimes, iii) linking power

regimes to policy and institutional frameworks, and iv) understanding the power or dominance of the various discourses (Bäckstrand and Lövbrand, 2006). A form of discourse analysis is used within Trinidad and Tobago case study context to tease out perspectives regarding the sustainability assessment framework and its use within emerging PES initiatives.

In addition to examining the PES conservation policy, a secondary objective of this research is to encourage reflection on socio-ecological policy *processes.* This research asserts that meaningful engagement amongst a plurality of stakeholder perspectives can raise stakeholder awareness of the inherent complexity of socio-ecological systems, and of the existence and inevitable impact of underlying assumptions and beliefs. While the shared ideals of sustainable development, post-development, and post-sustainable development (e.g. democratic engagement and equity in participatory processes) are by no means new to conservation policy, little evidence exists to suggest these ideals have become broadly operational. If policy processes are to encourage new thinking for old problems, a process-oriented sustainability rather than one driven by fixed metrics and universal standards, they will need to promote cooperation and connection amongst the plurality of perspectives in lieu of accepting competition and conflict as inherent and unavoidable. This examination of the PES conservation policy via an impact assessment lens opens a discussion on the policy's intent and its capacity for greater socio-ecological connectivity.

The remainder of the document is outlined as follows:

Chapter 2 presents a PES literature review in a manner which tries to unpack the plurality of ideological perspectives currently associated with the policy proposal. The meta-analysis lens of this research discerned a range of narratives identifiable within the literature which are presented using a spectrum of PES based perspectives.

Chapter 3 presents a conceptual framework in which mutual learning through participatory, pluralistic engagement becomes the thread that ties dialectical inquiry and transdisciplinarity to the proposed post-sustainable development assessment practice – sustainability assessment.

Chapter 4 describes the methodology developed to identify and analyze the plurality of PES narratives present within each of the case study contexts.

Chapter 5 presents the findings of the PES impact assessment meta-analysis and highlights the range of values and beliefs identified within the Costa Rican, Brazilian, and Ecuadorian case study contexts. The second investigative angle into the transformational potential of the PES model, field-based stakeholder examination of the possibility of the sustainability assessment framework for guiding PES pilot initiatives in Trinidad and Tobago, is presented in Chapter 6. Sustainability assessment, introduced in Chapter 3, is an impact assessment framework which deliberately promotes mutual learning through pluralistic participatory engagement and as such represents an assessment methodology supportive of a post-sustainable development agenda. The goal of the case study investigations in both phases of inquiry was to identify the range of values and beliefs operating within diverse socio-

ecological contexts adopting PES initiatives and to examine, specifically within the Trinidad and Tobago case study, the institutional arrangements under which they could engage for the purpose of mutual learning.

Chapter 7 summarizes, based on perspectives plurality insights gained from each of the PES case studies, some of the practical challenges to the adoption of a post-sustainable development approach to socio-ecological problem solving identified by this research. The chapter additionally discusses the prospects for reflective engagement and mutual learning as they connect with current debates within geography on sustainability and PES.

The quest for sustainable development stakeholders, policy makers and practitioners, and the ultimate goal of this research, is to identify the potential for dialogue-based multi-stakeholder problem-solving processes proposing a learning based approach to sustainability. How do these processes and their resultant solutions answer the difficult yet essential sustainability questions of *Who pays? Who benefits? Who decides?* Or perhaps most importantly - *What is being decided?* What does sustainability mean for socio-ecological systems and what is required to achieve that vision? The theory of post-sustainable development acknowledges the value-laden challenge posed by these questions. Exploring PES from a post-sustainable development perspective questions the model's transformational potential to this end.

Chapter 2

PAYMENT FOR ECOSYSTEM SERVICES PERSEPCTIVES: POTENTIAL, PERIL, POSSIBILITY

"We must learn to dissect and harness complexity rather than eliminate it from socio-ecological systems." (Ostrom, 2009:420)

The concept of payment for ecosystem services (PES) has existed quietly within the ecological and economic discourses for decades (Redford and Adams, 2009, Gomez-Baggethun et al, 2010). It has been referred to as an '*eye-opening metaphor intended to awaken society to think more deeply about the importance of nature and its destruction through excessive energy and material consumption'* (Norgaard, 2010:1219). One particular notable ecosystem service-based awareness raising effort is the landmark study (*The Value of the World's Ecosystems and Natural Capital in 1997*) which conservatively estimated the annual global economic contribution of 17 ecosystem services[8] as between $36 and $58 trillion, double the Gross World Product of $39 trillion (all values are stated in 1998 dollars) (Costanza et al 1997). Economic valuation of nature's services is the basis of natural capitalism, a 'sister' concept to ecosystem services, which identifies natural resources with visible and direct *use* value (water, minerals, oil, trees, fish, soil, etc.) and their larger ecosystems (grasslands, savannahs, wetlands, estuaries, oceans, coral reefs, tundras, as well as temperate, boreal and tropical forests) which provide 'invisible' (ecosystems

[8] Since the 1997 study by Costanza et al, well over a dozen ecosystem services taxonomies have been developed (Brouwer et al, 2013).

services such water regulation, soil enrichment, coastal protection, etc.) and indirect *existence* (amenity) value as natural capital 'assets' (Daily, 1997, Hawken et al, 1999). Natural capital sustainability translates natural capital stocks into economic terms to provide more complete information about the impacts of resource use decisions. "*Humankind inherited a 3.8 billion year store of natural capital, little of which will remain in the next century given the current level of use and interaction*" (Hawken et al, 1999:2). Payment for ecosystem services is the latest attempt to raise public awareness about the state of planetary resources; it additionally seeks to directly influence nature and society interactions through the use of economic incentives. Over the past decade the intent of PES as an eye-opening interpretation of nature's value have been transformed into one of the dominant natural resource conservation policy models (Norgaard, 2010).

Ecosystem services were catapulted to the forefront of sustainable forest management discussions and international climate change negotiations following their inclusion in international climate change negotiations The 2009 *Cancun Agreement* included the climate change mitigation strategy of 'compensated reductions' (Santilli et al, 2005) first proposed by the Coalition of Rainforest Nations[9] led by the governments of Costa Rica and Papua New Guinea at the 2005 climate change negotiations in Montreal.

> *Compensated Reduction is a voluntary mechanism that offers tropical countries access to substantial market incentives for reducing emissions while respecting their sovereignty in selecting means and*

[9] The Coalition of Rainforest Nations is a network of governments, academic and industry representing over 40 countries working to address issues of tropical rainforest sustainability (http://www.rainforestcoalition.org).

> *investing returns….It is a strategy for an equitable global distribution of the costs and allocation of benefits for reducing deforestation. (Santilli et al, 2005:273)*

The principle of compensated reductions was adopted as i) a strategy to address alarming rates of deforestation in tropical countries such as Indonesia and Brazil, and ii) to engage all nations, not just Annex I counties[10], in contributing to global carbon emissions reductions (Santilli et al, 2005). The proposal's operational premise anticipates Annex I countries and other greenhouse gas emitting entities with carbon emissions reduction mandates will purchase carbon offsets generated through avoided deforestation and degradation land use activities such as forest conservation, improved (sustainable) forest management, and enhanced forest carbon stocks. Compensated reductions as initially proposed in 2005 is now known as REDD+ or Reducing Emissions through Deforestation and forest Degradation, a global-scale forest carbon PES initiative which is driving much of the debate around PES as a forest conservation strategy.

The growth in popularity of the PES model within the context of climate change has spurred a dearth of discussion, assessment and critique of i) the model, ii) its method of implementation, iii) its articulated objective and expectations, and iv) the potentially unintended social and ecological impacts. While there is no claim to have conducted an exhaustive literature review of the PES concept, a broad cross-section of

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[10] 'Annex I' is a geopolitical designation which emerged from the United Nations Framework Convention on Climate Change (UNFCCC). The list of Annex I countries includes industrialized nations as well as countries considered economies in transition (countries of the former Russian Federation). Under the 1997 Kyoto Protocol, only Annex I countries committed greenhouse gas emission reductions.

literature accessed from a variety of internet sources[11] as well as academic journals was reviewed. As noted in Chapter 1, the vast majority of reviewed PES literature was selected for its relevance to the South American context and for a focus on assessing the policy and its impacts. Literature selection was biased toward books and articles examining experiences of PES implementation, as well as on the assessment of impact and outcomes, however it also included theoretical discussions on design issues and implementation concerns of a PES-based conservation policy. This chapter first introduces in more detail the PES concept, and then explores a range of ideological positions which have emerged from within the PES literature. In order to effectively present these varying positions, the PES literature is presented in a somewhat unique format that utilizes the concept of perspectives plurality introduced in Chapter 1.

2.1. **What is Payment for Ecosystem Services?**

The chosen starting point for delving into the PES literature is an identification of the informally acknowledged and widely referenced PES definition proposed in 2005 by Sven Wunder of the Center for International Forest Research (CIFOR). Wunder's five part definition states that PES involves the following:

i) a voluntary transaction of a

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[11] The following is a list of the more active organizational listservs consulted (in no particular order): International Institute for Environment and Development (IIED), Global Canopy Programme (GCP), International Institute for Sustainable Development (IISD), FAO Infosylvia, World Resources Institute (WRI), World Wildlife Fund (WWF), Mongabay, United Nations Commission on Sustainable Development (UNCSD), Rights and Resources Institute (RRI), Ecosystem Marketplace, Center for Global Development, the Daily Climate, and the UN-REDD **Programme.**

ii) well-defined ecosystem service or land use practice likely to deliver that service which is
iii) ‘bought’ by a (minimum of one) buyer from
iv) a (minimum of one) seller
v) only if provision of the identified service or land use practice can be verified.

Three key elements are suggested as providing this conceptualization of PES with its ‘innovative’ status. First, the exchange is voluntary and not legislatively mandated. Second, compensation is awarded directly to the service provider for a defined output. And third, the exchange is conditional, i.e. compensation is provided only if the service is delivered (Pirard et al, 2010, Sommerville et al, 2010). The direct, conditional terms of ecosystem service exchanges are deliberate elements of the PES policy structure which encompass lessons learned from the lack of improved forest conservation practices derived from indirect, unconditional incentive structures of the PES predecessor policy, integrated conservation and development initiatives (Ferraro and Simpson, 2002, Romero et al, 2012). The voluntary nature of the exchange attempts to accommodate localized variability and the avoidance of a perceived universal participation mandate (Porras et al, 2008). Direct and conditional incentives create a clear link between action and reward.

Wunder’s very straightforward definition articulates a set of expectations for the process of ecosystem service exchange which is based on a number of fundamental assumptions. Most notably it assumes that creating systems to facilitate voluntary exchanges between ecosystem service users (buyers) and providers (sellers) will automatically produce more sustainably managed natural resources (Pagiola et al, 2002, Wünscher et al, 2008, Arriagada and Perrings, 2009). This assumption also lies at the heart of the climate change mitigation strategy of compensated reductions. This

assumption, however, overlooks the reality of socio-ecological complexity and the reality of value conflicts These omissions have generated a wealth of PES critiques ranging from contradictions within the mechanics of exchange to an articulated belief that reductionist processes of ecosystem quantification and valuation as required for executing ecosystem service exchanges will likely only lead to a continuation of the status quo (McCauley, 2006, Kosoy and Corbera, 2010, Matulis, 2013).

As a means of organizing a diverse collection of supportive and critical PES literature, the two largely oppositional positions and the plurality of positions which emerge between the two are mapped onto the PES Perspectives Spectrum presented in Figure 2.1. The theoretical intent of pluralism in both post-sustainable development and feminist political ecology discourses might caution against this proposed dichotomous framing, yet endpoint identifications within a broader spectrum of ideas and beliefs help identify points of difference, and, in this case tease out the layers of support and critique surrounding PES as a conservation policy. Other examples of dichotomous framing include ‘universal’ and ‘local,’ and ‘developed’ and ‘developing.’ The latter example further illustrates how additional contextual layers attached to spectrum endpoints create perspectives plurality. Developed countries, North America and Western Europe, share per capita income similarities yet have uniquely diverse cultures and histories. Similarly, developing countries of South America, Africa and Southeast Asia grouped by economic metrics also have few cultural, political, and in some cases biophysical similarities.

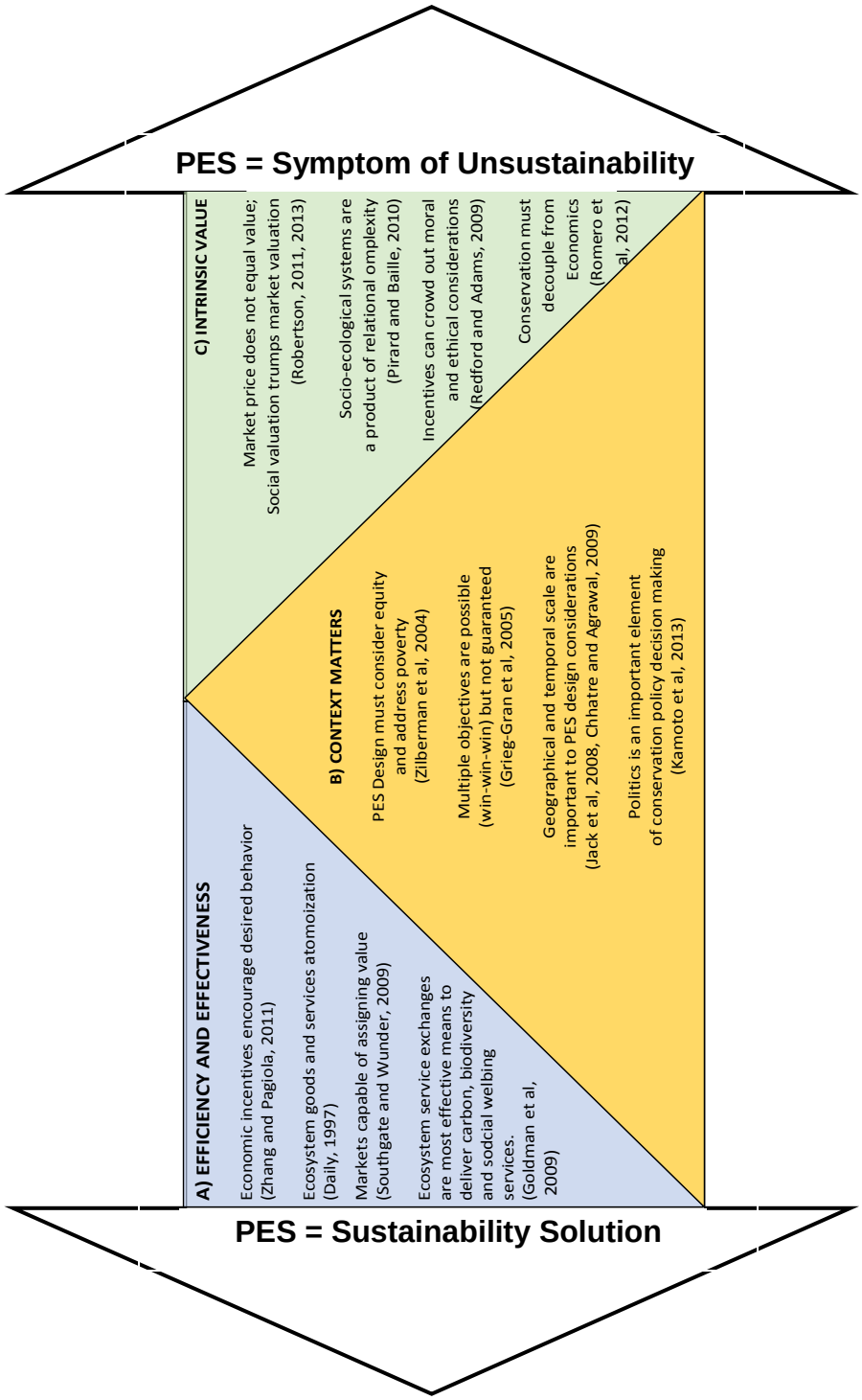

Figure 2.1: PES Perspectives Spectrum

Whereas the above dichotomous framing examples use per capita and gross domestic product economic indicators to identify spectrum endpoints, the PES Perspectives Spectrum highlights differing ideological positions regarding key elements of the PES conservation policy. The PES literature is rich with debate over various points of contention ranging from ethical to operational considerations for context (Schröter et al, 2014). The debate in ethics is not new, revolving around a utilitarian vs. intrinsic nature valuation dichotomy (McCauley, 2006, Redford and Adams, 2009). Arguments for the contextual grounding of socio-ecological policy, a recognition of the political ecology in which the policies are intended to operate, are also well established in the literature (Moran and Ostrom, 2005, Potschin and Haines-Young, 2011, Muradian et al, 2010). Operational critiques examine the model's inherent quantification and valuation processes focused on economics and ecology and frequently ignore social and cultural considerations for nature valuation (Silva, 2003, Robertson, 2006, Gomez-Baggethun et al., 2010, Robertson and Wainwright, 2013). Ethical considerations emerge from debates on whether ecosystem service exchanges are part of a neoliberal agenda seeking to extend the capitalist model into the previously untouched realm of nature (Kosoy and Corbera, 2010, Fletcher, 2012, Matulis, 2013, Bücher et al, 2012, McAfee, 2012). Lastly, concerns have been voiced over the market-based system of governance proposed by PES (Fletcher, 2010, Daniels et al, 2010, Corbera et al, 2011, Muradian and Rival, 2012). Potentially new ethical questions raised in connection with the rapid growth in prominence of PES model and connected to the issue of pluralism raised by post-sustainable development, however, examine the policy's overarching intent and ability to address the fundamental causes of unsustainability. Does a conservation strategy based on raising

awareness of social interdependencies with nature necessitate also question the overarching political and economic institutions that promote an unsustainable resource use patterns (Van Hecken and Bastianensen, 2010, Norgaard, 2010, Gomez-Baggethun and Ruiz-Perez, 2011)?

The PES Perspectives Spectrum highlights the ethical and operational range of these debates as they move within the fluid and in some cases overlapping space existing between the dichotomous ends of utilitarian value and an intrinsic value. Figure 2.1 identifies three broad positions to highlight key points within and between these debates. A belief in the effectiveness of markets and technological fixes ties together ideas contained in left hand (blue) triangle. A belief in the overarching importance or socially derived value ties together ideas of the right hand (green) triangle. An intermediary position suggests conservation policy must consider context and the role of institutions and ties together ideas of the middle (orange) triangle. Choice of color was deliberate to propose a linkage between these three positions and the three priority areas engaged by the sustainability concept. Blue is economics, orange is social well-being, and green is the natural environment. The next section details a closer examination of key positions found within the PES Perspectives Spectrum. The examination begins by scaling back to two broad dichotomous narratives under which a range of sub-narratives then emerge to fill the spectrum's middle ground. Identified PES narratives and sub-narratives highlight the range of values and beliefs surrounding the PES conservation policy and seek to further highlight the concept of socio-ecological complexity.

BOX 2.1: Policy Assessment Sustainability Targets

- Economic efficiency: maximization of difference between social benefits and social costs.
- Ecological Criteria: ability of an ecosystem to provide necessary service flows
- Social Prosperity: maintenance and/or improvement of present and future generational well-being. Well-being is a function of the state (quantity) and resilience (quality) of environmental capital, e.g. ecosystems.
- Public Participation: (process indicator) ability to incorporate information about stakeholder preferences in decision making, allow for negotiated solutions.
- Equity: social distribution of costs and benefits at both the spatial and temporal levels.
- Environmental justice: levels of environmental risk allowed for different segments of the population.
- Ethics: in lieu of indicators, suggested use of ethics is to serve as constraints to decision making.

Source: Adapted from Ervin et al (2003)

Recognizing that this research is structured to develop a better understanding the impacts of a PES conservation policy, it analyzes the literature in terms of i) anticipated outcomes of PES implementation and ii) evaluation priorities in measuring its impact. Box 2.1 presents a framework of universal policy assessment sustainability targets which provide the organizational structure for discussing the diverse set of assessment criteria and analytical priorities found within the PES literature (Ervin et al, 2003). While there is always a danger of over simplification in any one-on-one relational mapping, several links are nonetheless proposed between the sustainability targets listed in Box 2.1 and the PES positions articulated in Figure 2.1. 1) In terms of analytical priorities, PES as a solution (blue) is concerned with measuring economic efficiency and ecological effectiveness. 2) The middle position concerned with context (orange) focuses on analytical priorities concerned with social well-being, e.g. social prosperity, public participation and social equity. 3) PES as a symptom focuses on issues of justice and ethics. The following section presents the more nuanced

collection of perspectives which emerged from this targeted examination of the PES literature. Within the framework of two broad oppositional perspectives, those more favorable and those more critical, a spectrum of perspectives is explored.

2.2 Payment for Ecosystem Services (PES) Perspectives Spectrum

The PES Perspectives Spectrum begins with two broad narratives, each corresponding to an opposing ideological position vis-à-vis PES as a conservation policy. The two narratives are identified as: i) narratives of optimistic *potential* which embrace PES as a solution for the sustainability challenge, and ii) cautious narratives of potential *peril* which view PES as merely symptomatic of the broader, more complex socio-ecological problem of unsustainable resource use. Each of these narratives has a collection of sub-narratives which are detailed in the next two sections. The term ‘narrative’ is employed to illustrate that the ideological positions captured by the various positions on the spectrum are more than a collection of values and beliefs but instead form the basis of what could be considered an ongoing story which has been developed, embraced and perpetuated by research *and* by the involvement of key stakeholder institutions.

BOX 2.2: Payment for Ecosystem Services (PES) Narratives and Sub-Narratives

Optimistic Narratives of Potential:	• Efficient and Effective Conservation Finance • Triple "E"- Efficiency, Effectiveness, Equity • Incentives for Collective Action • Conditional Incentives/Investments
Cautious Narratives of Potential Peril:	• Institutional (In)Efficiency • Distributional (In)Equity • (Limited) Scope of Engagement • Ethical Impacts of Valuation

2.3 Optimistic Narratives of Potential

Ecosystems-based strategies for natural resource management have been the subject of extensive investigation over the past two decades with the level of inquiry going into an almost hyper-mode following the mainstreaming of the concept of system services through Millennium Ecosystem Assessment (MA, 2005), The Economics of Ecosystems and Biodiversity (TEEB) research project (2010)[12], and the United Nations Framework Convention on Climate Change (UNFCCC) official embrace of REDD+ in 2009. This hyper-mode of inquiry is evidenced by the breadth of institutions engaged in improving the capacity of the PES model to deliver it anticipate benefits.

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[12] TEEB came from a proposal by G8+5 Environmental Ministers to study the global *economic* impact of biodiversity loss and establish an international standard for natural capital accounting. For more on the TEEB project see www.teebweb.org.

The World Bank, led by senior economist Stefano Pagiola, has actively promoted the benefits of an ecosystem services-based conservation policy since the early 1990s. Between 2001-2006 the World Bank utilized its management of the Global Environment Facility (GEF) to develop PES-based biodiversity conservation initiatives through its Ecomarkets Initiative (Hartshorn et al, 2005). Since 2008, the World Bank has poured financial and technical resources into PES as a climate change strategy through establishment of the BioCarbon Fund, the Forest Carbon Partnership Fund (FCPF), and Forest Investment Programme (FIP).[13]

The three UN agencies (UN Food and Agricultural Organization [FAO], UN Development Program [UNDP], and UN Environment Program [UNEP]) are collaborating to advance the PES/REDD conservation model under the UN-REDD Programme[14].

The UK-based policy think tank International Institute for Environment and Development (IIED) has directed its Sustainable Markets and Livelihoods, Environmental Economics, and Forestry and Land Use initiative to explore how PES can provide social and ecological benefits (Landell-Mills et al, 2002, Porras et al, 2008, 2013, Porras, 2008). A message of PES potential is similarly advanced by published studies and policy briefs of international environmental NGOs such as

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[13] As of 2013 the Forest Investment Fund had commitments of $500 million from donor countries to build national-level institutional capacity for REDD+ (www.climateinvestmentefunds.org), the Forest Carbon Partnership Facility has approximately $800 million (www.forestcarbonpartnership.org).

[14] UN-REDD Programme is the United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (www.un-redd.org/).

World Wildlife Fund (WWF), World Resources Institute (WRI), Conservation International (CI), World Conservation Union (IUCN) and forest research institutions such as the Center for International Forest Research (CIFOR), International Union of Forest Research Organization (IUFRO) and the Union of Concerned Scientists (UCS) (Angelsen, 2008, Emerton et al, 2009, Parrotta et al, 2012, Daviet and Larson, 2013).

Several university research centers have also taken up the baton of optimistic potential. International networking on the science and practical application of ecosystem services assessment is promoted by *The Ecosystem Services Partnership* (ESP)[15] launched in 2008 by the Gund Institute of Ecological Economics and currently coordinated by the Environmental Systems Analysis Group of Wageningen University in the Netherlands. ESP has organized annual international conferences since 2003 and is closely linked to several academic journals, including *Ecosystem Services: Science, Policy and Practice*[16] which the Partnership launched in 2012. The University of Florida is the organizational body behind the bi-annual *ACES: A Conference on Ecosystem Services*[17]. *The Ecosystems Commons* blog[18] is managed by the Institute for Natural Resources at Oregon State University. And the *National Ecosystem Services Partnership* is another private sector, governmental and academia partnership housed at Duke University's Nicholas Institute for Environmental Policy Solutions.[19] The multi-stakeholder discussion and collaboration forum on multi-scalar

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15 www.es-partnership.org
16 www.journals.elsevier.com/ecosysetms-services/
17 www.conference.ifas.ufl.edu/ACES/index.html
18 www.ecosystemcommons.org
19 www.nicholasinstitue.duke.edu/initiaties/national-ecosystem-services-partnership

issues facing people and forests – The Forests Dialogue[20] – is currently hosted by the Yale University School of Forestry and Environmental Studies but was created by a group of private forestry and economic development interests with backing from the World Bank, the World Business Council for Sustainable Development (WBCD), the World Resources Institute (WRI), and the World Wildlife Fund (WWF).

The above list of institutions and initiatives are identified for their active engagement in exploring the potential of PES. The consistently emerging message is that operational challenges arising from a PES conservation policy can be effectively addressed via adjustments to the model, e.g. targeting small landholder participants to achieve greater equity or target high biodiversity value forests to achieve greater ecological benefits. The assessment literature associated with the optimistic narrative of PES potential frequently concludes that anticipated ecological benefits will be delivered "*if* the PES initiative is properly designed and appropriate systems are in place" (Grieg-Gran et al, 2005, Wunder, 2008, Pascual et al, 2009). Identified barriers to effectiveness include inadequate institutional and regulatory frameworks, limited baseline data for ensuring additionality[21], lack of technical and financial resources to ensure that anticipated ecosystem service benefits are actually delivered, and lack of political support to ensure adequate monitoring and enforcement (Landell-Mills and Porras, 2002, Engel et al, 2008, Pfaff et al, 2008). The optimistic narrative of PES potential seeks to address these roadblocks through operational modifications. Four

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20 www.tfd.yale.edu/about/hisotory

21 Additionality refers to the changes in forest cover or enhanced ecosystem service delivery not achievable without a PES intervention. Additionality requires a baseline or counterfactual for comparative purposes frequently non-existent.

proposed alterations, differentiated by identified objective and underlying operating premise, represent the four sub-narratives of optimistic potential: i) Efficient and Effective Conservation Finance (EEFC); ii) Triple "E" - Efficiency, Effectiveness, Equity (E3); iii) Incentives for Collective Action (ICA); and iv) Conditional Incentives/Investments (CI). A summary of the optimistic potential narrative and sub-narratives is presented in Table 2.1.

Table 2.1: Summary of Sub-Narratives of Optimistic Potential

	Market Based Payments for Ecosystem Services (PES)		**Incentive Driven Compensation for Ecosystem Services (CES)**	
Objective	Efficient, Effective Conservation Finance (EECF)	Triple "E" - Efficiency, Effectiveness, Equity (E3)	Incentives for Collective Action (ICA)	Conditional Incentives/ Investments (CI)
Authors	Pagiola (2002, 2004)	Wunder (2005b) Sommerville et al (2009)	Muradian et al (2010) Corbera et al (2011)	Karsenty (2011) Kissinger et al (2012)
Operating Premise	Markets can best negotiate between conflicting interests	Competition (not regulation) leads to efficient resource allocation	Inherent ecosystem complexity requires adaptive sustainability intervention strategies. Valuation is a function of local negotiation not (global) market valuation	
Strengths	Succeeds when goal is narrow (e.g. carbon)	Institutional flexibility for achieving trade-off decisions	Institutional capacity to compensate for multiple goals, including poverty and equity issues. Does not require market valuation.	
Weaknesses	Efficiency and effectiveness require equity trade-offs	Difficult to sustain change w/o creating alternative income streams	Time consuming	Dependent on political will and donor finance

These four sub-narratives are united in a willingness to engage economic incentives in the form of ecosystem services exchanges to motivate desired socio-ecological change and an assumption of economic rationality as a primary motivator. Sub-narrative differentiations emerge in the identification of ideological justifications for determining i) the source of ecosystem service supply (who are the land stewards/owners) and demand (who are the ecosystem service beneficiaries) and ii) the basis of the ecosystem service exchange.

The sub-narratives of i) efficient and effective conservation finance (EECF) and ii) efficiency, effectiveness and equity (E3) both accept almost without question the capacity of PES to deliver the desired 'sustainability' outcomes, i.e. equitable and cost-effective forest conservation (Pagiola et al, 2002, 2005, Wunder, 2005b). For EECF sub-narrative, however, the goal of efficiency supersedes concerns for additionality, ecological diversity, and social equity. Desired outcomes for the EEFC sub-narrative are little more than increased forest cover, generally undifferentiated by forest quality and accepting sustainably managed mono-crop, forest plantations as contributing toward increased forest cover targets (Engel et al, 2008). Ecosystem services 'supply,' therefore, comes from lands with limited options for alternative use, not necessarily those with high biodiversity value. Operationally there is little regard for engaging small and medium-sized landholders (service providers) as they generate greater transaction costs and thus reduce efficiency (Wunder, 2007). Conservation efficiency and effectiveness, however, are heavily dependent on political-economic decisions regarding economic valuation methodologies and the allocation of resource rights and, a concern taken up by the next sub-narrative category.

The E3 sub-narrative questions the processes by which efficiency objectives are prioritized over distributional equity and advocates for efficiency and effectiveness policy design considerations to additionally consider distributional equity (Miranda et al, 2003, 2006, Tacconi et al, 2010). Greater equity is most frequently manifested as a measurable outcome via enhance security of resource access and land tenure. The EECF and Triple "E" sub-narratives both rely on markets to value and facilitate ecosystem services exchanges between buyers and sellers.

In contrast to the market-driven proposals of EECF of E3, the last two optimistic sub-narratives propose PES as a model for incentivizing collective action toward improved ecosystem management but not necessarily through conditional compensation. The incentives for collective action (ICA) and conditional incentives (CI) sub-narratives propose to incentivize sustainable land use practices through negotiated transactions which need not work through market-based systems. These sub-narratives are less concerned with efficiency focusing instead on incentives to affect desired socio-ecological changes which include both social and ecological targets. Ecosystem quantification, market-based economic valuation, and the clear [legal] allocation of ownership rights are, therefore, not required components of ecosystem service exchange from these sub-narratives. Land stewards are *compensated* for identified land management actions (agroforestry, reforestation, improved forest management) and not for the provision of a measurably quantifiable ecosystem service such as sequestered carbon. Nearly all PES initiatives currently operational function as programs of incentive based compensation[22]. The drive to

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[22] Prominent examples of compensation-based exchanges include the U.S. Department of Agriculture Conservation Reserve Program (CRP) (www.fsa.usda.gov)

involve markets in the process, however, stems from the very practical need to generate adequate levels of conservation finance (Pagiola et al, 2004, Wunder, 2005b, 2008). Markets are assumed to provide an appropriate means to engage private sector investment in conservation efforts. Whether the predominance of incentive based models within the realm of operational PES mechanisms is a function of preference or a practicality which recognizes the infancy of ecosystem service markets and the operational challenges posed by ecosystem quantification and valuation is an intriguing subject for further research.

2.4 Cautious Narratives of Potential Peril

Despite strong institutional, economic and academic support for the PES model, a growing chorus of caution proposes a viewpoint more cognizant of socio-ecological complexity and values plurality. These cautionary voices are discussed under the four main headings of concern listed in Table 2.2: i) institutional and structural inefficiencies; ii) inequitable benefits distribution; iii) limited scope of stakeholder engagement; and iv) the ethical impacts of valuation. Sub-narrative differentiation within the broader narrative of potential peril is given more attention within the context of this research for several reasons. First, until recently the cautious narratives have largely been masked by those of optimistic potential; there is, therefore, a need to highlight the concerns raised by these sub-narratives. The Center for International Forest Research (CIFOR), engaged in PES research for over a

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and the Vittel Payment for Ecosystem Service Program (http://www.fao.org/fileadmin/user_upload/pes-project/docs/FAO_RPE-PES_Vittel-France.pdf)

decade, has just recently begun to highlight the concerns raised by the cautious sub-narratives. One recent CIFOR analysis of REDD+ concludes that REDD+/PES 'is filled with equal measure of hope and discouragement.'

> *"REDD+ launched the latest round of global efforts to slow tropical deforestation, but so far does not appear to have contributed much towards that goal. There is a growing urgency to stop treating forests as a sacrificial biome, the stability of the Earth's climate and ecological processes are at risk. Nevertheless, there is much political, economic and cultural momentum from the past inhibiting a breakthrough on forest-based climate change mitigation. The interests of those deriving a benefit from conversion of forests to non-forest uses are still dominant in land-use decisions in much of the tropical world…..Transformational change related to institutions, interests, ideas and information remains a high priority."* (CIFOR, 2014)

Another recently released CIFOR publication (*Analysing REDD+: Challenges and Choices*, [Angelsen et al, 2012]) explicitly proposes a political ecology analytical approach in which four 'I's – institutions, interests, ideas, and information – become the investigative framework. This shifting from the previous 'E+' framework – efficiency, effectiveness, equity and additional co-benefits (Angelsen, 2008) – suggests a larger shift in thinking about the drivers of deforestation and the challenges presented by socio-ecological complexity. The four 'I's are acknowledged as *the* source of improved conservation constraints and challenges and therefore need to be factored more directly into sustainable forest management proposals. This recognition is neither new nor unique but to date has received limited attention within forest conservation debates. A focus on the 'I's - institutions, interests, ideas, and information - may be a novel lens for ecologists, however, it is an established frame of reference within the geographic scholarship. It is not surprising the PES debates which have engaged geographers and social scientists are those situated solidly within the

cautionary sub-narratives, an additional justification for greater depth of analysis for the cautionary sub-narratives of potential peril.

Table 2.2: Summary of Cautious Sub-Narratives of Potential Peril

	Institutional (in) Efficiency	**Distributional (in) Equity**	**Scope of Engagement**	**Ethical Impacts of Valuation**
Objective	Manipulation of market structures to protect social and biological concerns	Policy mechanisms needed to ensure spatial and temporal equity	Policy process embodies innovative tools for broad and sustained participation	Critical reflection on social meanings of value
Authors	Richards and Jenkins (2007) Engel et al (2008)	Angelsen (2008) Porras (2010)	Kosoy et al (2008) Corbera et al (2011)	Norgaard (2010) Robertson (2006, 2012)
Operating Premise	Strong institutional and regulatory framework needed to ensure efficient outcomes	Strong institutional and regulatory framework needed to ensure equitable outcomes	Multiple levels of engagement are required to account for contextual variability	Awareness/embrace of problem complexity is essential for problem solving
Strengths	Multiple Safeguard mechanisms exist to ensure win-win outcomes	Multiple Safeguard mechanisms exist to ensure win-win-win outcomes	Delivery of desired sustainability outcomes increases with -engagement	Plurality of social values needed for problem resolution
Weaknesses	Safeguards are voluntary; inadequate institutional and regulatory structures	Equity often sacrificed to efficiency	Stakeholder participation in practice rarely leads to participatory decision making	Requires stakeholder trust and willingness to engage

None of the cautious sub-narratives advocate a blanket rejection of the PES policy, but as the narrative title suggests, they highlight a need for more critical examination of the PES proposal and, in particular, the many unintended, potentially perilous, impacts of a predominantly economic and utilitarian framing of nature. "*PES is a powerful conservation tool, but it must be adopted slowly with caution, and with a*

keenly critical eye" (Redford and Adams, 2009). Potentially perilous impacts raised by geographic scholarship include:

- Natural resource use decisions once guided by ethical obligations or communal regulations may be transformed into actions guided only by economic self-interest (McCauley, 2006, Redford and Adams, 2009, Gomez-Baggethun et al, 2010).
- Market led environmentalism, i.e. the privatized management of formerly public natural resources, can further lead to exacerbated social and economic inequities (Dempsey and Robertson, 2012, Fletcher, 2010, Fletcher and Breitling, 2012, Matulis, 2013).
- The grab for land and resource rights in anticipation of emerging ecosystem services markets for carbon, biodiversity or watershed protection has the potential to strip resource access from traditional populations (Kosoy et al, 2008, Kosoy and Corbera, 2010, Corbera et al, 2011).
- These various governance concerns are, however, largely overshadowed by the question of value. How is it determined, by what process and by which perspectives (Robertson, 2006, 2012)?
- Is PES as a solution to the challenge of sustainable forest management detached from the actual drivers of the problem (Van Hecken and Bastianensen, 2010)?

These concerns are explored within the framework of the four cautious sub-narratives of potential peril.

2.4.1 Institutional (In)Efficiency

As suggested in the discussion of the optimistic narratives of PES potential, efficiency goals such as sustainable finance are intimately dependent of the creation of institutional structures which can encourage private sector engagement, ensure transparent disbursements, mitigate against corruption, and measure and verify

outcomes to ensure additionality and ecosystem service delivery (Gernett et al, 2007, Engel et al, 2008, Vatn and Vedeld, 2011). Realizing efficiency goals, therefore, is dependent on supportive institutional and regulatory frameworks which vary widely across socio-ecological contexts. Addressing the reality of institutional inefficiency is the rationale behind the approximately $1 – 7 billion committed to REDD+ Readiness initiatives[23], investments trying to create the missing yet critically important institutional infrastructure (Rosendal and Andresen, 2011). Institutional (in)efficiency overlaps with questions about distributional (in)equity (Van Hecken and Bastianensen, 2010, Grieg-Gran et al, 2005, Kosoy et al, 2008, Kissinger et al, 2012). The literature is awash with analyses of efficiency/equity trade-offs and cautionary tales of challenges to balancing these two objectives (Ferraro and Simpson, 2002, Wünscher et al, 2008, Pascual et al, 2009, Tacconi et al, 2010). Equity concerns vis-à-vis benefits access and distribution are explored by the next cautious sub-narrative.

2.4.2 Distributional (in)Equity

PES as a cost-effective conservation and climate change strategy raises difficult sustainability questions of distributional equity. Redford and Adams (2009) brought the difficult questions of *Who benefits?* W*ho pays?* into PES debates via their observations on the following socio-ecological limitations and implications of ecosystems based decision making:

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[23] The three primary REDD+ Readiness funds (Forest Carbon Partnership Facility, Forest Investment Program, and UN-REDD Program Readiness Fund have collectively received only $1.1 billion of a $7.5 billion donor commitment (www.ecosysetmmarketplace.org).

- ecosystem service valuation reflects only current knowledge about nature's benefits, and ignores the value of intangible and invisible inter-linkages for which markets do not exist,
- ecosystem service valuation is highly subjective and only reflects current tastes and preferences,
- ecosystem services based decisions typically ignore the inherent benefits of native species and the peril of invasives,
- ecosystem service valuation encourages a preference to manage more profitable services and potentially reduce ecosystem resilience,
- ecosystem service markets are highly dependent on increasingly global socio-political institutions which are not likely to have the capacity to make the complexity of local socio-ecological contexts,
- ecosystem services supply and demand glosses over inequitable access rights and ownership to the detriment of both ecosystem integrity and social equity.

These observations raise questions about fundamental geographical issues such as spatial and temporal variability, the social construction of value and preference, and economic and political power differentials operating at multiple levels within any given socio-ecological context. Given the limited evidence that these considerations have adequately entered the PES debate, a growing subset of scholars are advocating for time to fully consider the implications of PES on socio-ecological inequity before lunging forward and assuming that structural adjustments will mitigate the problem (Caplow et al, 2011, Parrotta et al, 2012). Additional distributional concerns raised (in)equity sub-narrative highlight the importance of resource access and security of tenure (FAO, 2009, Cotula and Mayers, 2009, Corbera et al, 2011), the need for improved market access for previously marginalized populations (Grieg-Gran et al, 2005, Emerton et al, 2009, Pokorney et al, 2013), and a minimization of market transaction costs (Pfaff et al, 2007, Thompson et al, 2013).

The last two sub-narratives delve even further into issues repeatedly raised by geographic scholarship and in particular scholarship focused on political ecology and the fundamental role of historical, cultural and political factors, i.e. historical patterns of governance, existence of profit-oriented natural resource policies, cultural support for rent-seeking behavior, local systems for governing resource access and tenure security, and even variations in environmental awareness levels amongst differing stakeholder groups. These issues are the concern of the next two sub-narratives.

2.4.3 Scope of Engagement

The cautious sub-narrative concerned with engagement embraces these socially constructed contributors to socio-ecological complexity and advocates for broadening the scope of stakeholder participation to ensure these variables are considered throughout the natural resource policy process (Bingham et al, 1995, Lambin et al 2001, Wilson and Howarth, 2002, Chhatre and Agrawal, 2009). Broadening the scope of participation, however, does not automatically guarantee broader scale of engagement (Kosoy et al, 2008, Dooley et al, 2011, Chouinard, 2013). An underlying tenet of the PES engagement question consistently addressed by the geographical lens of political ecology is the socio-ecological reality of power differentials, in particular as they relate to access. Meaningfully broadened engagement occurs when power differentials are exposed and minimized and multiple sources of knowledge inputs are included throughout the policy process.

Lawlor et al (2013) identify 7 levels of stakeholder participation: i) no consultation, ii) one direction informational consultation, iii) consultation on implementation, iv) consultation both design and implementation, v) adherence to

principle of free, prior and informed consent (FPIC)[24], vi) complete co-management, and vii) 100% locally initiated and managed. Participation levels of (iv) and above are required for policy processes to adequately encompass the list of socially constructed contributors to socio-ecological complexity (Sayer et al, 2007, Rammel et al, 2007, Ostrom and Cox, 2010). Engagement is only likely to take place at levels (v) and above when deliberate effort is made to share decision-making authority. "*The complex nature of cross-level resource use requires institutional arrangements that facilitate the co-production, mediation, translation and negotiation of information and knowledge within and across levels*" (Brondizio et al, 2009:253).

2.4.4 Ethical impacts of Ecosystem Valuation

Whereas understanding the complexity of localized socio-ecological interactions is the center of the stakeholder engagement narrative, the last sub-narrative questions the ethical implications of ecosystem valuation. This perspective strongly aligns with the critical geography cohort who believes the PES policy's neoliberal agenda is nothing less than a corporate takeover of natural resources in the tropical forest countries under the guise of market-based conservation (Robertson, 2006, Igoe and Brockington, 2007, Fletcher, 2010, Büscher et al, 2012).

Dempsey and Robertson (2012) frame PES firmly within a broader neoliberal agenda of nature commodification and governance hybridization. "*It [PES] folds easily into capitalism and non-capitalism…. dressed in the language of science and*

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[24] FPIC is a human rights protocol established by International Labour Organization Convention No. 169 and the 2007 UN Declaration on the Rights of Indigenous Peoples.

policy debate, narratives about ES that surpass capitalism as usual are everywhere we look" (Dempsey and Robertson, 2012:3). Accepting the 'fables' or unfounded assumptions of neoliberal policy is an acceptance of the role of price (not value) as a guarantor of democracy (Robertson, 2007). Policies which encourage paying for socially desirable behavior without adequately challenging or penalizing socially and ecologically destructive behavior both fail to examine the role of the dominant consumer/producer paradigm within the larger socio-ecological problem and dramatically reduce the realm of intervention alternatives (Potschin and Haines-Young, 2011). This angle of critique supports Redford and Adams (2009) challenge to the danger of ecosystem atomization, but also raises deeper sustainability questions about the policy's contribution to social-ecological (in)equity at local and global levels. "*Defining ecological objects as commodities masks the unequal social relations embedded in the process of buying and selling."* (Dempsey and Robertson, 2012:5) Whereas markets assist in creating partial awareness of nature's benefits, the imposition of privatization structures on formerly public or commons resources marketization transforms established 'use' values into de-contextualized 'exchange' values (Gomez-Baggethun et al, 2010, Gomez-Baggethun and Ruiz-Perez, 2011). Kosoy and Corbera (2010) describe PES as a product of commodity fetishism, an insistence on enclosing socially beneficial goods and services with legal and material boundaries solely for the purpose of creating exchanges. Market expansion into previously social goods and services can erode inherent, intangible and socially constructed values such as relational benefits and the sense of social responsibility (McCauley, 2006, Gomez-Baggethun and Ruiz-Perez, 2011). "*We will make more progress in the long run by appealing to people's hearts rather than their wallets. If*

we oversell the message that ecosystems are important because they provide services, we will effectively have sold out on nature" (McCauley, 2006:28).

Norgaard (2010) adds to the list of above articulated concerns what he considers the greatest danger of the model which is to allow existing social, political, and economic institutions to remain unchanged as these institutions currently promote unsustainable resource use. Despite its promise of innovation, the PES conservation policy promotes an unquestioned belief in markets and a stock-flow model of ecosystem services which collectively safeguard the disciplinary institutions at the heart the problem; a blindness Norgaard might argue is adopted by many of the PES spectrum sub-narratives and certainly many of the progressive sects of science and his own field of economics. *"Ecological economists need to resist using current dominate ways of thinking to reach short-run, partial solutions and favor both emerging and multiplicity or less dominant ways of analyzing problems to promote a rich understanding of the complexities of society and nature" (Norgaard, 2010:1225).* In response to this blindness, the ethical sub-narrative states more emphatically than any of the other cautionary perspectives, a viewpoint shared in principle by the sub-narratives of institutional (in)efficiency, distributional (in)equity, and scope of engagement. Integrated, collaborative and discourse-based problem solving processes are needed to effectively manage the complexity, dynamism, uncertainty and normative characteristics of socio-ecological interactions (Norgaard, 2010). Payment for ecosystem services mechanisms need to be the subject of critical and self-reflective public discourse.

> *The more the discourse moves away from the common lives and real life concerns to abstruse quantifications and reductionism, the more people are likely to give preferences that are fudged and*

> *confused as much as confusing, merely because the choices offered are far from adequate. (Kumar and Kumar, 2008:814)*

2.5 Narrative of Possibility via Pluralistic Engagement

To suggest that PES is not being discussed is inaccurate. PES is the center of a great deal of discussion taking place in cross-disciplinary academic literature as well as in fora and conferences dedicated to advancing an ecosystem service conservation agenda. Until quite recently, this discussion was dominated by the narrative of optimistic potential, the efficiency promise of economic rationality and scientific objectivity (Pagiola, 2002, 2008, Wunder, 2005a, 2008). To suggest, therefore, that PES is advancing with limited *critical* discussion is a more accurate statement. It is fair to also suggest the range of concerns raised by the cautious narratives is slowly gaining momentum. The cautionary voices of institutional (in)efficiency and distributional (in)equity have impacted the PES discussion and forced the insertion of social and ecological 'safeguards' to protect vulnerable social and ecological systems into PES initiatives, policy design and monitoring intended (Merger et al, 2011, Daviet and Larsen, 2012). Most recently, the sub-narrative on engagement has impacted the effective and efficient narrative of REDD+ and forest carbon offsets (Sunderlin et al, 2014, Asean Regional Knowledge Network on Forest and Climate Change (ARKN-FCC), 2014).

