Payments for Ecosystem Services Programs & Development Goals: How have different interaction strategies with local institutions impacted PES program outcomes?

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A major research paper submitted in partial fulfillment of the requirements for the Master's degree in Globalization and International Development

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Stefan Innes, Ottawa, Canada, 2018

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1. Introduction

Finding a balance between environmental conservation and development is critical to human well-being on the planet and while this is widely acknowledged, few programs or policies have successfully looked to address both issues and even fewer have had any success. The planet's natural ecosystems provide countless services that ensure human existence and development; however, the land-owners who own parts of these ecosystems are rarely compensated for the services they generate for others.[1] Payments for Ecosystem Services (PES) is a market-based instrument (MBI) that attempts to induce environmental conservation through direct payments to ecosystem service providers. Because of the potential overlap of environmentally sensitive areas and poor landowners, particularly in developing countries, PES programs have also been widely cited as having the potential to reduce poverty.[2] However, there is often a tension between achieving environmental conservation and program equity, both theoretically and practically, with a focus on one potentially hampering the achievement of the other. Due to current design and implementation practices, it is often the case that changes made to encourage environmental efficiency in PES programs can lead to negative impacts on programs' ability to address livelihood outcomes, and vice versa. These potential trade-offs between environmental efficiency and social equity outcomes are a barrier to potential synergies found in PES programs. For PES, and like many other so-called 'win-win' solutions, the reality often differs from theory and thus PES programs have typically achieved livelihood impacts on a sliding scale from 'no harm' to 'small local benefits'. Because of this tension, few ways have been identified as to how PES programs can achieve both outcomes simultaneously.[3]

PES theory indicates that in order to have the most environmental impact, programs must keep a narrow focus on efficiency. However, this theoretically ideal, efficiency-focused model of PES program would seem to be at odds with the flexibility and adaptability that has made these programs popular in situations where poverty reduction is also an objective. As McAfee and Shapiro show, "the translation of PES schemes from paper to practice reveals tensions between

[1] Stefano Pagiola, Agustin Arcenas, and Gunars Platais, "Can Payments for Environmental Services Help Reduce Poverty? An Exploration of the Issues and the Evidence to Date from Latin America," *World Development* 33, no. 2 SPEC. ISS. (2005): 238.
[2] R. Muradian et al., "Payments for Ecosystem Services and the Fatal Attraction of Win-Win Solutions," *Conservation Letters* 6, no. 4 (2013): 274.
[3] Tom Clements and E. J. Milner-Gulland, "Impact of Payments for Environmental Services and Protected Areas on Local Livelihoods and Forest Conservation in Northern Cambodia," *Conservation Biology* 29, no. 1 (2015): 79.

the conservation-first, market efficiency, and "pro-poor" priorities endorsed by different PES advocates."[4] This tension is reflected in many PES programs that attempt to achieve multiple outcomes and is the basis of one of the core debates concerning the conceptualization of PES programs. These differing approaches to the conceptualization of PES programs are often seen as arguments for efficiency versus equity. This is the issue encountered by many PES programs in developing countries. As resources are often limited, programs must balance being 'fairly efficient and efficiently fair' to ensure a sustainable provision of both ecosystem services and livelihood outcomes.[5]

PES programs have generally attempted to balance these objectives, when desired, in two ways.[6] First, by either adapting program design and/or implementation to ensure poor participants have access to, and benefit from, the program. Second, rather than focusing on the program design itself, programs have attempted to achieve livelihood outcomes through a focus on non-monetary co-benefits of implementation such as stronger land tenure rights – usually a burden assumed by an outside institution.[7] Programs rarely implement these methods individually, rather, programs usually find some combination of both depending on local circumstances and the strength and willingness of local institutions. While an extensive literature has been written concerning both PES program theory and implementation, especially along the lines of program effectiveness and design, fewer questions have been asked concerning the interaction of PES with local programs as well as how these links have impacted programs outcomes. The link with local institutions will therefore be the focus of this paper.