> *One critically important factor for successfully addressing the [deforestation] drivers is early and continuous participation of all actors and stakeholders that are associated in a country or region with the deforestation or forest degradation problem. This includes all relevant government entities, the private sector, local communities and local government, the civil society organizations, and whoever else is seen as important in causing and/or addressing the problem.* (ARKN-FCC, 2014:5)

The vast majority of these increasingly cautious sub-narratives, however, stop short of openly challenging the dominant narrative of optimistic potential and its unfounded assumptions of economic rationality and scientific objectivity. The most critically reflective narratives, those concerned with the ethical implications of valuation, do question this validity as well as social desirability of the PES model. The complete rejectionist position of this sub-narrative, however, often leads to a disengagement from constructive discussion, choosing instead to critique from the sidelines. Yet all narratives, cautious and optimistic, recognize the benefits of increased awareness about the social and economic importance of nature which can accrue from ecosystem valuation (McCauley, 2006, Norgaard, 2010, Porras et al, 2008, Farley, 2012). *"Nature underpins the human economy and ecosystem services represent an attempt to measure and more importantly explain that dependence*." (Redford and Adams, 2009:787). What separates the narratives are varying and sometimes contradictory beliefs in the source of disconnect between society's understanding of nature's benefit and resource use decisions. Optimistic narratives understand disconnect as emerging from a longstanding failure to include natural resources in the market-based economy; cautious narratives offer structural and ethical explanations for the growing disconnect. Acknowledging the validity of the diversity and simultaneous unity of the PES Perspectives Spectrum narratives and sub-narratives is reminiscent of the recognized validity of post-development, post-structuralist and post-colonial discourses as well as their collective unity towards the ideal of an equitable, just and ecologically sustainable world in which the rights and interests of all are incorporated. The PES narratives are equally united in the goal of sustainable forest (natural resource) management.

Mutual learning through pluralistic engagement, the basis of post-sustainable development (Morse, 2008) and mainstay of feminist geography (Haraway, 1988, McDowell, 1995), is also prevalent in applications of a political ecology framework to understanding socio-ecological complexity (Schubert, 2005, Sunderlin, 2014). It has recently been invoked by a handful of Geographers as a potentially valuable means for the discipline to engage with the concept of ecosystem services (Jackson and Palmer, 2014) by using these types of engagement processes to highlight the concept's communicative potential. Jackson and Palmer (2014) suggest the need for these engagements in order to create a narrative of possibility that re-imagines the concept of ecosystem services. Rather than a utilitarian focus and predominantly quantitative methodology, a narrative of possibility for PES would endeavor to capture the relational and contextual components of socio-ecological systems found explicitly in the space between the dichotomous ideological endpoints representing an embrace of market-based resource management or a flat rejection of the perceived neoliberal agenda that PES is argued to support.

> *It is just possible that a revised conceptualization of ecosystem services, one that recognizes the space between nature and society is itself social, can create an opportunity to valorize the role of human relationships of management and care along with the diverse and amorphous ways in which they are embedded in communicative reciprocity with non-human nature?" (Jackson and Palmer, 2014:18)*

Chapter 3

PLURALISTIC ENGAGEMENT AND MUTUAL LEARNING

"Sustainability is achieved through the uncovering of existing values, perspectives and beliefs via broadly engaging, collaborative processes."
(Meppem and Gill, 1998)

A post-sustainable development agenda proposes a predominantly transdisciplinary approach to addressing complex socio-ecological challenges such as sustainability, deforestation, and climate change. Transdisciplinarity is a research strategy which is intentionally cross-disciplinary and holistic in its approach. It differentiates from inter-disciplinary research practices via its inclusion of knowledge created outside of traditional disciplinary practices. It is action-oriented and structured deliberately to address practical, life-world issues. A transdisciplinary grounding requires post-sustainable development to acknowledge a plurality of socio-ecological narratives, each created by a set of normative ideals and shaped over time by multiple, interdependent social interactions and experiences. Transdisciplinarity and by extension post-sustainable development assume that mutual learning through participatory engagement can ultimately lead to social change. The proposed uniqueness of mutual learning within the policy context can be understood as a two-way, interactive learning or sharing process in which knowledge outcomes are the product and goal of engagement. Mutual learning through pluralistic engagement is the center of the framework for socio-ecological connectivity (SEC) developed for this research as a new approach for guiding socio-ecological policy development and implementation.

The SEC framework is the conceptual guide providing the structure for this inquiry into the post-sustainable development potential of PES. The framework is based on three investigative concepts: i) dialectic inquiry and the need for contextual awareness, ii) transdisciplinarity and collective knowledge production, and iii) sustainability assessment which offers a practical approach to harnessing pluralistic engagement for practical problem solving. The connecting link for these three concepts is a grounding in the acceptance of socio-ecological complexity and the challenge it poses to social inquiry and socio-ecological problem solving.

The SEC framework suggests that each of these concepts - dialectics, transdisciplinarity, and sustainability assessment - provides a unique contribution to complex socio-ecological problem solving. Dialectics proposes a theoretical framework to *understand* complexity as a basis of guiding social change, transdisciplinarity suggests a process of c*ollective knowledge creation* built on a shared understanding of the socio-ecological challenge, and sustainability assessment is adopted as a *life-world practice* built on the theory of dialectics and process of transdisciplinarity. Together these concepts create a framework for socio-ecological connectivity that becomes both the means and ends of social change. Figure 3.1 provides a graphic representation of mutual learning through pluralistic engagement at the intersection of dialectic inquiry, transdisciplinarity, and sustainability assessment. What follows is an introduction to each element of the SEC framework and their connection via mutual learning via pluralistic engagement. This chapter concludes by highlighting signs of socio-ecological connectivity in practice as it slowly emerges within the context of conservation policy.

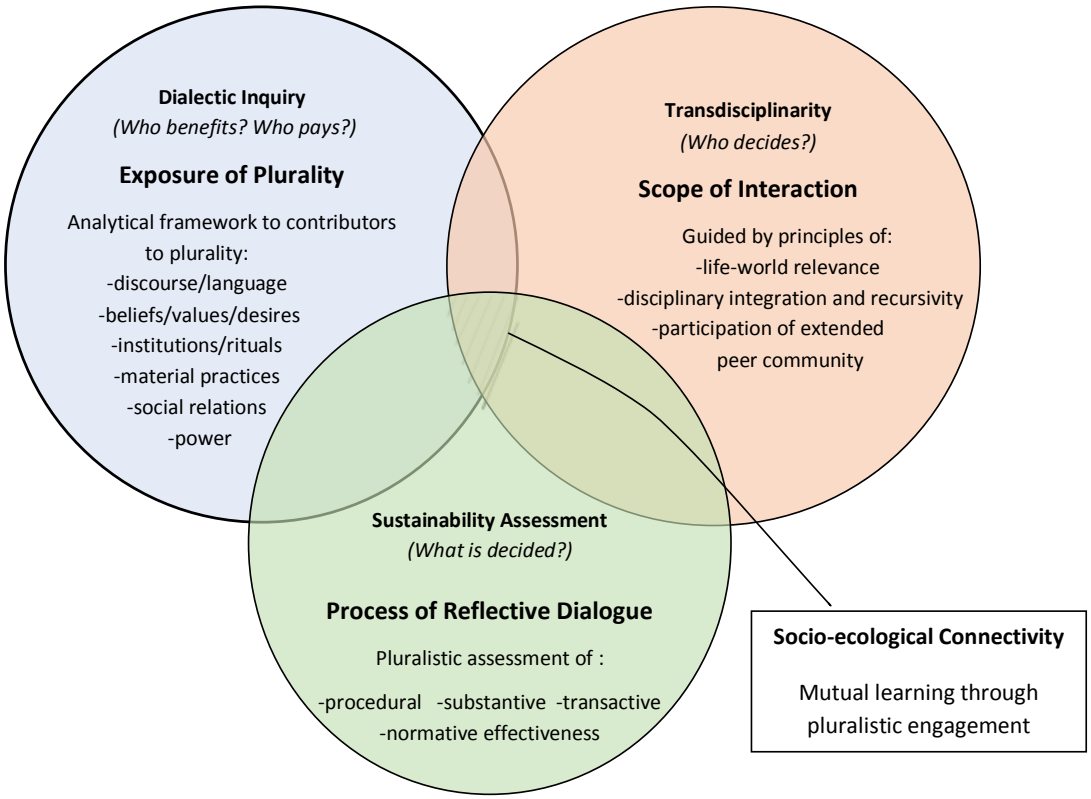

Figure 3.1: Socio-Ecological Connectivity Conceptural Framework

3.1 Exposure of Plurality via Dialectic Inquiry

"Once we come to appreciate how such [socio-ecological] processes operate, we can better understand how and why certain kinds of permanences get constructed in particular places and time so as to form the dominant social values to which most people willingly subscribe." (Harvey, 1996:11)

Understanding the complexity of socio-ecological systems from a human geography and political ecology perspective is arguably an effective analytical point of entry. It is not, however, the only means by which to engage with socio-ecological complexity. Powerful contributions to the growing body of knowledge on the topic have been made by environmental scientists, economists, and public policy analysts (Anderies et al, 2004, Ostrom, 2009, Putz and Romero, 2012), however, the majority of these frameworks provide inadequate attention to the contested concepts of space, time, place, and nature (Harvey, 1996). A political ecology framing explores these traditional geographic concepts as they relate to nature and society interactions yet with a lens which additionally explores issues of distribution, equity, and justice, fundamental components of any attempt to define and operationalize sustainability (Morse, 2008). The two frameworks highlighted in Chapter 1 illustrate the limitations of not addressing directly these factors produced by power differentials in social relations. The Millennium Ecosystem Assessment (MA, 2005) analytical framework conceptualizes socio-ecological systems quite simply as nature's contribution to human well-being. Within this framework nature is understood as a collection of identifiable services, and human well-being is achieved via access to these necessary goods and services. Social, political, and economic influences are acknowledged in the model as 'indirect drivers of change' which impact the condition of and access to these services, yet inadequate attention is given to how these influences are produce

and maintained, nor to how they define concepts of well-being and poverty. The potential for pluralistic perspectives and a means to mediate between various conceptualizations of well-being or of nature is glaringly absent. A seemingly more suitable framework for capturing socio-ecological complexity which acknowledges pluralistic ways of interacting with nature is Ostrom's multi-tier institutional analysis and development (IAD) framework which directly engages varying political and economic interests as contributors to complexity. The IAD framework also situates analysis directly within a localized natural resource context, endeavoring to address important concepts of space and place. Still missing from the IAD framework, however, is a means to account for and engage with the plurality of values and beliefs which are perhaps the most critical, uncertain and underestimated component of socio-ecological systems.

Harvey (1996) labels this plurality the *geographies of difference*, and inserts dialectical inquiry as a means for understanding the cultural, historical, political, economic and social *processes* by which these pluralities are constructed. Dialectics, as embraced by Harvey, exposes conceptual contradictions through an examination of the complex interdependencies of social processes, institutions, and systems. Heterogeneity in the fundamental components of socio-ecological systems – formal and informal social systems and institutions - is inevitable given the complexity of the social, ecological, political, economic and cultural processes which create these systems. This same heterogeneity, however, also creates the internal conflicts and instabilities which dialectical inquiry seeks to expose. Conflict and contradiction are important features of socio-ecological systems as they create tensions which contribute to system (socio-ecological) change (Harvey, 1996).

Harvey (1996) explores geographies of difference with the aid of a 'dialectical cognitive map' which identifies the range of socio-ecological influences creating and regularly re-creating different narratives. The map identifies six distinct 'points of engagement'[25] contributing to narrative creation: i) discourse and language; ii) power; social relations; iii) beliefs, values and desires; iv) institutions and rituals; and v) material practices. While each of these 'points' is distinct yet inseparably integrated into larger processes of social change and worthy of further investigation, the critical role of language and discourse in constructing life-world understanding as well as in mediating collective social action affords it special status in Harvey's map. Elaborating what he identifies as the internal heterogeneity of discourse, Harvey suggests that a wide range of discourses, or narratives, emerge from diverse disciplinary and professional contexts, institutional contexts, as well as social, cultural and political contexts. Each unique discourse provides meaning and direction for those sharing its contextual base; however it is important to recognize that discourses are neither fixed nor permanent. Engagement across disparate discourses frequently occurs within the normal course of socio-ecological interaction and in so doing exposes ambiguities and incoherencies present within the various narratives. As successive contradictions repeatedly emerge, particularly within the more dominant social discourses, "*counter-hegemonic and dissident discourses regularly erupt to challenge hegemonic forms*" and thus present an important force in instigating social

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[25] Instead of 'engagement' Harvey uses the term 'moment'; both terms convey process or time in the sense of being distinctly in the present, prior to and separate from any crystallization of influence into a 'permanence', e.g. an institution, system or structure which has become a recognized and accepted fixture of the social landscape.

change. Identifying, understanding and exposing the geographies of difference via dialectic inquiry is, therefore, a critical first step in ensuring these geographies of differences 'rub together until they catch fire,' igniting what Harvey calls the human imaginary or the possibility of new ways of interacting.

> *The search for possibility is contained within rather than articulated before or after social practices. It is never a matter of choosing between different applications of neutral knowledge, but always an embedded search for possibilities that lies at the heart of dialectical argumentation. (Harvey, 1996:57)*

The process of dialectical inquiry must also be prepared to engage in normative decision making; a willingness to advocate for some form of socio-ecological 'permanence'[26] to counter processes of social fragmentation and constant social deconstruction which are as equally unproductive as hegemonic thinking (Harvey, 1996). A post-structuralist world in which all narratives are given equal and unqualified status is not only counter-productive to socio-ecological problem solving, but also untenable for individuals and societies willing to tackle normative questions about what kind of world is desirable (Harvey, 1996). Collective determinations of ethical, moral and political choices are critical; however, attention must be given to ensure they are produced through processes of engagement and exchange between various constructed narratives. 'Triumphalism' of any kind, regardless of seemingly noble intent, however, must be met with appreciative scrutiny (Harvey, 1996).

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[26] Permanence here represents the institutionalization of selected social practices, systems or structures.

> *While no society can do without a working and workable concept of justice any more than it can dispense with workable concepts of space, time, place and nature, the WAY these concepts get constituted through social practices has to be the primary focus of attention….A Utopianism of process looks radically different from a Utopian form. (Harvey, 1996:333)*

Sustainability as a process of mutual learning connects in theory with Harvey's dialectical inquiry to engage human imaginary in the 'quest for progressive socio-ecological and political-economic change.' It additionally connects with Jackson and Palmer's (2014) encouragement to engage in a reconceptualization of ecosystem services. Mutual learning represents more than an interdisciplinary, participatory approach in which different perspectives are merely spoken; it requires cooperative, experiential interaction amongst the plurality of stakeholders for the purpose of developing and executing a shared vision (Meppem and Gill, 1998); a rubbing together of the geographies of difference. Engagement for mutual learning extends beyond disciplinary, academic and 'expert' narratives in order to reach the broadest potential set of stakeholders and socio-ecological differences. Engagement of multiple sources of knowledge is the basis of mutual learning and fundamental to a transdisciplinary research approach which. The next section introduces practice of transdisciplinary research and its relevance to socio-ecological connectivity.

3.2 Mutual Learning via Transdisciplinarity

"The first step in integration is to acknowledge, respect and explore the diversity of perspectives. Diversity is not a handicap to be overcome, but in invitation to creative interaction."
(Hirsch Hadorn et al, 2010:3)

Transdisciplinarity emerges from a critical theory critique of the positivism of scientific inquiry. It adopts the theory of multiple rationalities as proposed by critical theorist Juergen Habermas (Hirsch Hadorn et al, 2008). Habermas suggests there are three different ways in which life-world reality can be understood and knowledge constructed: i) instrumental rationality, ii) contextual rationality, and iii) communicative rationality. He proposes that natural and physical sciences advance knowledge based on an application of only *instrumental* rationality which is generated through processes of quantification and structured experimentation. Investigations into *socio*-ecological systems, however, need to rely additionally on *contextual* rationality in which the meanings assigned to data are derived through interpretation. *Communicative* rationality, considered the basis of the science of action and social transformation, is the third form of rationality and is a function of stakeholder engagement (Hirsch Hadorn et al, 2008). Recognizing that transdisciplinary research is proposed to address pressing socio-ecological challenges, the collective of these three forms of rationality is required for transcending existing dichotomies between scientific and experiential knowledge, between truth and opinion, or between fact and value; dichotomies created by a restriction of engaged rationalities and a lack of extended peer community engagement. Transdisciplinarity acknowledges that the life-world context is characterized by complexities, uncertainties, interdependencies and contradictions and as such requires a research agenda able to operate *within* the needs,

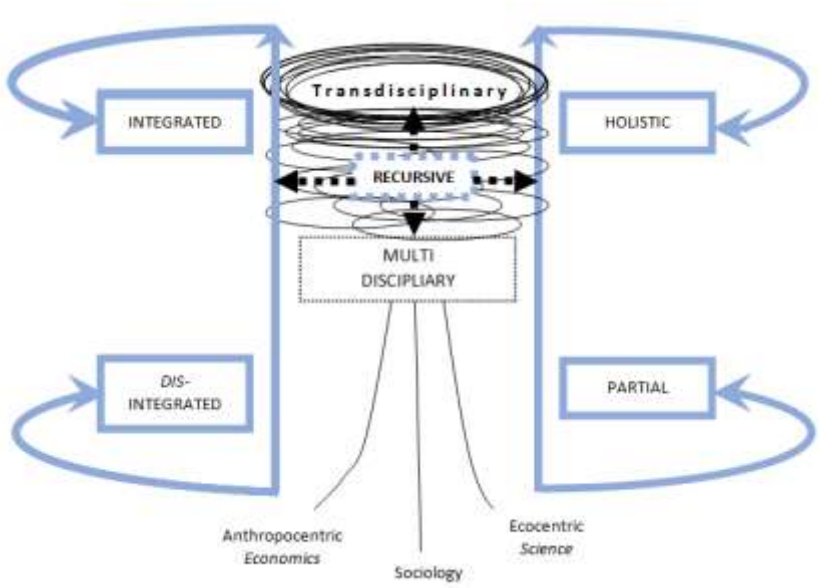
structures, and institutions of society as opposed to separate and in isolation. *"Knowledge is a necessary supportive base for wisdom, but not its equivalent. Wisdom requires the broad view and the comprehension of connectivity"* (Ernst, 2008:123 as quoted in Leavy, 2011:51).

From a theoretical framing in critical theory, transdisciplinary research found application in the social movements of the 60s and 70s which challenged dominant social perceptions about gender, class, and race. It was further promoted within academic circles via theories of post-modernism, post-colonialism, and post-structuralism, all of which illuminated the existence of power structures in research and knowledge production (Leavy, 2011). Transdisciplinary research is a decidedly pluralistic, integrated and holistic process which engages the realm of disciplinary knowledge as well as life-world experiences in the identification and analysis of complex socio-ecological problems. Transdisciplinarity suggests that 'traditional' forms of research structured on disciplinary isolationism and linear rigidity have led to a dominance of instrumental rationality without the benefits of contextual or communicative rationality (Lang et al, 2012). A transdisciplinary research agenda does not endeavor to replace disciplinary knowledge, but rather to build on it and ultimately transcend it; to include problem framing from a plurality of perspectives as an essential component of the research process in order to ensure that the research and its outcomes have relevance for the socio-ecological context under investigation (Leavy, 2011).

> *Through scientists entering into dialogue and mutual learning with societal stakeholders, science becomes part of societal processes, contributing explicit and negotiable values and norms in society and science, and attributing meaning to knowledge for societal decision making. Problem solving includes reflection, transformation of*

attributes, development of personal competencies and ownership, along with capacity building, institutional transformations and technology transformation. Mutual learning connects transdisciplinary orientations to action research, a conception aimed at mutual benefit to theory and practice. (Funtowicz and Ravetz, 2003: 25)

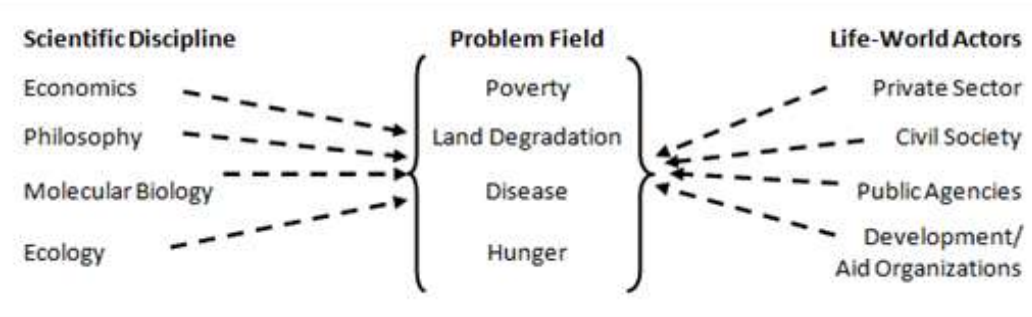
Several fundamental principles differentiate transdisciplinary research from efforts which merely extend the scope of disciplinary inclusion; among the most noteworthy are *integration* and *recursion*. Integration requires that various disciplines work in consort, not in isolation, throughout the entire process of investigation or policy development. Recursion suggests that transdisciplinarity requires a continuous re-assessment of inputs, outputs, and processes in a style akin to adaptive management approach. Figure 3.2 presents a graphical representation of transdisciplinarity's integrated and recursive characteristics.



Source: Adapted from Gill, (n.d.)

Figure 3.2: Transdisciplinary Characteristics

Another differentiating characteristic resides in the level and scope of engagement with an extended peer community. As depicted in Figure 3.3, transdisciplinarity extends beyond the narratives of disciplinary experts and "*engages in mutual learning with societal actors in order to account for barriers in real life and possible unintended effects of problem solving*" (Hirsch Hadorn et al, 2010:1). Engagement involves the highly recursive processes of cooperation, appreciation, illumination, reconstruction, modification, and ultimately transformation. The extent to which these varied forms of engagement lead to recognizable social change is ultimately a function of the range of types of exchange(s), the degree(s) of interaction, and the degree(s) or paradigmatic (perspective) variation engaged in the problem solving process (Leavy, 2011).



Source: Hadorn et al (2008)

Figure 3.3: Structure of Transdisciplinary Engagement

Of the multitude of *inter*disciplinary research initiatives conducted over the past half century, it might be suggested that the work of the Intergovernmental Panel on Climate Change (IPPC) and that of the Millennium Ecosystem Assessment committee (MA) come close to engaging a transdisciplinary approach to socio-ecological inquiry based on their strong issue-driven agendas, engagement of multiple disciplinary and stakeholder perspectives, and use of scenarios as a means of anticipating trends and impacts. Both the IPPC and the Millennium Ecosystem Assessment (MA, 2005) proposed conceptual frameworks which proposed new ways of thinking about pressing socio-ecological challenges of climate change biodiversity loss. They additionally adopted a scenarios format to offer predictions of multiple potential outcomes in a context of much scientific uncertainty. It is hard to discern within either of these efforts, however, the presence of what might be considered the linchpin of transdisciplinarity: *disciplinary transcendence* to the engagement of life-world actors, or perhaps more accurately the democratic engagement of a plurality of perspectives and geographies of difference. Scientific and economic analyses underpin the dominant perspectives which in turn establish operational assumptions and identify investigative methodologies.

These studies represent valuable problem-solving initiatives, yet one in which trained ‘experts’ analyze the socio-ecological condition through discipline-determined metrics and assess change via statistics produced by instrumental rationality devoid of a complement of meaningful life-world knowledge to add essential contextual rationality. Although ‘narratives’ or ‘scenarios’ have become common place in issue-driven research such as the IPCC and MA studies, the engaged knowledge base still represent a singularly ‘expert’ opinion. It is possible the issue framing adopted by

these studies deliberately chose to maintain traditional and accepted [e.g. expert disciplinary] boundaries in order to sustain scientific 'credibility'; a potentially understandable position recognizing that the anticipated conclusions of these studies, if believed, should have launched nothing short of a socio-ecological revolution. But as Waltner-Toews et al (2008) assert in their proposal for a transdisciplinary ecosystems approach, one which is quite different from the highly normative discourse of MA (2005), TEEB, (2010) and the PES optimists, acknowledging the post-normal context in which research and policy must now operate (e.g. conditions of extreme complexity and high levels of uncertainty) requires problem-centered research which operates in the spaces created *between* disciplines, and not merely the spaces in which two or more disciplines have relevance. And because there is "*no correct answer and no definitive perspective, decision-making under conditions of complexity must be broadly participatory*" (Waltner-Toews et al, 2008:80). Broad participation within a transdisciplinary approach reaches beyond expert inputs to engage the range of life-world actors, the *extended* peer community (Funtowicz and Ravetz, 2003). A transdisciplinary approach transforms the role of the expert or scientist from the current *sole* narrative creator to that of narrative *facilitator* (Meppem and Gill, 1998, Lang et al, 2012).

The seemingly entrenched societal belief in the objectivity and disciplinary rigor of traditional research (pure and applied) practices is slowly being softened, however, by two distinct communities of practice. In the past two decades, program evaluation and environmental impact assessment (EIA) practitioners have significantly utilized mutual learning through pluralistic, participatory engagement within their practice. Although both practitioner communities existed prior to the 1960s, they each

became solidly formalized in response to the passage of key pieces of U.S. legislation in the late 1960s. Program evaluation research methodologies advanced in response to President Lyndon Johnson's legislative efforts to address poverty and racial inequality through education health care initiatives; environmental impact assessment methodologies formed in response to President Richard Nixon's National Environmental Policy Act (Gibson, 2006a, Bond et al, 2013). Recognizing the environmental centering of this research and the traditional sectoral emphasis of program evaluation toward education and public health, pluralistic engagement is explored further within the Environmental Impact Assessment (EIA) research practice. The practice of impact assessment is also selected for exploration as it represents the foundation for sustainability assessment, a practical application of transdisciplinarity and the practice of engagement within the framework for socio-economic connectivity.

3.3 Pluralistic Engagement via Sustainability Assessment

"It is clear that impact assessment is beginning to be seen not just as a tool for informing and influencing decision-makers, but as a process which changes the views and attitudes of stakeholders who engage with the process such that their own attitudes and practices change outside the immediate decision-making context." (Bond and Pope, 2012:3)

Since its emergence in the US in the 1970s, environmental impact assessment (EIA) as a practice is now well established throughout the world and legislatively mandated in 191 countries, embraced by the 1992 UNCED agreements, and is an increasingly required practice for all multi-lateral development agency investments (Pope et al, 2013). EIAs have also significantly evolved from their environmental origins to encompass complementary assessment practices with varied investigative

foci such as social impact assessment (SIA), health impact assessment (HIA), and cultural impact assessment (CIA); and varied scope in the form of policy assessment, integrated impact assessment, cumulative impact assessment, and strategic environmental assessment (Pope et al, 2013). They remain, however, driven by legislative mandate, and as such the investigate terms of reference, requirements for stakeholder participation including length and scope of engagement, are mandated by policymakers. The innovative and potentially transformative aspect of impact assessment has become little more than a "*regulatory driven information gathering exercise*", or "*paper based exercise to obtain project approval"* (Morrison-Saunders et al, 2001). Effectiveness in mitigating environmental damage is perceived to be further hampered by methodologies which have become too systemized and weighted down by checklists and protocols lacking the flexibility required for post-normal conditions of variability and uncertainty (Pope et al, 2013).

Impact assessment, however, is currently in the midst of a 'paradigm shift' toward a new assessment methodology known as *sustainability assessment*. This practitioner-driven shift in focus and intent began with the expansion of scope (strategic, cumulated and integrated assessment methodologies) and was further prompted by the growing recognition that impact assessment as an innovative practice was failing to reverse environmental degradation (Morrison-Saunders and Fisher, 2006). A sustainability assessment framework recognizes the import of process and context for assessing socio-ecological policy effectiveness. It suggests that understanding socio-ecological relations and interactions through engaging multiple sources of knowledge in socio-ecological investigation and problem solving is critical for effective social change (Bond and Pope, 2012).

> *There is no way of avoiding the intricate and powerful connections among social, economic and ecological factors, or of local and global scales, or of short or long term implications. There are no theories that can safely ignore the particulars of the case and the place. There is no automatic mechanism that will deliver a better future. (Bond et al, 2013:12)*

Sustainability assessment differs from predecessor assessment methodologies in its transformative agenda and focus on a conceptually broad and recognizably variable goal of sustainability (Gibson, 2006, Wallington, 2007). Gibson (2006) calls sustainability assessment a marriage between "*two of the major concepts introduced over the past few decades (e.g. sustainable development and environmental impact assessment) to improve the odds of continue human survival on the planet*." (p. viii) While sustainability and impact assessment each have valid histories of [minor] accomplishments, Gibson (2006) argues their union is necessary to take each concept in a new more contextually relevant direction. Sustainability assessment suggests that trade-offs proposed under a pillared conceptualization of sustainability represent a business as usual scenario and should not be accepted as inevitable (Bond et al, 2013). Impact assessment practitioners have historically embraced trade-offs within mitigation measure prescriptions, e.g. actions proposed to compensate for expected instances of 'unavoidable harm.' True sustainability, however, is not achieved through the trade-offs which succeed primarily in blocking progressive problem solving and inhibiting innovative thinking about socio-ecological interactions (Gibson, 2013). Sustainability assessment does not seek win-win scenarios, e.g. no one 'loses', but rather a negotiated future which creates mutually reinforcing outcomes (Gibson, 2013). The uniqueness of the sustainability assessment framework is its capacity for pluralistic engagement and questioning of the business as usual perspective.

> *It is possible a more advanced approach to sustainability assessment, with a broader and more critical early framing of key questions and a consequently richer range of development options under consideration, would expand the search for feasible solutions with wider benefits and less ugly trade-offs. (Gibson, 2006:265)*

Practical applications of the sustainability assessment framework, however, are significantly rarer than those of more positivist assessment methodologies. Strong practitioner support is constrained by resource limitations and limited stakeholder support. Resource limitations, a fundamental problem for all methods of monitoring and assessment, pose additional challenges for admittedly more resource intensive, engagement driven assessment frameworks such as sustainability assessment. Limited stakeholder support stems from logistical difficulties in maintaining engagement of an extended peer community coupled with historical experiences of participatory approaches which consistently failed to effectively consider relational issues of equity, capacity, and transparency (Bond and Pope, 2012). The theoretical potential of participatory processes requires that shared learning become both a means (enhanced mutual understanding) and an end (identification of shared goal) within all phases of the policy process (Palerm, 2000).

> *It is clear the impact assessment is beginning to be seen not just as a tool for informing and influencing decision makers, but as a process which changes the views and attitudes of stakeholders who engage with the process such that their own attitude and practices change outside the immediate decision–making context. (Bond and Pope, 2012:3)*

3.4 Experimenting with Socio-Ecological Connectivity

"Key issues for effective forest verification do not appear to be the dichotomy between endogenous and exogenous pressures and developments, but rather the evidence of broad and lasting stakeholder participation and intervention."
(Navarro et al, 2006:16)

It has been argued throughout this chapter that sustainability is achieved through pluralistic engagement processes which succeed in uncovering existing values, perspectives and beliefs. Sustainability within pluralism is based on the need to acknowledge socio-ecological diversity as a characteristic and an objective of the socio-ecological policy process. Chapter 1 introduced the concept of post-sustainable development which advocates for moving beyond hegemonic thinking, whether that hegemony is the science and economics-based ideologies which underpin much of the current sustainability debate or the counter-discourses of post-structuralism, post-development, and neoliberalism. The proposal fosters a transformative approach to conceptualizing sustainability, one which brings to the fore of socio-ecological problem solving efforts the moral and ethical questions of *Who benefits*? *Who pays*? *Who decides*? and *What is decided*? The framework for socio-ecological connectivity embraces the concepts of dialectics, transdisciplinarity, and sustainability assessment in response to this challenge. While the use in this research of an admittedly theoretical and highly aspirational goal of socio-ecological connectivity grounded in a process of mutual learning via pluralistic engagement serves at the conceptual framework for an investigation of the PES conservation policy, practical examples of pluralistic engagement in socio-ecological policy processes exist within the assessment and evaluation literature. Examples of these efforts are worth highlighting as they demonstrate not only the possibility of enhanced stakeholder engagement

within the socio-ecological policy process; they also illustrate the intangible benefits of social empowerment and local capacity building which often result.

A selection of case studies from varied geographical contexts and disciplinary foundations provides examples of practical applications of transdisciplinary research principles. These case studies, listed in Table 3.1, highlight the uniquely different outcomes of pluralistic engagement in contrast to stakeholder engagement opportunities missing more critical points of engagement, e.g. problem identification and the consideration of intervention alternatives. The last case study discussed illustrates the potential ill effects frequently resulting from limited participation (Navarro et al, 2006). The selection of highlighted case studies emerged from a broader review of the Latin American sustainable forest management and PES assessment literature not from direct efforts to identify transdisciplinary research practices. Transdisciplinary research practice applications to environmental policy are still limited but are an excellent topic for further research

Table 3.1: Case Studies in Pluralistic Stakeholder Engagement

Author (date)	Context	Peer Community	Engagement Process(es)	Challenges/Outcomes
Gregory and Wellman (2001)	Tillamook Bay National Estuary Project Management Plan Oregon, USA Assessment of tradeoffs anticipated from management plan recommendations (150+)	TBNEP Management Committee Policy Makers Affected Stakeholders Broader Community	Multi-stakeholder management committee Stakeholder Group Meetings Public meetings Written input via questionnaire Small group work (workbook design)	Overcoming stakeholder burnout and unrealistic expectations from past engagement processes Overcoming jurisdiction territoriality Insertion of stakeholder value in management plan prioritization Sense of collective ownership of restoration project
Sheppard and Meitner (2005)	Development of a Sustainable Forest Management Monitoring and Assessment Framework for the Arrow Forest District IFPA of southeast British Columbia	Disciplinary experts from UBC and IFPA (9) Stakeholder groups: property owners, water users, community dvlpmt, local government, recreation, environment, forestry, tourism, others users	Stakeholder meetings – criteria weighting Focus Groups – scenario development and visualization	Conflict and mistrust between discreet user groups Limited interest in participatory processes Lack of trust that stakeholder concerns meaningfully embraced Increased stakeholder awareness of issues, and understanding of other perspectives Improved trust in resource management process Consensus on overarching goals and priorities
Hunsburger et al (2005)	Community-based assessment follow up and monitoring in three Canadian contexts (two watershed quality monitoring and one lobster fisher)	Given the favorable institutional context created by national legislation, each of the case study communities had individual groups engaged in citizen science activities	Identified citizen groups were engaged in planning and design on monitoring and follow-up activities.	Challenges to research credibility of citizen science Lack of sustainable financial resources Integration of local and conventional knowledge Stakeholder driven follow up research more effective in capturing cumulative and interactive impacts

* The tradition of stakeholder engagement in environmental management and impact assessment is strong within the Canadian regulatory framework as well as the Canadian culture as many of the academic researchers engaged in advancing both theory and practice are Canadian.

Table 3.1: Case Studies in Pluralistic Stakeholder Engagement *(cont'd)*				
Author (date)	**Context**	**Peer Community**	**Engagement Process(es)**	**Challenges/Outcomes**
Sayer et al (2007)	Monitoring and Assessment of Landscape-oriented Conservation Initiative in (3) African contexts	Stakeholder Planning group contained local and international NGO representatives, academics, forest management personnel, local government officials.	5-day Workshop to: 1) build shared landscape vision 2)develop locally owned indicators Field visits to insert context in indicator refinement	Developing stakeholder interest Translating issues to varied stakeholder audiences Capital Assets framing provided for holistic assessments, unique trade-off analysis Effective engagement of stakeholders in conservation monitoring
Gaudreau and Gibson * (2010)	Integrated Sustainability and Resilience-based Assessment (S/RA) of a small-scale Biodiesel Plant in Barbados	Academic Researchers Management and Employees of Biodiesel Operation Other key biodiesel stakeholders	Key informant interviews and stakeholder meetings contextualize S/RA criteria Recursive Stakeholder meetings to revise, apply, and assess criteria More stakeholder engagement recommended	Sustained Stakeholder engagement Identified key areas of concern under categories of socio-ecological, scale, and social learning issues Joint analysis of limitations and opportunities produced innovative recommendations.
Sims* (2012)	Community-Based Strategic Environmental Assessment (CBSEA) of utility-driven watershed management agricultural program in Costa Rica	Members from five communities involved in the initial stages *Instituto Costarricense de Electricidad* (ICE) agro-conservation initiatives participated in its evaluation.	Multiple workshops to: • Determine program purpose; • Assess program and alternatives, • Identify potential impacts; • Feed CBSEA results to proponent	Limited financial resources Limited technical capacity and experience Range of socio-political factors which prohibit successful continuation Strengthened community interactions Built local capacity to participate in environmental management and more broadly in critical problem-solving
Navarro et al (2006)	Forest Management in Ecuador	Ministry of Environment, Professional Foresters, Police, Army, Contracted agencies	For purposes of award and maintenance of contract	Political Instability, limited resources Deepening of Government mistrust Failure of forest governance system

* The tradition of stakeholder engagement in environmental management and impact assessment is strong within the Canadian regulatory framework as well as the Canadian culture as many of the academic researchers engaged in advancing both theory and practice are Canadian.

Gregory and Wellman (2001) describe their effort in engaging stakeholders in trade-off analysis (costs, benefits, and risks) of over 150 proposed management actions to restore the Tillamook Estuary Watershed in Northwestern Oregon. Through multiple stages of engagement, stakeholders were asked to: 1) identify what they considered the fundamental objectives of the management plan, 2) identify, using multiple value structuring tools (e.g. value trees, influence diagrams, means-ends networks), important causal relationships from the proposed actions, 3) provide preference data for trade-off analysis, and 4) design a policy evaluation framework complete with criteria, indicators, and metrics. Despite sample size and information limitations, the study suggested that stakeholders possessed a wide diversity of views and values that were only captured through multiple opportunities and methods for engagement. Capturing this diversity with multiple stages of the policy process, they conclude, can lead to the adoption of management actions that might not emerge from simplistic cost-benefit analysis. In the case of Tillamook, stakeholders articulated strong support for costly restoration efforts (infrastructure development and land purchase) and the resulting list of proposed management actions was adjusted to suit the revealed stakeholder preferences. A collective prioritization of management actions was just one of the potentially secondary outcomes of the engagement process. Gregory and Wellman (2001) suggest that the strengthened sense of collective ownership, and a renewed local commitment to restoration and conservation that emerged from the participatory process was potentially even more valuable.

Sheppard and Meitner (2005) assess a pilot effort to utilize enhanced stakeholder engagement for the development of a multi-criteria assessment framework under the Arrow Forest District Improved Forest Practices Agreement in the Slocan

Valley of southeast British Columbia. The effort undertook to address traditional participation shortcomings such as mistrust, fragmentation and conflict by ensuring the following process elements: i) broad representation of stakeholders, ii) open access to the process to all interested in participating, iii) a clearly defined and transparent decision making process articulated at project initiation, iv) attractive and engaging process, v) easily understandable and accessible information provided through multiple channels and products, vi) multi-criteria assessment frameworks which can be understood and utilized by diverse stakeholder population, and vii) the use of spatially explicit forecasting of sustainability values over multiple long term scenarios encompassing multiple uncertainty conditions. An initial stakeholder analysis identified 9 stakeholder groups tasked with refining a broad set of sustainability criteria which they then "weighted" using three unique methodologies (top priority selection, ranking, and fixed point allocation). Using the local regulatory framework as a starting point, the technical experts leading the engagement process developed two forest management scenarios which were also evaluated by each of the 9 stakeholder groups. Stakeholder input revealed strong social values for biodiversity and water conservation *across* the spectrum of diverse stakeholder interests, including those representing the extractive industries. The priorities were then used as the basis of developing and evaluating management options. The pilot provides evidence to support the argument that engagement at the earliest stage of policy making, e.g. determination of goals and objectives, provides greater opportunity for collaboration than engagement which seeks consensus of already developed action plans.

Citizen monitoring is explored, again within the Canadian context via three select case studies present by Hunsberger, et al (2005)[27] and via three case studies within the African context by Sayer et al (2007). Given Canada's well-established practice of citizen engagement in environmental management and monitoring activities, the engagement processes discussed by Hunsberger et al (2005) focused largely on overcoming some of the broader institutional barriers such as limited scientific credibility of participatory research processes or inadequate levels of sustained funding which limit effectiveness. The case studies described by Sayer et al (2007) involved processes to build stakeholder awareness of various socio-ecological issues and develop capacities for engagement as participatory research is still extremely limited within the African context. Both sets of case studies, however, concluded that broad stakeholder participation in resource management planning as well as implementation of collectively developed action plans enhanced overall effectiveness of the larger resource management initiatives and was broadly perceived as worth the time and resource investment. "*Case study evidence suggests that the benefits of broadening the scope of follow-up activities outweighs the logistical challenges*" (Hunsberger et al, 2005:622).

Gaudreau and Gibson (2010) and Sims (2012) both represent case studies from the Latin American/Caribbean context, and each was conducted within an impact assessment framework. Gaudreau and Gibson (2010) applied a Sustainability

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[27] Canadian Environmental Impact Assessment legislation mandates project planning for impact and process compliance monitoring which is frequently undertaken by citizen monitoring groups which have grown significantly in number over the last two decades. (Hunsberger et al, 2005)

Assessment (SA) approach to an assessment of a biodiesel plant in Barbados whereas Sims (2012) conducted a Community-Based Strategic Environmental Assessment (CBSEA) of an agro-conservation program in Costa Rica. Sims' research was framed within the context of transformative learning theory which suggests that stakeholder engagement with critical reflection can transform perspectives and heighten individual and collective agency and responsibility. Sims' case study takes a further innovative investigate step by combining the participatory practices promoted by the Canadian regulatory framework with the strategic level analysis of an SEA. Gibson's innovation combines sustainability assessment with a resilience framework[28] to identify the mutually reinforcing and lasting gains proposed to result from environmental management activities developed through enhanced engagement and social learning processes. Through a highly interactive and integrated assessment process, a small-scale biodiesel plant in Barbados was evaluated by identified stakeholder groups on over 50 criteria under the following headings: socio-ecological integrity and resilience; livelihood sufficiency and opportunity; intra-generational equity; intergenerational equity; natural resource maintenance, feedback, and efficiency; social-ecological civility, networks and governance; precaution and adaptation for resilience; and interactive effects delivering multiple, mutually reinforcing and lasting benefits. The analysis revealed opportunities and limitations with the country's existing structure regulatory for biodiesel operations and produced recommendations couched in higher level policy and program initiatives as opposed to those targeted simply at a project level. For example, development of a distributed co-operative of small-scale producers was recommended as a means to maintain the

[28] See www.resalliance.org for more on Resilience Assessment.

small-scale benefits of flexibility and adaptability while simultaneously addressing the small-scale challenges of high input costs and variable product quality. Government tax incentives and public awareness campaigns highlighting the importance of biodiesel in the broader national context of renewable energy targets were also recommended as national policy initiatives supportive of the desired operational transitions. A green fuel tourism marketing campaign was further recommended to tie the expansion of biodiesel to the country's strong tourism industry. A fundamental difference between the outcomes produced within these enhanced engagement case studies and those derived from more traditional participatory practices is the opportunity to create mutually beneficial outcomes which engage all stakeholders in crafting a new socially determined development trajectory. Practices of engaged learning suggests a process of collaboration toward collective goals, whereas the negotiating consensus intimates competition and conflict and rarely allowing for creative, out of the box thinking and solutions.

The last case study illustrates how the subtle difference between these different forms of engagement can produce dramatically different results. Navarro et al (2006) describes efforts to engage Ecuadorian forest management stakeholders in the development and implementation of a new forest management plan. The need for new management structures emerged from the Government's 1999 *Strategy for Sustainable Forestry Development* developed in response to the country's alarming 1.5% deforestation rate. The Strategy proposed to strengthen forest management systems constrained by limited state resources by delegating identified forest management activities to civil society and private sector stakeholder under what was known (and hailed internationally) as the *Outsourced National Forest Control System (SNTCF*).

The SNTCF was broadly viewed by most stakeholders as a continuation of the forest management decentralization begun in the early 1990s but slowed by political turbulence. The *theory* behind the SNTCF was to improve forest management efficiency and effectiveness, improve transparency, and provide a more equitable system for the forest products sector through enhanced technical and forest product marketing assistance targeted to assist small-scale forest management operations. And although the SNTCF was developed through a 'consultation' process, stakeholder input was heavily dominated the private timber industry, Ministry of the Environment and international donors. The exclusion from the consultation process of i) indigenous populations representing 30% of the country's land managers[29] and ii) essentially all other government ministries, despite significant areas of overlap in agricultural, energy and transportation sectors, left the resultant plan without the input or support of critical stakeholders. In the existing climate of political instability, the failure of the SNTCF architects to engage the broadest spectrum of stakeholders in problem identification, solution strategizing and trade-off analysis left the outsourcing initiative vulnerable to legal and protest action. Despite short term data to suggest the initiative had significantly curtailed illegal logging in its short two years of operation, its failure to deliver on the additionally proposed objectives of increased transparency and enhance equity incited strong stakeholder opposition and an eventual abandonment of the initiative. The SNTCF case study illustrates the critical need for broad stakeholder

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[29] Approximately 50% of the country's 12 million ha of forests are state owned, 30% under management/ownership of indigenous peoples, and 20% are considered 'private production units', however there is a significant level of tenure overlap and/or discrepancy (Navarro et al, 2006).

engagement, particularly in contexts of highly politicized, administratively weak governance institutions.

Presentation of this limited set of case studies is intended to highlight the socio-ecological problem solving potential of pluralistic, participatory practices. While each case represents a unique context and set of research challenges, each embodies important principles of transdisciplinarity, e.g. driven by contextually defined issue/problem, discourse based learning, engagement of an extended peer community. Giving 'voice' to multiple stakeholder concerns through contextually relevant problem identification processes was demonstrated to be effective in improving stakeholder confidence in the goals, objectives, and potential outcomes of the various initiatives. The process (when executed properly) further succeeded in minimizing existing stakeholder conflict. Practices of discursive and experiential engagement (through field trips) were demonstrated to be effective in nurturing community which is required for sustainability. When innovative engagement practices are adopted at the earliest stages of socio-ecological problem-solving they are also capable of producing innovative resolutions (Bond et al, 2013, Sims, 2013). The (unintended) bias of the above case studies toward Canadian contexts may oversimplify a fundamental tenet of transdisciplinarity as well as fundamental challenge to the process, e.g. exposing and questioning dominant ideologies and perspectives. While the ability to expose and challenge is perhaps most critical at the point of problem identification, reflexivity and recursiveness are essential principles for the entirety of the problem-solving process. It must be stressed, however, that socio-ecological connectivity through engagement is challenging even in the most supportive of contexts.

3.5 Socio-Ecological Connectivity is neither Simple nor a Panacea

The preceding case studies highlight challenges and benefits to the socio-ecological problem solving potential of pluralistic, participatory practices. While each case represents a unique context and set of research challenges, each embodies important principles of transdisciplinarity, e.g. driven by contextually defined issue/problem, discourse based learning and engagement of an extended peer community. Giving 'voice' to multiple stakeholder concerns through contextually relevant problem identification processes was demonstrated to be effective in improving stakeholder confidence in the goals, objectives, and potential outcomes of the various initiatives. The process (when executed properly) further succeeded in minimizing existing stakeholder conflict. Practices of discursive and experiential engagement (through field trips) were demonstrated to be effective in nurturing community. When innovative engagement practices are engaged at the earliest stages of socio-ecological problem-solving they also have a greater capacity to produce innovative resolutions (Bond et al, 2013, Sims, 2012).

The means and ends, challenge and potential of socio-ecological connectivity is mutual learning through pluralistic engagement. This chapter explored the underlying theory and principles of socio-ecological connectivity. The following chapter describes the process by which payment for ecosystem services (PES) is examined for its socio-ecological connectivity potential.

Chapter 4

EXPOSING INTERNALIZED HETEROGENEITY

"The history of social science is not a matter of progressing to ever better theories and methods, but rather of successive efforts to capture the social world and to answer questions that themselves may be different."
(della Porta and Keating, 2008:9)

This research is couched within the debates about the highly variable and frequently contested concept of sustainability, and advocates for a collective means by which to redefine i) what sustainability means in practice, ii) how it will be achieved, and iii) how it will be assessed. Chapter 1 introduced the concept of post-sustainable development which suggests that decades of initiatives developed to achieve sustainability and sustainable development have failed to: i) identify, expose and challenge hegemonic discourses, ii) provide mechanisms for meaningful multi-stakeholder engagement, and, perhaps most importantly, iii) use the knowledge and understanding created through discursive engagement to craft and implement innovative socio-ecological solutions capable of embracing uncertainty and plurality. Chapter 2 identified two collections of PES narratives and suggested that a PES narrative of post-sustainable development possibility needs to embrace processes of pluralistic participatory engagement. Chapter 3 explored the conceptual foundations of a socio-ecological connectivity (SEC) framework to meet the requirements of post-sustainable development. This Chapter outlines the means by which PES as a concept and a practice is examined for its potential contribution to a post-sustainable development agenda.