It is recognized that PES programs must have at least some links to local institutions to succeed. However, relatively few authors have examined these links and therefore the link between interactions and program outcomes is poorly understood.[8] It is also found that PES

[4] Erik Gómez-Baggethun et al., "The History of Ecosystem Services in Economic Theory and Practice: From Early Notions to Markets and Payment Schemes," *Ecological Economics* 69, no. 6 (2010): 1213.
[5] Beria Leimona et al., "Fairly Efficient, Efficiently Fair: Lessons from Designing and Testing Payment Schemes for Ecosystem Services in Asia," *Ecosystem Services* 12 (2015): 16.
[6] Genowefa Blundo-Canto et al., "The Different Dimensions of Livelihood Impacts of Payments for Environmental Services (PES) Schemes: A Systematic Review," *Ecological Economics* 149, no. March (2018): 160.
[7] Ibid.
[8] Tanya Hayes, Felipe Murtinho, and Hendrik Wolff, "The Impact of Payments for Environmental Services on Communal Lands: An Analysis of the Factors Driving Household Land-Use Behavior in Ecuador," *World Development* 93 (2017): 428.

programs tend to be part of broader development strategies.[9] In addition, it has been shown that while stronger links with local institutions may increase the administrative burden and complicate or slow the implementation of PES programs, these links are important for the longevity of the program as well as the support and empowerment of these same institutions.[10] Thus, the impact of institutional connections are not always predictable and strong conclusions based on interactions have not been drawn. This paper will therefore look to better identify relationships between PES programs and local institutions that aid in the successful achievement of both environmental and development outcomes by examining program interactions with local institutions. By identifying how PES programs interact with other local institutions this project will show the variety of practices present and thus attempt to reach conclusions as to how interactions impact program outcomes. Identifying such synergies could help better inform the implementation of future 'pro-poor' PES programs that attempt to balance both objectives.[11]

Given this, the following research question is proposed:

> How have Payments for Ecosystem Services programs' different interaction strategies with local institutions impacted their ability to achieve program outcomes?

To explore this question, the present paper conducts a literature review followed by an examination of key case studies. The results of this analysis are then compared within and between cases to reach conclusions concerning how PES programs are interacting with local institutions and how these interactions are impacting program outcomes. Overall conclusion are then drawn showing both effective and ineffective practices. While few outcome indicators are comparable across all cases, the outcomes of these interactions can generally be compared by grouping outcomes by area of impact. Building on early research that indicates a link between local institutions and a focus on non-monetary gains (as will be outlined below), it is shown that that program interaction with local institutions tended to shift the focus of the program to the livelihood outcomes rather than focusing directly on ensuring a balance of outcomes. This was done through a focus on maximizing participation and program adaptability to specific local

[9] Giulia Irene Wegner, "Payments for Ecosystem Services (PES): A Flexible, Participatory, and Integrated Approach for Improved Conservation and Equity Outcomes," *Environment, Development and Sustainability* 18, no. 3 (2016): 618.
[10] Tom Clements et al., "Payments for Biodiversity Conservation in the Context of Weak Institutions: Comparison of Three Programs from Cambodia," *Ecological Economics* 69, no. 6 (2010): 1283.
[11] Genowefa Blundo-Canto et al. (2018), 160.

conditions to ensure that those enrolled received the greatest possible benefit. Further, it was shown that due to the increased program sustainability offered by interaction with local institutions, these programs have the potential achieve their desired livelihood outcomes in a way that does not negatively impact environmental outcomes, indicating that in the case of PES programs, a policy mix of multiple objectives can be successful, something that is opposed to the general understanding that each externality should be address by a separate policy.[12]

2. Literature Review

The literature concerning Payments for Ecosystem Services has rapidly expanded since the idea first gained popularity as an instrument for conservation in the late 1990's and early 2000's. The theory behind PES evolved from investigations into the interactions between people and nature, specifically the need to conserve the natural world while ensuring local needs were met.[13] They also arose from early work around the idea of paying for conservation.[14] From here Sven Wunder put forward the first definition of PES as research began in earnest on all aspects of the instrument.[15] Within the literature, examinations of the balance between multiple program outcomes - usually environmental conservation and livelihood improvement - have also received a significant amount of attention.

More often referred to as the balance between efficiency and equity, this area has not only seen a significant amount of research into the more practical issues such as program design and implementation, but also features heavily in debates concerning the purpose and conception of PES. The debate concerning the need to balance program outcomes is a product of the differing conceptualizations of PES programs as referenced above. Here the literature often debates the value and practicality of implementing "PES according to the neoclassical economic theory of efficient market transactions and utilitarian human behaviour" as compared to the

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[12] See: J. Tinbergen, *Economic Policy: Principles and Designs*, Amsterdam: North Holland, 1956; and P. Lehmann, "Justifying a policy mix for pollution control: a review of economic literature," *Journal of Economic Surveys*, 26 (2012): 71–97.
[13] See: Michael Wells and Katarina Brandon, "People and Parks: Linking Protected Area Management with Local Communities," *The World Bank*, 1992, vii.
[14] See: Paul J. Ferraro and Agnes Kiss, "Direct Payments to Conserve Biodiversity," *Science* 298, no. 5599 (2002): 1718–19; R D Simpson and R A Sedjo, "Paying for the Conservation of Endangered Ecosystems: A Comparison of Direct and Indirect Approaches," *Environment and Development Economics* 1, no. 2 (1996): 241–57.
[15] See: Sven Wunder, "Payments for Environmental Services : Some Nuts and Bolts," *CIFOR Occasional Paper* 42, no. 42 (2005): 24; Pagiola (2008).

implementation of a program that attempts in some way to balance efficiency with equity in order to more closely reflect the needs of participants.[16] In this discussion, an efficient PES program would be one maximizes the production of the target ecosystem service while minimizing the cost, aiming for the greatest area of endangered forest conserved for the smallest cost. These programs can negatively impact local equity when, for example, the program only targets the largest landholders to lower transaction costs, not allowing smaller (and presumably poorer) land –owners to benefit. Discussions concerning how program design and implementation can lead to a balance of efficiency and equity often follow from these kinds of debates.

Program design has also been the focus of a significant amount of research as experts attempt to better understand how PES programs can be successfully implemented and reach their potential. This research includes looking at how program design impacts both efficiency and equity and it has resulted in numerous literature reviews and compilations.[17] The same however, cannot be said for the role of local institutions in PES implementation. While the existing literature does contain individual references to how specific institutions have helped or harmed program outcomes, few have attempted to understand the broader picture. In addition, while it is understood that links between PES projects and local institutions are crucial to their success, how exactly these relationships can best support the balance of development and environmental outcomes is poorly understood.[18] Teasing out these heterogeneous impacts of institutional interactions is important in order to determine not only their impact on local livelihoods and development but also the environmental effectiveness of the intervention.[19] This literature review will first introduce the history and development of the idea of PES before outlining its traditional

[16] Giulia Irene Wegner, "Payments for Ecosystem Services (PES): A Flexible, Participatory, and Integrated Approach for Improved Conservation and Equity Outcomes," *Environment, Development and Sustainability* 18, no. 3 (2016): 617.
[17] See: Driss Ezzine-De-Blas et al., "Global Patterns in the Implementation of Payments for Environmental Services," *PLoS ONE* 11, no. 3 (2016): 1–16; Jan Börner et al., "The Effectiveness of Payments for Environmental Services," *World Development* 96 (2017): 359–74.
[18] Dougill et al. (2012), 3180; Clements et al. (2010), 1289; Hayes et al. (2017), 438; Nicolas Kosoy, Esteve Corbera, and Kate Brown, "Participation in Payments for Ecosystem Services: Case Studies from the Lacandon Rainforest, Mexico," *Geoforum* 39, no. 6 (2008): 2082.
[19] Emilie Beauchamp, Tom Clements, and E. J. Milner-Gulland, "Assessing Medium-Term Impacts of Conservation Interventions on Local Livelihoods in Northern Cambodia," *World Development* 101 (2018): 202.

structure. The review will then unpack the tension between environmental efficiency and program equity before delving into the literature specific to balancing outcomes.