A distinction is made between the long sought after target of ‘sustainable development,’ and the more process-oriented concept of ‘sustainability.’ The latter is defined as synonymous with post-sustainable development and pluralistic engagement; the former proposes achieving a broadly identified socio-ecological state, frequently understood as a social, economic and environmental balance. Over the past half century the identified targets and literal shape or relational structure of the desired balance has varied significantly, evolving to embrace sustainability considerations of biophysical limits, and socio-ecological interdependence (Daly, 1973, Rammel, 2007). Four visual conceptualizations of that evolution are depicted in Figure 4.1, three conceptualizations (A-C) are taken from the sustainable development literature, the fourth (D) was developed by this research to visually capture post-sustainability. Each conceptualization might be considered representative of a unique socio-ecological perspective with sustainability balance (A) concerned with ensuring economic [green] growth for the maintenance of social and environmental systems. The capital assets perspective (Option B) seeks a balance between social, human, natural and economic capital and emphasizes social well-being. Daly’s Triangle (Option C) promotes biophysical limitations. Socio-Ecological Connectivity (Option D) emphasizes resilience.

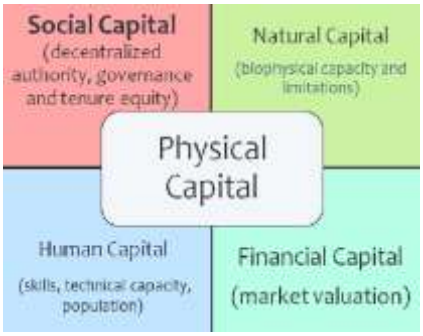
Post-sustainability represents a break from the balancing acts of sustainability targets and criteria and seeks instead an engagement process based on universally agreed upon principles and embracive of diversity. Sustainability in this post-disciplinary, post-sectoral context centers on ensuring resilience and adaptability for the entirety of the socio-ecological system and not an orchestrated balance between identified components or sectors. Within purely ecological systems - what we might

call ‘nature’ - resilience and adaptability is ensured by the presence of a diversity of species and diversity of ecological functions. Post-sustainability suggests a similar requirement for socio-ecological systems, namely a diversity of institutions, practices, values and beliefs for guiding socio-ecological systems; a condition referred to in the social sciences as heterogeneity or plurality (Harvey, 1996, Gibson, 2006, Rammel et al, 2007). *“Diversity in governance and in routes to sustainability is thought to be as important as genetic variation in the evolution of robust socio-ecological systems” (Gernett et al, 2007:11).* Understanding how PES contributes to a post-sustainable development agenda requires understanding how the PES policy identifies, facilitates and encourages socio-ecological diversity.

Option A: Sustainability Balance

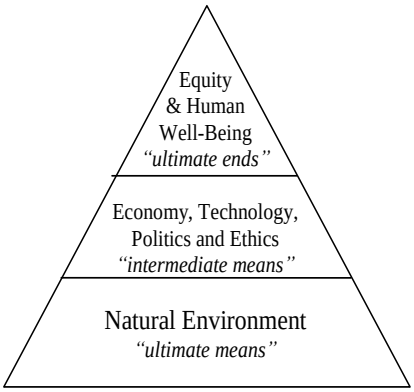
Source: www.energyeducation.tx.gov

Option B: Capital Assets



Source: adapted from Gernett et al (2007)

Option C: Daly's Triangle



Source: Daly (1973)

Option D: Socio-Ecological Connectivity

Figure 4.1: Sustainable Development Conceptualizations

Transdisciplinarity suggests that socio-ecological resilience is fostered through reflexive and recursive discourse-based learning with an extended peer community. The PES narratives of potential and of peril presented in Chapter 2 suggests that reflexivity can indeed expose a plurality of perspectives, even within a literature-based 'extended peer community.' Perspectives identification within the context of this research seeks to understand the socio-ecological connectivity potential of PES by first assessing the perspectives plurality within identified socio-ecological contexts and second through an identification of the multi-scalar systems and institutions which support (or inhibit) diversity and perspectives engagement. The framework for socio-ecological connectivity presented in the Chapter 3 was ultimately developed to guide an actual policy development process and ensure broad pluralistic engagement from start to finish. It guides this investigation into the post-sustainable development potential of PES first via an exposure of plurality via discourse analysis of the PES impact assessment literature for selected case studies in Costa Rica, Ecuador and Brazil. PES perspectives are identified via the priorities expressed in assessment targets, criteria, and methodology choices. Analysis of the assessment literature additionally explores stakeholder engagement processes to promote mutual learning outcomes using a contextual assessment of socio-economic and socio-political contexts. The practice of engagement is explored via a field exploration exercise in Trinidad and Tobago with sustainability stakeholders. The initial intent of the field-based component was to facilitate the launch of a sustainability assessment of the country's first official PES initiative; however multiple barriers (discussed in Chapter 6) forced modifications to the field work objective. What was ultimately achieved in the Trinidad and Tobago field exercise was a stakeholder analysis of the sustainability

assessment framework for the Trinidad and Tobago context. The following section details the four PES perspectives identified within the assessment literature and the analytical methodology developed to use application this perspectives spectrum within the case study meta-analysis and field exercise.

4.1 Perspectives Analysis

"The ability to discover intrinsic values depends on the ability of human subjects endowed with consciousness and reflexive as well as practical capacities to become neutral mediators of what those values might be." (Harvey, 1996:158)

Chapter 2 outlined two broad categories of PES narratives – the narratives of optimistic potential, and the cautious narratives of potential peril - each with a unique set of sub-narratives. These narratives and sub-narratives were developed from a review of the PES and ecosystem services conservation policy literature[30]. The narratives capture the prominent implementation issues confronting the PES conservation policy, issues ranging from payment and compensation logistics to ethical considerations. The narratives also represent differing positions regarding a desired basis for socio-ecological problem-solving, e.g. i) economic rationality and scientific objectivity, ii) enhanced concern for inter and intra-generational equity, iii) improved governance and greater stakeholder participation, and iv) concern for socio-ecological relations. Figure 4.2 below (PES Narratives Alignment Options) proposes a relationship between the identified narratives with currently advocated managerial

[30] A distinction is made PES and ecosystem services-based policy. While both are based on an identification of understanding the connection between ecosystem goods and services and human well-being, the former proposes to insert that understanding into a narrow model of economic utility maximization whereas the latter embodies a broader view and willingness to explore options for maintaining and enhancing socio-ecological relationships.

responses to sustainability challenges as well as some of the academic disciplines frequently associated with these positions. Maintaining the correlation between PES narratives and the traditional sustainability components (economic-blue, social-orange, and ecological-green) first proposed in Figure 2.1 assists in translating traditional, pillared sustainable development thinking to the PES perspectives framework. Highlighted in Figure 4.2 is the relationship between narratives of optimistic potential and an economic prioritization of sustainability, narratives concerned with equity and the social component, and narratives of ethics and engagement are more closely aligned with ecological sustainability. The disciplines identified follow a categorization developed for the meta-analysis. It should be noted that the purpose of any categorization is to assist with analysis and should not be interpreted as a definitive pigeon holing of a particular discipline with an identified sustainability sector, narrative, or perspective.

A word about economics as a discipline. Although economics is ultimately a social science as its basis is the prediction of human behavior, over that past century it has been slowly separated from its social science foundation and endeavored to compete more firmly with the hard sciences and instrumental rationality. When economics is allowed to recognize its social foundations, an economic theory spectrum emerges which is significantly more complex than the simple four-part spectrum proposed for PES. A website entitled "*Musings on Economics, Finance and Life*" lists fifty (50) of what it considers the most important of economic theory perspectives – to get the discussion started.[31] Economic theory represented within the

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31 www.dmarron.com-

PES spectrum represents the neo-classical and neo-liberal traditions. Ecological economics has been differentiated in the PES spectrum as it represents an economic theory which deliberately differentiates itself on sustainability issues and is frequently considered more multi-disciplinary than constrained by strict economic dogma. Several transdisciplinary-based critiques suggest, however, that in spite of its multi-disciplinary aspirations, ecological economics quite frequently revert back to an economic framing of problems and solutions (Funtowicz and Ravetz, 2003).

Figure 4.2 presents the PES narratives spectrum based on articulated PES implementation concerns; Figure 4.3 identifies linkages between PES assessment perspectives and four main impact assessment priorities. These four PES assessment perspectives are identified as *Optimist*, *Realist*, *Skeptic* and *Rejectionist*, recognizable in the assessment literature according to analytical priority. *Optimists* are efficiency-oriented, concerned predominantly with readily measurable economic and ecological indicators which seek to quantify target goods and services and ignore ecosystem interdependencies. *Realists* are concerned with livelihood and equity impacts and target assessments on measuring social and economic well-being, poverty, and distributional issues. *Skeptics* are concerned with institutional barriers to improved resource use and management and assess issues of stakeholder access and participation (engagement), institutional and structural change. And finally, *Rejectionists* are equity-driven, concerned with the impact of policy in social relations and the impact of policy power hierarchies. Table 4.2 details the issue priorities and key assessment indicators associated with each perspective. A detailed summary of the four PES Assessment Perspectives is found in Appendix A.

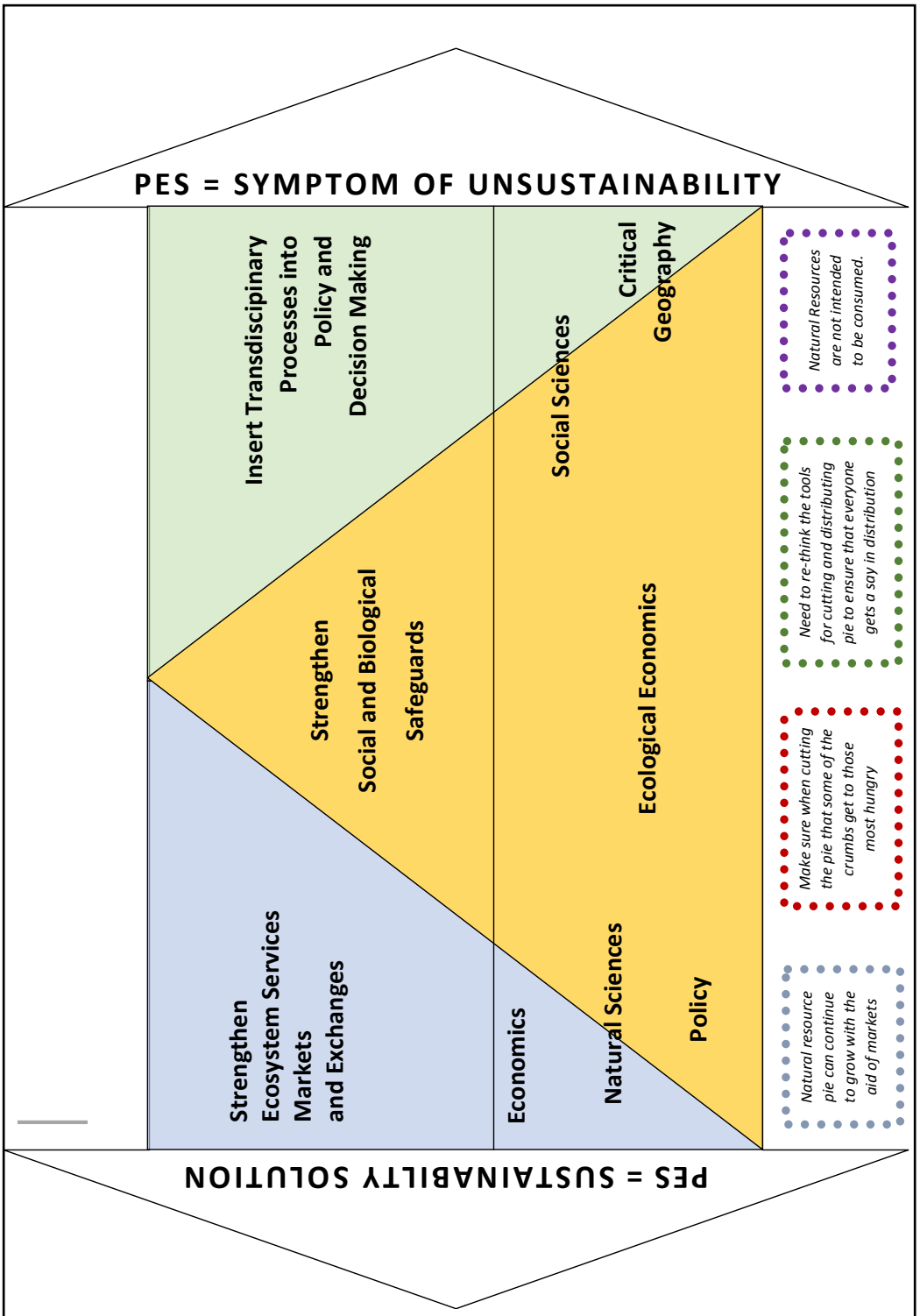

Figure 4.2: PES Narratives Alignment

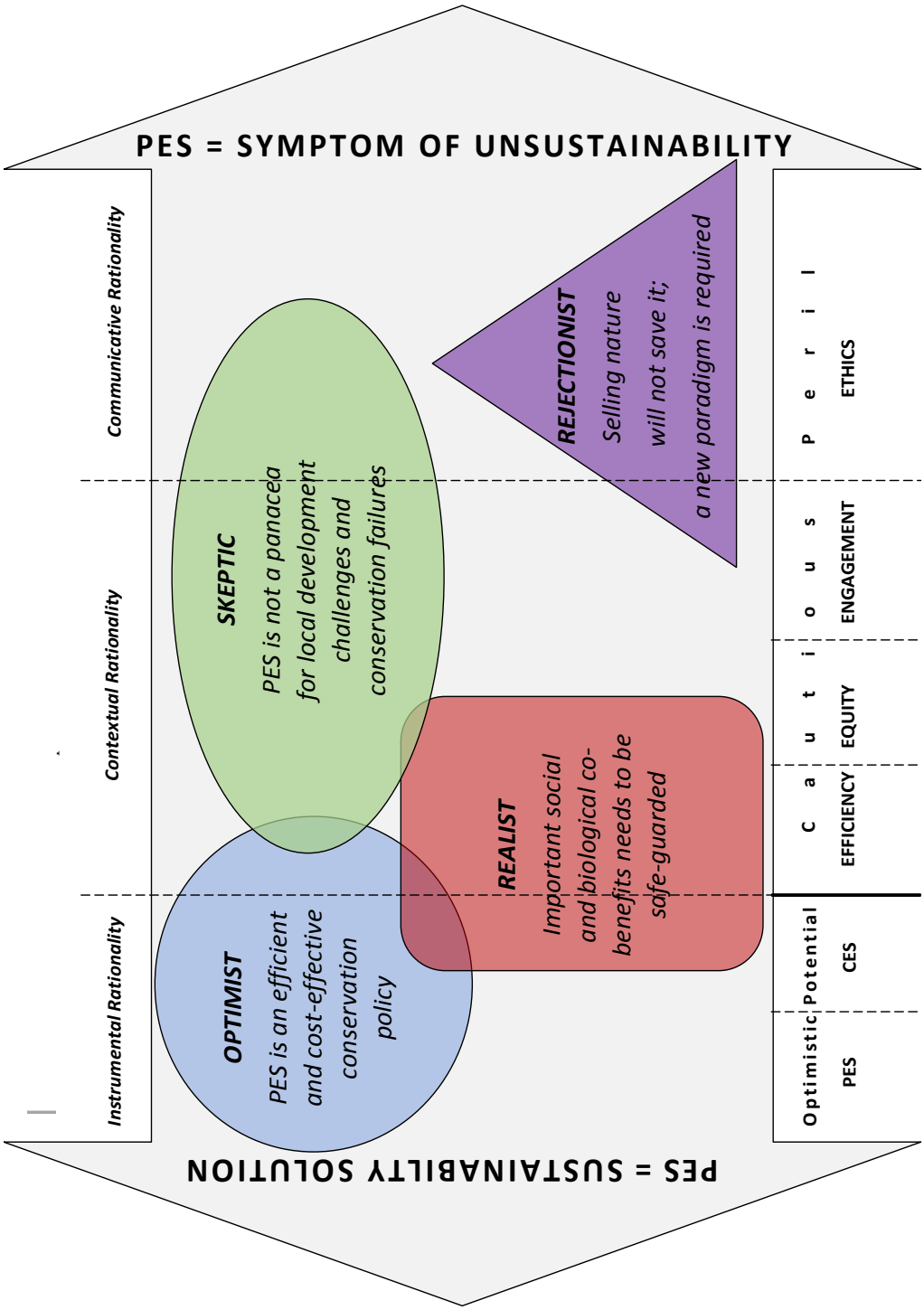

Figure 4.3: Four PES Perspectives

4.2 Four Perspectives

Optimist - *Efficiency*

Optimist sustainability is closely linked to the balanced pillars (economic, social, and ecological) articulated by *Our Common Future* (Brundtland, 1987) and illustrated in Option A of Figure 4.1. This perspective assumes a need for economic growth in socio-ecological problem solving, believing that a rising tide will lift all boats, or that a bigger pie will ensure that everyone gets dessert. This perspective is intimately linked with the narratives of potential accepting without question PES' fundamental assumptions of utility maximization and economic rationality, and the belief that resource degradation is the result of market failure. *Optimists* acknowledge that market-based tools may at times be less effective in addressing multiple policy problems (e.g. achieve social and economic co-benefits in addition to ecological targets), but firmly believe the model's economic incentive structure will facilitate the required regulatory reforms (land tenure conflict resolution, enhance protection of public lands, etc.) needed for 'win-win' outcomes. While *Optimists* do not believe that market-based conservation mechanisms are flawless, subjectivity in valuation and measurement are recognized as problematic, they strongly believe in the desirability of harnessing the power of the market (e.g. accessing conservation finance) to deliver measurable ecosystem service delivery benefits. When performance and outcomes are less than desirable, *Optimists* suggest modifications to the implementation structure and mechanisms of ecosystem service exchange. Efficiency-oriented *Optimists* evaluate effectiveness through simple biophysical indicators (forested hectares, carbon sequestered, quantity and species of trees plants, and flora and fauna species counted) which are proposed as proxies for capturing enhanced levels of ecosystem service

delivery; and through easily captured socio-economic indicators of participation rates, payments delivered, and financing generated. *Optimist* assessment methodologies are highly quantitative. The *Optimists'* primary evaluation concern is in understanding how to improve ecosystem market supply, demand and exchange functions.

Realist - *Equity*

Realists adopt a conceptualization of sustainability based on a 'capital assets' framework in which the goal of policy is to simultaneously enhance social, natural, physical, economic, and human capital contributors to sustainable development goal. *Realists* still believe markets can deliver win-win solutions and thus have some overlap with the *Optimist*s; however, they are less willing to admit that such outcomes are easily achieved by simple adjustments and modifications to implementation structures. *Realists* represent the cautious narratives of potential peril concerned with institutional efficiency and social equity. *Realists* are often considered "Pro-Poor" PES advocates and question the processes used in determining what they see as inevitable efficiency vs. equity trade-offs within market-based conservation policies. (*Who pays? Who Benefits?)* Pure efficiency goals in any market activity are generally achieved through scale and standardization; however, *Realists* argue these objectives may need to be sacrificed to ensure equitable benefits delivery to smaller scale stakeholders and more diverse populations siding with equity within trade-off determinations. *Realists* are concerned with capturing indicators of social well-being and focus on livelihoods, local economic development and cost/benefits distribution metrics, and utilize a variety of data collection methodologies which combine technical and economic quantitative surveys with qualitative social assessments.

Skeptic - *Engagement*

Skeptics represent an important shift from *Optimists* and *Realists* in their acknowledgement of what drives ecosystem degradation. Whereas the first two perspectives accept market failure as a fundamental driver, *Skeptics* believe strongly that unsustainable resource use is a policy failure; a function of unclear, inadequate, inappropriate and conflicting sectoral policies with socio-ecological impact often across multiple scales. *Skeptics* recognize the existence of multiple institutional, political and cultural barriers to effective conservation. Overlapping jurisdictional authority, insecure land and resource tenure, conflicting sectoral policies all support or detract from conservation policy effectiveness. Social equity, from the *Skeptic* perspective, is not merely about equal access to economic benefit, it is about fair and equitable decision-making processes in which the power differentials which create inequity are exposed and at minimum neutralized, at best eliminated. *Skeptics* cross the center line of the PES Perspectives Spectrum and lean more toward advocating for the removal of markets from conservation but do not suggest a complete abandonment of market or incentive based policies and thus do not represent a decisive break with the market myopia of the first two perspectives. *Skeptics* instead advocate for analytical priorities focused less on quantitative efficiency and more on qualitative structural reform and institutional change. As suggested in Figure 4.3, *Skeptics* encompass a range of cautious narratives, efficiency, equity, engagement and some ethics but primarily from the vantage point of concern for institutions and context. The relevance of the engagement narrative for the *Skeptic* perspective is a desire to engage multiple perspectives in socio-ecological problem identification and assessment of alternatives. Enhanced engagement in scale and in scope is proposed as a means to

help identify institutional challenges and engage in collective problem-solving efforts to address them. Although none of the 'established' sustainable development graphics completely captures the skeptic perspective, Option C – *Daly's Triangle*, comes closest and is proposed as a potential illustration of the Skeptic position. The role of economy, technology and politics in mediating socio-ecological relations is fundamental to this sustainable development interpretation.

Rejectionist - *Ethics*

Rejectionists argue that ecosystem degradation is neither a market *or* policy failure but instead an ethical issue involving the social subjugation of nature. The failure of previous conservation interventions is caused by an inability (or unwillingness) to address embedded socio-cultural and political-economic drivers of ecosystem degradation. A *Rejectionist* conceptualization of sustainability is very eco-centric. For *Rejectionists*, PES mechanisms merely re-brand the pillared conceptualization of socio-ecological relations, representing little more than business as usual. The *Rejectionist* perspective is prominent amongst geographers engaged in the PES debate who suggest that economics as a foundation for socio-ecological problem solving is operationally and morally problematic (McCauley, 2006). *Rejectionists* represent the cautious narrative of potential peril concerned with ethical considerations and break completely with the other perspectives which maintain varying degrees of a willingness to include markets in socio-ecological problem-solving. Option D of Figure 4.1 was created specifically an as attempt to capture this alternative conceptualization. The primary evaluation concern for *Rejectionists*, therefore, is to detect an ideological shift.

4.3 Assessment Case Study Meta-Analysis

"Attempts to construct places and build imagined communities must take cognizance of processes that transcend separable cases, moving through and beyond them and transforming them as they proceed" (Harvey, 1996:352)

Meta-analysis is a process in which data and observations from a collection of studies are compiled and analyzed. The methodology is instrumental in identifying trends unlikely to be detected within the outcomes of a singular study (Clark and Kozar, 2011). Meta-analysis in the context of this research is proposed as an effective means to identify PES perspective trends. Its application across three case studies provides an additional opportunity to explore those trends across contexts and investigate how unique socio-cultural and political-economic conditions influence (or not) any identified trends. Training the investigative lens of this meta-analysis on the potentially pivotal role of impact assessment was determined a viable means for exploring the post-sustainable development potential of PES, specifically to gauge the existence of PES perspectives plurality. Although the PES impact assessment meta-analysis methodology was initially proposed in order to compile and consolidate assessment indicators frequently utilized in PES project evaluation, the meta-analysis suggested that more effective socio-ecological policy assessment would not be achieved through a more comprehensive set of assessment indicators, but rather through a more integrated and participatory policy evaluation *process.* Recognizing that post-sustainable development requires exposing the plurality of socio-ecological values and beliefs operational in any given socio-ecological context, this meta-analysis explores target indicators and data collection methodologies to identify trends in PES perspectives both within and across the case study contexts.

As the PES literature is vast and growing daily (if not hourly), the assessment literature for inclusion in the meta-analysis was restricted to assessments PES initiatives operational within the Latin American and Caribbean region. The scope of review was further refined to three target countries: Costa Rica, Brazil and Ecuador, each of which offers a unique socio-ecological context in which to examine PES assessment. For the sake of simplicity, only one of the multiple PES initiatives operating within each of the identified case study countries was selected for in-depth analysis. The PES initiatives were selected based on the extent of the analysis found within Latin American PES literature. Costa Rica's well-researched national PES initiative (*Programa Pago por Servicios Ambientales* or PSA) was an obvious choice due to longevity and extensive analysis. Brazil's *Bolsa Floresta* was selected from amongst a variety of sub-national PES initiatives due to the relative wealth of assessment literature (19 studies). Ecuador's *Pimampiro* Watershed Protection Project was selected from the array of sub-national and municipal PES programs operating in Ecuador due its length of operation and availability of PES assessment literature. It should be noted that while each of the case study contexts is currently engaged in REDD+ Readiness activities[32], effort was made to select PES initiatives designed and launched prior to the current push to develop forest carbon PES schemes to access anticipated REDD+ funding. Chronologically this translates to projects initiated prior

[32] REDD+ Readiness requires development a National REDD+ Strategy to identify the role of forest carbon in a country's overall plan for carbon emissions reductions. It further entails developing an institutional capacity to effectively manage REDD+ projects, e.g. a system to identify forest carbon reference levels; a national forest carbon accounting system; a system for monitoring, reporting and verifying carbon emission reductions; identified benefits sharing mechanisms; safeguards and grievance mechanisms; and systems to clarify land, forest, and carbon tenure. (www.forest-carbon.org)

to 2009 when REDD+ was adopted in principle as part of the UNFCCCC climate change mitigation and adaptation platform.

A total of 74 assessment studies were reviewed, their breakdown by case study context is found in Table 4.1. Studies were identified through library database and internet searches using the name of the selected initiative and qualified by a search for '*assessment'* or '*evaluation.*' This refinement was particularly critical for the Costa Rican PSA as operational longevity (since 1996) and current status as role model for the international REDD+ initiative has produced an extensive base of analytical literature. For all case study contexts, assessment and evaluation literature selected for inclusion were studies which identified a data collection methodology and assessment targets.

Articles and reports providing an informational discussion of the program and its context were not included as part of the PES meta-analysis. Such studies did, however, contribute to an increased understanding of the case study context. Language limitations restricted the reviewed studies to those published in English. While this limitation may have resulted in the meta-analysis not fully capturing assessment perspectives voiced at national and possibly regional levels, the restriction to English language assessment is estimated to have been adequate for the purpose of the research for two reasons. First, nearly every English language study engaged literature produced within the respective country context and native language, thus findings of locally produced Spanish and Portuguese studies are assumed to have been encompassed within the English language assessments. Second, as the intent of the research is to unveil the potential dominance of a sustainability perspective and

primarily within the global PES discourse which is ultimately driving the forest governance agenda, English language studies can be assumed to represent the discourses produced for the international sustainability debate.

Table 4.1: Breakdown of Case Study Assessment Literature	
Costa Rica	31*
Brazil	26
Ecuador	18*
Total	74
*One study assessed both Costa Rica's PSA and Ecuador's *Pimampiro* Project and was counted in each country summary.	

The majority of studies involved ex-poste assessments; however one or two ex-ante modeling studies were included with each case study context. While there was a deliberate effort to exclude REDD+ analyses, it is an increasingly preferred topic for conservation policy analysis and as such was difficult to avoid. All three case study countries are exploring REDD+ funding for the initiatives studied. The Brazilian PES case study *Bolsa Floresta* represents a broader program initiative under which *Juma* Sustainable Development Reserve REDD+ Initiative has emerged. The Ecuadorian case study looked at the municipal-level *Pimampiro* Watershed Protection Initiative which is likely to be incorporated into the more recently established national-level *Socio Bosque* PES (SBP). SBP forms the basis of the country's REDD+ Strategy. Costa Rica's PSA has long struggled with sustainable finance and the country is eagerly putting in place the necessary 'readiness' frameworks which will allow it to access anticipated REDD+ funding.

The identified objectives of the assessment literature meta-analysis were:

i) identify sustainability priorities via target indicators used in PES assessment,
ii) determine the existence of dominant perspectives within PES assessment, and
iii) explore whether or not author discipline(s) or employed data collection methodology(ies) are representative of particular sustainability perspectives.

To achieve these objectives, each study was categorized by:

i) target indicator(s) (Table 4.2)
ii) discipline(s) of author(s) (Table 4.3)
iii) author's institutional affiliation (Table 4.4)
iv) data collection methodology(ies) (Table 4.5)
v) method of study dissemination (indicated in Tables 5.4, 5.7, 5.10)

The meta-analysis used identified target indicator as the primary basis for perspectives assignment. In cases where multiple indicators were prioritized and no clear perspective could be identified, context of discussion and conclusion sections determined the final perspectives identification. Market favorable conclusions shifted the perspective assignment leftward on the spectrum; market critical conclusions shifted the identified perspective to the right. This insertion of a more nuanced means to evaluate perspectives highlights an important juxtaposition between holistic evaluation processes and those based on atomization and amalgamation, in this case via a series of indicator codifications. Amalgamation risks overlooking or masking nuances and subtle variations which exist 'between the lines', in this case amongst and within the spectrum of stakeholder perspectives. Nuances revealed in concluding discussions, it was determined, were not always captured by the more systematic assessment based on indicator and data collection methodology choices. It is

acknowledged, however, that both forms of evaluation are heavily seeped in researcher subjectivity.

The meta-analysis also investigated author discipline and institutional affiliation, and method of study dissemination in an effort to uncover possible trends in relationships between and amongst those variables and the various perspectives. One assumption is that university-affiliated studies/authors are likely to adopt a more critical investigative stance vis-à-vis PES whereas studies generated by government and development agencies as well as environmental NGOs are likely to be more engaging of PES. It is likewise assumed that disciplines more strongly affiliated with institutional rationality (economics and natural sciences) will represent more optimistic perspectives; those pursuing contextual and communicative forms of rationality will move to the right of the perspectives spectrum. The intent of capturing method of study dissemination is to identify the intended research audience which may also influence assessment priority. Certain journals have a wider disciplinary readership whereas others are consumed by a decidedly smaller, more disciplinary-narrow audience. Some studies are conducted specifically as policy briefs targeting resource management decision makers. The number of assessments reviewed was not equal for each of the case studies which prevented a comparison of trends between case studies based solely on the literature. Trends analysis was attempted, however, for all case studies combined, as well as for the literature reviewed from *within* each case study context. In its conclusion, Chapter 5 explores perspectives trends based on contextual characteristics across the case studies. As the intent of this meta-analysis was not to produce statistically robust conclusions but rather raise awareness about trends and issues, analysis relies largely on graphs and charts.

4.4 Coding Framework

"Struggles to bring a particular kind of discourse about justice into a hegemonic position have to be seen as part of a broader struggle over ideological harmony between conflicting groups in society." (Harvey, 1996:361)

This section outlines the categorization process used to explore perspective plurality within the impact assessment meta-analysis. As noted earlier, the primary means for perspectives identification was identified assessment priority. A total of 17 indicators were identified throughout the literature reviewed across the three case study contexts. Table 4.2 describes the impact assessment concerns attached to each indicator, illustrates a perspectives assignment for each indicator, a suggested rationality relationship, and a correlation through color-coding with traditional sustainability categories (blue for economic, orange for social, and green for environmental). As indicated in Chapter 3, *Optimists* focus on economic and quantitatively measurable ecological evaluation metrics. *Realists* look at distributional economic equity. *Skeptics* assess institutional barriers and conflicts. *Rejectionists* highlight attitudinal and relational issues.

Author characteristics, i.e. disciplinary and institutional affiliation, were also analyzed; categorizations for these two criteria are found in Tables 4.3 and 4.4. Broad disciplinary categorizations were utilized and do not necessarily coincide with what might be considered traditional disciplinary groupings.[33] Studies categorized as multi-disciplinary had an authorship represented two or more disciplines.

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[33] In a formal academic sense economics, most of what is categorized as policy, and all of geography would likely be considered social sciences. Likewise several of the disciplines included under natural science and policy are considered 'applied sciences.'

Table 4.2: Target Indicators/Analytical Priorities

Label				Indicators Identified:	
Optimist	1	Forest cover		Extent of forest area engaged in program, net gain in forest canopy	Instrumental Rationality
	2	Deforestation		Rate and extent of deforestation and forest degradation	
	3	Cost effectiveness		Maximization of output (forest cover) as a function of resource input	
	4	Participation		# of individuals enrolled, # of contracts signed	
	5	Additionality		Change in forest cover in relation to established baseline	
	6	Financial Viability		Economic sustainability of initiative	
	7	ES Delivery	Carbon	Changes in forest carbon stocks	
	8		Hydrological Services	Improved quantity and quality of water resources	
	9		Biological Diversity	Extent of protection enhancements afforded biological diversity	
Realist-	10	Economic Development		Poverty rates, development of sustainable livelihoods, analysis of barriers to adoption of new livelihoods	Contextual Rationality
	11	Social well-being		Changes to Natural, Social, Human, Physical and Financial Capital Assets, impacts of cultural attributes	
	12	Equity ($)		Distribution of costs and benefits	
Skeptic	13	Security		Access rights; tenure clarity; free, prior and informed consent	
	14	Governance		Institutional Reform, Policy development, stakeholder participation, structure of ES markets, cross-sectoral coordination	
	15	Sustainability		Scope, scale, permanence of behavioral change	
Rejectionist	16	Relationships and Power Structures		Impact on existing power hierarchies	Communicative
	17	Perspectives		What is the framing of PES, REDD, sustainability, nature, equity….	

Table 4.3: Academic/Research Discipline of Author(s)		
Label	**Disciplines Included:**	**Rationality**
Economics	Development Economics, Environmental Economics, Resource Economics,	Instrumental
Natural and Physical Sciences	Biology, Ecology, Environmental Sciences, Forestry, Agriculture, Climate Change	
Policy	Political Science, Law, Public Policy, Environmental Studies, Environmental/Conservation Policy	Contextual
Interdisciplinary	Sustainability Science, Ecological Economics Water Resource Management	
Social Sciences	History, Anthropology, Cultural Anthropology, Sociology	Communicative
Geography	Human Geography, Physical Geography, Political Ecology	
Multi-disciplinary	Presence of any combination of two or more of the above disciplines	

Table 4.4: Primary Author Institutional Affiliation	
Institutional Label	**Description**
University	Published research in which the institutional affiliation of the primary author was a university academic department or research center
Government	Reports produced by any government funded agency, including development agencies such as USAID
Environmental NGO	National and International environmental NGOs
Development Agency	Research and funding agencies concentrating on international development issues.

Data collection methodologies were also investigated for perspectives trends. Fourteen (14) different methodologies were used throughout the assessment studies investigated; some studies utilized multiple methodologies. Table 4.5 categorizes data collection methodologies as data or document-based or derived from stakeholder engagement.

Table 4.5: Data Collection Method for Assessment Study Analytic Component

Label			**Description of Data Source:**
Document/Data	Document Review (D)		Project documents and official reports
	Literature Review (L)		Published articles in addition to project documents
	Historical Analysis (H)		Historical accounts and documents
	Mapping, Modeling, Spatial Analysis (M)		Remote sensing, spatially depicted data, computer modeling
	Field Survey (FS)		On the ground biophysical field observations
People -driven	***Scope***	***Scale***	
	Household	Survey (HS)	Written surveys[a] administered at the household level
		Interview (HI)	Verbal interviews[b] (structured and semi-structured) administered at the household level
	Participant	Survey (PS)	Written surveys administered to program participants)
		Interview (PI)	Verbal interviews administered to program participants
		Survey w/Interview (PS/I)	Both written and verbal instruments administered to program participants
	Stakeholder	Survey (SS)	Written surveys administered to program stakeholders (generally inclusive of participants and administrators)
		Interview (SI)	Verbal interviews administered to program stakeholders (generally inclusive of participants and administrators)
	Public Consultation		Public meetings
	Participant Observation		Observation of socio-ecological context and plurality of stakeholders for identified period of time
	[a, b] It cannot be assumed that all written surveys target quantitative data and interviews focus on qualitative issues, but the typically lean in these respective directions.		

4.5 Field Exploration

"The only permissible form of universality is infinite respect for historically (and geographically) produced shared ways of life, each with its own distinctive structure of feeling." (Harvey, 1996 35)

Whereas the impact assessment meta-analysis identified perspectives diversity, the Trinidad and Tobago field exploration investigated perspectives engagement. Trinidad and Tobago is a biodiversity-rich tropical island situated at the southern end of the Caribbean chain ten miles off the northeast coast of Venezuela. Like its Latin American case study counterparts, the twin-island country struggles to balance its fossil fuel-based economic development model with conserving its ecological richness and ensuring social equity. The choice of Trinidad and Tobago as the field exploration site comes from an emerging trend within the national context to adopt PES conservation policies. In 2009 the national government's launched a forest carbon PES initiative as part of the Nariva Swamp Restoration Initiative. The PES concept has additionally been embraced by a range of civil society and academic sustainability stakeholders who are keen to explore the win-win promise of generating conservation finance and local economic development as promoted by the model. These multiple contextual factors, coupled with previous research experience with the Nariva Swamp Restoration Initiative, provided a unique opportunity for assessing the potential of PES to promote pluralistic engagement via a sustainability assessment framework.

The intended approach for the Trinidad and Tobago field exploration was to engage sustainability stakeholders in workshops to collectively explore the application of a sustainability assessment framework within the Trinidad and Tobago PES context, specifically for the Nariva project. Since the Nariva forest carbon project

launch in 2009, however, conflicting multi-level political interests began to sow seeds of mistrust amongst key stakeholder groups. At the time of the field exploration exercise this mistrust had virtually shut down the forest carbon component of the restoration initiative. This distrust appears to be strongest between the key institutions with resource management authority as well as between the executing staff of these institutions and the politically tainted bureaucracies by which they are steered.

With the initially proposed practical stakeholder exercise aborted due to lack of key stakeholder support, the potential for stakeholder engagement was, instead investigated via an informal stakeholder exploration of the sustainability assessment framework. Stakeholders were identified following the key stakeholder groupings proposed by the sustainability assessment framework (Gibson, 2006):

- Project Proponent
- University/Research
- Government Agencies
- Target (direct and/or indirect) Beneficiaries
- Civil Society
- International Partners

Stakeholders were contacted during two separate field visits to Trinidad in 2013. During the July visit, informational meetings were held with a variety of sustainability stakeholders in order to assess the current status of the PES project proposed for application of the Sustainability Assessment framework, the Nariva Swamp Carbon Sequestration and Livelihoods Project (NSRP). During the September field exercise, identified stakeholders explored the Sustainability Assessment framework based on the summary information provided on the handout found in Appendix B, and guided by a set of broad questions on the proposed scope and scale

of the sustainability assessment framework and its potential implementation. The four sections of the discussion guide correspond to the four assessment areas of the sustainability assessment framework: transactive, normative, procedural and substantive; their proposed integration within the sustainability assessment framework is depicted in Figure 4.4. The potential for mutual engagement as perceived within the Trinidad and Tobago context is explored in the analysis found in Chapter 6. The next chapter explores the findings of the case study impact assessment meta-analysis.

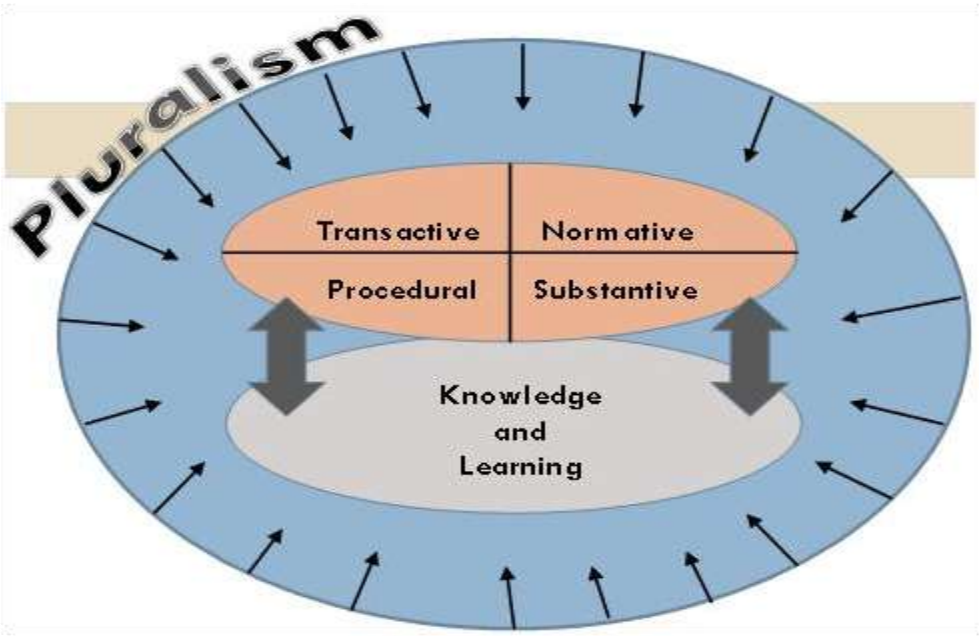

Figure 4.4: Sustainability Assessment Framework

Chapter 5

PAYMENT FOR ECOSYSTEM SERVICE ASSESSMENT CAST STUDIES

"Ecosystems services are a value for understanding the linkages between nature and society. Yet any study of ecosystems must begin with an understanding of how we define the use of the term, as well as the historical, geographical, and political context in which it is applied." (Balvanera et al, 2012:57)

It is the thesis of this research that effective socio-ecological policy, that which can reverse current trends toward unsustainability, must engage the principles of post-sustainable development as its means and its end. In other words, a pluralistic, participatory process of mutual learning through extended peer community engagement is the means by which desired attitudinal change is likely to be realized, but establishing and maintaining these participatory processes is also the goal of socio-ecological interventions. This research effort to assess whether such a change in conceptualizing sustainability is either underway or even possible uses the payment for ecosystem services (PES) conservation policy as a basis of analysis. As noted earlier, various forms of the PES policy have been operational for decades, however the concept has recently been catapulted into the international conservation policy spotlight following its recognition as a cost-effective climate change mitigation and adaptation strategy in the form of REDD+ (Reducing Emissions from Deforestation and Forest Degradation) (Stern, 2005, Eliasch, 2008). Since an official adoption of REDD+ by the UNFCCC in 2010, the number of forest carbon offset projects has steadily increased, although forest carbon exchange is still dwarfed by the broader carbon offset market which includes energy efficiency and renewable energy offsets

exchanged within the regulatory carbon markets (European Union Emissions Trading Scheme (EU ETS) and Clean Development Mechanism (CDM) and regional markets such as the Regional Greenhouse Gas Initiative (RGGI)[34] and California's emergent Cap and Trade Program[35]. Apart from the small number of afforestation/reforestation (A/R) credits which have been traded within the CDM[36], forest carbon offsets form the vast majority of the carbon traded in voluntary (non-compliance) markets (Peters-Stanley et al, 2012). The expansion of ecosystem service markets into commodities other than carbon (water, biodiversity and bundled services which lump carbon, water, biodiversity and amenity services into one value of exchange) has also risen in the past decade as illustrated in Table 5.1 below. Landell-Mills and Porras (2002) identified 287 PES initiatives operating globally - mostly watershed conservation and predominately located in Latin America. Ecosystem service markets are tracked in terms of the number operational, number of beneficiaries/participants, and acreage protected, as well as via their trading volume. Recent reports from the Ecosystem Services Marketplace[37] indicate the total number of PES initiatives has grown to well over a thousand if compliance and voluntary forest carbon, watershed, and biodiversity exchanges are summated. REDD+ pilot projects add an additional 340 exchanges worldwide (CIFOR, 2014). Map 5.1 highlights the countries and regions most actively engaged in REDD+.

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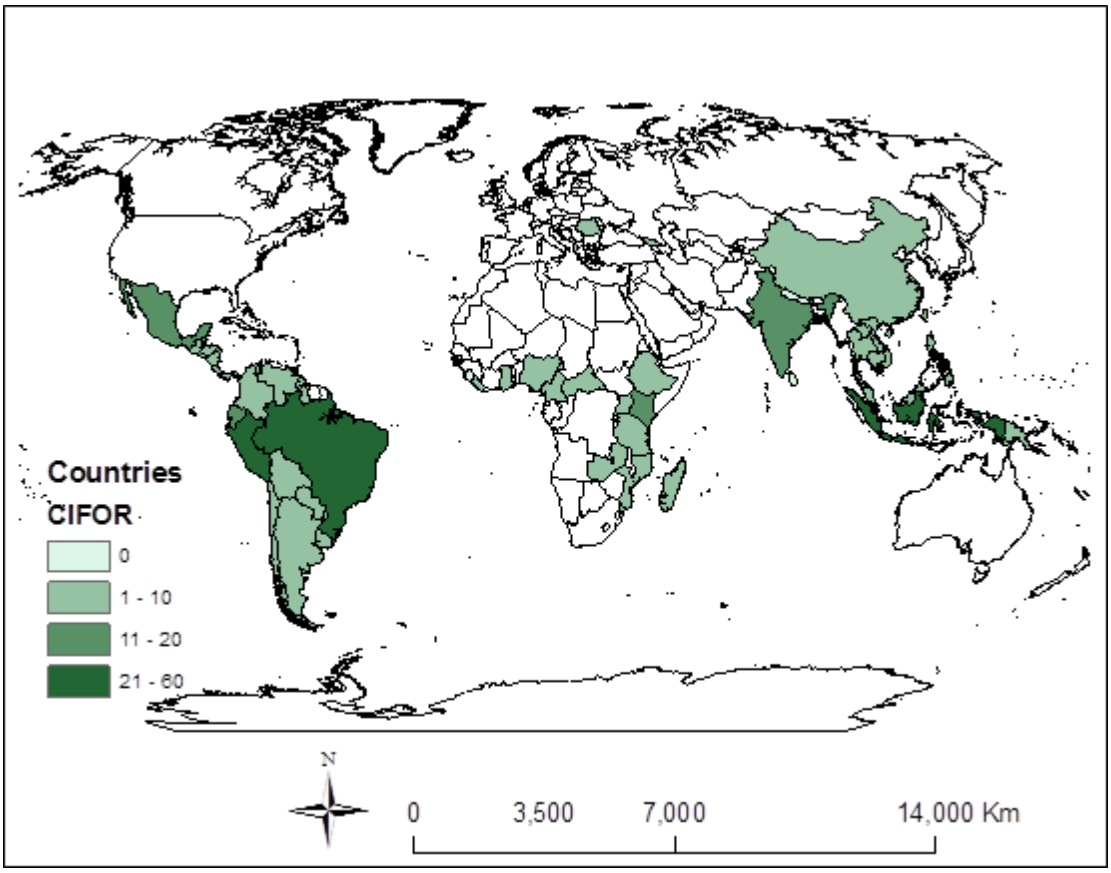
[34] www.rggi.org
[35] www.arb.ca.gov
[36] In May 2000, 22 out of 3000 registered CDM projects (.0007%) involved forest carbon credits. (www.forestcarbonasia.org)
[37] http://www.ecosystemmarketplace.com/

Table 5.1: Global Status of Payment for Ecosystem Services Markets				
Type of Market	**Project Volume**	**Trade Volume**	**Trends**	**Source**
Carbon (voluntary, compliance, and government mediated)	n/a	$176 billion (10.3 billion tons of CO_2e)	11% increase from 2011	*World Bank State and Trends of the Carbon Market* (2012)
Forest Carbon	513	$216 million (28 million tons of CO_2e)	9% increase from 2011	*State of the Forest Carbon Markets* (2013)*
Water	288	$9.3 billion	400% increase (2000-2008)	*State of Watershed Payments* (2010)*
Biodiversity	45 (additional 27 in development)	$2.5-4.0 billion (conservative estimate as up to 80% of programs not captured by survey)	n/a	*State of Biodiversity Markets: Offset and Compensation Programs Worldwide* (2011)*
* Studies all produced by the Katoomba Group Ecosystem Marketplace (www.forest-trends.org)				

In illustrating the geographical distribution of current REDD+ initiatives, Map 5.1 also highlights the three geographical regions struggling to maintain the planet's largest remaining intact tropical forests: the Amazonian forests of South America, the Congo Basin Rainforest of Central Africa, and the Indonesian rainforests of Southeast Asia. The case studies selected for the PES assessment meta-analysis are all from the Latin American/Caribbean (LA/C) region; two within the Amazonian region, one in Central America. Map 5.2 highlights the location of the meta-analysis case studies as well as the location of Trinidad and Tobago, the case study for the field engagement component of the analysis. Most Latin American countries, and in particular those

with terrestrial jurisdiction over the Amazon Rainforest[38], struggle to balance economic growth with their articulated conservation priorities. As of 2010, the nine countries of the Amazon have collectively lost 16% of their original forest cover, approximately 1 million km^2 (Hall, 2011).

Map 5.1: Global Distribution of REDD+ Projects



Map Data Sources: www.theredddesk.org and www.forestsclimatechange.org

[38] The nine countries with jurisdiction over the Amazon rainforest are: Brazil (60%), Peru (13%), Columbia (10%), Venezuela, Ecuador, Bolivia, Guyana, Suriname, and French Guiana (Pereira, 2010).

Map 5.2: Case Study Location Map

5.1 Patterns of South American Deforestation

The Amazonian rainforest provides multiple levels of essential ecosystem services: local (and international) food production, regulation of regional rainfall, and maintenance of global atmospheric cycles. The region which is home to 25% of the planet's remaining tropical and sub-tropical forests; provides up to $1 billion annually toward the incomes of rural populations, and contributes to socio-ecological diversity

(Hall, 2011, 2012) and accounts for 25% of global forest loss and 46% of global carbon emissions from land use change over the past two decades (Long, 2014). The region lost 7% of its total forest cover between 1990 and 2005, approximately 64 million ha due urban expansion and global demand for agricultural products (FAO, 2010). In terms of social well-being, however, rampant deforestation has assisted the region in achieving a 50% increase in the middle class and a lowering of national poverty levels (Balvanera et al, 2012).

The region as a whole has actively experimented with 'alternative' forest management strategies (not centralized government-based command and control) such as increased managerial and access rights for local and indigenous communities, zoning for targeted uses (strict conservation, research, extraction, recreation), increased involvement of the private sector, economic incentives (subsidies, loans and tax breaks) for improved forest management, and multi-stakeholder management arrangements in which sub-national initiatives collaborate with local and international NGOs and development agencies (FAO, 2009, Sarre and Sabogal, 2013). The countries selected for case study analysis, Costa Rica, Ecuador and Brazil, are frequently lauded for having made exemplary progress in this regard (Sabogal et al, 2010). Each of these natural resource-rich counties is a developing economy endeavoring to balance economic growth with environmental conservation. Each country has actively pursued economic expansion into its forest frontier and followed a land conversion pattern typical for the region, e.g. government sanctioned settlement migration supported via infrastructural development and in some cases subsidized large holder and industrial agricultural expansion (FAO, 2003, 2010). Frontier expansion continues when a second round of land conversion occurs at the hands of

smaller landholders and landless subsistence agriculturalists capitalizing on newly accessible land.

This pattern of land conversion at the expense of economic development has been identified as the forest transition curve, an environmental Kuznets curve for forest cover (Rudel et al, 2005). The theory of forest transition suggests that as national economies grow their percentage of forest cover simultaneously decreases until a political, technological, or cultural intervention reverses the trend and forests are re-established; economic expansion then either becomes less intensive or shifts to foreign sourced forest resource inputs.

Of the three case study countries, Costa Rica has already reversed its trend of declining forest cover, bouncing back from 20% in the 1980s to a current 50% (Hall, 2012). The country's PSA is frequently attributed as the force behind this forest cover increase, however equally important factors include the political and cultural adoption of a natural resource amenity-based national economic development agenda. Based on the extent of forest recovery, Costa Rica is situated at Stage IV on the forest transition curve[39]. Brazil, on the other hand, remains in the early stages of Phase II based on its 64% forest cover; Ecuador is farther along the curve having reduced its forest cover to as low 35%[40]. The country's high percentage of severely degraded forest cover is, however, not captured by these figures (Mosandl et al 2008, FAO, 2010). Figure 5.1

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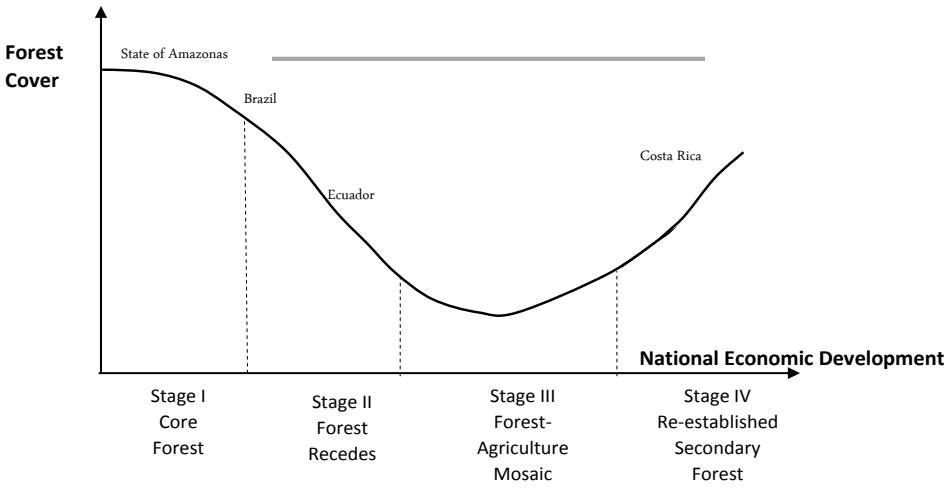
[39] The forest transition curve identified by Rudel et al (2005) does not have Stage IV but it has been added to identify an end target of re-established secondary forest.
[40] Brazil and Costa Rica each have state agencies in possession of sophisticated forest cover tracking technologies, Ecuador struggles to deliver accurate forest data. Forest cover estimates vary between 35-50% (FAO, 2010, Hall, 2012).

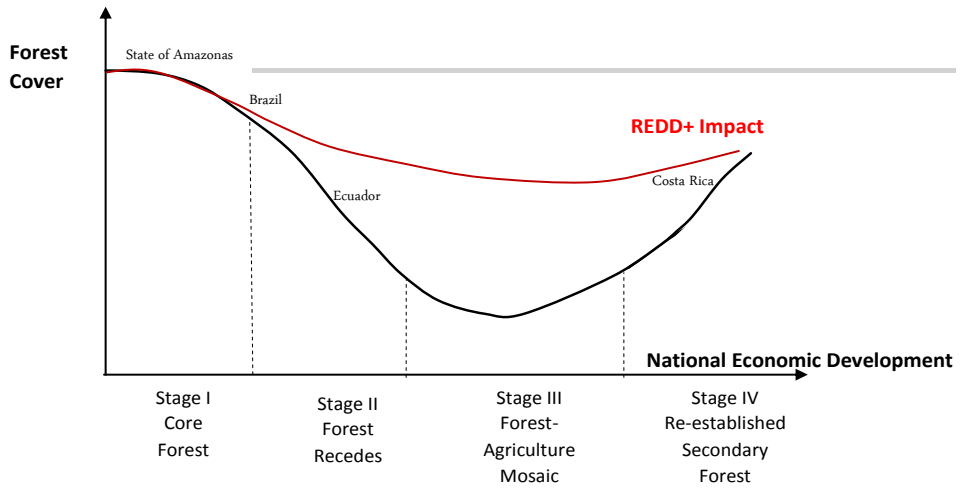
highlights the position of each of the meta-analysis case study contexts along the forest transition curve.



Source: Adapted from Angelsen and Rudel (2013)

Figure 5.1: Forest Transition Curve

Although the theory behind the forest transition curve suggests a continual progression toward increased forest cover, progression from one stage to the next is neither guaranteed nor inevitable. Multi-scalar deforestation drivers such as an increased scarcity of forest services, shifts in agricultural rents, and changes of national and sub-national development policies are all capable of changing a particular country's position in either direction on the curve. It is precisely this possibility to influence external drivers which makes PES/REDD+ proposals attractive. Figure 5.2 highlights the intent of REDD+ in influencing forest transitions.



Source: Adapted from Angelsen and Rudel (2013)

Figure 5.2: Proposed REDD+ Impact on Forest Transitions

Brazil, by far the largest of the three case studies, encompasses the heart of the Amazonian rainforest with administrative jurisdiction over 60% of the multi-state rainforest. Within just the last five years the country has reversed its previously high rate of forest loss by 70%, an impressive feat considering the reduction did not slow the country's economic average 3-5% growth over the past decade (Nepstad et al, 2009, 2014). And while it is tempting to suggest that Brazil may be 'beating the forest transition curve', e.g. reacting to increased levels of deforestation before reaching a critical state, like Costa Rica, Brazil's success in reducing the *rate* of forest loss does not suggest that the country's deforestation pattern has been fully reversed, it has merely been slowed. Recent research from the Earth Innovation Institute suggests this

success is extremely fragile and could easily reverse if global demand and commodity prices for beef and soy increase (Nepstad et al, 2014).

Ecuador, the last case study context, experienced a relatively rapid loss of its biodiversity-rich forests post-1970 and the launch of the country's oil extraction industry. Ecuador's deforestation is driven as much by fossil fuel exploration and extraction as traditional Latin American deforestation drivers of industrial agricultural and settlement expansion. Neither the energy nor agricultural industries, however, have maintained a steady economic development path for the country (Martin, 2011). Following the oil boom of the 1970s, Ecuador had the highest 1980 GDP of the three case study countries (Ecuador - $2,261; Costa Rica - $2,057; and Brazil - $1,931[41], however it currently lags behind economically, has the highest rate of deforestation in the region, and suffers from extensive oil-based soil and water pollution (Finer et al, 2008, 2010, Martin, 2011). Despite unique proposals by the country's progressive government to arrest this alarming trend, e.g. the Yasuni-ITT Initiative[42], the country appears poised to continue its current economic development and corresponding forest transition pattern.

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41 www.data.worldbank.org

42 The Yasuni-ITT proposal was a unique avoided deforestation proposition. An estimated 900 million barrels of crude oil lie under the Ishpingo, Tambococha, and Tiputini (ITT) blocks of the Yasuni National Forest, indigenous territory, and UNESCO heritage site. In 2009 President Carrera sought compensation for ½ the market value ($4 bn) of the crude which would remain in the ground and in so doing avoid an estimated 400 $MTCO_2$ in carbon emissions. The proposal was abandoned in 2013 when less than $300 million was raised (www.amazonwatch.org).

While all three countries could benefit from economic incentives for improved forest governance and avoided deforestation, Ecuador's forests appear the most at risk. Brazil and Costa Rica have each already initiated national level initiatives to adjust their economic development trajectories as they relate to forest cover. Ecuador's national economy, however, remains heavily dependent on ecologically destructive hydrocarbon extraction which takes places primarily within its jurisdiction of the Amazonian rainforest (Wunder, 2003, Martin, 2011). The Yasuni-ITT Initiative was abandoned in 2013 due to insufficient interest by international investors, despite its proposal to avert ecological degradation in one of the planet's biodiversity hotspots and leave 410 million metric tons of CO_2 underground. Abandonment of this innovative avoided deforestation proposal due to the lack of international support for the Yasuni ITT proposal is evidence of the country's economic dependence on the globalized economy (Finer et al, 2010).

Table 5.2 presents key economic and sustainability indicators that underscore contextual similarities and differences. Indicators include Gross Domestic Product (GDP), the Human Development Index (HDI), the less utilized Happy Planet Index (HPI), and the Environmental Sustainability Index (ESI). Insight into the socio-political and environmental context is found in the Gini coefficient which measures economic inequality. Economic metrics (GDP and HDI) rank the three case study contexts (plus Trinidad and Tobago) at the 'lower end' of the development spectrum whereas metrics measuring sustainable resource use (ESI, GHG, CO_2) place the case studies (but NOT Trinidad and Tobago) at the more favorable end of the ranking spectrum, i.e. low emissions rate and high sustainability rankings. Inclusion of a range of indicators illustrates the range of measures of developmental 'success,' based on

chosen analytical criteria. Data for the US, Canada and the EU are included for comparative purposes.

Table 5.2: Case Study Socio-Economic Metrics

	1	2	3	4	5	6	7	8	9
Country	**Population** million **(2012)**[7]	**GDP**[43] US$ million **(2012)**	**GDP/ Capita** 44 **(2012)**	**HDI** 45 **(2012)**	**HPI**[46] **(2012)**	**ESI**[47] **(2005)**	**GINI Index (2009)**[48]	**GHG**[49] ($MtCO_2e$) **(2010)** (% of global)	**CO_2**[50] **Emissions /capita (2010)**
Brazil	193.4	2,395,000	11,340	0.73 (85th)	**52.9**	62.2 (11th)	54.7	1621 (3.2%)	2.2
Costa Rica	4.6	48,500	9,386	0.733 (62nd)	**64.0**	59.6 (18th)	50.7	11 (0.022%)	1.7
Ecuador	14.2	91,400	5,426	0.724 (89th)	**52.5**	52.4 (51st)	49.4	54 (0.11%)	2.2
Trinidad and Tobago	1.3	27,130	17,437	0.76 (68th)	**30.3**	36.3 (139th)	n/a	57 (0.11%)	38.2
Canada	34	1,800,000	51,206	.0911 (11th)	**43.6**	64.6 (6th)	n/a	728 (1.5%)	14.7
US	310	16,720,000	51,749	0.937 (3rd)	**37.3**	53.0 (45th)	n/a	6715 (13%)	17.6

[43] Value of goods and services produced (www.cia.gov.library)
[44] Measure of purchasing power parity (www.cia.gov.library)
[45] Human Development Index (HDI) combines life expectancy, educational attainment and income (www.hdr.undp.org)
[46] The Happy Planet Index combines life expectancy, well-being, and ecological footprint. Aggregate rankings coded with **Red** represent a poor ranking; **yellow** in the middle, and **Green** with components ranked good. (www.happyplanetindex.org)
[47] Environmental Sustainability Index ranks resource endowment, environmental history, pollution stocks and flows, extraction rates, institutional mechanisms, capacity to influence future pollution and use trajectories (Esty et al, 2005)
[48] GINI index measures income inequality with '0' representing perfect equality and '1' perfect inequality. (www.data/.worldbank.org)
[49]Greenhouse Gas Emissions (GHG) are compiled based on country submissions (www.unep.org/pdf/2012gapreport.pdf)
[50] Figures published for period (2009-2013) (www.data.worldbank.org)

Table 5.3 details the structural components of PES initiatives selected for the impact assessment meta-analysis. The Costa Rican PSA, established by law in 1996, is considered the longest running and most successful PES mechanism. Costa Rica's PSA was selected for inclusion because of its pioneering status, the 'bundled'[51] nature of its PES initiative, and the country's current status as one of the few countries within the region with a net positive rate of deforestation. Brazil's role in maintaining the largest remaining tract of tropical forest on the planet merits its inclusion. The Brazilian case study is simplified, however, by a focus on PES in the state of Amazonas; a jurisdiction just beginning its descent on the forest transition curve. (Figure 5.2) Ecuador is included for the country's extensive experimentation with market-based conservation initiatives, one of which is the *Pimampiro* project.

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[51] PES bundling involves providing compensation for multiple ecosystem services. Costa Rica's PSA provides an economic incentive for forest management practices which deliver i) carbon sequestration, ii) watershed protection, iii) biodiversity habitat protection, and iv) amenity and landscape value.

Table 5.3: Summary Details of PES Case Study Initiatives

	Initiative	Acreage	Jurisdiction	Launch Date	Ecosystem Service(s)	Buyer	Seller	Service/ Activity 'Purchased'	REDD+ Funding and Safeguards
Ecuador (18 studies)	*Pimampiro* Watershed Protection Program	496 ha	Municipal	2000	Watershed protection	Residential and Commercial Water users	Upstream landowners	Forest Conservation Forest Restoration	n/a
	Socio Bosque (Forest Allowance)	882,000 ha	National	2008	Carbon Sequestration (*for goal of poverty alleviation*)	National Government	Low income land stewards	Conservation Restoration	UN REDD Program Social and Environmental Safeguards (SES)
Brazil (20 studies)	*Bolsa Floresta* (Forest Partner)	17 million ha	Sub-National (State of Amazonas)	2007	Carbon sequestration (*for goal of poverty alleviation*)	State Government	Small landholders	Conservation	Brazil's Amazon Fund (Brazilian, Norwegian and German Funding) CCBA Gold Certification
Costa Rica (31 studies)	*Programa Pago for Servicios Ambientales* (PSA)	860,000 ha	National	1996	Bundled Service (Carbon sequestration, watershed and biodiversity protection, landscap amenity)	National Government	Private landowners	Conservation Restoration Forest management Agroforestry	World Bank Forest Carbon Partnership Facility (FCPF)

As noted earlier, Latin America has a history of PES experimentation and these three cases studies are not the only PES initiatives with implementation histories to explore. Other Latin American PES initiatives offering additional contextual insight include the *Noel Kempff Mercado* Climate Action Project in Bolivia, the National Programme for Hydrological Environmental Services (*PSA-H)* in Mexico, and the Central American *Regional Integrated Silvo-Pastoral Ecosystem Management Project* (RISEMP). The *Noel Kempff Mercado* initiative was launched in 1996 as a partnership between The Nature Conservancy and the Bolivian Government with backing from American Electric Power, BP-Amoco, and Pacificorp. Deliverable carbon credits are reported to have been third party verified but an investigation by Greenpeace suggests the project is plagued by fraud and carbon leakage.[52] Mexico's *PSA-H* is also a government-driven initiative which was launched in 2003 and built on an existing communal forest governance network.[53] *RISEMP* was developed as a pilot project and supported by the World Bank/GEF funding from 2003-2007. It was supported by a collection of international and national environmental NGOs and aims for regional impact across six watersheds in three countries.[54] Each of these initiatives is intended to be included in future research of the PES model.

Seventy-four (74) assessments were consulted for this; just under half analyzed the PSA. As the *Bolsa Floresta* and *Pimampiro* are more recent initiatives, launched in 2005 and 2000 respectively, their assessment literature is less abundant, yet the available assessments provide both sufficient contextual insight into existing

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[52] www.redd-monitor.org
[53] www.watershedmarkets.org
[54] www.watershedmarkets.org

perspectives as well as offer a unique opportunity to analyze trends across different contexts. Each country's sub-chapter begins with an overview of the biophysical, socio-economic, and socio-political contexts in which the select PES initiatives operate. Contextual introductions are followed by an introduction to the investigated PES initiative, a summary of the reviewed assessment literature and discussion of the analytical findings from each case study's meta-analysis. The chapter concludes with a discussion of the respective and collective case study findings.

5.2 Case Study #1: Costa Rica – *Conservation Pioneer*

In addition to its renown as a premiere ecotourism destination, Costa Rica is also acclaimed for transforming an alarmingly high rate of deforestation (1.4 % in 1980) (Pagiola, 2002) to one which now results in net annual increase in forest cover (0.9%) (FAO, 2010). *Programa Pago por Servicios Ambientales* (PSA) is the policy mechanism frequently credited with successfully reversing this environmentally destructive history (Pagiola, 2002, Wunder, 2006, 2007, Barton et al, 2009). The PSA provides direct economic incentives to private landowners in an effort to encourage sustainable land use practices. In the early days of implementation the initiative focused solely on increasing forest cover; it later proposed to additionally increase conservation-generated economic benefits for the poor and marginalized (Hartshorn et al, 2005, Sierra and Russman, 2006). The Costa Rican PES model was promoted at the 2005 UNFCCC COP meeting in Montreal as a means to justify the inclusion of incentives for avoided deforestation within the next climate change agreement. As such, the PSA model can be considered the theoretical basis for what is now known as REDD+ (Reducing Emissions from Deforestation and Forest Degradation). Costa's

Rica's PSA also provided the inspiration for the *Bolsa Floresta* initiative in Amazonas, Brazil, *Proambiente* in Ecuador, the *PSA-H* in Mexico and the Central American *RISEMP*, and it is currently being studied by Trinidad and Tobago as the country seeks to engage the PES/REDD+ conservation policy.

Two decades of operational history have contributed to a relatively extensive collection of PSA assessment literature, however *ex-poste* studies assessing the program's delivered benefits remain somewhat limited (Tacconi et al, 2011). Even more surprising given its global status as a conservation policy success story, however, is the lack of conclusive findings regarding sustainability impacts. While the lack of standardized assessment metrics is one possible explanation for impact assessment inconsistencies, the wider PES literature suggests that impact variability and articulations of unfilled sustainability expectations could also be a function of differing ideological perspectives (Russo and Candela, 2006, Arriagada et al, 2009, Daniels et al, 2010, Cole, 2010). The role of perspectives in PSA impact assessment is explored following an introductory discussion of the sustainability context in which the PSA operates. Case study context descriptions draw on discussions from the various assessment studies as well as other investigative reports and published studies highlighting important contextual considerations. Table 5.4 lists the PSA assessment studies reviewed.

Table 5.4: Summary of PSA Assessment Literature Reviewed		
Author(s)	**Discipline(s)**	**Method of Study Distribution**
Arriaga et al (2008)	Natural Science, Public Policy, Economics	Conference Paper
Arriaga et al (2009)	Natural Science, Public Policy, Economics	*Journal of Sustainable Forestry*
Arriaga et al (2012)	Natural Science, Public Policy, Economics	*Land Economics*
Barton et al (2009)	Natural Science	*Journal of Environmental Management*
Cole (2010)	Environmental Studies	*Int'l Journal of Sustainable Development and World Ecology*
Daniels et al (2010)	Forestry and Ecological Economics	*Ecological Economics*
Engel et al (2007)	Environmental Policy	Book Chapter
Fletcher and Breitling (2012)	Cultural Anthropology, Environmental Sciences	*Geoforum*
Friends of the Earth (FOE) (2010)	Ecology	Independent Monitoring Report
Grieg-Gran et al (2005)	Resource Economics (IIED/CIFOR)	*World Development*
Hartshorn et al (2005)	Forestry, Economics, Law	Evaluation Ecomarkets Project
Hope et al (2005)	Water Resources, Environmental Economics, Environmental Studies	DFID Research Report
Kull et al (2007)	Geography	*Society and Natural Resources*
Le Cog et al (2013)	Economics, Agriculture	Book Chapter
Locatelli et al (2008)	Environmental Studies	*Forest Policy and Economics*
Miranda et al (2003)	Environmental Economics, Environmental Studies	DFID Research Report
Miranda et al (2006)	Environmental Studies	*Environmental Management*
Morse et al (2009)	Natural Science	*Ecology and Society*
Pagiola (2002)	Environmental Economics	Book Chapter
Pagiola et al (2008)	Environmental Economics	*Environmental Economics*
Pfaff et (2007)	Public Policy	*Land Use Policy*
Pfaff et al (2008)	Public Policy	Duke Univ. Institute of Public Policy Working Paper
Porras (2010)	Resource Economics	IIED Sustainable Markets Working Paper
Rosa et al (2004)	Interdisciplinary	U-Mass Political Economy Research Institute (PERI)
Russo and Candela (2006)	Economics	*Tierra Tropical*
Sanchez-Azofeifa et al (2007)	Earth Sciences, Conservation Biology	*Conservation Biology*
Sierra and Russman (2006)	Geography	*Ecological Economics*
Silva (2003)	Political Science	*Latin American Politics & Society*
Wünscher et al (2008)	Development Economics and Forestry	*Ecological Economics*
Zbinden and Lee (2005)	Development Economics	*World Development*
Zhang and Pagiola (20101	Development Economics	*Environmental Conservation*

5.2.1 Biophysical Context

Costa Rica covers 51,000 km^2 and is world-renowned for its biodiversity-rich forest ecosystems and 11 Ramsar[55] designated wetlands which collectively house 5% of the world's biodiversity (Greiber and Schiele, 2011, Porras, 2010, Friends of the Earth [FOE], 2010). Between 1950 and 1990 the country lost 75% of its native forest cover, primarily at the hands of agricultural expansion and titling laws which encouraged deforestation (use it or lose it) (Miranda et al, 2006, Porras et al, 2012, Corbera and Schroeder, 2011). As noted earlier, land use patterns throughout the region have traditionally been heavily influenced by government policy. Costa Rica's historically high rate of private land ownership, as much as 75% of forested lands are privately owned¸ led to a government driven agricultural expansion in the early 1970s based on an array of incentives and subsidies. Successful agricultural incentive programs for the country's rapidly expanding coffee, cane, palm oil and timber plantations are credited with driving the country's high rates of deforestation up through the mid-1980s. When country's forest cover dropped below 20%, concern grew over the environmental as well as the economic implications; diminished forest cover was negatively impacting water resources and the country was importing the timber inputs needed for local production. The Costa Rican Government first responded to its diminishing national forest stocks by establishing an extensive system

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[55] The Convention on Wetlands of International Importance especially as Waterfowl Habitats was signed in Ramsar Iran in 1971 and is frequently referred to as the Ramsar Convention. The Conventions represent the first international convention on conservation and sustainable resource use. Over 1850 wetlands encompassing 180 million ha are given special protection under the Convention. Brazil has 12 Ramsar sites, Ecuador has 18, and Trinidad and Tobago has 3. (www.ramsar.org)

of protected areas and private reserves; a system which now extends to over 25% of the country's land mass (Zbinden and Lee, 2005, Miranda et al, 2006). Additional efforts to reverse deforestation trends included the 1996 legal ban on deforestation (discussed further in the next section) which was coupled with economic development policies designed to shift ecologically destructive, land-intensive plantation and industrial livestock production toward less land intensive export crops such as pineapple and banana crops. Map 5.3 provides is a locational map that also highlights the country's topography.

Map 5.3: Costa Rica Location Map

5.2.2 Socio-Economic Context

Political stability over the past two decades has supported a consistent rate of economic growth (an average of 4% annually) (Porras, 2010). Costa Rica's national economy is natural resource-based; agricultural exports and ecotourism are the primary sources of foreign exchange earnings (Greiber and Schiele, 2011). Tourism arrivals have more than doubled in the past decade bringing over $2 billion into the national economy, approximately 23% of total foreign exchange earnings. Eco-tourists also provide important tax revenue, as much as $50 million is collected annually as a result of the departure tax charged to foreign visitors (Echeverria, 2010). Agriculture (bananas, pineapple, coffee and ornamental flowers) represents approximately 10% of GDP (Echeverria, 2010). Although it represents a much smaller percentage of the national income, the pharmaceuticals industry through several lucrative research contracts with the National Biodiversity Institute (INBio) also generates national revenue (Echeverria, 2010).

Costa Rica's population of 4.6 million is predominantly urban with 63% residing in cities (Greiber and Schiele, 2011). As of 2012 the average per capita income was $9,000; however any growth in average income levels has been accompanied by slow increases in poverty and income inequality. Approximately 20% of the total population is currently classified by the government statistical office as poor; the poorest of which reside predominantly in the county's rural areas (Porras, 2010).

Like many Latin American countries hit by the global economic downturn in the 1980s, the Costa Rica Government accepted financial assistance from multi-lateral

development agencies (primarily the World Bank) which in turn led to a period of 'structural adjustment' within the national economy. One area of 'restructuring' was the removal of longstanding public subsidies and incentives for forest conservation (Daniels, 2010, Fletcher and Breitling, 2012). Forest Law #7575 (1996), specifically its total ban on unauthorized timber harvesting and the resultant forest management incentives of PSA, contained a number of specific structural adjustment recommendations (Silva, 2003, Fletcher, 2010). "*The PSA was designed to move forest policy away from the deficit-plagued, subsidized operations that are only able to survive with state 'alms' toward a form of profitable, competitive land use based on sound business principles." (Fletcher and Breitling, 2012 405)* For landowners, the PSA functioned as little more than a compensatory gesture for private land use restrictions imposed by the new Forestry Law (Arriagada et al, 2009).

5.2.3 Socio-Political Context

Culture

As noted earlier, a strong a political commitment to reversing the alarming rate of natural resource degradation in the 1980s was the first step toward establishing socially recognized economic value for ecosystem services. Greenhouse gas (GHG) mitigation, watershed protection, biodiversity conservation and amenity services were each identified by Forestry Law #7575 as essential ecosystem services in need of protection and enhancement. As a result of this legislative commitment, the contribution of these 'protected' goods and services to the country's national economy become an integral and accepted 'value' throughout Costa Rican society (Locatelli et

al, 2008). A further boost to the socio-cultural transition from values based on forest extraction and agricultural land conversion practices toward those which supported natural resource conservation was the political commitment to develop the country's emerging eco-tourism industry. A national economy increasingly dependent on the maintenance 'pristine' natural resources encouraged an attitudinal shift within the broad population of the importance of nature for well-being (Morse et al, 2009).

Policy

Costa Rica's 1996 Forestry Law (#7575) established its flagship PES initiative which was in actuality part of the country's *third* wave of environmental legislation crafted to provide economic incentives for forest conservation and rehabilitation (Arriagada et al, 2012). Whereas earlier laws primarily addressed natural resource degradation on state lands, however, the PSA was specifically designed to engage private landowners (who controlled as much as 70% of the country's forested lands) within the push to increase the level of forest conservation nationally (Daniels, 2010). Forestry Law #7575 gave legal status to four specific ecosystem services (greenhouse gas mitigation, watershed protection, biodiversity protection, and landscape and aesthetic value), and created the institutional framework required to manage a program of ecosystem service provision incentives. The Law gave birth to the *Fond Nacional de Financiamiento Forestal* (National Fund for Forest Financing or FONAFIFO) as the initiative's administrative agent. The Law also established a 3.5% domestic fossil fuel tax as the PSA's (initial) funding mechanism. As noted earlier, the Law also banned forest clearing on all forested land – both public and private, and constricted indigenous communities' use of forest resources to strictly domestic purposes. Within

public forests, the Law eliminated "*any rights of access, withdrawal, management, exclusion, and alienation in national parks, biological reserves, mangroves, protected areas, wildlife refuges, and forest reserves*" (Corbera, 2011:315). In some ways, the Law was seen as little more than a continuation of the already established system of forest management subsidies because the payment structure or incentive structure remained virtually unchanged (Zbinden and Lee, 2005). The PSA's incentive structure and central government funding source carried over from previous programs. PSA incentive levels are, therefore, politically determined, guided primarily by available funding, and not based on any socially acknowledged ecosystem service value or market-derived compensation quantum intended to cover lost opportunity costs as proposed by theoretical PES mechanisms. Re-branded as a payment for ecosystem service initiative, the PSA merely changed the underlying ideological justification of its existing conservation subsidy programs (Corbera, 2011).

Stakeholders

The PSA is heavily supported by government stakeholders. The principle government ministry involved in natural resource management is the Ministry of the Environment and Energy (MINAE) under which FONAFIFO, the National System of Conservation Areas (SINAC), and the National Forestry Office (ONF) are housed (Greiber and Schiele, 2011). FONAFIFO is the statutory body created by Forest Law #7575 to administer the PSA; the Agency maintains an Integrated Project Management System (IPMS) to coordinate forest-specific data, and manages PSA zoning, land use and payment information (Greiber and Schiele, 2011).

5.2.4 Costa Rica's PES Initiative

The primary aim of the PSA when launched in 1997 was to expand the country's forest cover and ensure delivery of legally designated essential ecosystem services (carbon sequestration, watershed protection, biodiversity conservation, and natural landscape amenity) through a system of fixed, per hectare payments to private landowners for approved forest management activities. Approved forest management activities are identified as: i) forest preservation (e.g. natural re-growth on abandoned agricultural lands), ii) reforestation or forest restoration (e.g. land conversion to forest), iii) improved forest management (e.g. sustainable practices for production forestry), and iv) agroforestry which was added after 2002. Compensatory payments are determined by proposed land use practice and biophysical characteristics of enrolled lands. Payments range from $64/ha annually for forest protection regeneration to $196/ha annually for a reforestation contract (Daniels, 2010, Porras et al, 2012). Economic incentives are supplemented with technical assistance from intermediary forest management institutions. An additional indirect participation incentive, particularly for absentee landowners, is the added protection against squatting which results from the program's monitoring activities (Arriagada et al, 2012). Enrollment is limited to property owners with land parcels between 2 – 300 ha in size, and requires proof of secure title. Participation also requires that landowners develop an approved forest management plan with the assistance of identified forest technical officers who then monitor compliance (Arriagada et al, 2009).

While payments have rarely matched opportunity value or fully compensated for transaction costs, the program is consistently oversubscribed and underfunded

(Arriagada et al, 2009). Over 850,000 ha of forested land are currently enrolled (17% of the country's total land mass), with almost 90% of participants enrolled in the forest preservation category which merely requires maintaining current forest cover (as also required by law). Six percent (6%) of enrolled lands are part of reforestation efforts; five percent (5%) receive compensation for improved forest management – which initially also included sustainable logging. Agro-forestry activities were added to the list of eligible activities in 2002 yet remain a small percentage of PSA contracts (Cole, 2010). Through 2012, as much as US$300 million has been disbursed as incentives (Porras et al, 2012).

The PSA was funded initially by an allocation (US$ 34 million) collected from a national 3.5% fuel tax and supplemented by the [one-time] sale of carbon offset credits (US$2 million) to the Government of Norway (Arriagada et al, 2012). Contracts with hydroelectric power companies provided additional annual revenue (Porras et al, 2012). In 2006 watershed protection services financed by utility company contracts and payments from water-dependent industries (beer, water and fruit juice manufacturers) and mandated national water tariff were incorporated into the initiative's financing structure (Porras et al, 2012). Despite various sources of domestic funding, international grant and donor funding consistently play an important role in financing the PSA (Hartshorn et al, 2005, Porras et al, 2012).

The dynamic nature of the socio-ecological context in which the PSA operates is partly reflected in its various operational phases, each of which is characterized by evolving stakeholder (including that of external funding agencies) influences. Stakeholder influence is suggested to have succeeded in adjusting program targets in

an effort to improve delivery of the initiative's desired social and ecological co-benefits (Hartshorn et al, 2005).

- Phase 1 *(1996-1999*): Costa Rican government independently ran and financed the program, offering first-come, first-served conservation contracts which compensated three distinct land use modalities (forest conservation, forest restoration, sustainable forest management). While as much as 300,000 ha of forest was enrolled during this period, few studies reveal national level forest cover additionality as the vast majority of contracts were for lands which with minimal, if any, deforestation activity, or degradation threat (Greiber and Schiele, 2011, Sierra and Russman, 2006, Pfaff et al, 2008). The program's first-come, first-served enrollment practice which capped enrollment according to available funding was strongly criticized for its lack of additionality as well as its failure to engage small, rural landholders (Grieg-Gran et al, 2005, Porras, 2010).

- Phase 2 (*2000-2006*): Financing from the World Bank/GEF Fund (US$ 8 million GEF grant and US$ 32.6 million World Bank loan) expanded the PSA under the direction of the GEF *Ecomarkets* Project[56] (Hartshorn et al, 2005). The PSA received additional funding (US$11.2 million) in development assistance from the German Development Bank (Greiber and Schiele, 2011). Although initially engineered predominantly as a forest conservation (and forest cover expansion)

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[56] The Ecomarkets Projects operated between 2000-2005 and was created for the purpose of expanding and refining the Costa Rican PSA. It involved approximately US$50 million which came from a GEF Grant of US$8 million, World Bank Loan of US$33 million, and US$9 million from the Costa Rican government. (Hartshorn et al, 2005)

mechanism, it was in this phase of operation that the PSA began to adopt broader social and ecological objectives as dictated by the conditions of the World Bank/GEF 'investment'. Contracts were no longer randomly allocated on a first-served basis, instead targeted to areas of high biodiversity value or socio-economic development need (Arriagada et al, 2009).

- Phase 3 (*2006-2011*): Project management continued a 'targeted' approach for enrollment and focused deliberately on expanding biodiversity conservation outcomes through increasing the participation of lands within designated biodiversity corridors and protected area buffer zones (Corbera et al, 2011). Increased pressure from local environmental NGOs encouraged the PSA to further enhance delivery of social co-benefits (Hartshorn et al, 2005). Participation criteria were revised to better engage small rural landholders who remained largely excluded (in part by tenure restrictions). National water tariffs were legislatively mandated as an effort to supplement perpetually insufficient funding levels as voluntary private investment in ecosystem service provision remained virtually non-existent (Porras et al, 2012).

- Phase 4 *(2012 – present*): The PSA's current phase is heavily influenced by REDD+ preparations. Costa Rica is embracing the international REDD+ initiative and has high hopes that its national PES initiative, with slight structural modifications, will succeed in accessing financing from the international carbon market.[57] In 2012 Costa Rica's National REDD+ Strategy was approved by the World Bank Forest Carbon

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[57] Costa Rica announced a goal of net carbon neutrality by 2021 and created a national Voluntary Domestic Carbon Market to track and trade local carbon emission reductions (www.ecosystemmarketplace.com).

Partnership Fund (FCPF) and the Costa Rican government was awarded a US$ 3.6 million REDD+ Readiness grant.[58]

While PSA implementation has already established a significant portion of the required REDD+ institutional infrastructure and generated sufficient public support for PES, REDD+'s carbon accounting expectations require compliance with the measurement, reporting and verification requirements of international funders, requirements beyond the reporting and verification systems currently in place. Expansion into the realm of REDD+ will also require national-level reflection on how PSA/REDD+ might address increased land use pressures from urban expansion, the desire for increased economic returns from agro-industries and the physical reality of diminishing sources of available lands (Daniels, 2010, Porras et al, 2012).

BOX 5.1: Costa Rican REDD Connection

Costa Rica is a '*member*' of the World Bank Forest Carbon Partnership Fund (FCPF). The country has benefitted from a US$200,000 proposal preparation grant, and a US$3.6 million REDD+ Readiness grant to support the following activities:

- Comprehensive assessment of national forest governance infrastructure.
- Identification of REDD+ Strategy Options
- Social and environmental risk and impact assessment
- Determination forest GHG emissions reference level and corresponding MRV and safeguard monitoring systems.
- Integration of co-benefit issues into REDD+ preparations through a Strategic Environmental and Social Assessment (SESA)

58 "The Forest Carbon Partnership Facility (FCPF) is a global partnership of governments, businesses, civil society, and Indigenous Peoples focused on reducing emissions from deforestation and forest degradation, forest carbon stock conservation, the sustainable management of forests, and the enhancement of forest carbon stocks in developing countries." (FCPF, 2012:11) The FCPF Readiness Fund provides REDD+ preparation grants; the Carbon Fund purchases anticipated forest carbon reductions.

5.2.5 Assessment Analysis

In order to identify PES perspectives trends, the impact assessment meta-analysis analyzed the following characteristics from each case study: i) target indicators, ii) data collection methodologies, iii) author's academic discipline, iv) author's institutional affiliation, and v) method of study dissemination. The intent of the coding was to: i) identify sustainability priorities, ii) identify dominant perspectives, and iii) explore the influence of discipline, institution and data collection methodology on perspective. It is acknowledged that the list of studies reviewed for each of the case studies is neither conclusive nor absolute and as such a definitive identification of stakeholders or perspectives is not feasible or necessarily required for the purpose of this investigation. What the assessment analysis proposes to highlight, however, is the existence of perspectives plurality and to explore the potential for pluralistic engagement. A future area of analysis could explore how perspectives trends impact PES design, application, and assessment. Do current PES perspectives favor a more instrumental approach to assessment and by extension emphasize economic and measurable ecological indicators? Or do they challenge the dominance of one or more perspectives, seeking to both expose perspective hegemony and promote pluralistic engagement? The contextual introduction to the identified PES initiatives makes an initial contribution to this area of inquiry by highlighting variations in socio-ecological histories, practices and institutions as proposed by dialectical inquiry.

Of 31 PSA assessment studies were reviewed, only two studies (Zhang and Pagiola, 2010; and Pfaff, 2007) involved ex-ante modeling, the remainder assessed

various elements of program impact, frequently from the perspective of in-depth investigation in a geographic sub-area. While the two ex-ante studies looked at biodiversity impact and carbon offset equity distributions, respectively, other studies looked at a wide range of indicators including governance, social well-being, forest cover and economic development. A distributional representation of the indicators assessed by the PSA assessment studies is found in Figure 5.3.

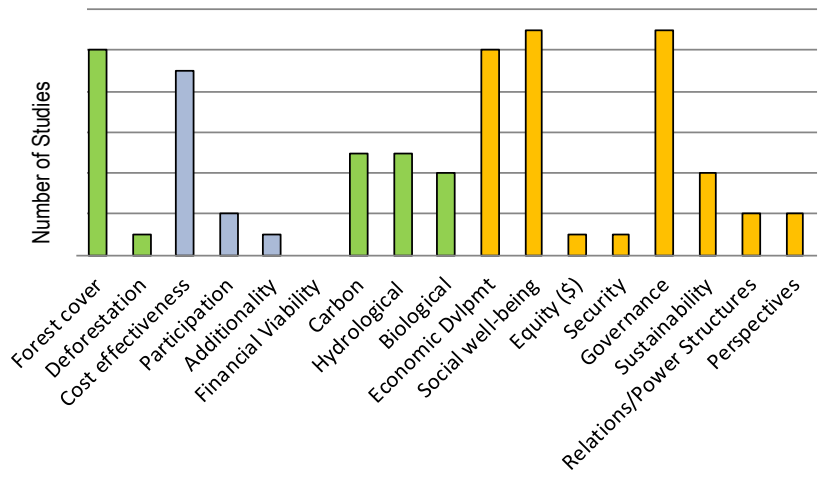

Figure 5.3: Distribution of Costa Rica Assessment Criteria

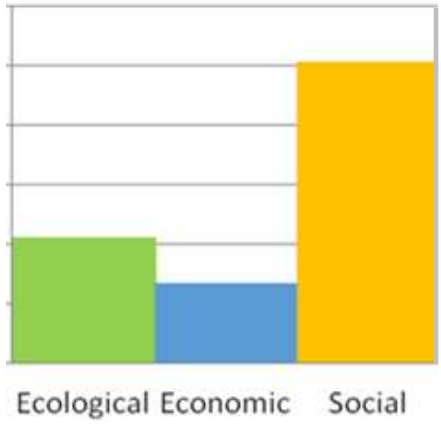

Figure 5.4: Distribution of Costa Rica Evaluation Criteria by Sustainability Component

When grouped according to traditional sustainability components (ecological, economic, and social components are color-coded: economic–blue, ecological-green, social-orange), social factors represent by far the most investigated outcome category. The strong showing of social indicators is illustrated in Figure 5.4 most likely a function of the inclusion of a greater number of social indicators (8) than either of the other two sustainability components: ecological (4) and economic (3) within the indicator coding framework. Whereas '*social well-being'* and '*governance'* are the two most assessed criteria, '*forest cover*' and '*cost-effectiveness'* are dominant criteria for investigation; a trend which should present a more evenly distributed emphasis amongst the three areas of sustainability.

The strong presence of these latter two sustainability components within the assessment literature is one potential explanation for the dominance of an *Optimistic* perspective within the PSA assessment literature. An additional explanation for the strong *Optimistic* showing depicted in Figure 5.5 might be found in the PSA goals and

targets identified for Phase I, e.g. increased forest cover and enhanced (measurable) ecosystem service outcomes.

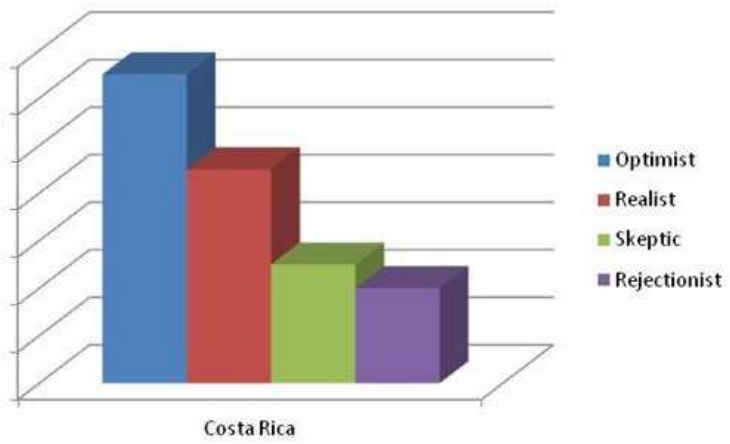

Figure 5.5: Perspectives Distribution from Costa Rica Impact Assessment Literature

As the PSA was implemented in three distinctly defined phases, assessment studies were broken down chronologically by publication date in an effort to detect any perspective adjustments in response to shifting implementation priorities and evolving funding arrangements. Figure 5.6 highlights the perspectives distribution for each of the earlier defined project implementation phases. Although it is assumed that all studies assess program impact from inception, the limited number of assessment studies published during Phase 1 questions whether the program was launched with a clear assessment strategy. Initial assessments may also exist as unpublished government reports.

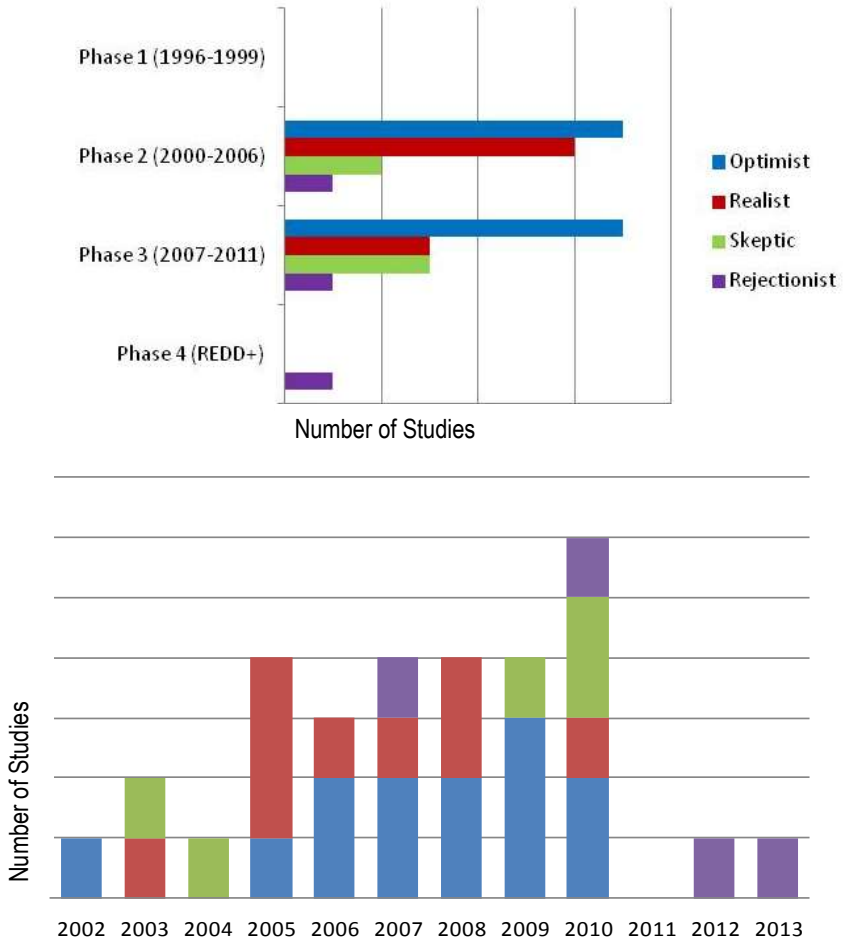

Figure 5.6: Chronological Distribution of Costa Rica Assessment Studies

The *Optimistic* perspective remains consistently strong through Phases II and III after which *Rejectionist* perspective emerges and subsequently maintains a consistent, potentially dominant, presence into Phase V. Overall, *Rejectionist* and *Skeptic* perspectives might be considered 'slow but steady' yet are challenged to compete in volume with the perspectives more optimistically embracive of market-

based conservation policy. Collectively the *Rejectionist* and *Skeptic* perspectives only represent 33% of the total PSA studies reviewed.

When analyzed according to discipline, a multi-disciplinary dominance is detected, as illustrated in Figure 5.7. The multi-disciplinary label was assigned to studies whose authors represented two or more of the identified disciplines. The multi-disciplinary label is slightly misleading as an indicator of perspectives plurality, however, as deeper investigation into the disciplines combined under this category revealed a dominance of economic and natural sciences.