2.1 Background and History

Emerging from the human-centered view of conservation that was ushered in by the Bruntland report of 1987 and the Rio conference in 1992 as well as the growing disillusion in the ability of Integrated Conservation and Development Projects (ICDPs) to achieve both poverty reduction and environmental conservations, PES programs responded to calls for more direct conservation mechanisms.[20] This move was part of a shift from indirect, system-changing, holistic movements as represented by ICDPs to a focus on direct incentives. This move was not unsurprising as ICDPs and similar projects were believed to have only gained such popularity due to the political and economic ideals of the time that viewed poverty reduction as a key aspect of successful environmental conservation. As such these programs were quickly criticised for being cost-ineffective and not ensuring that conservation actually took place due to fact that they often permitted "alternative livelihood strategies to be incorporated as complements, rather than substitutes, to ecosystem-degrading activities."[21] Similarly, PES programs can be seen as a progression from community-based natural resource management (CBNRM) which, like ICDPs, looked to be the successor of strict state regulations. PES is believed to carry the potential to be more efficient than both approaches by creating new markets for the direct purchase of ecosystem services.[22] Command-and-control regulations, policies that control actions and command a certain land-use method, are also a popular direct policy. However, this style of regulation lacks the flexibility of PES and is often hampered by a lack of capacity in developing countries.[23] A rough comparison of PES to other conservation approaches can be seen below.

[20] Sven Wunder, "Payments for Environmental Services: Some Nuts and Bolts," *CIFOR Occasional Paper* 42, no. 9 (2005), 1.
[21] Matthew Cranford and Susana Mourato, "Community Conservation and a Two-Stage Approach to Payments for Ecosystem Services," *Ecological Economics* 71, no. 1 (2011): 89.
[22] Wegner (2016), 621.
[23] Engel, Pagiola, and Wunder (2008), 669.