In terms of institutional affiliation, Figure 5.8 reveals a dominance of university-affiliated studies both overall and across the perspectives. This is perhaps not surprising as internet and database literature searches heavily favor academic journals. The range of ecosystem services, sustainability, forest governance, and development listservs and (non-academic) research institutions followed throughout the course of this research did provide an ample supply of non-academic published studies and analytical reports on PES generally as well as the various case study initiatives. Many of these studies, such as CIFOR's Global Comparative Study on REDD+, however, conducted broad policy analyses and did not entail identified impact assessments. Only those studies which identified impact assessment criteria and methodologies formed the final set of impact assessment literature cited in Table 5.4. Of the case study impact assessment analyses which met the assessment criteria for inclusion in the meta-analysis; non-academic reports represent approximately 20% of the assessment studies included in the meta-analysis. Figure 5.9 suggests institutional affiliation may not, however, always be an indicator of perspective.

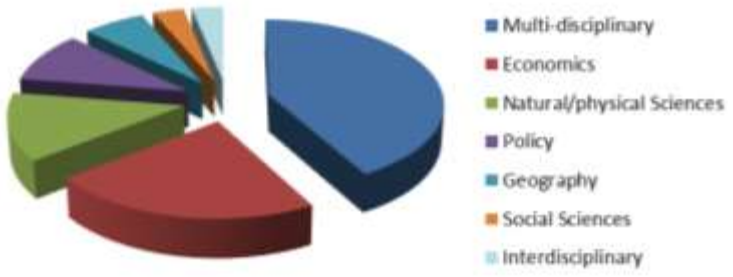

Figure 5.7: Disciplinary Distribution of Costa Rica Assessment Studies (% of total)

Figure 5.8: Costa Rica Assessment Literature Distribution by Author Institutional Affiliation

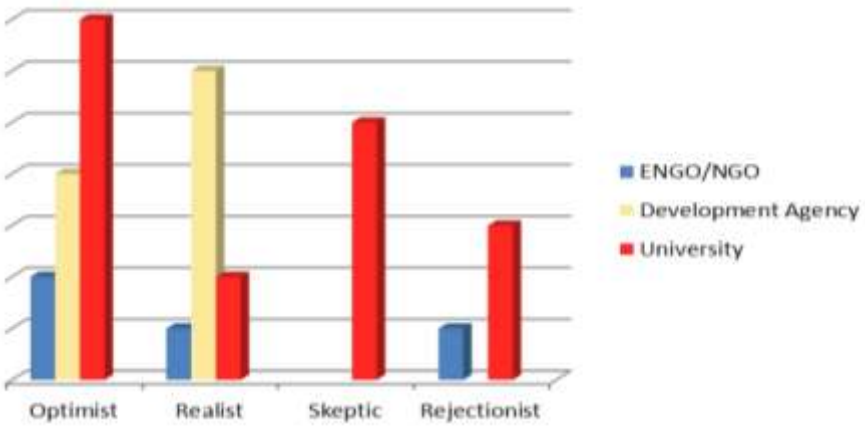

Figure 5.9: Institutional Affiliation of Costa Rica Assessment Studies by Perspective

Assessments produced by university and environmental NGO researchers represent varying perspectives. Only assessments produced by development agencies show a strong perspective affiliation.

A final criterion for analysis is data collation methodology. Identified methodologies are listed by perspective in Table 5.5 below. Numerous studies utilized multiple methodologies, with close to 25% utilizing three or more. Methodologies were grouped into two broad categories: data-driven and people-driven. The former involves extracting data from printed, digital and biophysical (forest field visit) sources, whereas the latter uses various forms and scales of stakeholder engagement as the data source. Distinction is made also between scale of stakeholder - household, participant, and conservation stakeholders; and method of engagement - survey, interview, survey/interview, and participant observation. Caution is taken not to assert that data-driven, people-driven or any particular methodology or combination thereof has superiority or greater credibility than another as the spirit of transdisciplinarity and post-sustainable development suggest that perspectives pluralism and multiple methodologies are most desirable as outcomes from all methodologies are, to some degree, dependent on researcher subjectivity and initial perspective. The assumption of the bi-level distinction (data vs. people), however, is that data-driven methodologies potentially produce knowledge from a more limited perspective (that which has been vetted, produced and published) whereas people-centered methodologies hold the promise to capture a greater perspective diversity as well as socio-ecological contextual nuances that live in between perspectives and ideologies.

In terms of the distribution of impact assessment methodology across the PSA meta-analysis, document (including map) review and participant-level surveys combined with interviews were used quite consistently across the perspectives. Distributional patterns of the other methodologies are less evident. Historical and ethnographic studies are only used by *Rejectionists*; mapping, spatial analysis and field surveys are only used by *Optimists*. When categorized by data character (document/data vs. people based), the analysis as presented in Table 5.6 reveals that *Optimistic* research is much less people-centric than the other perspectives; *Realists*, the perspective most focused on equity and distribution, appear to utilized people-driven methodologies the most.

Table 5.5: Data Collection Methodologies within Costa Rica Assessment Literature

		Data Sources	Optimist	Realist	Skeptic	Rejectionist
Data/Document Driven		Document Review	1	3	2	1
		Literature Review (w/i ethnographic survey)				1
		Historical Analysis			1	1
		Mapping and Spatial Analysis	5			
		Field Survey	3			
Stakeholder Driven	Scale	Household	1	2	1	
		Participant Stakeholder	1	2	1	1
		Stakeholder	2	3		1
	Method	Survey w/o interview		3	1	
		Interview w/o survey		1		
		Combined Survey/Interview	3	4	1	2
		Participant Observation				1
		Studies using 3 or more methodologies	4	2	1	1

Figure **5.6: Costa Rica Assessment Data Source Characteristics by Perspective**

	Data-Driven	People-Driven
Optimist	9	7
Realist	3	17
Skeptic	3	5
Rejectionist	3	6

5.2.6 Costa Rica Case Study Summary

A few observations are proposed to sum up the Costa Rican PSA case study. Costa Rica's strong presence of an *Optimistic* perspective is potentially a function of both national and international influences. Contributing national characteristics include i) a high percentage of private landownership which greatly facilitates the economic incentive model, ii) an established history of incentive-driven land use management and conservation policy, and iii) a strong government commitment to promoting the PES model. Forestry Law #7575 established the regulatory and institutional infrastructure needed for the PSA to function, including a local funding source in the form of a 3.5% fuel tax and subsequent water tariff. These three characteristics are suggested to have succeeded in influencing national attitudes in favor of environmental conservation, albeit for the ultimate benefit of improved economic returns and not for more eco-centric motivations of more 'balanced' socio-ecological interactions. Nature and forests are still very much managed for improved socio-economic well-being.

It can be argued that some level of stakeholder engagement did succeed in influencing the PSA's implementation targets and priorities, shifting from its initial

objective of an increase in net forest cover to later ensuring that afforestation and reforestation efforts simultaneously contributed to enhanced biodiversity conservation and rural development priorities. The most influential stakeholders, however, are those who control program funding, e.g. Costa Rican central government and the international development agencies and developed countries providing development assistance, e.g. Norway and Germany; stakeholders all supportive of market-based conservation policy, and equally supportive of modifying the PSA to meet the requirements of the up and coming REDD+ mechanism. The PSA itself emerged from the World Bank's structural adjustment influence in the 1990s which proposed to open the country's conservation policy to external economic influences – ostensibly to assist in financing an expansion of existing national conservation efforts.

Lastly, however, it should be noted that post-sustainable development goals of mutual learning through pluralistic engagement are extremely challenged in the Costa Rican context due to the dominance of the *Optimistic* perspective and the corresponding dominance of program financiers. The goals and structures of the PSA are likely to shift toward the identified targets of the REDD+ mechanism if and when that initiative becomes fully operational. Effort to strengthen local and international sources of *Skeptic* and *Rejectionist* perspectives will likely be required for mutual learning opportunities to be realized.

5.3 Case Study #2: Brazil - *Lungs of the Planet*

"It is increasingly recognized that local indigenous, traditional and even colonial rain forest populations can, given favorable circumstances and appropriate incentives, play key environmental roles as guardians of the forest by promoting non-destructive practices and forms of resource use that contribute to sustaining livelihoods." (Hall, 2011:185)

Brazil is global leader in multiple areas. It is the fifth largest country in terms of geographical territory, fifth most populous, home of greatest wealth of planetary biodiversity (20%) and largest track of remaining tropical forest, and the most impressive record for World Cup soccer[59]. At just over 5 million km^2, the Brazilian Amazon represents over 50% of the country's geography, is estimated to sequester over 14 million tons of CO_2 ($MTCO_2$), and gives the Brazilian government an important role in global forest governance discussions, particularly as they relate to forest carbon (Hall, 2011, Long, 2012, Novaes and Souza, 2013). During the period of 1980 – 2005, however, Brazil was also a leader in deforestation losing on average 20,000 km^2. Brazilian deforestation is primarily driven by industrial agricultural (soybean) and cattle ranching (approximately 15% of the Amazon currently supports soy and beef production); however, mining, forest fire, illegal logging, and settlement expansion also contribute to deforestation (May et al, 2011). Since 1990, deforestation at the hands of these combined forces released annually over 1 billion tons of CO_2 into the atmosphere constituting between 50% -75% of the country's overall GHG emissions (Hall, 2008, Nepstad, 2009).

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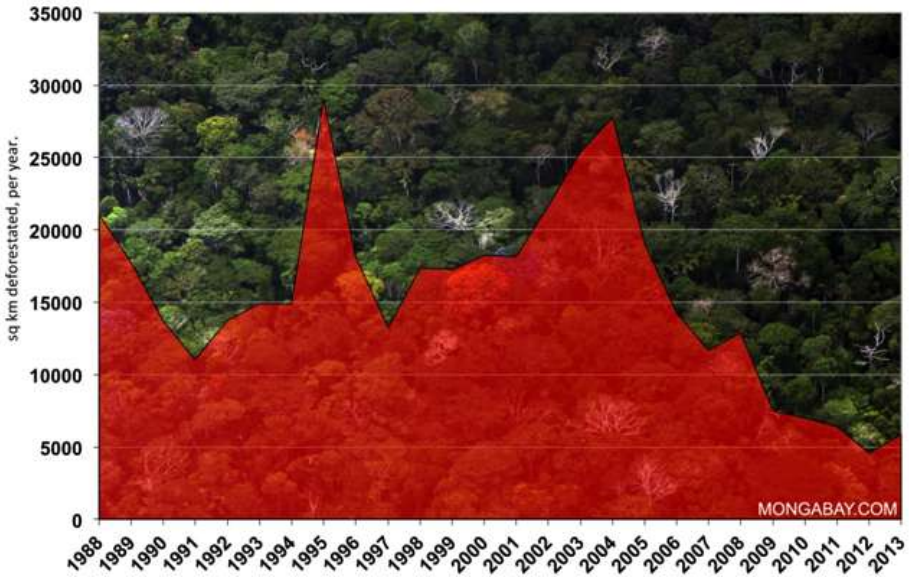
[59] Brazil is the only country to have played in every World Cup tournament and holds the record for most wins with five championships (www.fifa.com).

The country recently reduced its deforestation rate by approximately 70% following a period of strict enforcement by the central government of national forestry laws; a period which incidentally coincided with a global drop in agricultural prices (Boucher, 2013). Changes in the Amazonian forest cover, monitored by the Brazilian National Institute for Space (INPE) since 1988, suggests a strong positive correlation between deforestation and global food prices. The impact of the government's crackdown on illegal forest activities was suddenly offset in 2007 when rapidly rising global food prices cause a sudden rise in Amazonian deforestation (Tollefson, 2013). Similarly, previously decreasing deforestation rates began to climb in 2012 with a surge in soy prices (Hall, 2011, Nepstad et al, 2014).



Source: Mongabay (2013)

Figure 5.10: Deforestation in the Amazon 1988-2013

What follows is an exploration of the Brazilian socio-ecological context (economic, biophysical and socio-political conditions) within which this reduced deforestation rate has taken place. The contextual analysis focuses heavily on the Brazilian Amazon, site of great potential and impeding peril vis-a-vis climate change. Context analysis focuses in particular on the northwest state of Amazonas[60], location of the *Bolsa Floresta* PES initiative and subsidiary *Juma* Reserve REDD+ Project and the largest Brazilian state, highlighted in Map 5.4.

Map 5.4: Brazil Location Map

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[60] Amazonas is the largest of Brazil's 26 states. Amazonas, Para, and Mato Grasso represent the majority of states within the boundary of the Brazilian legal Amazon. With the addition of Acre, these states are currently most active in the developing PES/REDD+ initiatives (Hall, 2012).

5.3.1 Biophysical Context

The Amazon Biome is the world's largest rainforest accounting for over 30% of planet's remaining biodiversity rich tropical forests (Simpson, 2010). The Amazonian river basin covers an area equivalent to 25% of the South American land mass and provides as much as 20% of the global water supply (Milliken, 2009). This critical planetary ecosystem service of water cycling also helps regulate regional and international weather patterns. It provides the essential air filtering service, sequestering as much as 2 billion tons of CO_2 annually and subsequently generating significant quantities of oxygen (Hall, 2012). It is not surprising, therefore, that this vitally important tropical forest is known as the lungs of the planet (Simpson, 2010). The internationally recognized socio-ecological importance of the Amazon has not, however, stopped its continued destruction. Deforestation in the Brazilian Amazon has fluctuated over the past two decade, peaking at 29,000 km^2 in 1995 and again at 28,000 km^2 in 2004 (Mongabay, 2013). And while the rate of deforestation in 2012 was the lowest in the past half century, scientists are cautious to suggest this trend can be sustained as global demand for agricultural products is only expected to climb (May et al, 2011, Nepstad et al, 2014).

The Brazilian State of Amazonas represents approximately 1/3 of the Brazilian legal Amazon and has historically been less threatened by agricultural expansion due to its relative inaccessibility. Municipal, state, and federal layers of designated park and reserve status provide legal protection to over 50% of the state's land mass and help maintain a 98% native vegetation cover (Viana, 2010). National highway and energy infrastructure development into Amazonas have recently begun opening these

pristine areas to illegal logging as well as settlement expansion (Milliken, 2009). Modeling based on the central government's current and planned developments indicate that Amazonas could lose as much as 30% of its current forest cover by 2050 (Viana, 2008).

5.3.2 Socio-Economic Context

Brazil is the sixth largest global economy, the largest economy in South America[61], and part of an emerging international bloc of global economic powers known as the BRICS countries (Brazil, India, China and South Africa). Brazil is also the fourth largest GHG emitter globally; over 75% of Brazil's GHG emissions from land-use change are the result of export-driven agricultural expansion, primarily soy and beef (May et al, 2011, Long, 2012). Brazil is the world's largest exporter of beef, an industry which accounts for roughly 80% of national level deforestation (Nepstad, 2009). Within the State of Amazonas, Brazil's largest state (20% of the total country), the economy is driven by the *Zona Franca de Manaus* (tax-free industrial zone) established in 1987 in the State's capital of Manaus. As industry situated within the *Zona* provides as much as 95% of the State's economic earnings, Amazonas, has t9 date managed to avoid the traditional development patterns driven by agricultural expansion and extractive industries and maintained over 90% of its original forest cover throughout the past two decades of continued economic development (Viana, 2010).

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[61] Brazil's GDP in 2011 was $2,477 billion, followed by Argentina with a GDP or $695 billion. (www.data.worldbank.org)

5.3.3 Socio-Political

Culture

The Brazilian Amazon is an important geographic, economic, and cultural cornerstone for the vast majority of Brazilians (Long, 2012). It is also the cultural and spiritual home to the bulk of Brazil's indigenous peoples who represent approximately 1.1% of the total population and who depend directly on the rainforest for their livelihoods (Hall, 2008, Long, 2012). Amazonas alone is home to over 60 different indigenous tribes as well as a vibrant non-Indian, "traditional" population of *seringuerios* (rubber tappers) and *riberirinhos* (riverine dwellers)[62] (Viana, 2010, Hall, 2012). Although indigenous peoples and traditional populations have historically been marginalized by government policies more supportive of powerful commercial interests, economic development policy has shifted slightly since the mid 1980s and the establishment of indigenous and extractive reserves which on paper provide legal rights and boundaries to indigenous inhabited forests (May et al, 2010, Long, 2012). At present, land tenure arrangements in the Brazilian Amazon identify approximately 24% as private holdings and 76% as managed by public agencies (Corbera et al, 2011). Roughly 20% of public lands are protected, 20% are under indigenous tenure,

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[62] Indigenous and traditional populations both live off the land, largely disconnected from modern society, but have different cultures and traditions. The latter are generally small, family-scale producers who practice sustainable fishing, hunting and gathering for consumption and trade as opposed to commercial markets. While they do not seek outside contact, neither do they automatically retreat from it. Many Indigenous populations, on the other hand, deliberately maintain a no-contact status (www.socioambiental.org).

and 30% are undefined or considered contested; the bulk of illegal deforestation activity takes place in these contested regions (Hall, 2011, Corbera et al, 2011).

Extractive reserves and resource concessions to loggers and miners are two state mechanisms designed to ensure lands fulfill their 'social function' of providing direct and tangible economic benefit to society (Viana, 2010). Logging, mining and other extractive concessions are culturally encouraged for creating value and they are additionally viewed as a means of asserting control. Virgilian Viana, head of the *Fundacao Amazonas Sustenval* (FAS) and founder of the *Bolsa Floresta* Program calls this attitude the *mato paradigm* (weeds/woods/forests) in which 'unutilized' forest symbolizes underdevelopment or the lack of value production (Viana, 2008). This paradigm underpins the bulk of the national land use policy, particularly as it relates to tenure and titling which favors the productivity of large landholders. Resolving unsecure and contested land tenure is widely recognized as fundamental to sustainable forest management (Duchelle et al, 2013).

Policy

While a significant portion of national government economic development policy directly and indirectly facilitates deforestation, several key laws and executive orders demonstrate a countervailing national commitment to forest protection. The 1965 Forest Code, established in consort with Amazonian settlement efforts currently mandates that 80% of all private lands remain in permanent reserve (Corbera et al, 2011). In addition to the private land reserve requirement, the Code established permanent legal reserves within each of the country's six conservation biomes, 80% of the Brazilian Amazon is protected by reserve status (Greiber, 2009). Monitoring and

enforcement activities of the PPCDAM are given significant credit for the 70% reduction in the rate of Amazonian deforestation through 2011 (Boucher et al, 2013).

In addition to the Forest Code, a more recent inter-ministerial, national level initiative, the *Plan for the Preservation and Control of Deforestation in the Amazon (PPCDAM)*, aims to address the national deforestation challenge (Boucher et al, 2013). Since implementation in 2003, the Plan oversaw the creation of an additional 19 million ha of federally protected areas and a national investment in state-of-the-art forest monitoring capabilities through key agencies such as the National Institute of Space Research (INPE), *Instituto National de Pesquisa Nacionais* (IPAM) and the *Instituto do Homeme Meio Ambiente da Amazonia* (Amazon Institute of People and the Environment or IMAZON). The Plan's deforestation reduction objectives are supported by the 2008 *National Climate Change Plan* which declared a national GHG reduction target of 80% by 2020[63]. The bulk of the committed reductions are expected to be achieved through reduced deforestation (Boucher et al, 2013).

Stakeholders

The inter-sectoral natural resource management framework established by national government initiatives (e.g. PPCDAM) is unlikely to have realized the same impressive results in controlling deforestation without the support of additional stakeholder interventions, i.e., state and local government conservation initiatives of local and international civil society advocacy campaigns, and foreign development

[63] Targeted reductions are based on a baseline established by the average of annual national deforestation rates over the period 1990-2005.

assistance. Several key stakeholders and their initiatives with direct relevance for *Bolsa Floresta* are highlighted below:

- **State Government.** The 2007 state of Amazonas *Law on Climate Change, Environmental Conservation and Sustainable Development* created the legal and fiscal infrastructure necessary to support a PES initiative. The equivalent infrastructure in Costa Rica was created by its Forestry Law #7575 and is credited for the longevity of the Costa Rican PSA. The absence of an equivalent, national level infrastructure is widely believed to have contributed to the abrupt ending of Brazil's national PES initiative, *Proambiente*, precursor to *Bolsa Floresta* (Simpson, 2010, Hall, 2008).

- **Civil Society.** Greenpeace International investigative reports released over the past decade[64] have raised global awareness of the links between food production and deforestation and launched an international campaign against Amazonian deforestation. By drawing worldwide attention to the social and biological impacts of Brazil's industrial agriculture industry as well as the facilitative role of banks and multinational corporations, Greenpeace efforts are credited with generating sufficient international public pressure to demand changes within beef and soy production practices and supply chains (Boucher et al, 2011). The international campaign was supported by a local NGO coalition known as the Zero Deforestation Campaign and exerted local pressure on government support for ecologically destructive private sector supply chains. The Campaign also pressured the Brazilian national government to provide fiscal support local deforestation reduction efforts and proposed what

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[64] Released in 2006, *Eating up the Amazon*, focused on soy production; *Slaughtering the Amazon*, published in 2009, targeted beef production.

became known as the Amazon Fund (Boucher et al, 2011). The Fund is managed by the Brazilian National Development Bank (BNDES) and provides a mechanism to collect and disperse financial resources to local conservation initiatives (Duchelle et al, 2013).

- **International Financing.** While the Amazon Fund represents an important effort in maintaining national and sub-national control over natural resource policy and implementation, the Fund's dependency on international grants and development assistance cannot be overlooked. The Norwegian Climate Initiative is a principle financier of the Amazon Fund (Zadek et al, 2010). The State of Amazonas *Bolsa Floresta* program depends on support from the country's largest commercial bank as well as funding from the Coca-Cola Company (Pereira, 2010).

5.3.4 State of Amazonas PES Initiative

Two PES initiatives dominate the PES literature for the Brazilian state of Amazonas: *Bolsa Floresta* and the *Juma* Sustainable Development Reserve. The two initiatives have some level of overlap, the *Bolsa Floresta* PES operates on a state-wide level whereas the 590,000 ha *Juma* Sustainable Development Reserve Project is one of fifteen (15) sustainable development reserves (Conservation Units which allow identified direct and indirect uses of natural resources within an identified zone) within the Amazonas State. The *Juma* Project is geographically and administratively situated within the *Bolsa Floresta* initiative. Both initiatives share the compensated conservation philosophy which focuses on livelihoods development; however, *Bolsa Floresta* does not require the carbon accounting infrastructure as required by REDD+. The *Juma* Project is structured to meet the international requirements of a REDD+

project and has become a pilot for testing the State's proposed carbon monitoring, reporting and verification (MRV) system. Once *Juma* succeeds in generating REDD+ revenue, it is envisioned that *Bolas Floresta* will also seek REDD+ status and financing (Hall, 2012).

The Amazonas Government launched its *Bolsa Floresta* (BF) initiative in 2007. The project's stated objective was to simultaneously reduce forest carbon emissions, address rural poverty and enhance sustainable livelihoods (Pereira, 2010). The project achieves these goals by enhancing the sustainability of small-scale agriculture and forestry activities, primary livelihood options for area residents. *Bolsa Floresta* adopts the conditional compensation structure established by the national poverty reduction initiative *Bolsa Familia*[65] and piloted within an environmental sustainability context under the short-lived *Proambiente.*[66] *Bolsa Floresta* emerged from collaborative discussions between the Amazonas State Government, the Institute for Conservation and Sustainable Development in the Amazon (IDESAM), Institute for Environmental Research of the Amazon (IPAM), the international Global Canopy Program (GCP), the Amazon Working Group, and the National Council of Rubber Tappers (Periera, 2010). Under the *Bolsa Floresta* initiative, residents committed to protecting mature forests are eligible for the four levels of compensation identified in Box 5.2. The initiative currently encompasses 18 million ha across 15 state reserves and benefits 8,500 families. The initiative is financed by the proceeds of a $40 million endowment created with support from the Brazilian commercial bank Bradesco and the Amazonas State Government (Börner et al, 2013)

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[65] For more on Bolsa Familia see Hall (2013)
[66] For more on Proambiente see Hall (2011) and Hall (2008)

BOX 5.2: *Bolsa Floresta* (*Forest Stipend*)

Requirements:

- Minimum 2 year residency within Conservation Unit (CU)
- Ensure that all children in household attend school
- Actively participate in CU Association
- Commit in writing to zero deforestation as a result of livelihood activities.

Compensation:

1. *Bolsa Floresta Familia*: US$25 payment issued to all participating households irrespective of size and structure
2. *Bolsa Floresta Associacao*: US$500 stipend paid to a local association
3. *Bolsa Floresta Social*: Annual US$7000 payment to each Conservation Unit for infrastructural investment to complement municipal and state efforts.
4. *Bolsa Floresta Renda*: Annual US$70,000 stipend to each Conservation Unit to develop alternative sustainable livelihoods.

Source: Gebara (2013)

The *Juma* Sustainable Development Reserve Project for Reducing Greenhouse Gas Emissions from Deforestation (*Juma* REDD+ Project) is one of nine active sub-national REDD+ initiatives operating in Brazil.[67] The *Juma* REDD+ Project has been awarded Gold Status by the Climate, Conservation and Biodiversity Alliance (CCBA)[68] in large part due to the social components provided by the structure of overarching *Bolsa Floresta* initiative. In addition to its social components, the *Juma* REDD+ Project proposes to improve state- level environmental monitoring capacity and infrastructure, develop sustainable community businesses within the reserve, provide education and training in sustainable forest management and conservation, and engage in various aspects of environmental research. At present, the initiative has financial support from Marriott International. In exchange for its investment in the

[67] www.theredddesk.org
[68] For more on CCBA certification see www.climate-standards.org

Initiative's forest conservation initiatives, Marriott receives the carbon offset credits generated through the project's reforestation and forest conservation activities. The impact assessment meta-analysis for the Brazilian case study includes assessments studies conducted for both *Bolsa Floresta* and the *Juma* REDD+ projects.

BOX 5.3: *Juma* Sustainable Development Reserve REDD+ Project

In 2006, the Brazilian National Government established the 590,000 ha *Juma* Sustainable Development Reserve (SDR) Conservation Unit. The SDR designation provides legal protection for the sustainable use of the Reserve's forests.

At present, the Reserve is threatened by in-migration via two major highways. The *Juma* REDD+ project was established in 2008 in an effort to counter the anticipated impacts of this transportation infrastructure. In addition to capturing 190 $MtCO_2$, the project taps into the social enhancement capacity of *Bolsa Floresta* (Viana et al, 2010).

5.3.5 Assessment Analysis

Twenty-five (25) assessments were consulted for the Brazilian case study research; a listing of these studies is found in Table 5.7. The vast majority of PES assessments for the Brazilian context explore the contribution of REDD+ toward achievement of Brazil's 80% deforestation reduction target. REDD+ evaluations are predominantly ex-ante cost-benefit analyses which assess cost-effectiveness, efficiency, and equity targets within a variety of implementation scenarios. Scenarios vary according to baseline determination (Börner and Wunder, 2008), differing payment modalities (Börner et al, 2010), and differing methods of calculating implementation and transaction costs (Börner et al, 2011, Olsen and Bishop, 2009). REDD+ analyses focused on equity implications analyze cost-benefit distributions for

smallholders and indigenous populations (Hall, 2011, Pokorney et al, 2013). The three *ex-poste* studies included in the meta-analysis analyzed livelihood impacts, livelihood sustainability, and broader socio-economic impacts (Cenamo et al, 2009, Reimer et al, 2011, Olsen and Bishop, 2009).

Figure 5.11 suggests the predominance of an economic assessment focus as the dominant assessment metrics are cost effectiveness and cost-benefit distribution, albeit the former is concerned with efficiency and the latter focused on equity. Equity issues are more dominant within the Brazilian context based on the strength of the social assessment criteria shown in Figure 5.12 and strong *Realist* and *Skeptic* perspectives shown in Figure 5.13. Both Costa Rican and Brazilian meta-analyses identify a prioritization of cost-effectiveness and governance, however, the Brazilian assessment studies additionally prioritize equity whereas the Costa Rica studies emphasize economic development and social well-being understood as enhanced capital assets (see Table 4.2 for assessment indicator definitions).

Table 5.7: Summary of Brazil Assessment Literature Reviewed		
Author(s)	**Discipline(s)**	**Method of Study Distribution**
Bolsa Floresta		
Grieg-Gran (2012)	Economics	IIED Policy Brief
Newton et al (2012)	Natural Sciences	*Global Environmental Change*
Pereira (2010)	Policy	*Journal of Environment and Development*
Reimer et al (2011)	Multi-disciplinary	CIFOR Technical Brief
Viana et al (2008)	Interdisciplinary	*Estudos Avandacos*
Juma Sustainable Development Reserve REDD+		
Anderson (2009)	Public Policy	*Journal of Sustainable Development*
Börner and Wunder (2008)	Economics	*International Forestry Review*
Börner and Wunder (2012)	Economics	*Forests*
Börner et al (2010)	Multi-disciplinary	*Ecological Economics*
Börner et al (2011)	Multi-disciplinary	CGIAR Report
Cenamo et a (2009)	Natural Sciences	TNC/IDESAM working Document
Corbera et al (2011)	Multi-disciplinary	*Forests*
Costenbader (2009)	Policy	Legal Framework Case Study
Crawford (2012)	Policy	Case Study Paper funded by DFID
Duchelle et al (2013)	Multi-disciplinary	*World Development*
Gebara (2013)	Natural Sciences	*International Journal of the commons*
Hall (2011)	Social Sciences	*Latin American Research Review*
Long (2014)	Policy	Book
May et al (2010)	Economics	CIFOR Discussion Paper
May et al (2011)	Economics	CIFOR Discussion Paper
Olsen and Bishop (2009)	Economics	IUCN Working Paper funded by Rio Tinto
Pokorny et al (2013)	Multi-disciplinary	*Ecology and Society*
Rival (2012)	Social Sciences	UNRISD Working Paper
Viana (2010)	Interdisciplinary	IIED (NORD funded)
Yanai et al (2012)	Natural Sciences	*Forest Ecology and Management*

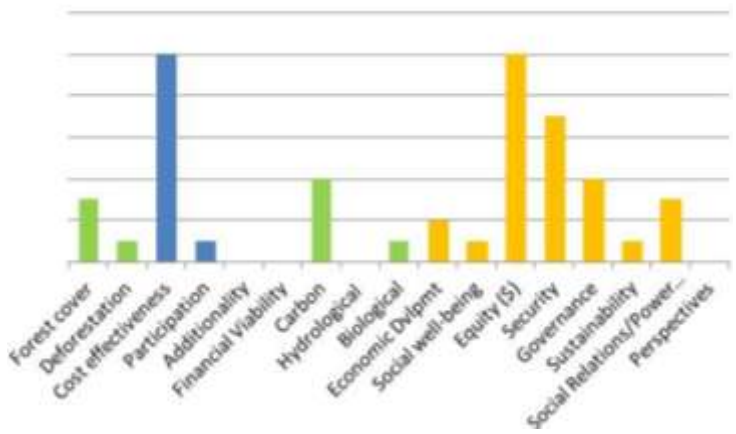

Figure 5.11: Brazil Assessment Literature Evaluation Criteria

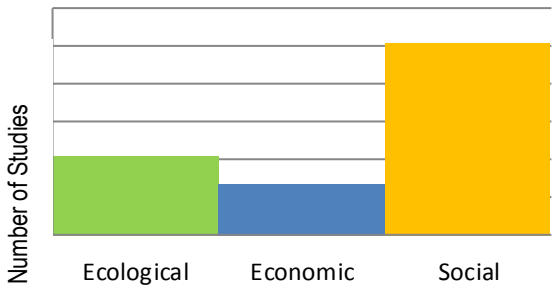

Figure 5.12: Distribution of Brazil Evaluation Criterion by Sustainability Component

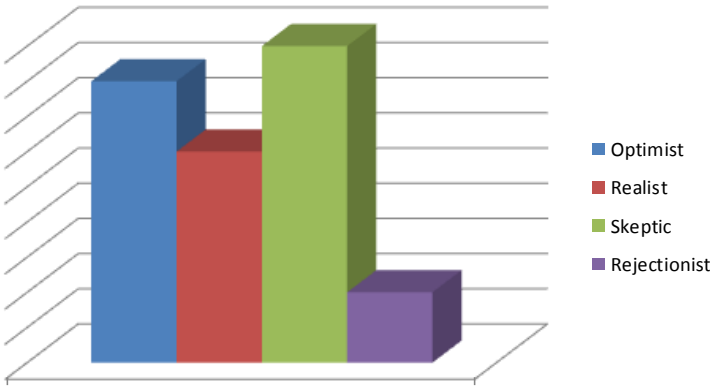

Figure 5.13: Perspectives Distribution across Brazil Assessment Literature

Figure 5.14 is a distributional representation of the disciplinary affiliation of assessment investigators. Much like the Costa Rican case study, economic, natural science, and multi-disciplinary studies (dominated by the previous two disciplines) are predominant within the literature, albeit to a slightly lesser extent. Whereas in the Costa Rican case this disciplinary trio represented roughly 75% of study authors, in the Brazilian context the dominance is closer to 60%, with a greater percentage of deliberately interdisciplinary studies, e.g. sustainability science, ecological economics, water resources.

Figure 5.14: Disciplinary Distribution of Brazil Assessment Studies (% of total)

Figure 5.15 indicates that the Brazilian case study assessment literature is much less dominated by university-driven research than the Costa Rica literature and influenced more by environmental NGOs and government-driven studies. Similar to the findings of the Costa Rica case study, institutional affiliation does not automatically guarantee perspective identification. Figure 5.16 shows both university and NGO affiliated studies representing a spectrum of positions, however in this case

study context, university derived studies lean toward a stronger *Skeptic* perspective whereas the environmental and developmental NGOs (ENGO/NGO) trend toward the left side of the perspectives spectrum. Government derived studies are firmly *Optimistic.*

Figure 5.15: Brazil Assessment Literature Distribution by Author Institutional Affiliation

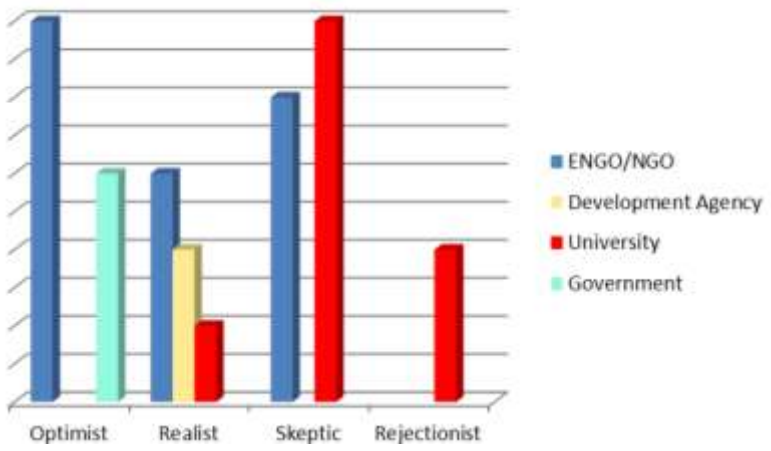

Figure 5.16: Institutional Affiliation of Brazil Assessment Studies by Perspective

Impact assessment data collection methodologies are the final criteria for analysis. Tables 5.8 and 5.9 provide an overview of the data sources utilized by the various assessment studies of the *Bolsa Floresta* and *Juma* REDD+ PES initiatives. Distribution of the full range of methodologies across perspectives is decidedly different than from what emerged within the Costa Rican assessment literature where there was a dominance of people-driven data collection methodologies (a high percentage of interview-based data collection practices) utilized by *Realist* researchers. The Brazilian case study assessments, dominated by *Skeptic* and *Optimist* perspectives, appear more oriented more toward data-driven methodologies. The slight edge of data-driven methodologies by the Skeptic and *Rejectionis*t perspectives may seem counterintuitive given the orientation of these perspectives toward understanding social infrastructure and relational characteristics; however, a closer look at the methodological breakdown of Table 5.9 offers some interesting insight. Data-driven methodologies identified within in the Costa Rican case study were predominantly document review and mapping/spatial analysis whereas the Brazilian assessment literature contained a more evenly distributed use of the data-based methodologies. Incorporating multiple data collection methodologies is an investigative pattern more consistent with the *Skeptic* perspective. It is surprising, however, that none of the *Rejectionist* studies supplemented their historical analyses with people-driven collection methodologies.

Table 5.8: Data Collection Methodologies for Brazilian Case Study Assessments

		Data Sources	Optimist	Realist	Skeptic	Rejectionist
Document and Data Driven		Document Review	4	2	3	
		Literature Review		1	2	
		Historical Analysis	1	1	2	3
		Mapping and Spatial Analysis	2	1		
		Field Survey	1			
People Driven	Scale	Household		1	1	
		Participant Stakeholder		1		
		Stakeholder	1	1	1	
	Methodology	Survey w/o interview	1	1		
		Interview w/o survey			2	
		Combined Survey/Interview		3	1	
		Studies using 3+methodologies	1	1	3	

Table 5.9: Data Source Characteristics by Perspective

	Data Driven	People Driven
Optimist	9	2
Realist	5	7
Skeptic	7	5
Rejectionist	3	-

5.3.6 Brazil Case Study Summary

In summary, a few key observations highlight additional differences between the two case studies reviewed thus far. Practical and logistical differences such as geographical size, population, period of operation and national development priorities can potentially explain some of the perspective distribution variations between the two contexts. Costa Rica's PSA launched in the early, post-1992 days of an international desire for more 'sustainable' development strategies. It was simultaneously motivated by a national desire to change the country's ecologically damaging economic development strategy; the national focus encouraged other sectoral policies, most notably agriculture and tourism, to adjust in response to the new national priority. The initial goal of the PSA was quite simply to increase net forest cover, the inclusion of social and ecological co-benefits emerged in Phase II of implementation and largely in response to international stakeholder influence. This relatively straightforward policy objective, increased forest cover, supported by the international development agencies providing technical and financial support, could explain the strength of the *Optimistic* perspective in the Costa Rica context. Brazil's PES initiatives are more recent, emerging within the last decade under growing concern over socio-ecological threats posed by climate change. It is perhaps additionally a function of geographic size that the Brazilian initiatives are more oriented toward national and sub-national priorities of socio-economic equity and natural resource security as opposed to an international agenda focused on addressing climate change and environmental degradation. Regardless of driver, however, a more localized agenda could account for the stronger presence of the *Skeptic* perspective. The influence of the international sustainable

development and climate change agenda does remain visible in the strength of the *Optimist* perspective.

Regardless of contextual and PES policy motivator variations (new economic development path or in response to climate change), both case study meta-analyses are driven by similar disciplinary drivers, albeit in slightly different percentages. Multi-disciplinary, economic, and natural science agendas dominate 21% of the Costa Rican and this percentage increases to 36% in the Brazilian context. These trends and influences are further explored in the Ecuadorian case study.

5.4 Case Study #3: Ecuador – *Post-fossil fuel and Sumak Kawsay*[69]

Ecuador hosts two global biodiversity hotspots, two UNESCEO World Heritage sites, and is home to over 10% of all planetary species (Martin, 2011). Ecuador's cultural diversity is found within the country's fourteen nationalities and 18 indigenous communities dispersed throughout the country's coastal, Andean, and Amazonian regions (Ministry of Environment Ecuador [MAE], 2012). Ecuador's cultural and biological diversity, however, competes directly with the country's oil and gas wealth located in the biologically and culturally diverse Ecuadorian Amazon. Since the 1970s these fossil fuel reserves have been exploited by national (Petroecuador) and foreign (Texaco-Chevron) oil companies with devastating impact. Over 68 million cubic meters of crude oil has flowed into formerly pristine rivers and waterways, the damage of which is estimated to be 90 times what was caused by the 2009 Deepwater Horizon disaster in the Gulf of Mexico (Carrera, 2014).

In 2008 the recently elected Correa government proposed a shift national policy in order to better protect the country's natural heritage. The shift began with the 2008 Constitution that provided legal rights to nature, and identified the objective of public policy as achieving *buen vivir,* or the good life, defined by man and nature living in community (Gudynas, 2011).

> *Buen vivir signifies a turn away from a society and an economy based solely on market and profit-driven growth toward a new form of democratic development….The good life is not a*

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[69] *Sumak Kawsay* means 'the fullness of life in community with people and nature' in kichwa, the language of the Quichua indigenous peoples in South America (Gudynas, 2011).

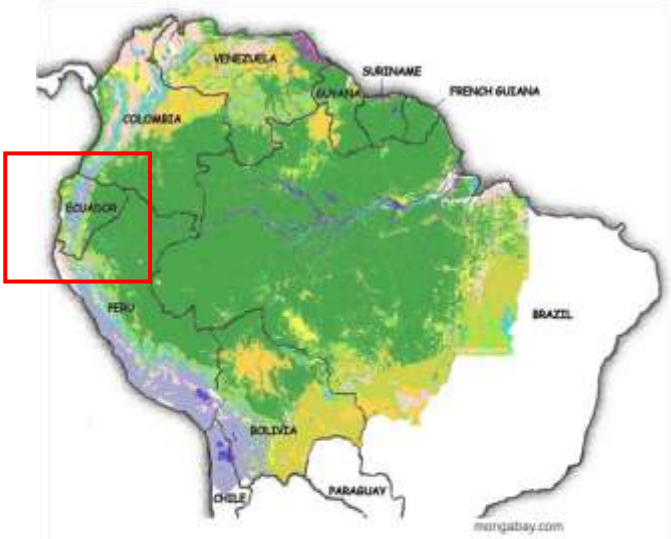
> *prescription nor is the process that defines it. Rather it is a social construction that changes as society deems necessary and nature warrants*" (Martin, 2011:103).

The new government further challenged traditional development models with its post-petroleum Yasuni-ITT proposal. The Yasuni initiative sought US$3.6 billion from the international community in compensation for the keeping estimated 850 million barrels of crude oil (20% of the country's known reserves) lying under the *Ishpingo*, *Tombacoicha*, and *Tiputini* concessionary blocks in the ground. The proposed avoided deforestation action was estimated to prevent the release of approximately 400 million tons of CO_2 emissions (Finer et al, 2010). The Yasuni proposal was applauded nationally and internationally for its innovation of design and potential contribution to climate change mitigation and biodiversity conservation (Martin, 2011).

> *Keeping the northwestern Amazon home to the Basin's highest biodiversity and the region least vulnerable to climatic drying largely intact as a biological refuge is a global conservation priority of the first order. If the world's most diverse forests cannot be protected in Yasuni, it seem unlikely that they can be protected anywhere else. (Bass et al, 2010:16)*

The proposal was abandoned in 2013 due to insufficient investor support; only $113 million of a committed $330 million was actually deposited into the UNDP-managed Fund. The Yasuni story highlights, however, the sustainability challenge faced by many natural resource-rich nations dependent on international stakeholder engagement and finance. It highlights the larger political and economic challenges faced by the sustainability efforts of a country struggling to balance its socio-cultural desire for *buen vivir*-led socio-economic (development) policies.

Map 5.5: Ecuador Location Map



Yasuni-ITT is not the country's first experiment with innovative ecosystem service exchanges. In 2000 the city of Quito created a watershed management fund (FONAG) with assistance from The Nature Conservancy (TNC); a regional watershed protection fund was launched in 2009 (FORAGUA) with assistance from Nature and Culture International (NCI). Ecuador is identified by the Ecosystem Service marketplace[70] as the Latin American country with greatest number of ecosystem service-based water conservation initiatives. The watershed conservation initiative selected for the Ecuador case study is the *Pimampiro* Watershed Protection Program, a municipal watershed protection initiative which differs from the previous case study PES initiatives in socio-ecological focus as well as in scale. *Pimampiro* represents a PES initiative that is perhaps closest to the theory behind ecosystem service exchange. Ecosystem service users pay ecosystem service providers for a received ecosystem service benefit. This exchange been water users and watershed protectors is facilitated by the municipal level Environmental and Tourism Unit. The operational design of *Pimampiro*, therefore, is directly related to its localized scale which contrasts with Costa Rica's national level PSA and the Amazonas state level *Bolsa Floresta.* More in-depth discussion of this PES initiative follows a brief examination of the Ecuadorian socio-ecological context.

5.4.1 Biophysical Context

Traversed by the Andean mountain range, Ecuador's biophysical geography consists of three distinct mainland regions: the mountainous Sierra, Amazonian

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rainforest and pacific coastal zone. A fourth region is represented by the country's Galapagos Islands (Echavarria et al, 2004). The Amazonian region covers approximately 1/3 of the country's land mass and stores as much as 60% of the country's biomass carbon (Bertzky et al, 2010). The region's extensive wealth of fossilized carbon contributes to the country's status as an oil-producing nation.[71] Oil production in the Ecuadorian Amazon since the 1970s, however, is credited with launching the country's current deforestation trend. From a forest cover of over 63% in 1950, forest cover is now below 40%.[72] Ecuador currently has one of the highest deforestation rates in the region (1.7%), with over 50% of the county's timber exports the result of illegal harvesting (FAO, 2010, Mosandl et al, 2008). Deforestation is the single greatest contributor to the country's GHG emissions (32,638 ktCO_2e as of 2010)[73]. In an effort to address this trend, more recent policy initiatives propose committing the country to a 30% reduction from 2008 deforestation rates by 2030 (Bertzy et al, 2010).

The country's relatively rapid rate of forest loss has implications beyond CO_2 emissions. Improved watershed management is identified as another important justification for enhanced forest conservation as over one third of the country is plagued with persistent water shortages and over half the country is challenged by poor water quality (Echavarria et al, 2004). Ecuador's tropical weather patterns create frequently extreme climatic conditions, e.g. extreme heat and drought in *dry* seasons

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[71] Ecuador is the smallest member of the Organization of Petroleum Exporting (OPEC) and the fourth largest South American producer/exporter with US and China as its two key export markets (Martin, 2011).
[72] South American average is above 50% (Mosandl et al, 2008)
[73] www.worldbankdata.org

(January to May), and excessive rains and flooding in rainy seasons (June to December) which exacerbate the country's water management woes (Echavarria et al, 2004). In addition to supporting domestic, industrial and agricultural water needs, Ecuador's water resources are also the foundation of the country's hydroelectric energy production.

5.4.2 Socio-Economic Context

Small-scale agriculture and livestock production dominate the Andean Páramo and industrial-scale export oriented agriculture (cocoa and bananas) is concentrated in the coastal regions. Agriculture and urban expansion drive deforestation in the densely populated coastal regions whereas oil exploration and extraction drive deforestation in the biodiversity-rich Amazon (Bass et al, 2010). Ecuador currently produces 538,000 barrels of crude oil daily over half of which is sold to the U.S. (Finer et al, 2008). Oil provides over 30% of the country's annual budget and 50% of foreign earnings, followed by banana and shrimp exports (Greiber and Schiele, 2011). Oil exploration is concentrated in the country's biologically and culturally diverse Amazon region; as much as 65% of the high biodiversity rainforest is zoned for oil extraction and traversed by concessionary blocks (Martin, 2011). The country's rapid oil-driven economic growth of the 1970s was abruptly halted by the global economic recession of the 1980s, and further crippled by natural disasters (hurricane and earthquake) which severely damaged much of the country's internal infrastructure. Ecuador currently suffers from a heavy debt burden from its 1990s recovery, a condition which guides much of the current resource use decision making. As of 2012, Ecuador owed as much as $7 billion to China (Kaiman, 2013).

5.4.3 Socio-political Context

Culture

Ecuador is geographically the third smallest yet most densely populated country in South America. Over 90% of the country's 14 million residents live in the coastal and Andean regions, with half of the country's total population classified as poor (Krause and Loft, 2013). The country's eighteen indigenous communities which represent approximately 5% of total population have legal jurisdiction over half of the country's forests, 25% of those within the Amazonian region, and 75% in the Andean mountain ranges (Bertzky et al, 2010). Ecuador is estimated to have one of the highest percentages of indigenous forest ownership in the region (Krause and Loft, 2013). Similar to the Brazilian context, however, land tenure disputes plague as much as 50% of these forests (Greiber and Schiele, 2011). Martin (2011) suggests that Ecuadorian culture possesses a type of 'social environmentalism' or 'ethical ecology' which increasingly drives a grass-roots demand for projects such as Yasuni that are perceived as protecting natural resources on behalf of the common good. It is the spirit captured by the 2008 Constitution and corresponding development plan which together promote *del buen vivir* (good living) and propose to put people and the environment in front of profits. "*The Yasuni ITT Initiative in many ways is indicative of the struggle to define the good life both in Ecuador and globally. It emphasized people over petroleum and human rights over company rights.*" (Martin, 2011:103)

Culturally there is also a strong belief that citizens have a *right* to clean air and clean water, that water is a public good, and that the State holds the de facto position of protecting those rights and goods (Echavarria et al, 2004, Espinosa, 2005).

Additionally, there is a strong cultural belief in the direct correlation between forest cover and water quality, thus forests and water are intimately linked in the Ecuadorian psyche. And while the State is viewed as the protector of these essential ecosystem services, a string of national ordinances over the past several decades have successively decentralized forest protection and watershed management to nine regional development corporations and, in some cases, additionally decentralized to sub-regional provinces and municipalities (Echavarria et al, 2004).

Policy

The Ecuadorian equivalent of the Costa Rican Forest Law #7575 and Brazilian Forest Code is the 2008 Constitution supported by the National Plan for Good Living (*Plan Nacional del Buen Vivir*), the country's operational guide for development planning through 2013. The Constitution specifies the State as prime defender of culture and the environment; accords nature "*the right to exist, persist, maintain and regenerate its vital cycles, structure, functions, and processes of evolution*" (Article 71 as quoted in Greiber and Schiele, 2011:96) and mandates use of the precautionary principle in all decision making. "*The constitution radically changes the legal perspective from an anthropocentric system of rights to a biocentric system of rights*" (Greiber and Schiele, 2011:97). The National Plan for Living identified forest conservation goals which proposed to expand protected areas by 5% and reduce deforestation rates by 30% by 2013. (Carrión et al, 2012) It also proposes (by 2013) to reduce the country's ecological footprint to sustainable levels, reduce urban poverty by 23%, and reduce rural poverty by 50% (De Konig et al, 2011).

The strong conservation ethic espoused by current government policies is not new to the country's socio-ecological context; the 1981 Forestry Law prohibits forest conversion without state permission. The country's extensive system of national parks, *Sistema Nacional de Areas Protegidas* (SNAP) establishes three layers of conservation protection, however legal protection extends to only 20% of the country's forests, leaving over 40% of high biodiversity (and high carbon) forests unprotected (Bertzky et al, 2010). The 2007 National Biodiversity Strategy declared biodiversity as a strategic national resource and created the institutional infrastructure needed to establish ecosystem services markets. These layers of legislative and regulatory support for forest protection are simultaneously contradicted by the state's promotion of energy-based activities as well as the expansion of the agricultural frontier which collectively contribute to a shifting political 'middle ground' of conservation priorities (Himley, 2009) Contradictory government policy coupled with non-existent enforcement mechanisms have been identified as the leading causes of deforestation in Ecuador (Greiber and Schiele, 2011).

Stakeholders

The Ministry of the Environment (MAE) is the principle central government stakeholder and oversees a highly decentralized system of environmental management in which regional, provincial and municipal authorities all exercise varying levels of managerial autonomy. This multi-layered, cross-sectoral, and cross-scale network of public institutions has been identified as the country's greatest barrier to effective natural resource management (Greiber and Schiele, 2011). It is perhaps for this reason that civil society organizations, local and international NGOs, and indigenous

communities have become increasingly active in environmental management. Both the Constitution and the Environmental Management Act mandate civil society participation in resource management (Greiber and Schiele, 2011). Local NGOs are coordinated at the political level by the umbrella institution National Committee of Environmental NGOS (CEDENMA) and have been active in building local capacity for engagement as well as engaging in advocacy and awareness campaigns. While it is not clear to what extent these organizations, individually or through CEDENMA, influence national level policy, there is evidence to suggest they are meaningfully involved in local and municipal initiatives.

International NGOs (The Nature Conservancy, Conservation International, the Inter-American Foundation and Nature and Culture International) along with government and multilateral institutions (Government of Germany, USAID, FAO) have been instrumental partners in the establishment and financing of a number of the country's watershed protection initiatives. These international stakeholders are also currently studying local opportunities for carbon offset initiatives. Recognizing the country's high level of indebtedness and limited conservation resources, international donors represent an increasingly important stakeholder group in Ecuador's conservation initiatives and have invested over US $95 million during the 1990s. These same stakeholders are providing the upfront capital needed to launch the various PES (REDD+) initiatives (Himley, 2009). These investments are not always welcomed by local groups who are suspicious of the true intent of these foreign organizations (Greiber and Schiele, 2011).

5.4.4 Ecuador's Municipal PES Initiative

As noted earlier, Ecuador is the Latin American country with the highest number of watershed market initiatives (only the United States, China and Indonesia have more recorded programs). The *Pimampiro* Watershed Protection Project (PWPP), one of a dozen payment for watershed services (PWS) schemes currently operational in Ecuador, was selected for assessment analysis based on its longevity (launched in 2000) and availability of assessment literature.

Pimampiro is a rural municipality of 18,000 residents in the northeastern Andean state of Imbabura; its upland forests are located in the buffer zone of the *Cayambe* Coca Ecological Reserve and the *Palaurco* River watershed (Echavarria et al, 2004). Sixty-six percent (66%) of the local population is indigenous, with 74% living under extreme poverty (Wunder and Alban, 2008). Empowered by the environmental management decentralization promoted by the 1999 Environmental Management Act, the *Pimampiro* municipal government opted to address directly local level deforestation and forest degradation caused by illegal timber harvesting, agricultural expansion, cattle ranching and highway expansion into the area (Echavarria et al, 2004, Quintero et al, 2009). Three separate yet related institutional initiatives converged to create the infrastructure of the *Pimampiro* Watershed Protection Program: i) a municipal level Environmental and Tourism Unit was created to oversee watershed management, pollution control and environmental awareness programs; ii) the FAO through its *Desarraollo Forestal Communitario* (DFC)

initiative[74] trained and developed local communities on sustainable forest management; and iii) The Inter-American Foundation (IAF) provided seed funding to establish the Ecuadorian Corporation for the Development Renewable Natural Resources or CEDERNA (an NGO offshoot of the DFC initiative) which was eventually tasked with managing the PMWPP initiative (Echavarria et al, 2004, Rodriquez et al, 2013).

Pimampiro received regulatory authority from a municipal ordinance that established the *Water Regulation for the Payment of Environmental Services for Forest and Páramo Conservation* mechanism; the ordinance also provided the necessary institutional framework to manage the collection and disbursement of the initiative's financing. Donor contributions ($10,000 from IAF and $5,000 from CEDERNA) established an operating fund which was further capitalized by a 20% surcharge on residential and commercial water usage which generated approximately US$5000 annually (Rodriquez et al, 2013). Participants, or service providers, are members of the *Nueva America Autonomous Association for Agriculture and Livestock* (NA). The Association is a local agricultural cooperative established in 1985 to formalize collective tenure on 500 ha of agricultural lands upland of the *Pimampiro* municipality (Rodriquez et al, 2013).

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[74] The *Desarraollo Forestal Communitario* (DFC) emerged from the FAO Forest Action Plan for Ecuador implemented in the 1990s and was part of a larger FAO regional effort to develop participatory forest management methodologies which improved socio-ecological well-being of highland communities via forest management training and greater empowerment (Echavarria et al, 2004).

The Project is managed by a local committee with representation from various arms of the municipal government (Mayor, Financial Director, Director of the *Pimampiro* tourism unit, Director of the *Pimampiro* Environmental Commission, and a representative of CEDERNA); the Committee manages the Fund, its investments, and all compensation logistics including stipend quantum and payment schedule. Monthly payment determinations are dependent on available funding and vary according to land use classification; maintenance of intact primary and secondary forests receive higher monthly per hectare incentives than improve forest management on disturbed or degraded forest lands. "*Payments are the result of political negotiation rather than a technical analysis of hydrology, water valuation, or financial planning of the fund*." (Echavarria et al, 2004:27) Payments are not intended to compensate for the opportunity costs of changing land use practice from deforestation to agro-forestry or sustainable forest management (Quintero et al, 2009). Participants who voluntarily agree to the payment structure sign a five-year renewable agreement with the Municipality for an identified land management practice (Echavarria et al, 2004).

The *Pimampiro* initiative (and its 'sister' municipal water Fund FONAG in the capital Quito) have been successful due to the creation of effective advocacy coalitions, careful project framing (targeted link between forest conservation and watershed management), and an internal capacity capable of influencing attitudes and behaviors of local politicians, local user groups, and local landowners (Kauffman, 2012). Also noteworthy is that the PWPP was established just after a period of drought and tapped into a base of stakeholder support due to the strong public perception of the positive relationship between forests, watershed protection, and erosion prevention (Echavarria et al, 2004, Quintero et al, 2009).

Socio Bosque and REDD+

Whereas PWPP and many of Ecuador's other municipal or watershed-based ecosystem service incentive initiatives are deliberately local in scale for the reasons identified above, the national government through its Ministry of the Environment has joined the global push to develop national ecosystem service (predominantly carbon) markets. Partly in response to its constitutional commitment to a 30% reduction in deforestation, and partly in response to a desire to participate in emerging global climate change mitigation and adaptation strategies, the Ecuadorian government recently developed a national forest conservation and rural development initiative known as *Socio Bosque*, or Forest Partner (Krause and Loft, 2013). The initiative spans the country's 23 mainland provinces and targets lands with high biodiversity value and a high risk of deforestation. Participant eligibility targets individuals, legally constituted communes, and indigenous peoples with clear title or with legally designated land management authority for protected areas. *Socio Bosque*'s strong socio-economic agenda also prioritizes lands located in high poverty areas. Participation requires paid incentives to be utilized for building sustainable livelihoods, supporting low carbon energy initiatives, or contributing to other community projects which develop social capital (education, health, housing, etc.). The program inserts equity and fairness into its payment structure by gradually decreasing per ha incentive payments as the number of enrolled ha per participant increases. The program requires a 20-year sustainable forest management commitment, and the submission of an investment plan indicating how the forest management stipends will be invested.

An initial enrollment target of 5 million ha of forests for an avoided 13.5 million tCO_2 annually was revised after two years of operation to 3 million ha; the incentive scale was also revised (doubled for smaller landholders) to encourage additional small landholder enrollment (Krause and Loft, 2013). As a core part of the country's REDD+ Strategy, the *Socio Bosque* program has invested US$14 million, engaged 1,474 individual and 92 communities in forest conservation agreements covering 882,000 ha, and provided socio-economic benefits to 90,000 citizens since its launch in 2009 (Fehse, 2012, Krause et al, 2013). The slower than anticipated uptake in the *Socio Bosque* initiative is attributed to factors such as: i) no history of economic incentives (unlike Costa Rica's decades of tax breaks and forest production stipends) to influence private land management decisions (De Konig et al, 2011); ii) participation requirements of secure tenure within a socio-political context which has (as yet) no effective tenure or titling system (Fehse, 2012); and iii) an underlying cultural conflict between natural resources as a public right or as a private good (Krause and Loft, 2013).

5.4.5 Assessment Analysis

Similar to the two previous case studies, a high percentage of available literature on the *Pimampiro* Watershed Protection Project entails policy discussions rather than empirical assessment of implementation or impact. Of the 18 assessment studies reviewed for the Ecuador case study and listed in Table 5.10, nine focus on PMWPP, six assess *Socio Bosque* (SB), and three assess other elements of Ecuador's forest management strategy. Ebeling and Yasué (2009) evaluate forest certification, Himley (2009) assesses the socio-political impact of protected areas, and Rudel (2000)

explores the socio-economic impact of foreign development on local forest governance. These three forest management strategy assessments each represent a *Skeptical* perspective and conclude that local institutional failure (i.e. weak government regulation and a corresponding [lack of] capacity for enforcement) and limited or selected stakeholder engagement (i.e. the strong presence of foreign development aid) significantly impaired effective socio-ecological management. Most PMWPP assessment studies evaluated the initiative within the broader context of multiple payment for watershed services case study analyses in which the PMWPP is one of several initiatives investigated.

The distribution of evaluation indicators for the Ecuador context illustrates a continual shift across the case studies towards a decidedly stronger emphasis on social indicators. Figure 5.17 shows a prioritization of governance, social well-being, economic development, and social relations assessment criteria. The distribution of evaluation criteria by sustainability component presented in Figure 5.18 highlights a pattern consistent across the case studies, i.e. an emphasis on the social conditions of sustainability. This pattern of prioritizing social and ecological sustainability over economic sustainability might be explained via the dominance of social indicators within the set of assessment criteria (>40% of the overall 17 indicators) compared with ecological (<30%) and economic (20%). Another possible explanation for the social and ecological dominance of indicators is the base assumption of the PES model as a cost-effective conservation policy that also strives to deliver social and ecological co-benefits; economic impacts are, therefore, assumed and not analyzed. The Pimampiro initiative is suggested as closely representative of the foundational theory of ecosystem service exchange and the delivery of social and ecological benefits.

Table 5.10: Summary of Ecuador Assessment Literature Reviewed		
Author(s)	**Discipline(s)**	**Method of Study Distribution**
Pimampiro Watershed Protection Project		
Echavarria et al (2004)	Economics	IIED Report
Espinosa (2005)	Interdisciplinary	IUCN Report
Greiber and Schiele (2011)	Policy	IUCN Report
Grieg-Gran et al (2005)	Economics	*World Development*
Kauffman (2012)	Social Sciences	International Studies Association Presentation
Quintero et al (2009)	multi-disciplinary	*Forest Ecology and Management*
Rodriguez et al (2013)	Interdisciplinary	*Society and Natural Resources*
Southgate and Wunder (2009)	Economics	*Journal of Sustainable Forestry* (funded by USAID)*
Wunder and Alban (2008)	Economics	*Ecological Economics*
Socio-Bosque		
De Koning et al (2011)	Policy	*Environmental Science and Policy*
Farley et al (2011)	Geography	*Environmental Conservation*
Krause and Zambonino (2013)	multi-disciplinary	*International Journal of Biodiversity Science, Ecosystem Services and Management*
Krause and Loft (2013)	multi-disciplinary	*Society and Natural Resources*
Krause et al (2013)	Interdisciplinary	*Ecology and Society*
USAID (2012)	Policy	Agency Program Report
Forest Management Strategy		
Ebeling and Yasue (2009)	Policy	*Journal of Environmental Management*
Himley (2009)	Geography	*Geoforum*
Rudel (2000)	Social Sciences	*AMBIO: A Journal of the Human Environment*

The dominance of governance issues quite expectedly translates to a strong dominance of a *Skeptic* perspective in the perspectives distribution highlighted by Figure 5.19. An attractive explanation for strong *Skepticism* amongst the Ecuadorian studies might be the relatively high percentage of university authored assessments and the assumption that university research adopts a more critically analytical position. Figure 5.20 shows that university affiliated assessments account for slightly less than 50% of the total studies reviewed for the Ecuador context. Recognizing that 50% of the Costa Rican assessment studies were also university authored and yet the dominant perspective in that case study context is strongly *Optimistic* suggests that perspective may not be strongly determined by institutional affiliation.

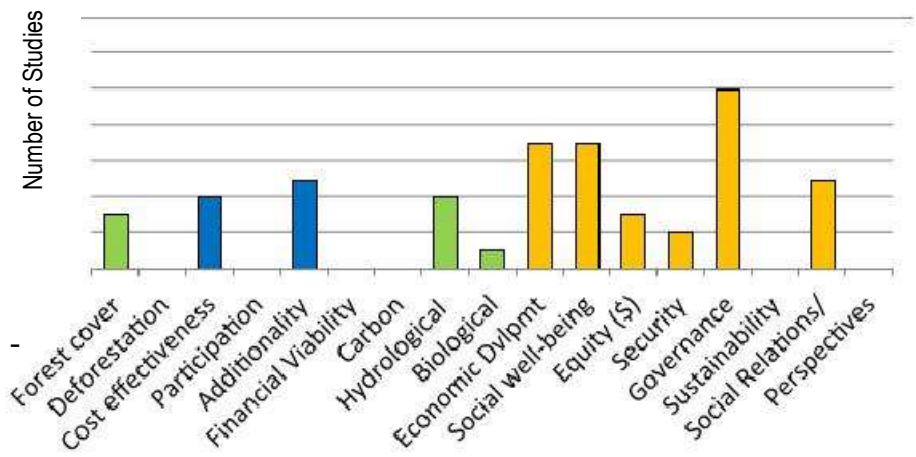

Figure 5.17: Distribution of Ecuador Assessment Criteria

Ecuador's strong *Skeptic* perspective could be a function of the smaller number of assessment studies included in the Ecuador case study analysis, a coincidence that highly *Skeptic* university researchers assessed Ecuador's PES initiatives, or possibly the influence of Ecuador's socio-ecological context which is known for political upheaval and populist protests demanding policy attention on governance, social relations, and institutional power distributions. An additional explanation is offered through an examination of the disciplinary distribution of the Ecuador case study assessments illustrated in Figure 5.21. Noticeably absent is a dominance of economics, natural sciences, and multi-disciplinary (which in most studies is merely a mask of the disciplinary dominance of the first two disciplines) studies. Interdisciplinary and social sciences disciplines are more representative within the Ecuador context, constituting over 30% of the context's assessments; when policy oriented disciplines are factored in the number exceeds 50%. Of the three case study contexts, Ecuador's assessment literature possesses the most even distribution across the represented disciplinary fields.

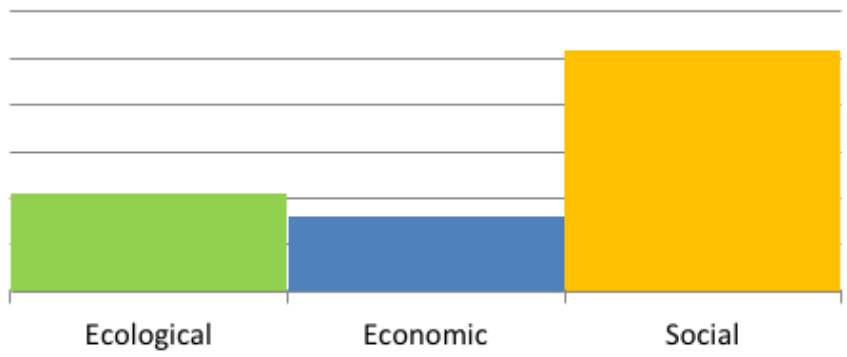

Figure 5.18: Distribution of Ecuador Evaluation Criteria by Sustainability Component

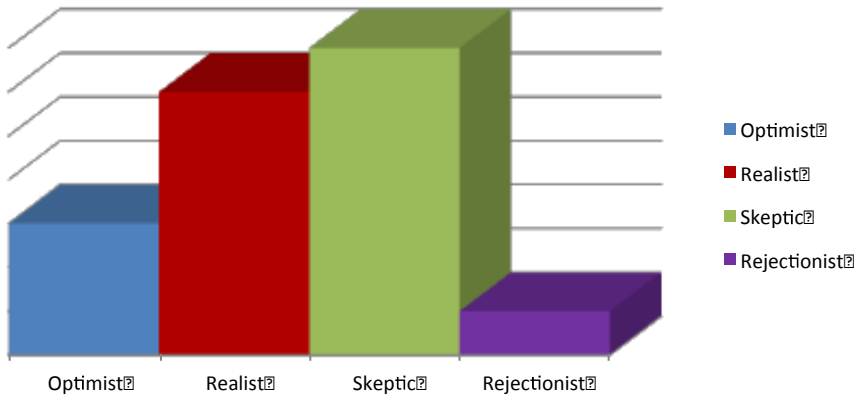

Figure 5.19: Perspectives Distribution of Ecuador Assessment Literature

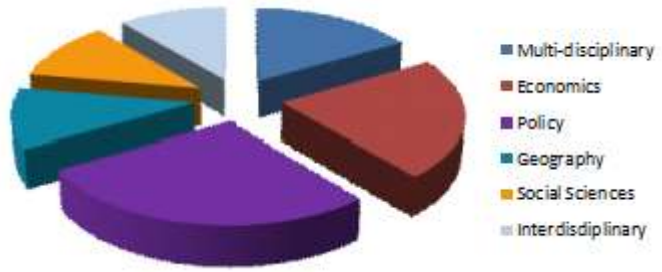

Figure 5.20: Disciplinary Distribution of Ecuador Assessment Studies (% of total)

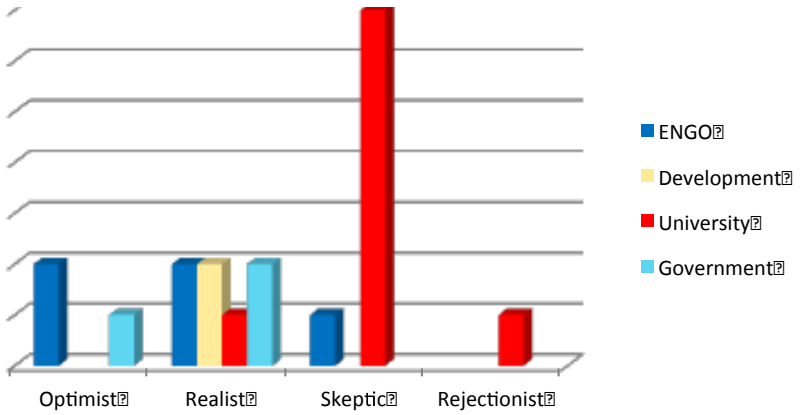

Figure 5.21: Ecuador Assessment Literature by Author Institutional Affiliation

Tables 5.11 and 5.12 summarize data collection methodologies across the perspectives and reveal what might be an anticipated pattern; e.g. *Optimists* rely more heavily on document and field data, *Rejectionists* rely more heavily on stakeholder engagement and observation, and *Realists* and *Skeptics* engage somewhat equally in both types of data collection methodologies. It should be noted, however, that no consistent pattern has emerged between perspective and methodology across the three case studies, suggesting, therefore, that perspectives variation and distribution emerges from some other contextual or research-based characteristic.

Table 5.11: Data Collection Methodologies for Ecuador Assessment Literature

		Data Sources	**Optimist**	**Realist**	**Skeptic**	**Rejectionist**
Document/Data Driven		Document Review	2	2	1	
		with Field Survey	1	2		
		with interview		2	2	
		with mapping				
		as basis of ethnographic survey			1	
		Literature Review				
		Historical Analysis				
		Mapping, Modeling, Spatial Analysis			1	
		Field Survey	1	3		
People Driven	Scale	Household				
		Participant Stakeholder			3	1
		Stakeholder		2	4	1
	Methodology	Survey w/o interview	1	2		
		Interview w/o survey		2	5	1
		Combined Survey/Interview				
		Participant Observation			2	1
		Studies using >3 methodologies		2	2	1

Table 5.12: Ecuador Assessment Data Source Characteristics by Perspective		
	Document/Data Driver	People-Oriented
Optimist	4	3
Realist	11	8
Skeptic	5	16
Rejectionist	-	4

5.4.6 Ecuador Case Study Summary

In addition to the *Pimampiro* Watershed Protection Project's municipal scale, several other socio-ecological contextual variables are noteworthy for understanding perspectives variations across the case study contexts. First, the country as well as the municipality has a higher poverty rate and higher percentage of indigenous populations than the other contexts, factors which could contribute to the importance placed on economic development and social well-being assessment indicators. Second, natural resource management has been legislatively decentralized and significant managerial authority delegated to parish and municipal jurisdictions offering greater local control and potentially more meaningful engagement of local stakeholders. Relatively strong local control coupled with an emphasis on the delivery of watershed protection ecosystem services contributes to building stakeholder awareness of the direct and indirect benefits and potentially creates greater stakeholder buy-in. The Ecuadorian context has perhaps the strongest cultural link with a conservation ethic, evidenced by the constitutional rights granted to natural resources and the nature-based policy goal of *buen vivir*. A final contextual variable unique to Ecuador is the country's fossil fuel-driven economy and the historical interactions this sector has had with local populations and their environment. In addition to contributing to rapid

deforestation and forest degradation, oil exploration by multi-national energy companies has contaminated soil and water resources with chemicals estimated to be more toxic to social and ecological well-being than those found in agricultural runoff (Finer et al, 2013). Several decades of socio-ecologically damaging private sector energy activities coupled with a strong cultural tie to the country's natural resource biological wealth and diversity is suggested, therefore, as accounting for Ecuador's *Skeptic* dominance, a perspective which seeks institutional reform and a greater level of broad-based, meaningful engagement in natural resource policy processes.

5.5 Perspectives across the Contexts: *Meta-Analysis Insights*

The intent of the case study meta-analysis was to explore post-sustainable development potentiality via an identification of PES perspectives expressed through identified target indicators and analytical priorities of the over 70 studies reviewed. Perspectives captured through impact assessment meta-analysis are but one means to analyze perspectives plurality and it is acknowledged that all stakeholder perspectives for each context have likely not been captured by the applied impact assessment meta-analysis methodology. Ideal investigative conditions would supplement this 'document-driven' analysis with a 'stakeholder-driven' perspectives assessment exercise. Perspectives identification via an impact assessment meta-analysis is, however, considered to have captured an adequate representation of local stakeholder concerns within each context as the compilation of assessment studies has on average 50% local authorship; international academic authorship represents an additional 25%, with the remainder of the investigations conducted by a balance of international environmental NGOs (ENGOs) and development agencies such as the World Bank.

Each group (local authors, international academia, ENGOs and development agencies) is recognized as a PES stakeholder with important contributions for the policy discussion

The analysis of the post-sustainable development capacity of the PES conservation policy based on case study insights draws from both the case study contextual backgrounds and the impact assessment perspectives analysis. Case study contextual analysis identified social structures and political institutions that influence and create the socio-ecological context in which PES initiatives operate; perspectives analysis then sought to identify perspectives and distributional trends. Based on the contextual data gathered from the case study literature, the three socio-ecological contexts are uniquely different on multiple levels; differences which have potential implications for PES implementation. Whereas an earlier set of comparative metrics (Table 5.2) suggested the case studies differed primarily on size and population, Table 5.13 contains socio-political metrics with direct relevance for conservation policy which highlight additional levels of contextual variability, most notably with respect to land tenure and forest protection status. Figure 5.22 summarizes the three case study perspectives distributions.

Table 5.13: Case Study Socio-Political Metrics*

	1	2	3	4	5	6	7	8
	Land Area (km^2)	**Forest Cover (% of total land area)**	**Net Deforestation Rate (%)**	**Population** (% Urban) *(% Indigenous)*	**Protected Areas** (% of total forests)	**Private Forests**	**Communal Forests**	**Vulnerable / contested** (% of total)
Costa Rica	51,000	51%	0.0%	197 million (40% urban) *1.7%*	20%	69%	10%	n/a
Brazil	8.516 million	64%	0.5%	4.7 million (31% urban) *0.4%*	23%	25%	20%	20%
Ecuador	284,000	~40%	1.8%	15 million (90% urban) *14%*	40%	n/a	65%**	50%

* Statistics compiled from contextual and PES assessment literature.
** Communally controlled forests in overlap significantly with forests under protected status.

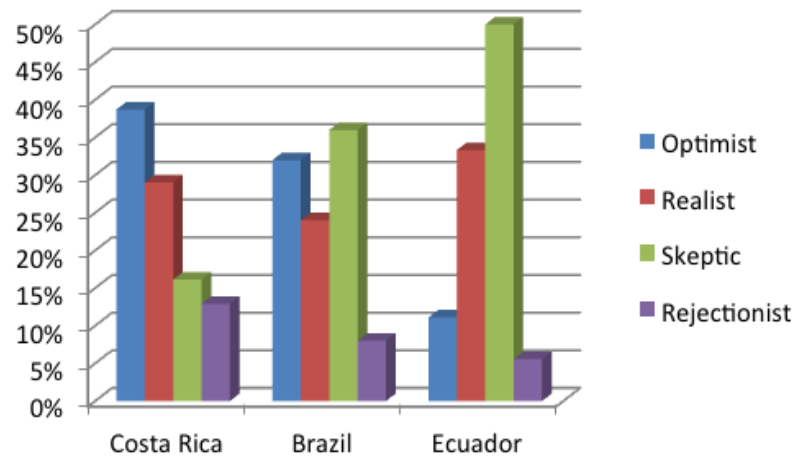

Figure 5.22: Summary of Three Case Study Perspectives Distribution

When placed side by side, these two summaries reveal a potential determinant for perspective plurality and distribution not yet explored, forest tenure. Costa Rica's PSA operates in a context of high private ownership and relatively low levels of vulnerable or contested land tenure (at least to the degree that could be discerned form the PES assessment literature); it represents a socio-political context more culturally and politically suited to market-based conservation than those of Brazil and Ecuador. In this context of predominantly secure, private forest tenure, PES functions as a compliance subsidy and not, as theoretically proposed by the model, as an incentive for behavioral change or lost opportunity cost compensation (Böerner et al, 2011, Fletcher and Breitling, 2012). For the Brazilian and Ecuadorian contexts which each experience land tenure insecurity, expectations of PES outcomes are less concerned with land use compensation or incentives and more on PES' potential impact on the access, tenure, and governance issues which continue to plague effective forest governance; concerns of the *Realist* and *Skeptic* perspectives.

In terms of potential for pluralistic engagement, each of the studies, based on the perspectives uncovered by the assessment literature and presented in Figure 5.22, contains a plurality of perspectives. Strong dominance of any one position, however, could potentially be counter-productive to mutual learning and the identification of mutually beneficial outcomes as dominance creates a likelihood of the less dominant perspectives being ignored in socio-ecological problem solving processes. Perspective dominance is clearly evident in Ecuador as well as in Costa Rica. Costa Rica's [*Optimistic*] dominance quite likely represents the influence of a suite of sustainability stakeholders (national government supported by international donors, The World Bank, GEF and now REDD+) all committed to advancing the PES model and making

adjustments as needed for better efficiency and improved equity. In Ecuador, strong *Skepticism* could be interpreted several ways. Ecuador's Yasuni-ITT proposal has been interpreted as a national challenge to the dominant, fossil-fuel driven global economic development model; it can also be seen as reflective of a national desire for innovative and mutually beneficial climate change mitigation proposals[75] (Martin, 2011, Finer, 2010).

Based purely on perspective distributional representation, none of the contexts possesses an evenly distributed perspective balance; however, the relatively equitable distribution of three perspectives within the Brazilian context suggests a contest with some potential for moving toward post-sustainable development. Factoring in additional contextual characteristics and details of the assessed PES initiative (*Bolsa Floresta)* strengthens this observation. *Bolsa Floresta* is a state initiative albeit with strong ties to the national *Bolsa Familia* and *Proambiente* both of which also seek to simultaneously address social well-being and environmental conservation, thus already creating a multi-scalar stakeholder interaction. The initiative has further engaged a range of sustainability stakeholders in its design and implementation.

Perspectives analysis throughout the three case study contexts sought to identify characteristics of the various studies which might provide insight into possible

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[75] While the Ecuadorian government and its people were united in proposing Yasuni ITT, President Carrera in 2013 abandoned the proposal despite strong, continued support from the plurality of sustainability stakeholders. A decision about the project is scheduled for public referendum having recently collected the requisite 700,000 signatures need to place it on the ballot. A date for the referendum has not been set at the time of this writing.

sources or drivers of the various perspectives; an insight which could potentially offer direction on the scope and scale of activities necessary to increase perspective diversity and pluralistic engagement. Institutional affiliation was explored based on the assumption that government and development agency studies would tend to favor PES optimism, ENGOs would likely have a middle spectrum position, and university based study would tend more toward the more critical positions. While the government and development agencies did consistently represent *Optimistic* and *Realistic* positions, ENGOs and university studies had representation across the spectrum. In terms of data collection methodologies, the *Realist* and *Skeptic* perspectives seemed to utilize a higher percentage of the 'people'-driven data sources, however no other identifiable pattern was found.

A potentially interesting trend does emerge, however, from analysis of disciplinary impact on perspective. Figure 5.23 highlights a perspectives distribution across disciplines for the composite of case study impact assessment literature. A positive correlation is argued to emerge between economic and natural science disciplines and an *Optimistic* perspective which is the dominant perspective for both disciplines. It is equally acknowledged, however, that each discipline has a strong secondary perspective, *Realist* and *Skeptic* for economics and the natural sciences, respectively. Multidisciplinary studies are significantly more balanced across the perspectives spectrum than driven primarily by either of the previously identified disciplines, despite the fact that these disciplines tend to dominate multidisciplinarity. Policy studies appear to embrace the full perspectives spectrum with *Realist* (concern for equitable cost-benefit distribution) and *Skeptic* (concern for institutional reform) perspectives registering as the most dominant. Social sciences are decidedly *Skeptical*,

and interdisciplinary studies have representation from across the spectrum yet with an interesting bi-modal strength of *Optimist* and *Rejectionist* perspectives. Geography, based on the assessment study dataset used for this analysis, appears to demonstrate no dominant perspective and also represents the full perspectives spectrum. This balance could potentially suggest geography as a disciplinary practice is uniquely qualified to promote the engagement of perspectives plurality. The suggested disciplinary-perspective correlations, however, need to be more rigorously tested within and across an expanded set of socio-ecological contexts.

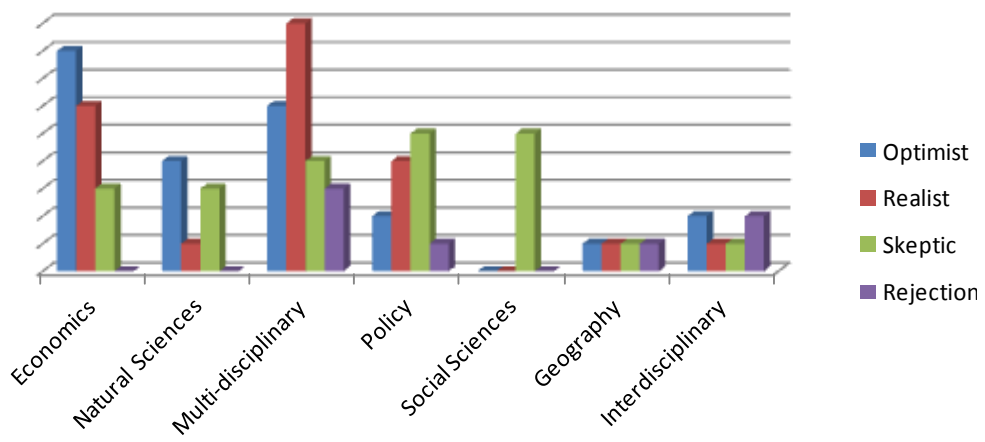

Figure 5.23: Disciplinary Distribution of Ecuador Assessment Studies

Chapter 6

EXPLORING SUSTAINABLITY ASSESSMENT IN TRINIDAD AND TOBAGO

"Through creativity, innovation and collaboration, we shall prosper together."

The vision of the Government of the Republic of Trinidad and Tobago
(Working for Sustainable Development in Trinidad and Tobago, 2012:iv)

The Payment for Ecosystem Service (PES) impact assessment meta-analysis of Chapter 5 explores the presence of perspective plurality in the context of three unique PES applications: *Programa Pago por Servicios Ambientales* in Costa Rica, *Bolsa Floresta* in Brazil, and *Pimampiro* Watershed Protection Program in Ecuador. The meta-analysis suggests i) that each case study context contains a plurality of perspectives although perspective dominance is evident in two of the three contexts; ii) that perspective dominance trends are potentially influenced by contextual factors; and iii) that certain disciplinary investigative practices are potentially more accommodating of pluralistic engagement and perspectives mediation than others. The Phase I case study meta-analysis identifies stakeholder values via an analysis of identified impact assessment analytical priorities; the Phase II Trinidad and Tobago field study[76] supplements the case study meta-analysis with a field-based stakeholder examination of the practical engagement component of the socio-ecological

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[76]Two field-based site visits were conducted: i) July 2013 to investigate the current status of the identified PES initiatives, and ii) September 2013 to engage PES stakeholders in an analysis of the applicability of the Sustainability Assessment for emerging PES initiatives in Trinidad and Tobago.

connectivity (SEC) framework. Sustainability assessment is proposed by the SEC framework as a practical means to encourage perspective diversity and minimize perspective dominance through mutual learning via pluralistic engagement. Both approaches to perspective identification (meta-analysis and facilitated stakeholder examination) are limited in their ability to capture the complete realm of perspective plurality for any case study context. The perspectives identification exercises are, however, considered an important and valuable first step in highlighting the existence of value-based perspective plurality and, perhaps more critically, understanding the potential sustainability impacts of perspective dominance in natural resource use decision-making.

As Phase I of the research methodology (impact assessment meta-analysis) was not intended to assess the strengths or weaknesses of the PES model, similarly Phase II is not intended to assess the strengths or weaknesses of the PES initiatives highlighted by the Trinidad and Tobago field-based examination. The overall objective of this research remains an examination of dominant socio-ecological problem-solving processes and the potential for mutual learning via pluralistic engagement within the context of existing and developing PES initiatives. After the originally intended objective of the stakeholder examination exercise, preliminary preparations for a sustainability assessment of the *Nariva Swamp Restoration, Carbon Sequestration and Livelihoods Project* (NSRP)[77], was aborted due to insufficient

[77] This project was selected based on its identified potential as a nation and regional forest carbon offset demonstration project. It was additionally selected because of a personal interest in following its implementation as I was part of the research team which developed the project management documents in 2006.

stakeholder support, field-based stakeholder examination took the form of guided stakeholder review intended to: i) raise awareness of the sustainability assessment framework as a model for stakeholder engagement, and ii) encourage stakeholder reflection on the relevance and potential applicability of the sustainability assessment framework to emerging Trinidad and Tobago-based PES initiatives. In addition to the originally targeted NSRP, the Fondes Amandes Community Reforestation Project (FACRP), the Caura Valley Village Council Watershed Protection Project, and the ProEcoServ Trinidad and Tobago Initiative were recommended by stakeholders as PES initiatives worthy of inclusion in the sustainability assessment exercise. The broadened scope of projects included in the field-based exercise subsequently broadened the scope of stakeholders included in the sustainability assessment examination. Stakeholder selection was a function of personal knowledge of current institutional actors and additional recommendations from local conservation advocates. Stakeholders targeted for participation included conservation oriented minded organizations, agencies, and departments involved in the development and implementation of PES initiatives. These institutional stakeholders were identified according to the six stakeholder categories of the sustainability assessment framework (Proponent, Academic/Research, Government/Regulatory, Beneficiaries, Civil Society, and International Development Agencies) (Bond et al, 2013) and are listed in Table 6.1.

Given the relatively small size of Trinidad and Tobago's physical geography and its population, conservation stakeholders frequently hold multiple stakeholder category affiliations depending on project of analysis. For example, the Fondes Amandes Community is simultaneously project proponent of the Fondes Amandes

Community Reforestation Project (FACRP) and civil society stakeholder for the NSRP. Likewise, the Forestry Division and Environmental Management Authority are both project proponents (for the NSRP) and government agencies for several other conservation initiatives. For the stakeholder analyses of the Sustainability assessment framework, one Sustainability assessment stakeholder category was assigned to each stakeholder; these designations are included in Table 6.1.

Stakeholder examinations were guided by a brief (both verbal and written) which presented the background and rationale for the sustainability assessment framework. (Appendix B) The brief's intent was to encourage stakeholder reflection on the following:

1. Theoretical and operational definitions of sustainability,
2. Theoretical and operational familiarity with participatory processes,
3. Current barriers and enhancements to adoption of the Sustainability assessment framework in the Trinidad and Tobago context.

Assessment of stakeholder PES perspectives relied equally on secondary documentation obtained for the four PES initiatives identified and published policy documents.

Continuing with the case study presentation format established in Chapter 5, the remainder of this chapter provides an overview of the Trinidad and Tobago contextual background (biophysical, socio-economic and socio-political). It then introduces the PES initiatives selected for the inclusion in the field-based stakeholder examination and concludes with a discussion of the potentially emergent PES perspectives.

Table 6.1: Trinidad and Tobago Stakeholder Groups

	Agency	Unit/Sub-Group(s)	Supplemental Documentation
Project Proponent	Environmental Management Authority	NSRP Project Management Unit	EMA Newsletter Draft Application to Green Fund for NSRP
	Forestry Division	Community Forestry Division	Internal Forestry Division Newsletters (*Trees*)
	The Cropper Foundation	ProEcoServ Trinidad and Tobago Project	ProEcoServ TT Newsletters ProEcoServ TT Technical Reports
Academic/ Research	University of the West Indies (UWI)	Department of Natural and Life Sciences Faculty ProEcoServ Researchers	
	Institute of Marine Affairs	Biodiversity and Ecosystems Programme	n/a
Government Agency	Ministry of the Environment and Water Resources	Environmental Policy Planning Division (EPPD) Green Fund Implementation Unit*	National Forest Policy National Protected Areas Policy National Climate Change Policy
	Ministry of Planning and Sustainable Development	n/a	Medium Term Policy Framework (2011) Working for Sustainable Development (2012) National Spatial Development Strategy Executive Summary (2012)
	Environmental Management Authority	Biodiversity Unit	State of the Environment Report (2005) Aripo Savannah Management Plans
	Forestry Division	Forest Research and Information Management (FRIM) Community Forestry Unit	n/a
Beneficiary	Caura Valley Village Council	Village Council Executive	UNDP-GEF, ProEcoServ and CANARI Project Reports
	Fondes Amandes Community Reforestation Project	Project Management Unit	FACRP Strategic Plan FACRP Constitution CANARI Reports (2006, 2011)
Civil Society	Caribbean Natural Resources Agency	Forests and Livelihoods Programme	CANARI Strategic Plan
	Council of Presidents of the Environment	General Membership	n/a
Int'l Partner	Food and Agricultural Organization	Trinidad Country Office	Draft Impact Assessment Policy
	United Nations Development Programme	Global Environment Facility Small Grants Program	GEF Small Grants In Trinidad and Tobago Annual Report

6.1 *Biophysical Context*

Situated 11° north of the equator and seven (7) miles east of Venezuela, the twin-island nation of Trinidad and Tobago shares both Caribbean and South American geology and natural habitat characteristics, and possesses some of the Caribbean region's most biologically diverse landscapes. The country's two main islands split the landscape diversity between the 300 km^2 volcanic island of Tobago with white sand beaches, and the 5,000 km^2 island of Trinidad with forested mountain ranges, rocky northern coastlines, and flat central plains. The country has three internationally recognized and legally protected wetlands: i) Trinidad's Nariva Swamp along the Atlantic coast, ii) the Caroni Swamp on the Gulf of Paria, and iii) Tobago's Bucco Reef Wetland in the Caribbean Sea. Map 6.1 highlights the country's location as well as the location of key PES initiatives.

The country's forest cover is estimated to be less than 50%[78] (FAO, 2010), with approximately 80% of the country's forests under state jurisdiction (Government of the Republic of Trinidad and Tobago [GORTT], 2011). Forest loss, driven by urban expansion, annual forest fires, illegal quarrying, agricultural and industrial pollution, is estimated to occur at a rate of 0.8% annually (FAO, 2010, Environmental Management Authority (EMA), 2005). Deforestation rates do not necessarily capture 'degradation,' however, and the quality of the remaining forest cover is questionable. Much of the country's southern forests are heavily degraded due to extensive oil and

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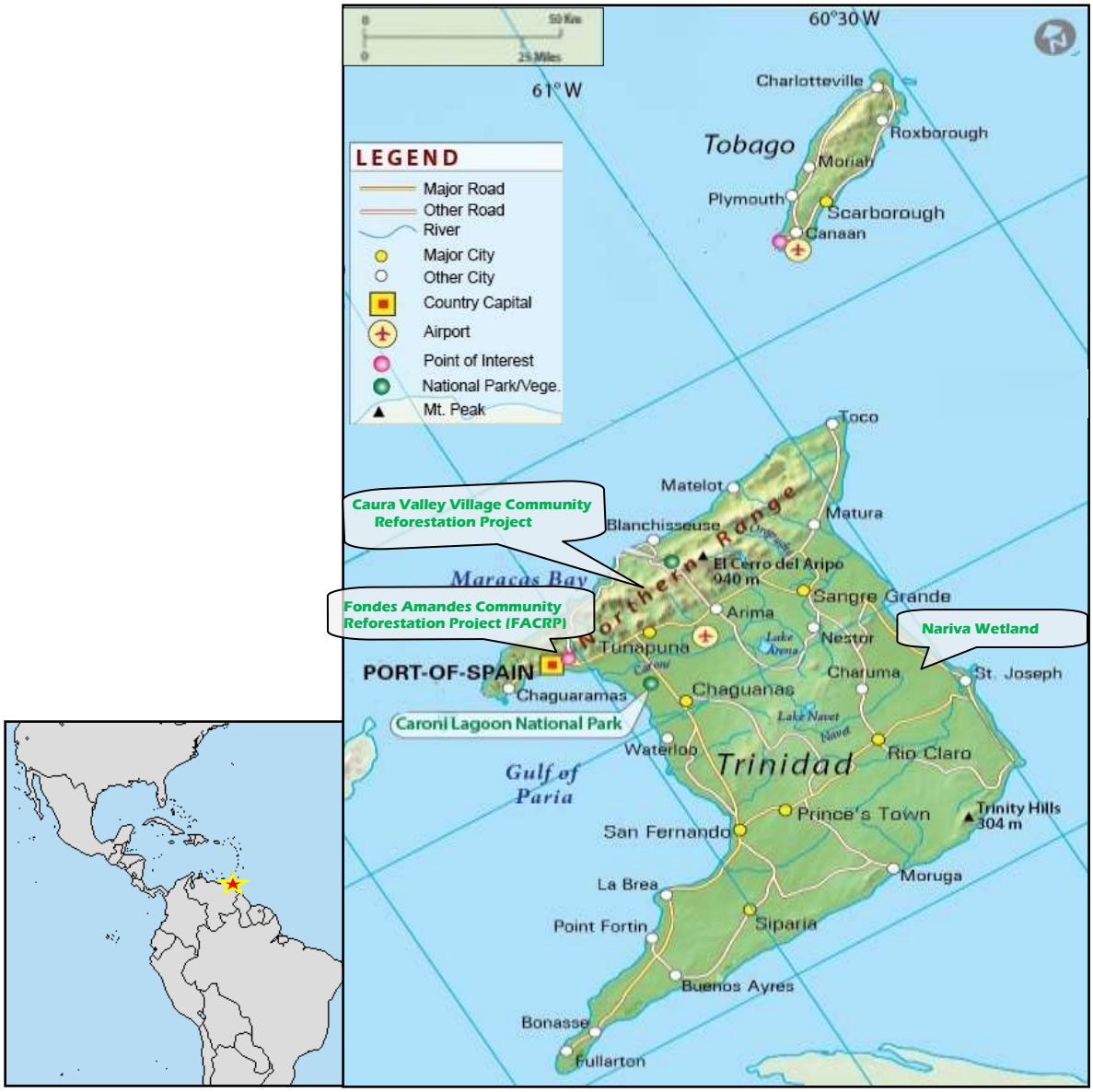
[78] FAO figures estimate forest cover at approximately 50%; Forestry Division officers suggest coverage could be as high as 70%. Tobago's forest cover is significantly higher than Trinidad, estimated at 80%.

gas exploration activities (EMA, 2005). Increased demand for forest-based ecosystem services (watershed protection, timber, agriculture) coupled with an enhanced intensity of deforestation drivers (urban expansion, dry season bush fires, water and soil pollution) contributes to a continual decline in forest ecosystem service delivery throughout the country (EMA, 2005).

Map 6.1: Trinidad and Tobago Location Map



6.2 *Socio-economic context*

Trinidad and Tobago has a total land area of 513,000 ha and a population which remains stable at 1.3 million. The national economy is driven by an established hydrocarbon sector[79] which at present contributes over 45% to the national GDP, represents over 80% of foreign exchange, and employs a mere 3% of the local population (GORTT, 2012). Abundance of oil and natural gas resources has established Trinidad and Tobago as one of the wealthiest and most economically 'developed' Caribbean nations; in 2012 the country's reported per capita GDP was $17,000[80]. Energy based economic growth has not filtered to all corners of the society, however, as the country maintains a relatively high poverty rate (24%) and increasing levels of income inequality (Pantin and Ram, 2010, GORTT, 2012). Poverty is more prevalent in the rural, largely forested areas located in the eastern and southern quadrants of the island. Subsistence agriculture and non-timber forest extraction provide a source of income in these areas; rural economies are also heavily dependent on short term labor contracts from central government agencies (Sletto, 2005). In contrast to the rural east and south, the western north and central quadrants of the island are home to three growing urban areas (the national capital Port of Spain, Chaguanas, and San Fernando) that support a heavy commuter population which travels daily on the main east/west and north/south highways to the capital and secondary urban hubs for education and employment. The country's thriving

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[79] Commercial production of oil and gas dates back to the early 1900s with the founding of the Trinidad Petroleum Development Company. Oil production soared during the 1970s global energy crisis but has slowed within the last two decades and more recently been superseded by an expanding natural gas industry.
[80] www.worldbankdata.org

petrochemicals industry and liquefied natural gas plant are also located within this high traffic volume area. Trinidad and Tobago is the largest supplier of liquefied natural gas (LNG) to the United States, and the world's number one exporter of ammonia (GORTT, 2005).