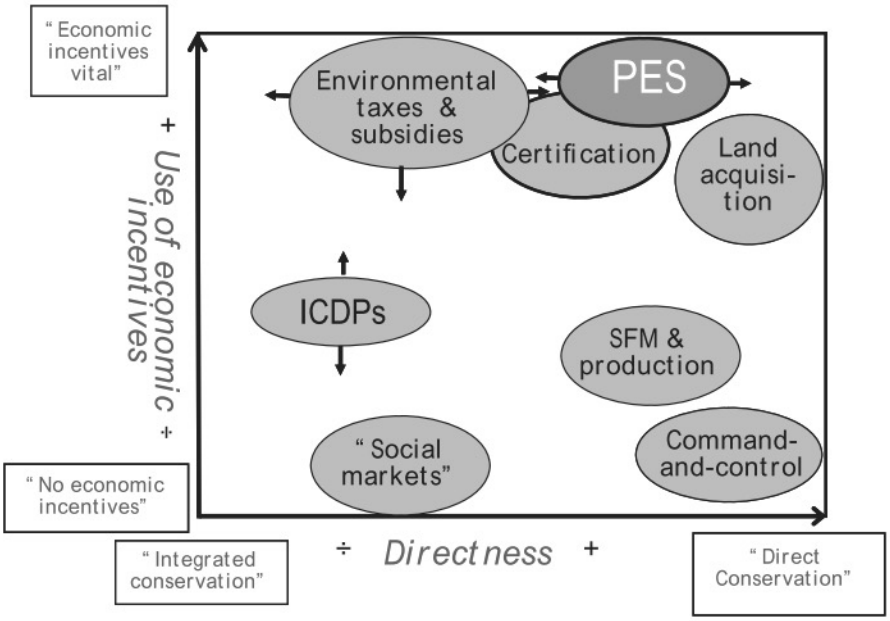

Fig 1. Comparison of conservation approaches

Source:*Wunder, 2005, p6*

One of the primary differences between PES-like programs (as defined in the following section) and conventional conservation efforts is the use of ecosystem services and their incorporation into market-based instruments and payment schemes. The modern idea of ecosystem services was conceived in the 1970's out of literature such as Hardin's "Tragedy of the Commons" in 1968 and Meadows' "Limits to Growth" report in 1972.[24] By the 1990's, ecosystem services had become part of mainstream literature before the Millennium Ecosystem Assessment put "ecosystem services firmly on the policy agenda," leading to an increase in the use of market logic to address conservation issues.[25] More recently, concepts such as The Economics of Ecosystems and Biodiversity (TEEB) have continued this use of environmental service valuation. On the other side, the increasing use of MBIs like PES (this also includes programs such cap-and-trade permits and certification schemes) has led to a debate concerning the impact of these kind of economic programs and their ability to address environmental issues.

[24] Erik Gómez-Baggethun et al. (2010), 1213.
[25] Ibid.

However, this style of program is still seen to be more efficient and better targeted than other environmental policies.[26]

As previously discussed, much of the early literature has worked on defining key concepts within PES and documenting early on-the-ground efforts to operationalize PES theory.[27] Correspondingly, only a small number of impact evaluations exist and even fewer use counter factual-based evidence.[28] Much of the basis of PES literature derives from programs that have been in existence for a significant period of time such as the Conservation Reserve Program and New York City's Watershed Program in the United States (1985 and 1997 respectively), the slopping-land conversion program in China (2002), and perhaps the most well studied PES program, Costa Rica's Pago por Servicios Ambientales (PSA) which was initiated in 1997.[29] While few rigorous impact evaluations exist, impact analysis is growing as more data becomes available. This work looks to add to this literature by reviewing and analysing how PES programs have interacted with local institutions to show a clearer picture concerning program outcomes.

2.2 Payments for Ecosystem Services

Payments for Ecosystem Services (PES) are defined by Sven Wunder as "voluntary transactions between service users and service providers that are conditional on agreed rules of natural resource management for generating offsite services."[30] In more practical terms, PES is often used to describe programs where the provision of ecosystem services are guaranteed using various types of incentives, usually in the form of payments to service providers such as land owners.[31] This heterogeneity in the application of the concept of PES has led to a wide variety of "PES-like" payment programs being implemented and has meant that Wunder's narrow definition often does not reflect the reality of many programs.[32] Due to this variety, multiple, wider definitions have been proposed, such as the definition put forward by Muridian that

[26] Stewart Lockie, "Market Instruments, Ecosystem Services, and Property Rights: Assumptions and Conditions for Sustained Social and Ecological Benefits," *Land Use Policy* 31 (2013): 90.
[27] Wunder (2005), 4.
[28] Jan Börner et al, (2017), 359.
[29] Ibid.
[30] Sven Wunder, "Revisiting the Concept of Payments for Environmental Services," *Ecological Economics* 117, no. February (2015): 251.
[31] Stefano Pagiola, Agustin Arcenas, and Gunars Platais, 2005, 238.
[32] Wunder (2005), 4.

defines PES as "… a transfer of resources between social actors, which aims to create incentives to align individual and/or collective land use decisions with the social interest in the management of natural resources."[33] These "PES-like" programs include programs that use various intermediaries, are government led, or are a means of targeting not just environmental conservation but issues such as poverty reduction or climate change resilience.[34] This variance in definition and application of programs also reflects the tension between the different conceptions of PES programs and what their goal should be. This paper will focus on programs that attempt to bridge this gap and balance the potential gains in both environmental conservation and development.