6.3 Socio -Political Context

Culture

Like its Latin American counterparts, Trinidad and Tobago's biological diversity is complemented by a rich cultural diversity; a product of both its geographical positioning between the South American mainland and the Caribbean archipelago and its Spanish and British colonial history which inserted the cultures of Europe, Africa, and Southeast Asia into the island's landscape. The country's rich cultural diversity has been suggested as a major contributor to strong socio-cultural ties with natural resources which are important for cultural and spiritual ceremonies as well as recreational activities (EMA, 2005, McIntosh and Renard, 2010). Natural resources, however, are most prominently considered for their economic potential. Like its South American counterpart, the country's economic development history is intimately tied to natural resource modification and extraction, first through sugar and cocoa production and more recently via the extraction of oil and natural gas. Forests are assessed largely in terms of the economic value of timber production from private forests and state-managed teak and pine plantations (GORTT, 2011a). A small but growing ecotourism industry is attempting to create economic value for environmental conservation but has not yet made significant inroads into changing traditional land use decision making (GORTT, 2011a).

Policy

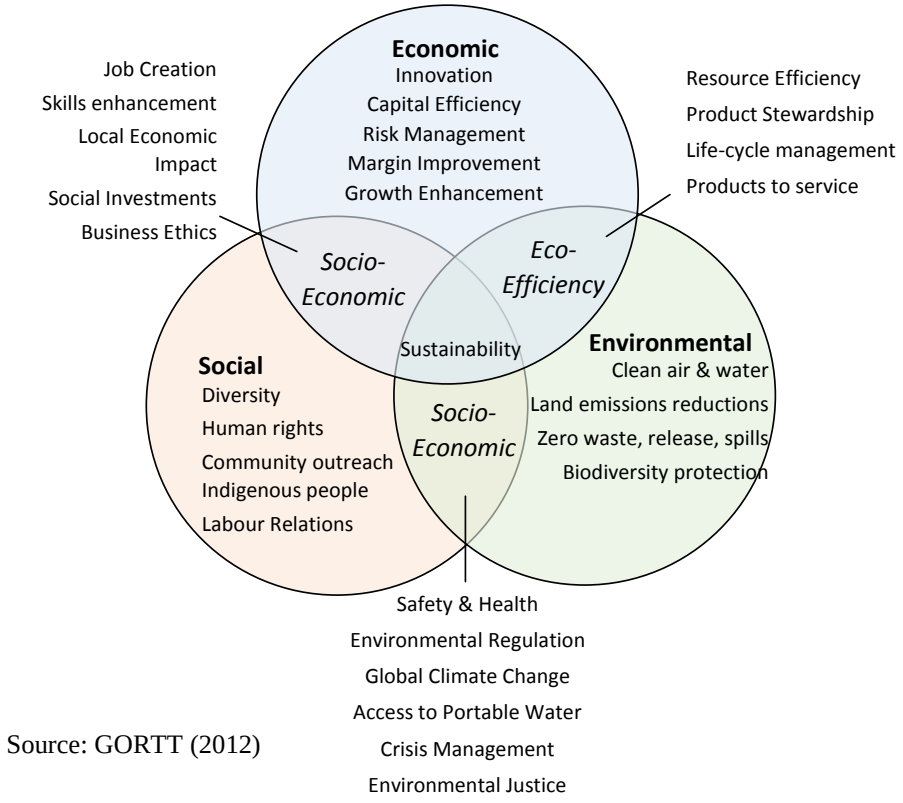
Current efforts at coordinated natural resource management date back to 1995 with the passage of the Environmental Management Act (EMAct 1995, 2000) and its mandate for inter-sectoral environmental management coordination (GORTT, 2005). With startup funding provided by a World Bank loan and technical assistance from the United Nations Development Program (UNDP), the EMAct launched the Environmental Management Authority (EMA), a statutory body authorized to write and coordinate enforcement of the country's environmental laws and regulations. The EMA's overarching objective was to synthesize and update a disjointed patchwork of environmental legislation scattered throughout some twenty-eight (28) government agencies and ministries. The Agency also coordinates an active public awareness and community outreach program to educate the public about environmental management and conservation issues (GORTT, 2005, 2011a). The EMA was instrumental in drafting the National Environmental Policy (NEP) which articulates the national government's natural resource management vision: "*The environment is an essential pillar of economic and social development and, consequently, environmental sustainability is a key objective of economic development planning*" (GORT, 2005:1). The intent of the NEP is to coordinate nationally and across sectoral interests the 'wise use' of natural resources.

The NEP-articulated 'wise use' of resources is supplemented by several recently adopted policies intended to give additional direction to strategicdevelopment

and resource use decisions: i) National Forest Policy[81] (2011), ii) National Protected Areas Policy (2011), and iii) Climate Change Policy (2011). Government interest in promotion the 'wise use' of resources might be interpreted by the recent transformation of the Ministry of Planning and the Economy into the Ministry of Planning and Sustainable Development. The new ministry's economic development guide and action plan, *Working for Sustainable Development in Trinidad and Tobago: Progress, Gaps and Opportunities for Action,* adopts an anthropocentric development vision which maintains the pillared, and economics-driven conceptualization of more traditional sustainable development thinking (GORTT, 2012). The vision is graphically depicted in Figure 34.

> *"The new growth dynamic will involve: 1) widening and deepening the production base and building new production clusters, ii) developing culture and supporting the development of creative industries, iii) developing green industry and alternative energy sources, and iv) developing information and communication technologies (ICT) and related knowledge and service industries"* (GORTT, 2012:9).

[81] Prior to 2011, forest management was governed by an outdated 1942 Forest Policy as repeated attempts at revision (1979, 1981, and 1998) were never formally adopted by Parliament.



Source: GORTT (2012)

Figure 6.1: Trinidad and Tobago Pillars of Sustainable Development

Stakeholders

The Ministry of the Environment and Water Resources (MEWR) is the line ministry for environmental management with authority over the Environmental Policy and Planning Division (EPPD), the Green Fund Implementation Unit[82], the Environmental Management Authority (EMA), and the Forestry Division; organizations that are key government agency stakeholders for the development, regulation and implementation of the country's natural resource use policies. The Ministry of Planning and Sustainable Development (MPSD) represents an additional environmental management stakeholder. Both Ministries promote the concept of stakeholder participation within the development of its plans and programs (GORTT, 2011b, 2012). MPSD embarked on an extensive stakeholder consultation process for the development of its 2012 action plan and more recently an update of a national land use plan. In 2012 the MEWR launched a web-based information sharing portal, *Green days by the EPPD* (www.eppd-tt.blogspot.com), to facilitate information sharing and to collect stakeholder views on the Ministry's proposed environmental management programs, plans, and policies.

The country has an active civil society conservation movement which includes research institutions such as the University of the West Indies (UWI), the Institute of

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[82] The Green Fund is a national conservation fund established in 2001 and capitalized by a 0.1% tax on the net profits of all companies registered with the Board of Inland Revenue. The Fund provides grants for local organizations, community groups, and NGOs engaged in environmental remediation, reforestation, environmental education and public awareness on environmental issues, or other direct conservation efforts (Laydoo, 2012).

Marine Affairs (IMA), and the University of Trinidad and Tobago (UTT) who work closely with an ever-growing network of local environmental non-governmental organizations (NGOs) and community-based organizations (CBOs). The critical role of civil society institutions in promoting conservation is culturally acknowledged yet remains loosely institutionalized via policy and regulatory instruments legislation such as the Environmental Policy (2006) and EMAct (1995, 2000, 2008) (McDermott, 2010). Attempts to strengthen and formalize civil society's role in natural resource management are proposed by the recently adopted National Forest Policy (2011), National Protected Areas Policy (2011), and National Wildlife Policy (2014). Despite a vibrant conservation oriented civil society, actual stakeholder engagement typically involves the handful of committed environmental professionals who frequently represent multiple stakeholder interests and struggle to accommodate stakeholder consultation and committee representation requests.[83]

An extremely influential stakeholder group frequently overlooked in local stakeholder analysis is the international development community, the primary funding source for a majority of national-level environmental activity. The United Nations Development Program (UNDP) and in particular its Global Environment Facility-Small Grants (GEF-SGP) Initiative, the Inter-American Development Bank (IADB), the Food and Agricultural Organization (FAO), and the World Bank each through their respective funding mandates influence the goals and objectives of national environmental initiatives. The World Bank Biocarbon Fund was the initial source of financing for the NSRP; the UNDP GEF-SGP is the primary funder of the Caura

[83] Personal communication with Rahanna Juman, Institute of Marine Affairs.

Valley Village Council Watershed Protection initiative; the UNDP funds ProEcoServ Initiative, and the IABD is working with the EPPD to fund an investigative study on the establishment of a local carbon offset market[84]. The *Green Days at the EPPD* blogspot further illustrates the dominance of international priorities within local environmental activities as the vast majority of issues posted to the site over the past two years involve training, sensitization and plan preparation to meet the country's obligations to the over twenty (20) international conventions to which Trinidad and Tobago is a signatory.

6.4 PES Initiatives

In addition to NSRP, three emerging PES initiatives were included as part of the field-based examination of the sustainability assessment framework: i) the Fondes Amandes Community Reforestation Project (FACRP), ii) the Caura Valley Village Council Watershed Management project, and iii) the ProEcoServ Trinidad and Tobago Initiative. ProEcoServ is not intended to become an actual ecosystem service exchange but is instead an investigation into ecosystem service valuation methodologies within three target ecosystems (Trinidad's Northern Range, the Nariva Swamp, and Tobago's Bucco Reef Wetland). It has been formally recognized by the MPSD (GORTT, 2012) as an essential step toward the establishment of local ecosystem service markets and as such was considered an important part of the current PES 'landscape.' Table 6.2 summarizes key characteristics for each project, with additional details provided in Appendix C.

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[84] Personal communication with Kishan Kumarsingh, Head of the Multilateral Environmental Agreements Unit of the MEWR.

Of the four projects identified, the initial design of NSRP most closely resembled a direct ecosystem service exchange. When first conceptualized, the Project was to be financed by carbon offset credits created by the project's reforestation activities and purchased by the World Bank BioCarbon Fund. In the very early stages of implementation, i.e. a 5 ha pilot reforestation effort in 2008, technical challenges and biophysical limitations forced the Project to reduce its physical scale from an original 1,330 ha to less than 800 ha, a scale no longer suitable (e.g. too small) for World Bank funding.[85] The Project's principle proponent (the EMA), however, subsequently succeeded in obtaining a US$10 million grant from the Trinidad and Tobago Green Fund in 2009; the full-scale NSRP officially launched in 2010.

Table 6.2: Summary of Trinidad and Tobago PES Initiatives

Initiative	Jurisdiction	Launch	Ecosystem Service(s)	Funding (Buyer)*	Management (Seller)	Service/ Activity 'purchased'
Nariva Swamp Restoration Project	Protected wetland	2010 to 2017	Carbon Sequestration	T & T Green Fund	Government Statutory Body	Wetland Restoration
Fondes Amandes Community Reforestation Project (FACRP)	Community (working to expand to watershed)	1990	Watershed Protection Amenity	Multiple Sources: Grants, donations, Government contracts, ecotourism, local product sales	Local community	Reforestation Forest fire protection Ecotourism Environmental Education
Caura Valley Village Council	Community (working to expand to watershed)	2012	Watershed Protection Amenity	Grants (CANARI, UNDP SGP-Trinidad)	Local Community	Forest restoration Forest fire protection
ProEcoServ Trinidad and Tobago	Three unique ecosystems	2010 to 2014	Research on ES valuation (soil /water protection, pollination, coastal protection	UNDP	University of West Indies and The Cropper Foundation	Development of ecosystem service valuation methodologies

[85] Personal communication with Sherif Faizool, NSRP Project Manager.

The PES initiatives involved in the stakeholder examination include two community-based initiatives currently seeking sustainable financing for ongoing forest management and watershed protection activities, the Fondes Amandes Community Reforestation Project (FACRP) and the Caura Valley Village Council (CVVC). FACRP is a well-established community-run project with an impressive history of national and international recognition for its social and environmental achievements since its launch in 1990[86] (FACRP, 2014). The Caura Valley Village Council (CVVC) has a similar history of 'official' project status resulting from state recognition of its ongoing community-driven restoration and conservation efforts. CVVC's *formal*[87] watershed protection project, however, is a relatively recent initiative (2012) launched with support of regional NGOs (Canari and The Cropper Foundation) and with support from the UNDP Global Environment Facility Small Grants Program (GEF-SGP). Both projects are welcomed by the state's water utility agency for their contribution to localized watershed protection.[88] Despite histories of demonstrated sustainable forest management practices, however, both initiatives struggle to maintain financial viability. NSRP and FACRP are both Green Fund grant recipients[89], yet both remain dependent on external financing to continue their conservation activities when

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86 FACRP's founders, Akilah and Tacuma Jaramogi, began informal efforts to rehabilitate St. Ann's degraded hillsides in the late 1970s, however, official status and recognition of their efforts by the state's land management agency, the Water and Sewerage Authority (WASA), was not granted to the project until 1990.

87 Formal project status refers to the development of an official project document which has subsequently been submitted to potential donor agencies.

88 Personal communications with CVVC and FACRP management teams.

89 FACRP was ultimately the very first Green Fund grant recipient and was awarded TT$1,914,806 (approx. US$300,000) for its Sustainable Community Forest Initiative in 2010 (www.mhe,govt.tt)

current grant funds are depleted. All three initiatives (FACRP, CVVC, and NSRP) are under consideration by the Green Fund Implementation Unit for participation in a (yet to be established) formal PES mechanism[90] (similar to Costa Rica's national PSA).

ProEcoServ Trinidad and Tobago is part of an international, four-country[91] UNDP initiative to develop ecosystem services quantification and valuation tools intended to assist in developing ecosystem service exchanges across multiple socio-ecological contexts. The Trinidad and Tobago project, a collaborative effort between the University of the West Indies and The Cropper Foundation, proposes to develop ecosystem service valuation methodologies for sediment retention, water yield and purification, carbon sequestration, crop pollination, biodiversity conservation, and coastal projection (ProEcoservTT, 2014).

6.5 Perspectives Analysis

The sustainability assessment brief used to guide stakeholder examination of the model was structured to: i) raise awareness of the sustainability assessment framework as a mechanism for stakeholder engagement, and ii) encourage stakeholder reflection on the relevance and potential applicability of the sustainability assessment framework to emerging Trinidad and Tobago-based PES initiatives. Figure 4.3 highlights the structure of the sustainability assessment brief and its correlation with

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[90] Personal communication with Director of the Green Fund Executing Unit, Richard Laydoo.
[91] In addition to Trinidad and Tobago, ProEcoServ pilot projects are being conducted in Chile, Viet Nam, and South Africa (www.proecoserv.org).

four areas of effectiveness that serve as the foundation of the sustainability assessment framework:

- Normative effectiveness identifies what society expects in terms of sustainability outcomes: *How does your organization define sustainability*?
- Substantive effectiveness indicates how normative goals will be measured: *What criteria are used by your organization to assess sustainability?*
- Transactive effectiveness assesses contextual factors which contribute to/prohibit the [efficient] realization of identified goals: *What factors/conditions support/challenge achieving sustainability*?
- Procedural effectiveness considers desirable assessment processes, potentially in contrast to those already in place: *What agency/institution is best suited to implement a Sustainability assessment? What data collection methods might be most effective? How should the data be processed, analyzed and distributed?*

Stakeholder reflection on transactive and procedural effectiveness examined local capacity for pluralistic engagement whereas questions on normative and substantive effectiveness provide insight into perspective plurality. The field-based stakeholder examination did not focus specifically on PES, PES assessment, or stakeholder perceptions of the effectiveness of current or proposed Trinidad and Tobago-based PES initiatives, but instead considered the sustainability assessment framework as a process for guiding future action on PES in the local context. Stakeholder reflection on the four sustainability assessment criteria revealed identifying characteristics of the four PES perspectives, *Optimist*, *Realist*, *Skeptic*, and *Rejectionist*. Identification of the four perspectives in the Trinidad and Tobago context utilizes the same set of target indicators and analytical priorities applied to the impact assessment meta-analysis conducted in Chapter 5 and highlighted in Table 4.2. A summary of stakeholder examination of the sustainability assessment framework is

found in Appendix D. The Appendix also contains a summary table that articulates correlations between assessment priorities identified during field-based exploration with target indicators utilized for the case study impact assessment meta-analysis.

Perspective variability between stakeholders, within stakeholder categories, as well as within individual stakeholder agencies is highlighted in Table 6.2. In addition to variety, Table 6.2 identifies notable perspective 'gaps' which exist within particular stakeholder groups. A *Realist* perspective is (surprisingly) absent from both the Project Proponent and Research/Academic stakeholder groups. A *Rejectionist* perspective is (not surprisingly) completely absent from the Foreign Actors stakeholder group. And while Normative and Substantive effectiveness from a *Rejectionist* perspective can be detected within the Civil Society and Project Proponent stakeholder groups, these same two groupings suggest the presence of multiple perspectives, thus neither are strongly representative of a *Rejectionist* viewpoint. The relatively limited presence of a *Rejectionist* perspective from within the spectrum of sustainability stakeholders engaged in the examination could suggest a potentially limited local capacity to challenge dominant sustainability conceptualizations. A detailed discussion of the findings is highlighted in Table 6.3.

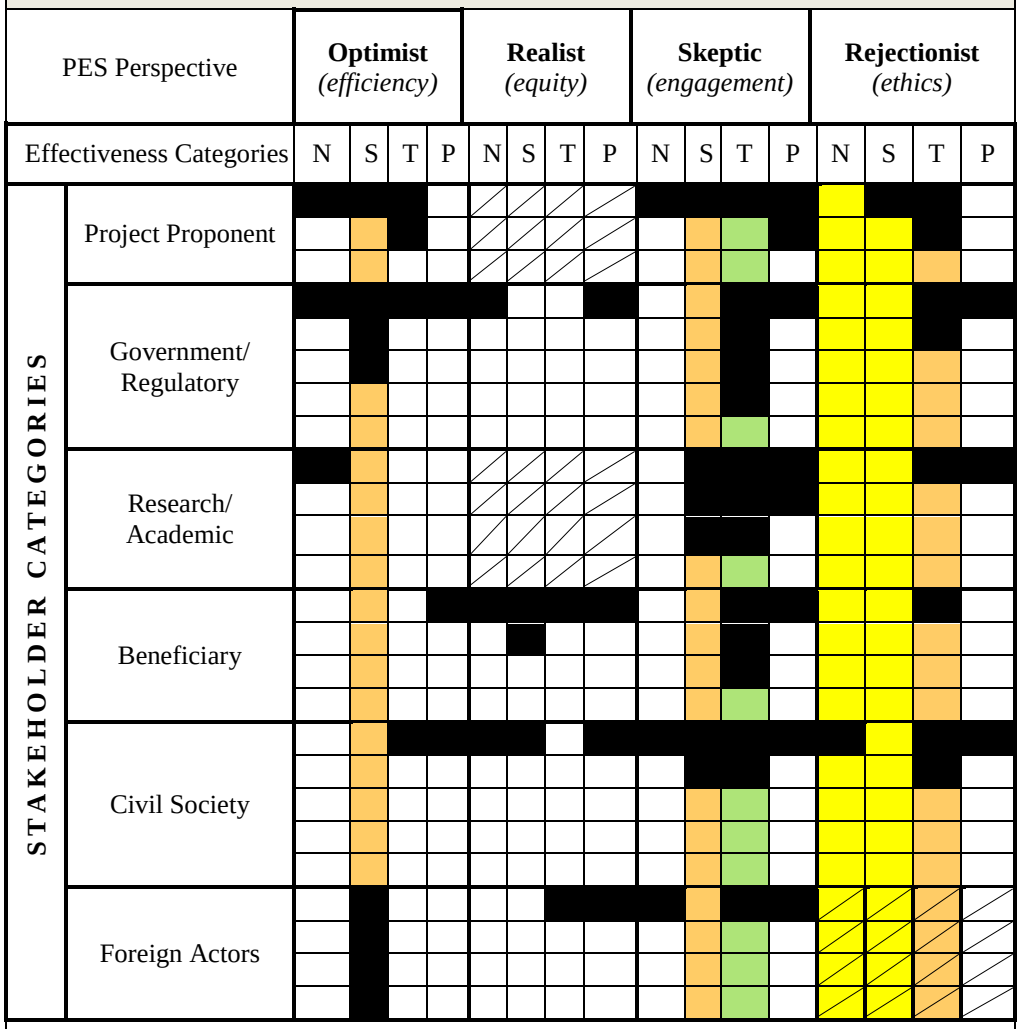
6.5.1 Sustainability Assessment

Of the four sustainability assessment areas for effectiveness, *Normative* effectiveness targets conceptualizations of sustainability. Key themes to emerge from Trinidad and Tobago stakeholders for *Normative* effectiveness were evenly distributed amongst the following:

- environmentally sensitive economic growth
- development of sustainable livelihoods and improved well-being
- improved capacity for stakeholder engagement in policy processes
- institutionalized shared management
- resilience of both ecological and socio-ecological systems

Based on these positions, stakeholders somewhat predictably represented the perspectives spectrum. Project Proponents and Government/Regulatory stakeholders adopted *Optimistic* normative ideals based on economic and ecological indicators. Beneficiary and Civil Society groups prioritized sustainable livelihoods within a *Realist* perspective. Foreign Actors highlighted partnerships and engagement suggesting a *Skeptic* view. Civil Society stakeholders represented the broadest spectrum of perspectives including a hint of *Rejectionism* via an articulated desire for socio-ecological resilience. Socio-ecological resilience is linked with the *Rejectionist* perspective for its suggested need for new, resilience-oriented nature-society relationships.

Table 6.3: Trinidad and Tobago Stakeholder Sustainability Assessment Analyses



EFFECTIVENESS CATEGORIES KEY:

N = Normative Effectiveness: *How is Sustainability Defined?*

S = Substantive Effectiveness: *What Criteria should measure sustainability?*

T = Transactive Effectiveness: *What contextual variables support or prohibit assessment?*

P = Procedural Effectiveness: *Who, how and why should sustainability be assessed?*

Color coding above indicates suggested level of stakeholder affiliation with identified PES perspective for an identified sustainability assessment effectiveness category.

Significant (>10) Modest (5-10) Weak (0-1)

The next realm of assessment within the sustainability assessment framework, e.g. *Substantive* effectiveness, explores sustainability indicators or how to assess delivery of identified goals and objectives. Again, emergent stakeholder perspective trends are largely anticipated. Trending toward the *Optimistic* perspective for *Substantive* effectiveness, Foreign Actors and Government stakeholders assess conservation and development projects in terms of dollars spent, number of grants awarded, and other directly measurable recipient benefits. The *Realistic* perspective is solidly found in Civil Society and Beneficiary stakeholder responses emphasizing livelihoods and building local resource management capacity. Civil Society stakeholders, however, were additionally concerned with *Skeptic* issues of improved enforcement and monitoring of existing legislation. Project Proponent stakeholders proposed multiple means of assessment which also spanned the PES Perspectives Spectrum and even included criteria perceived as *Rejectionist* in the articulated concern for improved trust between stakeholders, and respect for multiple sources of knowledge. The Academic and Research stakeholder community might not have been expected to present such a strongly *Skeptical* position for *Substantive* effectiveness, however, when placed in the context of their extreme frustration with the ineffectiveness of current policy and governance structures to sustainably manage natural resources the strong level of *Skepticism* is more easily understood.

Whereas the *Normative* and *Substantive* effectiveness criteria of the sustainability assessment framework seek to identify goals and targets of a contextually-determined sustainability conceptualization, *Transactive* and *Procedural* efficiency are considered the more action-oriented, potentially transformative, and practical elements of the sustainability assessment framework identifying the

contextual barriers, e.g. formal institutions and informal cultural practices, which typically prevent sustainability transformations (Bond et al, 2013). The action-oriented goal of the sustainability assessment framework deliberately includes an identification of important contextual barriers and enablers which are then intended to be monitored for change as part of the holistic sustainability assessment process. In the Trinidad and Tobago field exploration exercise, stakeholders considered contextual factors perceived as both enabling or prohibiting the realization of their sustainability conceptualization. Four primary categories of contextual factors are identified that, although not directly linked, can be correlated to the four perspectives: efficiency-O*ptimistic*; equity-R*ealist*; engagement – *Skeptic*; and ethics – *Rejectionist*.

Stakeholder reflection on *Transactive* effectiveness reveals several interesting trends. First, while a range of both enabling and prohibitive contextual factors were identified, supportive enabling conditions are largely countered by a corresponding institutional gap (indicated by ↔). For example, the Trinidad and Tobago Green Fund exists to support local conservation efforts, however, most stakeholders, including Green Fund grant recipients, felt adequate financial and technical support for conservation is still lacking. Under the engagement category, each of the potentially supportive contextual factors (vibrant community groups, existence and support of sustainability champions) is equally discounted by a broader context of conditions equally prohibitive of meaningful engagement and shared learning. Contextual factors for which there appears to be limited perspective representation (most notably for equity [*Realist* concerns] and ethics [*Rejectionist* concerns]) are the same issues for which limited enabling conditions were identified. No enabling factors were identified for equity and limited enabling factors were identified for ethical

issues. Lastly, the contextual issues receiving the most attention (illustrated by the highlighted green columns in Table 6.3) were those related to engagement and institutional structures or the *Skeptic* perspective.

	Enabling Factors		Prohibiting Factors
Efficiency	Local source of conservation finance (Green Fund)	↔	Lack of adequate technical and financial resources for project implementation, monitoring, follow up
Equity			Inequitable distribution of conservation finance amongst stakeholders
Engagement	Existence of vibrant community groups with histories of successful conservation efforts	↔	Lack of local capacity for resource management
	Stakeholder willingness to establish partnerships and create resource governance networks	↔	Poor to non-existent framework for stakeholder engagement, and participatory management
	Presence of sustainability 'champions' within key sustainability stakeholder categories	↔	Lack of sustainability champions in decision making positions
			Too much transition within key environmental governance agencies
Ethics	Culture is intimately tied to nature for spiritual and recreational purposes	↔	Resource management culture highly resistant to adaptive management
			Established power hierarchies
			Political interference in all levels of resource decision making

Procedural efficiency was the last assessment area explored and represents the area with the greatest distribution of responses, both across perspectives and across stakeholder groups. It should be noted, however, that stakeholders focused less on the

‘who’ and ‘how’ of sustainability assessment and more on process requirements such as greater transparency, broader participation, and enhanced sectoral coordination. There was limited emphasis on new assessment processes and more focus on improved effectiveness of existing structures. It is suggested that difficulty in conceptualizing new methods of assessment and processes of data collection, at least in the Trinidad and Tobago context, is potentially a function of the infrequent opportunity to conceptualize alternative assessment methods, as well as the limited local capacity to challenge the hegemonic conceptualization of sustainability, e.g. a socio-ecological balance driven by ‘responsible’ economic growth. The Government’s sustainable development vision reinforces this overworked and largely ineffective vision. And while environmental impact assessment and public consultation practices are now well established developmental requirements, implementation procedures for both are quite rigidly mandated and seek little more than ensuring (and measuring) regulatory compliance.

6.5.2 Perspectives Identification

A summary of the reflections on *Normative* and *Substantive* efficiency criteria and identified stakeholder placement on the PES Perspectives Spectrum is presented in Table 6.4. The dominant perspectives are *Optimist* and *Skeptic*, with Project Proponent and Civil Society stakeholder groups adopting a more ‘post-sustainable development’ perspective which acknowledges the validity of more than one position. Whereas the summary of Sustainability assessment analyses presented in Table 6.3 suggests that perspective diversity can be found within each stakeholder category – depending on effectiveness category, Table 6.4 synthesizes stakeholder perspectives based solely on

Normative and *Substantive* effectiveness, revealing a bi-modal perspectives pattern dominated by *Skeptic* and *Optimists* yet tempered slightly by a small degree of Pluralism (post-sustainable development perspective) within two stakeholder groups (Project Proponent and Civil Society). The emergence of a Pluralist view suggests a perspectives balance which could support mutual learning. As will be discussed in the final section of this Chapter, however, the power differentials and political interference highlighted by sustainability stakeholders as contextual barriers could shift the perspectives dynamic toward an *Optimistic* dominance as an *Optimistic* perspective is found in the stakeholder groups holding the majority of political and economic power, e.g. Government/Regulatory and Foreign Actors.

6.5.3 Potential for Pluralistic, Participatory Engagement

Pluralistic, participatory engagement, the basis of transdisciplinarity and sustainability assessment, is required for mutual or shared learning. Mutual learning through self-reflective engagement is the basis of post-sustainable development. The socio-ecological connectivity (SEC) framework outlined in Chapter 3 proposes a process to facilitate mutual, shared learning which requires i) an exposure of perspectives plurality and ii) a process of reflective pluralistic engagement. The Trinidad and Tobago field exploration used the sustainability assessment framework to explore perspectives plurality and to encourage stakeholder reflection on contextual factors which support or prohibit pluralistic engagement, both of which are now summarized in order to connect the results of the field-based exploration with the examination of PES and a post-sustainable development agenda.

Table 6.4: Proposed Perspectives Identification for Trinidad and Tobago Stakeholder Groups

Stakeholder Group	Normative Efficiency *(How is Sustainability Defined?*	Substantive Efficiency *(How will sustainability be measured?)*	Primary Perspective
Project Proponent	Financial and technical capacity to sustain initiatives Engagement and participation of all stakeholder groups	Sustainable resource inputs Institutional and regulatory framework to support participation Trust within stakeholder relations Respect for multiple source of knowledge	Pluralist (Optimist/ Skeptic)
Government/ Regulatory	Economic Development Social Well-being	Assessments to be conducted in accordance with nationally and internationally established EIA/SIA/HIA criteria	Optimist
Research/ Academic	Ecological resilience	Maintaining ecosystem resilience is mainstreamed throughout all policy documents Institutionalization of broad and participatory ecosystem management committees	Skeptic
Beneficiary	Sustainable Livelihoods	Increased livelihood opportunities Increased local capacity for co-management	Realist
Civil Society	Truly shared responsibility amongst stakeholders for resource management Socio-ecological resilience	Increased local capacity for co-management Expanded resource management partnerships Share stakeholder responsibility for enforcement of regulations	Skeptic/ Pluralist
Foreign Actors	Established governance partnerships to address global/local environmental concerns	Cost effectiveness and Additionality Validity, reliability Adherence to established goals and targets	Optimist

Perspectives Plurality

As identified in Table 6.4, the sustainability stakeholder groups involved in the Trinidad and Tobago field exploration exercise did indeed represent a plurality of perspectives. The PES perspectives spectrum, however, was dominated by *Skeptic* and *Optimistic* perspectives, with a weak presence of a *Realist* view, and a glaring lack of *Rejectionists*. What was potentially unique about two stakeholder groups (Project Proponents and Civil Society) was their Pluralist/*Skeptic* perspective, e.g. lack of a strongly dominant worldview or sustainability conceptualization. Recognizing, however, that each perspective raises concerns about a unique and critical component of fundamental principles of sustainability (efficiency, equity, engagement and ethics), the absence of any one perspective suggests the potential for a less than transformative outcome from any engagement exercise. Despite the presence of several 'rays of transformational hope' such as the Green Fund, a network of civil society conservation stakeholders, and a culture which recognizes both tangible and intangible natural resource benefits, the *Optimistic* dominance resident in the socio-cultural and political-economic context suggests that socio-ecological connectivity, or self-reflective mutual learning, will be difficult within the existing contextual configuration, e.g. political and economic power differentials. An officially mandated institutionalization of participatory resource management as proposed in several recently adopted environmental governance policies could, however, begin to shift this context in a direction that could be more supportive of pluralistic engagement.

Potential for Pluralistic Engagement

The application of the sustainability assessment framework and the proposed outcome of mutual learning through pluralistic participation engagement in Trinidad and Tobago will likely be challenging for a number of reasons which may also have relevance for the broader policy analysis of PES mechanisms, conservation of biological diversity, and sustainable development. First, there is a dominance of international environmental and development agencies as funders. The three emerging PES projects: 1) Nariva Carbon Sequestration and Livelihoods Project, 2) ProEcoServ, and 3) Community Led Forest Conservation and sustainable Livelihood Development Project in Caura are all funded by international development and conservation institutions and thus influenced in design and outcome by the agendas of these stakeholder institutions. ProEcoServ is a UNEP project. Caura Valley is funded by the UNDP Small Grants Program (SGP). The Nariva Project was developed and initially designed to access carbon offset funding from the World Bank BioCarbon Fund and appears to remain committed to the expectations of an international funding agency despite the shift to a local funding mechanism for actual implementation. Whether by design or default, the Project's implementation structure and output objectives remain largely tied to the international sustainable development agenda of forest carbon offsets. There has been no discernible effort to engage stakeholders, even those who are identified as members of the Project's Stakeholder Management Committee, in evaluating, monitoring or redesigning the project to more effectively meet the needs of the local context and specifically those of the local community.

Second, there is a commitment by the local political directorate to the international agenda. Current government leaders who took office in 2010 have embraced an economically driven, results-based development approach (GORTT, 2011b, 2012). Despite the theoretical belief that environmental problems require "bottom up" (e.g. local) solutions, national development priorities are firmly in line with those of the international community as outlined at the Rio +20 conference and in the Millennium Development Goals (GORTT, 2012).

Lastly, there is limited representation of a *Rejectionist* perspective and an engagement of more critical perspectives and disciplines willing to challenge the ideological status quo dominated by economic rationality and scientific objectivity. The environmental policy champions which exist amongst the various stakeholder agencies are predominantly from the scientific community and have embraced an ecosystem management approach to sustainability and conservation which does not question the potential consequences of natural resource commodification. Mutual learning through participatory engagement, however, requires a recursive and self-reflective examination of socio-ecological systems. Power differentials, including the dominance of disciplinary knowledge bases, need to be exposed and examined but rather the acknowledgement of inherent biases. The goal of examination is not the elimination of any disciplinary or knowledge base, but rather the elimination of dominance by any one perspective. Any contextual (socio-political) environment such as what is suggested to exist in Trinidad and Tobago in which alternative perspectives are more frequently squashed rather than engaged will have a limited potential for learning, adapting, and realizing ultimately its broad-based sustainability objectives.

As suggested earlier, without challenging the dominant working definition of sustainability/sustainable development, (e.g. without a paradigm shift) current patterns of resource use and management are likely to continue. Several factors are required in order to facilitate a paradigm shift in which a new, not yet envisioned definition of sustainability emerges. First, stakeholder perceptions of sustainability within a particular context must engage the spectrum of perspectives, identified within the context of this research as *Optimist*, *Realist*, *Skeptic*, *Rejectionist*, however other means to identify perspective pluralities could be equally effective. Second, an institutional framework that encourages meaningful and equitable interaction amongst these perspectives must be established and supported with adequate technical, financial and institutional resources. Within the Trinidad and Tobago context a glimmer of hope might be interpreted within the recognition that these factors are necessary; a recognition evidenced by presence of strong *Realist* and *Skeptic* perspectives which propose alternative sustainability conceptualizations. If a new conceptualization of sustainability can make headway in a country so dominated by international funding paradigms, a national government committed to being an "international" force, and a country largely beholden to the global economy as a result of its oil and gas wealth, it can potentially succeed in any context if the necessary conditions are adequately supported.

Chapter 7

PRACTICALITIES OF PLURALISTIC ENGAGEMENT

"[Sustainability] success depends not on unanimity or collective action among all citizens, but on the formalization on procedures and conditions for achieving free and fair deliberation between them." (Wilson and Howarth, 2002: 435)

The causes, trends and anticipated impacts of unsustainable resource use have been identified, labeled and analyzed for well over two decades. In spite of a steady stream of assessments and analyses urging immediate action, and decades of policy proposals proposing to reverse unsustainable resource use patterns, there is little discernible evidence any of these efforts have been effective. Global rates of deforestation and biodiversity loss remain alarmingly high, and atmospheric carbon cycles continue to be overwhelmed by excessive levels of anthropogenic greenhouse gas emissions. This research has argued that these decades of failed policy initiatives are the result of an inability of sustainability policy processes to acknowledge socio-ecological complexity and its inherent perspectives plurality and value disputes. The fundamental character of geographic scholarship, its contextual focus, attention to spatial and temporal scale, and recognition of perspective plurality, is uniquely suited to investigating this thesis. The PES policy at the center of this research is increasingly addressed within the geographic literature (Robertson, 2006, Redford and Adams, 2009, Dempsey and Robertson, 2012, Jackson and Palmer, 2014). Yet it is only very recently that works from some of the most relevant geographic substrata such as

feminist geography and political ecology have received similar attention within the international policy arenas that typically dominate the sustainability dialogues.

As noted in Chapter 2, however, these geography discourses are slowly providing important new insight into ongoing saga of unsustainability. Within the context of PES and its global forest carbon application of REDD+, international policy discussions are shifting from a previous emphasis on achieving efficiency, effectiveness and equity to recognizing the role of institutions, interests, ideas, and information (Angelsen et al, 2012). This is an important shift which acknowledges the importance of context and plurality. This investigation into the transformational potential of PES encompassed these contextual elements through its basis in post-sustainable-development theory and through the use of PES perspectives spectrum.

The theory of post-sustainable development (Morse, 2008) argues that both sustainability as a tripartite balance *and* the philosophical and operational critiques offered by neoliberal and post-development scholars share a normative ideal in need of highlighting. All desire an equitable, just and sustainable world in which the rights and interests of all stakeholders are incorporated. Differences between these perspectives emerge, however, in their proposals to operationalize this ideal. Post-sustainable development theory states that the knowledge base and unique understanding of socio-ecological complexity inherent in differing sometimes opposing perspectives offers important insight into determining how the shared sustainability ideal might be achieved. Post-sustainable development theory suggests that in lieu of sustainability targets achieved via natural resource regulations or incentivized resource use decisions, ‘sustainability’ needs to understood as a process

of stakeholder interaction which engages these different yet essential perspectives. The intent of this research was to investigate the transformational potential of PES to encouraging this new thinking about sustainability. Can a PES-based conservation policy encourage new processes of socio-ecological interaction, understood as pluralistic, self-reflective dialogue?

This research questioned the transformational potential of PES by examining the policy's capacity to nurture and support socio-ecological connectivity, e.g. reflective mutual learning via pluralistic engagement. Connectivity, or the potential for pluralistic engagement, was explored within the context of impact assessment at two different stages of the PES policy process across multiple case study scenarios. The first phase of investigation entailed a meta-analysis of ex-poste impact assessment indicators in the case study contexts of Costa Rica, Brazil and Ecuador. Each selected socio-ecological context was the beneficiary of an established PES initiative that had been evaluated by a variety of sustainability stakeholders. The existence of perspectives plurality became evident when different assessments produced different results based on different choice metrics and methodologies. Assessment indicator prioritization was thus used as a basis for a systematic means of perspectives identification; the details of analysis were laid out in Chapter 4. Phase two of the PES examination involved an exploration by Trinidad and Tobago sustainability stakeholders of the practicality of a sustainability assessment framework. The sustainability assessment framework is proposed as a practical means for pluralistic, self-reflective engagement. Exploration of the sustainability assessment framework involved i) a presentation of the sustainability assessment framework to sustainability stakeholders currently involved in the development and implementation of PES

initiatives in Trinidad and Tobago, and ii) and an examination of several logistical requirements for its application in the Trinidad and Tobago context. Assessing the potential for pluralistic engagement in all four of the case study contexts included an examination of socio-cultural and political-economic contexts through secondary data sources; these contextual elements provided additional into the presence and variability of sustainability perpsectives as well as the political and cultural institutions that frequently support or inhibit enhanced stakeholder engagement.

An understanding of socio-ecological context is equally fundamental to ascertaining the other two components of socio-ecological connectivity, e.g. an identified scope for interaction, and established processes for reflective dialogue. Within the SEC framework, the scope for interaction is guided by the principle of transdisciplinarity, an approach to investigative knowledge production dependent on disciplinary integration, the continuous recycling and re-adaptation of produced knowledge, and the ongoing participation of an extended peer community. The case study impact assessment meta-analysis methodology alone is insufficient to adequately assess the degree to which transdisciplinary principles were adopted within each of the selected case studies, however the range and distribution of disciplinary perspectives engaged in impact assessment, coupled with an understanding of the extent of stakeholder involvement in the development, implementation and adaptation of the various PES initiatives provides insight into the potential scope for interaction.

Identifying the existence or potential for processes for reflective processes is largely a function of the socio-political context, specifically the scope and structure of the institutional and regulatory framework for stakeholder engagement in sustainable

development and conservation. As noted above, stakeholder engagement articulated in policy and regulation remains difficult is infrequently practiced even when legislatively mandated. The ongoing challenges of the Trinidad and Tobago NSRP can be largely attributed to the failure to meaningfully engage the spectrum of stakeholders in processes of mutual learning via pluralistic engagement for the design, implementation, and assessment of the project. An additional challenge to reflective engagement and mutual learning, however, is the lack of a perspectives balance. As suggested by the target indicator taxonomy proposed in Chapter 4 (Table 4.2), each perspective represents a unique set of analytical priorities which need to be considered collectively in order to address value-laden sustainability questions of who benefits, who pays, who decides, and what is decided. The concerns raised by the PES narratives of cautious peril consider these questions under the headings of efficiency, equity, engagement and ethics; questions explored primarily by the *Realist*, *Skeptic* and *Rejectionist* perspectives. The absence or relatively minimal representation of any of the identified perspectives limits the scope of questions addressed even when stakeholders are meaningfully engaged. A minimal presence of the *Rejectionist* perspective results in limited questioning of ethical and valued-based considerations such as the impact of existing socio-ecological relationships and power differentials, and the validity of maintaining socio--ecological (perspectives) diversity. Using the findings of the four case study analyses, what, if any conclusions can be drawn about the post-sustainable potential of payment for ecosystem services?

7.1 *Case Study Observations*

A quick re-cap of the four case studies to highlight key elements of the socio-ecological context and selected PES initiative precedes a discussion of the overall findings of the PES examination. An initial overall observation is that none of the initiatives examined operate according to the 'textbook' definition of PES, namely as a market-based ecosystem service exchange in which buyers and sellers negotiate the terms of exchange and delivery. In fact, the 'buyer' in each case is the primary governmental agency involved in program oversight. Direct ecosystem service beneficiaries 'purchase' services via a legislatively mandated water, fuel, or income tax and not as voluntary exchanges argued by some theorists as necessarily fundamental to the policy's success (Wunder, 2005, Sommerville et al, 2010). In each case, 'payments' are politically determined based on available funding and government established targets and not, as PES theory would suggest, in compensation for land use change lost opportunity costs. While this observation of a PES theory-praxis disconnect has limited bearing on the policy's transformational potential, it is nonetheless worth noting that PES in practice throughout the case studies examined during the course of this research does not adhere to PES theory.

Costa Rica

The PES poster child, *Programa Pago por Servicios Ambientales* (PSA) can easily be viewed as the culmination of an evolutionary shift in the country's national agricultural incentive program. Government incentives for forest clearing and agricultural development throughout the 1960s and 70s were the primary contributor to the country's alarming reduction in forest cover (<20% by 1980). A shift in subsidy

priority from forest clearing to forest rehabilitation helped raise Costa Rica's forest cover to its current level of >50%. Recognizing that the per ha incentive payments between the two policy objectives are surprisingly similar (Zbinden and Lee, 2005, Miranda et al, 2006, Daniels et al, 2010) raised questions about the efficacy of the PSA as a PES mechanism (Fletcher and Brietling, 2012). There is limited evidence to suggest that the impressive reestablishment of forest cover has occurred anywhere but on abandoned agricultural lands (Morse et al, 2009, Arriagada et al, 2009). What possibly makes the PSA unique, however, is that incentives to encourage forest recovery were part of a larger shift in the country's national economic planning to develop an economy based on natural resource conservation as opposed to natural resource exploitation. The shift in national development priorities from exploitation (60s/70s) to conservation (80s through today) is, therefore, a shift in incentive priority and not a first time introduction of economic incentives to influence land management and natural resource use decisions. Established practices of incentivized land use decision-making are an important factor to consider when looking at Costa Rica's political ecology. The dominance of the *Optimistic* perspective within this case study context is highly attributable to the longstanding practice of incentivized land management. An additional consideration for the revealed perspectives distribution is the high level of private land ownership (70%), the low level of communal territories (10%), and the relatively well-established system of land titling and tenure regularization. These institutions are not as well established in any of the other contexts all of which are dominated the more critical perspectives associated with various sub-narratives of potential peril.

Brazil

Brazil's geographic size as well as ecological and economic 'might' make it a unique PES case study. The country's economic development and land use history underscore a continuing policy prioritization conflict between natural resource conservation and resource-dependent economic development, evidenced by the bi-modal *Optimist-Skeptic* perspectives distribution. Conservation prioritization can be found in the country's Forest Code (first established in 1965 and revised in 2001) that mandates a percentage (80%) of all privately held lands remain forested. Meaningful enforcement of the 40- year old Forest Code did not begin until 2003 when the Lula Government began to strictly enforce the 80% conservation mandate for private lands. These efforts were further supported by the country's 2008 climate change commitments to reduce national GHG emissions by 80%, almost completely via a reduction in deforestation. The climate change mitigation rationale behind this relatively recent commitment to address a 30-year old problem corresponds to the international environmental agenda shift from economic growth driven sustainable development to one more proactively engaged in conservation through more forceful efforts to reverse unsustainable trends of natural resource use. The country's established system of extractive reserves and resource concessions supplemented by continued patterns of urban expansion and multiple mega-infrastructure development projects simultaneously illustrate, however, the challenge of conservation in light population growth and economic globalization.

An additional driver of Brazil's natural resource policy contradiction comes from its decentralized governance system. Whereas the Brazilian central government

established the overall policy agenda, the country's twenty-six states ranging in population from 500,000 to over 5 million are highly autonomous each with their own constitutions and development agendas. In some cases these two agendas are complimentary, in others they are in conflict. The states of Mato Grosso and Para, in particular, continue to support a strong industrial agriculture economy as opposed to promoting a less ecologically destructive form of development. In terms of land use incentives, the federal government as well as several state governments has only recently begun experimenting with incentivizing land use decisions. In nearly every instance, however the state-level policy for the land use incentive targets socio-economic issues as much if not more than conservation objectives. The *Bolsa Floresta* PES of the State of Amazonas, for example, supports the national carbon emissions reduction commitment through developing sustainable local livelihoods and communal infrastructure. The ability of the *Bolsa Floresta* to bridge potentially competing federal (economic development) and state level (social wellbeing) priorities could contribute to its bi-modal, *Optimistic-Skeptic* perspectives distribution.

Ecuador

The municipal-level *Pimampiro Watershed Protection Program* resulted from the convergence of several multi-scalar contextual factors. First, a very highly decentralized environmental management system empowers provincial, municipal and/or parish governments to intervene directly in the localized environmental problems. Within this context, the Pimampiro Municipal Government passed an ordinance establishing the necessary institutional framework to collect and disburse ecosystem service payments. Creation of the ecosystem service exchange initiatives

was supported by the contribution of foreign actors to the required technical and resource components. An ongoing FAO initiative had already trained local stakeholders in sustainable forest management principles and practices; donor funding was made available for the express purpose of creating the institutional framework to oversee project implementation. In additional to the necessary legislative, technical and resource inputs, the project benefitted from a number of socio-cultural elements. First, municipal residents (technically the buyers in the exchange) believe there a direct correlation between enhanced forest cover and local water quality. Thus, an inherent willingness exists to support those engaged in improved forest management. - Second, there is a strong cultural view that the state is protector and guarantor of essential ecosystem services such as clean air and clean water. Thus, the public generally supports government initiatives intended to fulfill that responsibility.

The scale of the *Pimampiro* project must also be highlighted. Municipal level exchanges ensure that buyers (residents), sellers (area farmers), and the exchange intermediaries (municipal government institutions) are in agreement on policy objectives as they are all direct beneficiaries of the initiative. The national-level *Socio-Bosque* (Forest Partner) has been less successful in securing the anticipated level of 'buyer' and 'seller' participation, having to consistently revise downward its output expectations. The Program's forest management targets and land tenure stipulations attractive to policy makers offer limited support for small landholders who are the program's target beneficiaries. Whereas historical precedent with land use incentives, decentralized governance, and land tenure security may be less critical in the Ecuadorian context, scale of implementation could be a critical consideration for PES and perspectives distribution.

Trinidad and Tobago

The Trinidad and Tobago context shares some of the characteristics found in the other case studies, but in just as many ways is uniquely different. First, Trinidad and Tobago is a significantly smaller than all the other case study contexts, both geographically and in terms of population (See Table 5.2). Its oil and gas economy contributes to its ranking as the case study with the highest per capita GDP ($17,500) as well as highest per capita CO_2 emissions (38.2 metric tons).[92] Similar to the other case studies, Trinidad and Tobago's PES initiatives have their origins in locally-initiated efforts to address localized impacts environmental degradation. All case studies are influenced by both local and international environmental NGOs and development agencies. And perhaps most critically, like all the other case studies, Trinidad and Tobago has an extremely weak *Rejectionist* perspective.

Analysis of PES perspectives across these various case studies provides few clear trends or conclusions; however, a few inferences are offered regarding evidence of plurality, the disciplinary impact on perspectives interaction, and challenges for reflective dialogue.

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92 According to World Bank statistics (www.worldbank.org) only Qatar has a higher rate of per capita emissions with 40.3 metric tons per capita. The US is ranked 10th at 17.8.

7.2 Payment for Ecosystem Services and Socio-ecological Connectivity

Collectively, the case studies highlight a relatively solid representation of the *Optimistic*, *Realist*, and *Skeptic* perspectives, a modestly robust plurality. *Optimism* is dominant in socio-ecological contexts where land tenure and resource access are legally secure and in which the PES initiative emphasize ecological outcomes rather than rural economic development and the promotion of sustainable livelihoods, e.g. Costa Rica and Trinidad and Tobago, and to some extent Brazil. It is difficult to draw any conclusions about the strength of the *Realist* perspective concerned with economic equity and rural development as it is relatively prominent, albeit not dominant, in all case studies except Trinidad and Tobago where it was found to be weak. Perhaps Trinidad and Tobago's relatively high per capita GDP, historically strong middle class, and continuously vibrant petro-chemicals industry make economic development via PES a low policy priority for this context. This could suggest that a PES policy prioritizes outcomes based on the socio-economic needs of the context of application. While not a necessary disadvantage, it further supports the earlier observation regarding the PES theory-praxis disconnect. When utilized for socio-economic development PES is no longer a conservation proposal.

What is perhaps not surprising to find across all contexts is strong *Skepticism*. This perspective trend is suggested to be a function of the decades- long struggle to strengthen natural resource management and forest governance institutions and recognition of the need to strengthen institutional capacity of all natural resource governing agencies. Skepticism appears to be weakest in Costa Rica, a context which has successfully embraced natural resource conservation as part of its national

development strategy. It should also not be surprising to find a weak, almost non-existent *Rejectionist* perspective across the perspectives. *Rejectionists* argue that unsustainable resource use is a moral and ethical problem as opposed to a market, regulatory or policy failure. *Rejectionists* question the moral and ethical impacts of incentivizing illegal behavior. In each case study context unauthorized deforestation is punishable by law yet there is no ethical challenge raised against efforts to incentivize ecosystem service provision, i.e. legally mandated behavior. As *Rejectionists* also represent the perspective most willing to acknowledge socio-ecological diversity and values plurality, the absence of this perspective provides a distinct challenge to reflective engagement, a process fundamentally dependent on accepting diversity. It leaves a gap within the spectrum of socio-ecological actors of those willing to challenge the status quo and develop 'out-of-the-box' solutions. A stronger *Rejectionist* presence within the processes of engagement could increase the likelihood that socio-economic policy objectives address divergent values and beliefs in addition to ecological and social concerns.

The preceding section on case study observations briefly explored in each context the potential contribution of existing institutions and socio-cultural practices to the identified perspective plurality trends and distributions. Disciplinary affiliation of the impact assessment research team was also examined for its potential impact on plurality. The Ecuadorian context has the most diversified disciplinary input as well as the most extreme perspective imbalance. The Costa Rican context has the greatest dominance of science and economics based assessments yet ultimately analyzed the greatest array of impact indicators. Perhaps the most 'logical' discipline-perspective correlation emerges from the Brazilian and Trinidad and Tobagonian contexts where a

relatively strong natural science influence was detected. The bi-modal *Optimist-Skeptic* pattern exhibited in these contexts potentially suggests a belief in the ecosystem valuation theory along with a practical recognition of the critical role of governance institutions. Environmental management in Trinidad and Tobago in quite notably dominated by natural scientists increasingly desperate for solutions to ongoing ecological degradation yet equally mistrusting of existing governance institutions to enforce sustainable development laws and regulations once enacted.

As earlier noted, interdisciplinary, geography and social science perspectives are limited across all contexts (< 20% collectively). A stronger multi-disciplinary focus (<30%) suggests a potential for disciplinary balance, however multidisciplinary studies were also found to have a strong perspective bias. Figure 35 illustrates the combined disciplinary distribution by perspective across the case study contexts of Costa Rica, Brazil and Ecuador. An economics based analysis suggest a strong *Optimist* perspective, however, the natural sciences depicts a more bi-modal *Optimist-Skeptic* perspectives dominance, similar to the pattern noted in the T&T, which was argued earlier as capturing the discipline's skepticism toward institutional effectiveness in natural resource governance. A perspective dominance shared by the social science based studies. And whereas multidisciplinary, policy, geography and interdisciplinary driven studies all encompass varying distributions of the perspective spectrum, interdisciplinarity and geography suggest the greatest perspectives balance, e.g. a limited perspectives dominance. It is again cautioned that perspectives analysis via disciplinary focus is not intended to establish firm links between discipline and perspective, but rather to highlight disciplinary-based perspectives trends uncovered in the impact assessment meta-analysis; to raise awareness of potential perspectives

biases within limited multi-, inter-, and transdisciplinary structured research; and to prompt discussion on the need to explore perspectives bias in socio-ecological policy. Based purely on an analysis of discipline and perspective without the benefit of contextual details for additional clarification, Figure 7.1 suggests that integrated and cross-disciplinary research is more capable of spanning the perspectives spectrum.

The unique difference between multi-disciplinary, interdisciplinary, and transdisciplinary research is reiterated to highlight the added contribution of transdisciplinary analysis to socio-ecological policy. As illustrated in Figure 3.2, multi-disciplinary studies lack the integrated learning processes inherent in interdisciplinarity, illustrated in part in Figure 7.1. As geography is fundamentally an interdisciplinary research endeavor combining biophysical and socio-cultural elements in its analysis, it is not surprising that geography and interdisciplinarity both contained fairly balanced perspectives distributions in the impact assessment meta-analysis. Transdisciplinarity, however, supplements the integrated balance via the recursiveness of its analysis; an additional procedural step akin to the reiterative component of adaptive management practices. Transdisciplinarity builds on the integrated and holistic character of interdisciplinarity via its recursive and adaptive approaches to learning *and* through its engagement of life-world actors of the extended peer community making it an attractive methodology for socio-ecological policy. The Trinidad and Tobago case study, however, reveals that the practicalities of transdisciplinary research are neither simple nor straightforward.

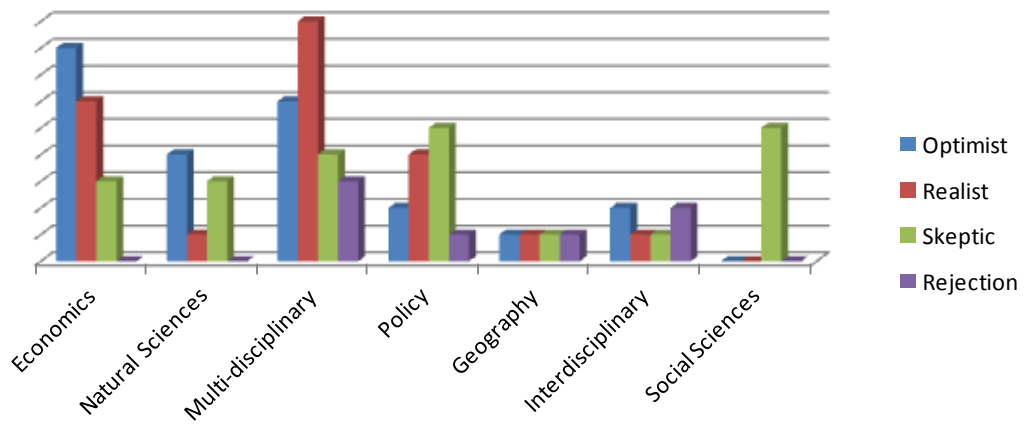

Figure 7.1: Disciplinary Distribution by Perspective across the Contexts

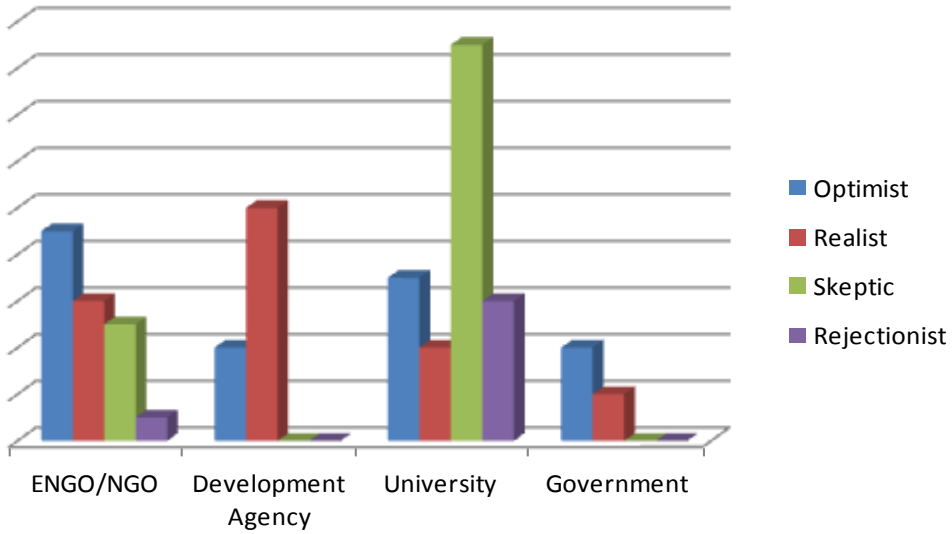

Figure 7.2: Institutional Affiliation by Perspective across the Contexts

Trends in pluralistic, self-reflective engagement were examined within the stakeholder examination of the sustainability assessment framework. As noted earlier, the sustainability assessment framework is proposed as a practical means of pluralistic, self-reflective engagement. It was selected as the practical component of the framework for socio-ecological connectivity based on its emergent status within the impact assessment community (Gibson et al 2006, Bond et al, 2013, Gibson, 2013). Other reflective engagement frameworks equally worthy of investigation include Q-Method (Brown, 1980, Robbins and Krueger, 2000) and multi-criteria evaluation (Munda, 2004, 2008).

In addition to the presence of a balanced perspectives plurality, a reflective engagement framework requires stakeholder willingness to acknowledge socio-ecological diversity. The perspectives imbalance detected across the case studies suggests a limited acceptance of diversity and a challenging context for reflective engagement. Other detected obstacles include: i) a strong direct and indirect influence of international NGOs and multi-lateral development agencies, ii) a notable absence of a critical perspective (*Rejectionists*) willing to challenge dominant economic and development patterns, and iii) national policy prioritization of economic development at the expense of conservation. The lone exception to this finding amongst the studied contexts is Costa Rica, a country whose national economic development strategy depends on natural resource conservation (Echeverria, 2010). This country's largely pro-conservation policy context does not mean that ecologically harmful decisions are never made. It merely suggests that conservation is a mandated policy objective across multiple sectors and carries sufficient weight in national policy decision-making. In terms of the other identified barriers, Figure 7.2 illustrates the basis for concern

regarding a dominance of international ENGOs/NGOs and multi-lateral development agencies within PES policy initiatives. Both stakeholder groups represent perspective biases, leaning heavily toward the *Optimist* side of the perspectives spectrum. The powerful influence of the international economic development agenda is perhaps most evident in the Ecuadorian case study context. Despite a socially progressive national government supported by an active and critical civil society and legal and cultural recognition of the rights of nature, the programmatic alternative to the internationally favored REDD+ initiative, i.e. the Yasuni ITT proposal, was abandoned due to the lack of support from international stakeholders. The rigidity of the international community to consider alternative means for achieving the articulated ideals of 'sustainable development' is perhaps the greatest barrier to any new sustainability conceptualization. It is argued, based on the perspective analysis across these established PES contexts, that PES as a conservation policy demonstrates little capacity to encourage socio-ecological connectivity.

7.3 PES Observations – Lessons and Limitations

Payment for ecosystem services is promoted at multiple levels of environmental governance as a cost-effective means to realize identified sustainable development goals of ecological protection, improved social well-being, and socio-ecologically 'responsible' economic development. Sustainable management of forest ecosystems is particularly amenable to PES given the range of readily identifiable forest-based ecosystem goods and services. Forest carbon sequestration services in the context of climate change mitigation and adaptation are arguably the most 'attractive' ecosystem service currently available for exchange. The case study contexts examined

for this research each have a established history with PES initiatives, and each has achieved varying degrees of success in achieving the above highlighted sustainable development goals, albeit none solely at the hands of PES. The intent of this research was not, however, to analyze directly the efficacy of the PES model in the identified contexts. This research instead analyzed the potential of the PES policy mechanisms to transition sustainable development policy away from static targets and rigid assessment metrics toward a process-driven endeavor capable of engaging diverse and pluralistic stakeholder groups in reflective discussion on how best in a given context to achieve the universal goal of sustainable development – and equitable, just and sustainable world in which the rights and interests of all stakeholders are incorporated (Morse, 2008).

Recognition of the need to transition toward a more process-oriented objective emerged from both the literature on PES and the literature on sustainability; two unique and interconnected concepts flush with contested meanings and corresponding operational challenges. Operational recommendations emerging from sustainability assessment literature repeatedly suggest a need for programmatic flexibility to accommodate socio-ecological complexity and adapt to rapidly changing and dynamic socio-ecological contexts. "*We must become able not only to transform our institutions in response to changing situations and requirements; we must invent and develop institutions which are 'learning systems' capable of bringing about their own continuing transformation*" (Raynor et al, 2010:3). While efforts to operationalize sustainability in *theory* acknowledge these concepts (flexibility, adaptability, uncertainty), their practical application is much less well documented. One reason is perhaps a philosophical barrier to an embrace of variability and uncertainty within a

dominant science and technology mindset of certainty and predictability (Meppem and Gill, 1998). Other explanations gleaned through interactions with researchers and practitioners from various sustainability oriented disciplines[93] include a lack of trust amongst stakeholders that equitable and democratic engagement is even possible, and a sectoral pre-occupation of many social science researchers with education and health issues. What is needed for sustainability, however, is not abandonment of scientific and economic perspectives, but rather the establishment of a process which endeavors to balance ideological dominance through pluralistic engagement.

> *"Our successful pursuit of sustainability clearly demands for consciously directed, better integrated, more iterative, and more flexibly adaptable overall approaches to understanding our challenges and options and deciding what to do about them." (Gibson, 2001:357)*

Over the past decade the PES literature has evaluated many of the model's logistical challenges and theoretical contradictions, including the need for clearly defined resource tenure and ecosystem service ownership, the limited administrative capacity to ensure effective ecosystem service exchanges, and the inevitability of trade-offs between the model's 'win-win-win' efficiency, effectiveness, and equity promises. Emerging from these analyses is a recognition of the value-based nature of

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[93] Between Dec. 2012 and Oct. 2013 the sustainability impact of a PES perspectives spectrum was presented at multiple conferences with attendees representing different points on the perspectives spectrum. ACES: A Community of Ecosystem Services (Dec. 2012) was strongly Optimistic. International Association of Impact Assessment Ecosystem Services Symposium (Feb 2013) adopted a technical Realist approach. Grabbing Green (May 2013) was decidedly Rejectionist, and US Society for Ecological Economics (June 2013) was both Skeptical and Pluralistic.

PES mechanisms and the potential for bias in establishing priority ecosystem service regions, identifying beneficiary populations and participation criteria, designing conditions of exchange, and perhaps most importantly the choice of service to be exchanged. Prior to their bending, like flowers to the sun, toward a preoccupation with carbon sequestration services and an international climate change agenda, PES initiatives across the various case study contexts were established to address localized socio-ecological issues such as watershed protection, adequate natural resource inputs for (local and national) development, and socio-economic well-being. Costa Rica's PSA was developed to re-establish a heavily diminished national forest cover needed by its local economy first in the form of timber and subsequently to support its ecotourism industry. Brazil's *Bolsa Floresta* and *Juma* Sustainable Development Reserve initiatives endeavor to address rural poverty and illegal habitat destruction; Pimimpiro seeks to improve local water quality. Presently, the objectives of Trinidad and Tobago's NSRP are somewhat vague, potentially serving as little more than an opportunity for political grandstanding and certainly less focused on a very early objective of wetland restoration and development of sustainable livelihoods for residents of the Swamp's neighboring communities.

Understanding the evolution of PES objective for each of the case study contexts raises the issue of scale vis-à-vis the sustainability potential of PES, scale of initiative objective, scale of implementation, and scale of stakeholder engagement. While the inherent economic bias of the PES mechanism presents a perspectives bias that could impair prospects for socio-ecological connectivity, attention to scale is proposed as means to create pluralistic engagement openings. Local is suggested as better. A more local context (municipal, watershed or ecosystem) quite simply offers

more logistical opportunities for physical interaction and the corresponding dialectical engagement of pluralistic perspectives in order to collectively determine ecosystem service values. "*Meaningful ecosystem service values are meant to result not from an aggregations of individual preferences, but instead from the consensus achieved through public debate; a notion rooted in the intuitive ideal of a democratic association through which the elucidation of social value proceeds through public argument among free and equal citizens*" (Wilson and Howarth, 2002:435). Calls for collaborative processes which acknowledge values plurality are as old as the sustainable development debate. (See Box 7.1) The increasingly globalized world in which sustainability issues are now considered, however, seems to force a continual upscaling of the policy initiatives proposed to address sustainability's ecological, social and economic components, often at the expense of local needs in these areas. The failure of Ecuador's Yasuni-ITT avoided deforestation model had to be abandoned in favor of the more globally accepted REDD+ proposal. Adopting the highly integrated character of transdisciplinarity for scalar as well as disciplinary and stakeholder diversity considerations offer a potential window of opportunity to collectively determine PES goals and operational logistics that are more contextually relevant that those proposed by global market-based economics.

There are multiple theoretical and operational challenges to PES' post-sustainable development potential. The one highlighted specifically by this research is the lack of perspectives balance. Insufficient problem framing, imbalanced problem ownership, lack of integration, lack of process credibility, and production of distorted results could all be considered functions of limited engagement of perspectives plurality. Strategies with the potential to improve pluralistic engagement include joint

project leadership, stakeholder mapping, adoption of collectively determined knowledge integration models, and transparent processes for collective stakeholder identification of roles and expectations. Throughout each of the recommendations is the inherent assumption that such actions will acknowledge the historical and cultural elements unique to the identified socio-political context. It is suggested, based on the analyses in Chapters 5 and 6, the influence of the international-scale political economy is one of the most powerful influences on national and various sub-national socio-ecological contexts. This level of influence impacts both agenda setting as well as processes of engagement via its perceived ideological superiority and practical economic might. The Trinidad and Tobago stakeholder community was challenged to propose alternative methods of stakeholder engagement in participatory assessment processes outside of the standards consultation and one-directional information exchange. Even when an alternative approach to stakeholder engagement (e.g. a community 'cook up' in which information exchange takes place via informal conversation) was proposed, the anticipated inability of securing financial support for such 'unproven' and seemingly unstructured methodologies prevented these types of innovation and potentially more contextually meaningful engagement practices from being pursued.. So while the international sustainable development community continues to call for increased stakeholder 'participation,' it is in practice only marginally supportive of any plurality of potential engagement processes and instead remains committed to established stakeholder identification and communication processes that have not achieved their desired results in terms of behavioral change toward greater sustainability.

BOX 7.1: Historical Calls for Collaborative Engagement from Sustainable Development Literature

Bingham et al (1995): "*The challenge of improving ecosystem valuation methods presents an opportunity for partnership – partnership between ecologists, economists, and other social scientists, and partnership between research and policy communities. Interdisciplinary dialogue between ecologists, ecologists, economists, and other social scientists is essential to the task of developing improved methods for valuing ecosystem attributes." p. 90*

Hunsburger (2005): "*A sustainable society must address intertwined requirements for ecological integrity, democracy and civility, precaution, equity, efficiency, and human sufficiency and opportunity*." p. 613

Kosoy and Corbera (2008): "*PES should be viewed as a window of opportunity, allowing for a co-existence of value systems rather than imposing the language of valuation."* p. 2082

Turner et al (2008): "*Given the nature of the indirect, cumulative, and interconnected invisible losses identified here, it seems unlikely that they can be addressed by simple tweaks to the status quo. What Is needed is a commitment to explore new and innovative alternatives to natural resource management…..alternatives that allow fundamentally different kinds of costs and benefits to be given equal visibility and standing within the process.*" p. 12

Fish (2012): "*Discussions about what matters and why are at the heart of resolving this dilemma. Rather than setting facts and values apart, a new analytic-deliberative decision making approach actively meshes them together , dealing with all the uncertainties pervading the 'evidence-based decision making in an open and responsive way.*" p. 678

Chouinard (2013): *"The issue of participatory evaluation is not about which methods to use, but whose voices to include, how to include them, the determining who will speak for whom. Decisions about method choice to no come from any a priori philosophical or methodological preference, but rather from the participants themselves and from the exigencies of the program and community context." p. 241*

Whereas a localized scale is believed to offer greater opportunity for pluralistic engagement, the ecosystem services concept, acknowledged for its eye-opening potential when not advanced to a stage of valuation and exchange, also has the potential to promote pluralism and socio-ecological diversity. Pluralistic engagement

as proposed by transdisciplinarity and the sustainability assessment framework, however, requires a self-reflective form of engagement. The self-reflective qualifier means that engagement must acknowledge, expose and do its best to neutralize the value disputes and power differentials operational in any given context. "*Participation in the policy process is a necessary but insufficient condition. The problem of power asymmetries must also be addressed. As it stands, mainstream state institutions, private sector groups, and international environmental NGOs benefit the most from the status quo*" (Silva, 2003:115).

Post-sustainable development theory suggests that self-reflective engagement requires making transparent dominant, hegemonic forces and beliefs, and empowering less dominant perspectives to equitably contribute to determining policy goals and objectives. Emerging social science studies on engagement suggest that self-reflective processes are only possible via connections fostered through vulnerability and empathy; radical concepts which encourage 'outrospection' and which are seemingly in direct contradiction of 20th century society's ideals of competition and individualism (Krznaric, 2010). Empathy not only requires engaging with vulnerable populations, it equally demands engaging dominant, hegemonic actors in order to understand directly the inherent values of these pluralistic populations and how those values translate into action. Self-reflective engagement does not necessarily require agreement or consensus but understanding of why different populations believe act in particular ways (Krznaric, 2014). Researchers in the field of empathy suggest that ongoing struggles to address the biospheric climate change crisis are hampered precisely by a lack of empathy across space (between countries) and time (future

generations), an unwillingness to expose hegemonic ideals of competition and individualism across countries and across generations (Krznaric, 2012, Rifkin, 2010).

The insights and recommendations emerging from this investigation of the PES conservation policy reveal that when the eye-opening concept of ecosystem services is advanced to an economic framing its innovative potential to promote a new sustainable development discourse is curtailed. This research proposes the SEC framework, socio-ecological plurality, transdisciplinary engagement of an extended peer community, mutual learning via pluralistic engagement, and the importance of understanding socio-ecological contexts including the components which influence perspectives plurality as important components of a policy process with the potential to ensure that innovative concepts remain contextually relevant. Evidence exists to suggest that more pluralistic voices are emerging within the extended peer community of sustainability stakeholders and that dominant economic models are increasingly being questioned. Practical examples of this trend include Michael Sandel's consistently oversubscribed Yale course on Justice[94], efforts of the Occupy Wall Street Movement, and recent publications by Thomas Piketty[95] and Naomi Kein[96]. Where these movements and these writings may have failed to gain meaningful traction, however, is in their limited capacity for reflective *engagement* of pluralistic perspectives. Efforts to question the status quo frequently adopt a practice of 'preaching to the choir' in which no mutual learning is possible due to a lack of meaningful dialogue with conflicting and contradictory perspectives. Another

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[94] http://www.justiceharvard.org/
[95] Capital in the Twenty-First Century
[96] This Changes Everything: Capitalism vs. the Climate

limitation of these efforts is adoption of a highly adversarial, combative, win-lose mentality which fails to nurture any level of stakeholder trust which is fundamental for mutual learning. Some argue that these limitations are inherent and part of human nature. The mere presence of perspectives plurality, however, is testament to the argument that such barriers are more structural and filled with the conflicts and contradictions that, when rubbed together, ignite the flame of socio-ecological change. The challenge is to broaden the scope of processes which encourage meaningful engagement of pluralistic perspectives.

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APPENDIX A

DETAILED SUMMARY OF FOUR PES ASSESSMENT PERSPECTIVES

Spectrum of Perspectives Toward Payment for Ecosystem Services as a Natural Resource Management Tool				
Position	**Optimist**	**Realist**	**Skeptic**	**Rejectionist**
Ecosystem Degradation Driver	Market failure: positive and negative externalities of resource use not captured in market transactions.	Market inefficiency: market structure needs to ensure that social and biological concerns are addressed	Policy failure: interventions do not capture the interests of multiple temporal and geographical scales	Moral failure: subjugation of social relations to market management
Ideal Means to Reverse Degradation	Efficient, cost-effective interventions which create supply/demand for ecosystem services	Efficient and cost-effective, equitable and safeguarded interventions which create supply and demand for ecosystem services	Build institutional and enforcement capacity of existing institutions to better manage natural resources	Enhance public awareness of the full value (not price) of nature
Conservation Philosophy	Neoliberal conservation – conservation for purely utilitarian purposes	Green Governance and economic incentives can enhance ecosystem service delivery	Landscape or Ecosystem Conservation – scale and conditions of political economy have implications for conservation interventions	Nature Preservation for intrinsic value
Nat Resource Management Policy Goal	Increased forest cover, enhanced forest carbon	Delivery of multiple ES goods and services, including sustainable livelihoods and biodiversity conservation	Long term behavioural change towards universal (global) sustainable resource use	Nature preservation as a moral imperative
Concerns	Sustainable Finance, minimization of transaction costs	Unintended social and biological impacts, efficiency and equity gains must be balanced	Underlying institutional degradation drivers (lack of capacity and resources, sectoral conflict	Lack of a strong public conservation ethic
	Additionality, Conditionality	ES markets are heavily dependent on external inputs, no independent price discovery	Resource commodification will likely exaggerate existing inequalities and further marginalize poor populations.	Behaviour once guided by ethical obligation and communal regulation becomes guided only by individual economic self-interest.
	How to minimize transaction costs which increase with greater targeting (for effectiveness) and monitoring (for efficiency)	Need to understand social costs beyond those of direct and indirect transaction costs	Global carbon PES is little more than a shift focus from aggressively pursuing a low carbon development path.	Framing conservation and development challenges in the language of markets underestimates complexity

Spectrum of Perspectives Toward Payment for Ecosystem Services as a Natural Resource Management Tool (cont'd)				
Position	**Optimist**	**Realist**	**Skeptic**	**Rejectionist**
Assessment Methodology	QUANTITATIVE – dominance of CBA mentality	MIXED - quantitative and qualitative methods need to assess market structure, functioning and evolution	PARTICIPATORY - Deliberative methods (focus groups, citizen juries, consensus conference, deliberative polls) and multi-criteria assessment.	Ethnography
Assessment Questions	Increased area of forest cover, land area enrolled; # of participants; revenue generated; distributional impact; ES delivery	In addition to outcomes, evaluation should assess transaction costs.	Governance mechanisms should be measured for their accountability, inclusion, and transparency.	What is the socio-nature created by nature commodification.
	Impact on participant and non-participant behavior	Why and How do markets evolve, e.g. what are the institutional and power relation conditions which impact ES markets.	How does design address geographical scale.	What role for local knowledge?
	Trend is toward working landscapes in which payments/incentives are provided for certain land management practices. Provides more flexibility, and closes gap between private and public benefits	Clear, understood, and trusted governance mechanisms tend to be found at smaller scales.	Socially defined units of service, value, payment structure, monitoring, accountability mechanisms MAY succeed in enhanced ES delivery	
Supportive Authors and Institutions	Pagiola, Wunder, Engel, Rosa, Richards, Dailey	Landell-Mills, Porras, Arriagada, Goldman, Miranda, Mayrand, Paquin	Kauffman, Pirard, Gupta, Muradian, Viana, Turner, Thompson, Börner	Childs, Robertson, McCauley, Smith, Fletcher, Bakker, Gomez-Baggethun, Igoe and Brockington
	United Nations, World Bank, International Institute for Environment and Development (IIED), World Wildlife Fund (WWF)	Center for International Forest Research (CIFOR), World Conservation Union (IUCN), Conservation International	Right and Resources Initiative	Greenpeace, Friend of the Earth

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APPENDIX B

TRINIDAD AND TOBAGO SUSTAINABILITY ASSESSMENT ANALYSES GUIDE

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Gauging the Potential of Sustainability Assessment in Trinidad and Tobago

"Learning derived from analyzing meanings and implications of plural interpretations of effectiveness represents the most constructive strategy for advancing impact assessment and policy integration theory."
(Bond et al, 2013: 47)

Pt 1: WHAT IS SUSTAINABILITY ASSESSMENT?

Sustainability Assessment is a monitoring and evaluation framework which encompasses principles from Sustainable Livelihoods (SL), Participation and Benefits (P&B), Political Ecology (PE) and Environmental and Strategic Impact Assessment (EIA/SEA) evaluation frameworks. Sustainability Assessment extends beyond the scope of these frameworks as it adopts social *well-being* as an objective, expanding the goal of sustainable livelihoods (secure income and assets, access to food, shelter, clothing, and other necessities) to also evaluate conditions of health, social relations, security, and freedom of choice. It further proposes to understand the relationships and dependencies of each of the well-being components not merely assessing their existence. (Fisher et al, 2013) It further proposes to assess more than outputs and efficiency by connecting impacts of particular policies and programs to the broader set of sustainability goals and objective.

A Sustainability Assessment framework is based on the premise that sustainable development (SD) is the best and most appropriate approach to environmental governance. The framework recognizes, however, that the operational goal of sustainable development is open to refinement according to the ecological, social, political and cultural conditions of the host or recipient context. Operationalizing SD is challenged by a lack of consensus of the primary issues (weak vs strong sustainability), choice of indicators (assessment of inputs, process, or outcomes), how to accommodate equally pluralistic views about the normative goals of sustainability. (Bond et al, 2013)

Sustainability Assessment involves the following components:

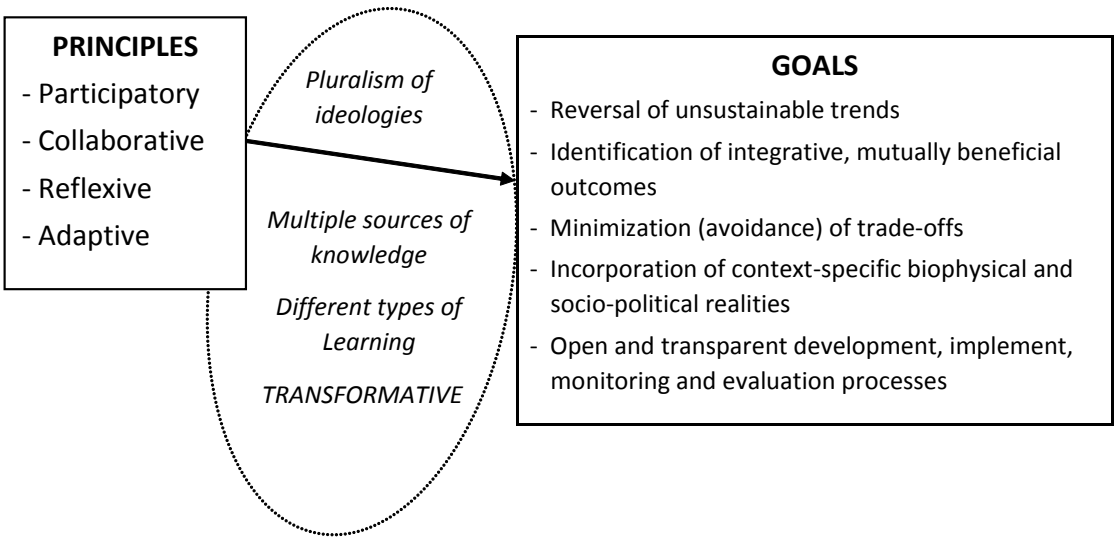
i) Procedural (were procedures and standards followed),

ii) Substantive (have overarching goals been met),

iii) Transactive (how efficiently in terms of time and resources have goals been met),

iv) Normative (what is the consensual position of a plurality of goals and standards). (Gibson, 2006)

Sustainability Assessment is guided by the following principles:



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Pt II: How receptive might your organization be to adopting a Sustainability Assessment Framework?

PRINCIPLE:	How does your organization define sustainability? (e.g. is the emphasis on sustainable development, sustainable livelihoods, other)
CRITERIA and INDICATORS:	What are 3 – 5 criteria which are typically used (by your organization) to assess sustainability? (or which would be considered representative of sustainability)
CONTEXT:	What are 3 – 5 factors/conditions which support achieving these criteria?
	What are 3 – 5 factors/conditions which challenge achieving these criteria?
PROCESS	Who might your organization identify as best suited to oversee and implement assessing sustainability of a) programs, b) plans, c) policy?
	What data collection methods might be most effective?
	What should be done with the data once collected?

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APPENDIX C

DETAILS OF TRINIDAD AND TOBAGO PAYMENT FOR ECOSYSTEM SERVICES (PES) INITIATIVES

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Nariva Restoration, Carbon Sequestration and Livelihoods Projects (NSRP)

"This flagship project represents Trinidad and Tobago's first entry into the carbon market where the gains from new human induced forest growth represents carbon stock that can be monetized on the international carbon market and enhance revenue generation." Dr. Roodal Moonilal, Minister of Housing and the Environment in EMA NSRP Documentary.

The Nariva Swamp Restoration Initiative (NSRI) dates back to 1999 when the Government of Trinidad and Tobago dedicated technical and financial resources to implementing the recommendations of an Environmental Impact Assessment (EIA) and subsequent Nariva Swamp Management Plan developed by the Institute of Marine Affairs (IMA). The Nariva Swamp, the country's largest freshwater wetland, had become severely degraded in the 1980s and early 1990s as a result of large scale rice farming, uncontrolled bush fires, and other unsustainable human influences. Local conservationists drew binternational attention the plight of the Swamp and were instrumental in securing its status as a Ramsar Site in 1992.[97] Nariva further attracted international agency support (Ducks Unlimited and the World Bank) in the form of technical and financial assistance with restoration.

In 2006 a significant portion of the swamp was declared an Environmentally Sensitive Area (ESA) under the Environmentally Sensitive Area Rules (2001) which are administered by the EMA. ESA declaration resulted in a legislated zoning for activities within the swamp, and the establishment of a Stakeholder Management Committee. In that same year, with financial backing from the World Bank, The Environmental Management Authority (EMA) oversaw the drafting of a reforestation and livelihoods scheme which was to form the basis of an application for funding to the locally based Green Fund.

Building on an EMA-funded pilot in 2008 in which three Nariva-based CBOs (Voice, Plum Mitan Enhancement Community Group, and Plum Mitan/Biche Farmers Group) collectively reafforested 15 ha of degraded swamp forest. The Nariva Swamp Restoration, Carbon Sequestration and Livelihoods Project (NWRP) was officially launched in 2010 having received a US $10 million grant from the country's Green Fund. Eleven community groups have since planted an additional 100 ha with seedling generated within local community nurseries. The NSRP aims to rehabilitate

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[97] The Convention on Wetlands of International Importance was signed in Ramsar, Iran on February 2, 1971 to raise awareness of the need to protect important wetland ecosystems. February 2 is now celebrated annually at World Wetlands Day.

and restore the ecological and hydrological characteristics of the nation's largest freshwater wetland through reforestation, fire prevention, and sustainable use and management is to develop livelihoods based on sustainable use. A significant component of the project, therefore, is to develop the capacity of local communities to engage in such activities and to become active participants in natural resource management.

The project is considered to be a collaborative project between the EMA, UWI, and the Forestry Division with funding from the Green Fund. The managerial arrangements of this collaboration, however, remain unclear. The EMA has an MOU with UWI to conduct hydrological and carbon measurement research. The MOU with Forestry Division is still being negotiated.

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PROECOSERV (Project for Ecosystem Services) Trinidad and Tobago

"ProEcoServ aims to better integrate ecosystem assessment and economic valuation of ecosystem services into poverty reduction and national sustainable development planning. (Caura Report, pg. 1)

ProEcoServ is a four year GEF-funded global initiative designed to integrate ecosystem valuation, scenario development and economic valuation of ecosystem services into sustainable development national planning. (www.proecoserv) Ecosystem services are the benefits humans receive from nature. (MA, 2005) Ecosystem service valuation (e.g. assigning a "robust" monetary estimate to these benefits) is understood by the project as a process contingent on creating linkages between ecosystem functions /services and human benefits. Transformation of dominant cultural views and attitudes toward resource use is, therefore, a component of ecosystem valuation.

Launched in 2010 with technical support from the UNEP, the ProEcoServ project seeks to provide tools and models to support mainstreaming ecosystem services into national level development planning and policy making. The Project is currently being piloted in five countries (Vietnam, Chile, Trinidad and Tobago, Lesotho, and South Africa). In the Trinidad and Tobago context, the project involves three case study areas: eastern Northern Range, Nariva Swamp, and Bucco Reef/Bon Accord Wetland in Tobago. The latter two sites are internationally recognized wetlands under the Ramsar Convention.

At present, the identified objectives for the Trinidad and Tobago pilot include:

- Insert ecosystem services and geographical areas of high ecosystem service delivery in national spatial planning models,
- Develop a PES model to access 'eco-financing' from the Green Fund[98].
- Insert ecosystem quantification and valuation findings – albeit only partial – into a system of national accounting, e.g. a revision of GDP as the defining indicator of economic progress and social wellbeing. Preliminary estimates suggest the contribution of [measurable] ecosystem services is approximately 3.5% of national GDP in 2010 (US$700 million).

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[98] The Green Fund is a national fund established in 2001 by a 0.01% tax on gross receipts of all entities registered under the Companies Act. The tax revenue is earmarked to assist NGOs, CBOs, and other civil society organizations to engage in environmental conservation activities. As of Sept. 30, 2012 the fund had TT$2.6 billion.

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Although one of the project's subsidiary goals is the engagement of national and local stakeholders and strengthening of multi-scalar linkages in problem development and goal setting, it has been suggested by several local level stakeholders that this outcome remains purely inspirational as UNEP-GEF and MA continue to drive the project's agenda in order to meet international objectives.

The language of some of the preliminary reports support this top down approach, suggesting the need to secure "buy-in by local stakeholders". There is also a strong belief that increased awareness of economic value will engender a more sustainable response, although there is no evidence in the PES literature to suggest such a link.

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Caura Valley Village Council Watershed Protection Program

Caura Valley has over 700 residents, the bulk of which desirous of generating livelihoods which would allow them to remain in the valley and not have to travel to town for work. There is a strong cultural ethic which respects ecological systems and the need for sustainable livelihoods, a concept which is embraced and promoted by a vibrant Village Council as well as a local Farmers Association. Caura Valley is the source of a significant portion of the organic produce generated locally. Caura Valley is also an important watershed for the country, thus national residents could benefit from quantitatively and qualitatively improved water resources. As Caura Valley is in the foothills of the very urbanized east-west corridor, improved land management practices could potentially result in reducing the perennial flooding which has been occurring with greater frequency in recent years.

*Community Led Forest Conservation – Sustainable Livelihood Developmen*t has emerged as a pilot PES project for the Trinidad and Tobago ProEcoServ Initiative. The pilot will build on the outcomes of a one year, US$ 33,000 UNDP GEF Small Grant to develop sustainable livelihoods in the form of eco tour guides and fire guardians. GEF/ SGP funds facilitated the training of 12 fire guardians, creation of some trails and fire traces, and the facilitation of a community visioning workshop. Caura Valley was also featured heavily in an earlier livelihoods initiative aiming to develop sustainable hillside farming practices. Both projects were strongly supported by a structured and comfortably funded local NGO (The Cropper Foundation). Caura Valley was also featured in a Caribbean Natural Resources Institute (CANARI) Climate change and Disaster Risk Reduction Programme funded by UNDP FEG-SGP Trinidad and Tobago. The location was selected in large part due its strong social capital. This capital was further enhanced through the CANARI project which involved the community in the determination of project focus through pre-project consultations as well as engaging the community in the monitoring and evaluation of the project.

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Fondes Amandes Community Reforestation Project (FACRP)

The Fondes Amandes Community Reforestation Project (FACRP) began in the mid 1980s with the efforts of young family led by the late Tacuma Jaramogi to restore the degraded hillsides of the Fondes Amandes watershed through organic agroforestry activities. Although the Jaramogis began their efforts without the official backing of Water and Sewerage Authority (WASA), the agency with responsibility for management of that particular portion of the watershed, WASA and the Trinidad and Tobago Forestry Division quickly recognized the benefits being provided by the project, specifically enhancement of the ecosystem services of improved water quality, reduction of soil erosion and enhanced flood protection, as well as improved biodiversity. Realization on the part of the authorities of the need to engage in management partnerships was also solidified following a year of devastating bushfires (1987) and subsequent St. Ann's Flood (1993).

An unofficial arrangement was established in which the Project (formalized as the Fondes Amandes Community Reforestation Project in the late 1990s) was allowed to continue[99], and has grown into an internationally recognized community reforestation model in large part due to the vision and commitment of the Project's co-founder and Managing Director, Ms. Akilah Jaramogi. In addition to the 15 ha of WASA controlled lands, the project has encompassed small holdings within the community, as well as a large portion of state lands which are managed by the Commissioner of State Lands.

The mission of FACRP is to conserve the St. Ann's watershed, using ecological restorative methods and activities which simultaneously develop and uplift the community. The Project is currently engaged in activities such as tree planting, forest fire prevention, organic gardening /permaculture /animal husbandry, a community run organic nursery, community eco-tourism, community recycling/composting, environmental education, and outreach. The Project has identified the following goals:

- to encourage community development and create opportunities for employment for the Fondes Amandes community;
- to promote the development of sustainable, responsible eco-tourism in the St Ann's watershed;
- to protect the biodiversity of flora and fauna in the St. Ann's watershed; and
- to work with other communities and organizations throughout the region who share the Project's goals.

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[99] At one stage early in the Jaramogi's tenure on the state lands under WASA jurisdiction there was an effort to remove the family initially considered to be squatting.

APPENDIX D

SUMMARY OF TRINIDAD AND TOBAGO STAKEHOLDER ANALYSES OF THE SUSTAINABILITY ASSESSMENT FRAMEWORK

Summary of Stakeholder Feedback on Sustainability Assessment Framework					
Effectiveness Levels	**NORMATIVE** *How is sustainability defined)*	**PROCEDURAL** *(deal assessment process)*	**SUBSTANTIVE** *(Criteria to assess sustainability)*	**TRANSACTIVE**	
				Enabling Conditions	*Challenges/Barriers*
Project Proponent	Full engagement and participation of all stakeholder groups in natural resource management and decision making Financial and technical capacity to maintain initiatives once they are launched	Coordinated Management Actions Active Public Outreach Monitoring and enforcement of policy and supplemental legislation	Institutional and regulatory framework to support participatory management Culture of trust between stakeholders, respect for multiple sources of knowledge and expertise Sustainability of required inputs and resources	Vibrant community groups Increased levels of public awareness for environmental issues Local funding to support conservation activities (Green Fund)	Lack of champions – at all scales of governance Lack of institutional infrastructure for co-management Funding to support project implementation Support from leadership of relevant regulatory agencies
Government/ Regulatory	Reducing poverty and improving social well being through environmentally sensitive economic growth. (traditional, Bruntland Commission conceptualization)	Economic growth and job creation Poverty eradication through human capital development Transparent policies processes which support equity and participation …to deliver a social and economic transformation.	Environmental Impact Assessments as required under Certificate of Environmental Clearance (CEC) rules Additional health and social assessments are highlighted in national planning documents. Significant tie in to internationally identified goals (UNFCCC, CBD, MA) and assessment frameworks.	Home to world's oldest legally protected reserve – Tobago Main Ridge Forest Reserve established in 1776. Existence of supportive policy Existing cases of successful community based natural resource management, most notably turtle protection	High levels of transition in key agencies/positions, e.g. loss of institutional knowledge and capacity and often loss of champion Hierarchical power/knowledge structure amongst stakeholders Overlapping and antiquated regulatory framework Inadequate institutional framework to implement, monitor and evaluate
Research/ Academic (2)	Maintenance of the resilience and adaptability of essential ecosystems	Pre-policy consultations with stakeholders to ensure broad-based, interdisciplinary stakeholder engagement Enactment and enforcement of subsidiary legislation so that policy can be operationalized (theory can lead to action)	Ecosystem services become a key consideration in all decision making for both public and private sectors. (Policy uptake) Intersectoral advisory and management committees for all essential ecosystems Expansion and strengthening of stakeholder partnerships	Increased levels of public and private sector environmental awareness as a result of decades long campaigns through local and international networks	High level of transition of individuals within key agencies Political interference in appointment of advisory boards and committees Inadequate regulatory and institutional framework to permit and protect participatory management arrangements

Summary of Stakeholder Feedback on Sustainability Assessment Framework					
Effectiveness Levels	**NORMATIVE** *How is sustainability defined)*	**PROCEDURAL** *(Ideal assessment process)*	**SUBSTANTIVE** *(Criteria to assess sustainability)*	**TRANSACTIVE**	
				Enabling Conditions	*Challenges/Barriers*
Beneficiary	Sustainable Livelihoods (river guardians, fire protectors, game wardens, organic farmers, agroforestry practitioners, ecotourism operators.	Obtain appropriate clearances, lease and tenure agreements for community level management Improved terms for funding/technical assistance (e.g. removal of conditionalities once capacity demonstrated).	Number of people trained Increased livelihood opportunities Capacity of local groups to engage in management decisions, e.g. level of authority and autonomy ceded to local level	Cultural and historical ties to the land Willingness to engage in partnerships with spectrum of stakeholders	Disregard on the part of funders and project managers to complex and varied community dynamics Lip service paid to concept of participatory management Small % of international conservation funding actually benefits local communities
Civil Society	Stakeholder capacity for self-sufficiency Shared management decision-making, including implementation and evaluation Socio-ecological resilience	Need for better baseline data Broader acceptance for often unstructured, participatory methods of implementation, monitoring and evaluation Build capacity of local NGOs and CBOs	Enforcement of existing policies, laws, and regulations Increased capacity of community to protect and manage natural resources Expansion of partnerships for resource management	Pockets of communities with concern for living sustainably off the land Handful of champions with various stakeholder categories	Short term time frame PR driven agenda of donors and politicians Dominance of natural scientists and political actors in natural resource management Cultural barriers to learning from (e. g. admitting) mistakes Historical power structures which limit public participation
Foreign Actors	Create governance partnerships to address global environmental issues which also support local sustainable development goals (UNDP – chemicals, climate change, biodiversity, international waters, land degradation)	Capacity development Applied research/policy analysis Networking and dialogue	Assessment needs to be externally driven to ensure validity (4) Dollar value of support given # of grants awarded/# of communities assisted	Increased levels of environmental awareness and advocacy	Lack of local capacity
1 – There is significant divergence in perspectives amongst Units of Ministries, amongst Ministries, and between Ministries and Regulatory Agencies. The perspectives presented here are the stated position of the central government according to national planning documents.					
2 – Research and academic stakeholders consulted tended toward those in the sciences, thus a socially driven research agenda was not necessarily captured.					
3- Beneficiaries in this context are those community organizations recognized as being environmental stewards.					