At its core, PES is a market-based instrument intended for environmental conservation that is based on the ideas of ecosystem services, market externalities, and on the idea that if trade in these economic externalities is possible, and transaction costs are low enough, that the problems from these externalities can be solved through negotiation by each party.[35] This idea is referred to as a 'Coasean' approach, based on the work of Ronal Coase, which believes that this negotiation can be more efficient at regulating externalities than state interventions such as taxes or subsidies.[36] However, in reality, barriers and obstacles such as high transaction costs and poorly defined property rights have limited the application of the Coasean an approach. Instead, many PES-like programs hold a greater resemblance to the Pigouvian approach (based on the work of Arthur Pigou) which widens the definition to include the use government interventions and regulations.[37] Most programs in existence therefore fall somewhere on the spectrum between a "true PES" as seen in Wunder's definition and the "PES-like" as represented by Muridian's definition.[38]

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[33] Roldan Muradian et al., "Reconciling Theory and Practice: An Alternative Conceptual Framework for Understanding Payments for Environmental Services," *Ecological Economics* 69, no. 6 (2010): 1205.
[34] Tanya Hayes, F. Murtinho, H, Wolff, "The Impacts of Payments for Environmental Services on Communal Lands: An analysis of the Factors Driving Household Land-Use Behavior in Ecuador," *World Development,* 93 (2017), 427.
[35] R.H. Coase, "The problem of social cost." *Journal of Law and Economics*, Vol. 3 (1960); Stefanie Engel, Stefano Pagiola, and Sven Wunder, "Designing Payments for Environmental Services in Theory and Practice: An Overview of the Issues," *Ecological Economics*, Vol. 65, No. 4 (2008), 664.
[36] Daniel Hausknost, Nelson Grima, and Simron Jit Singh, "The Political Dimensions of Payments for Ecosystem Services (PES): Cascade or Stairway?," *Ecological Economics* 131 (2017): 109.
[37] A.C. Pigou,*The Economics of Welfare* London: MacMillan, 1920.
[38] Claudia Sattler and Bettina Matzdorf, "PES in a Nutshell: From Definitions and Origins to PES in Practice-Approaches, Design Process and Innovative Aspects," *Ecosystem Services* 6 (2013): 3; See also A.C. Pigou,*The Economics of Welfare* London: MacMillan, 1920.

In the case of ecosystem services, market externalities are present when, for example, a community downstream of an industrial plant suffers contaminated water or local communities benefit from a farmer conserving the forests on their lands instead of harvesting them. In the second example, it is often the case that forest owners would receive comparatively few benefits for conserving forest as compared to logging or other extractive methods. While this is the case, the more profitable option – the harvesting of forests - can mean negative downstream externalities for populations who had previously received service benefits from the ecosystem.[39] As shown below, what PES programs are designed to do are help make the conservation option more attractive and to incentivise land owners as 'ecosystem managers' to adopt less destructive practices. Put more concisely, PES programs attempt to "internalize what would otherwise be an externality."[40]

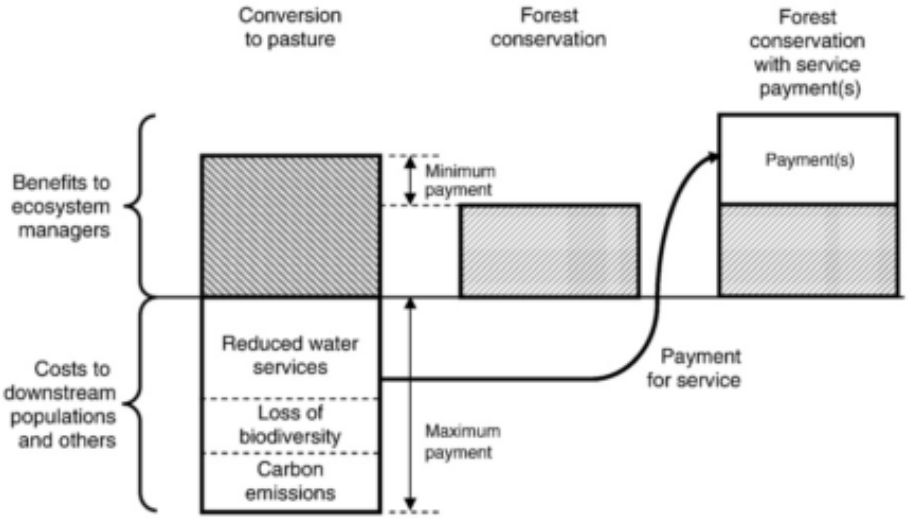

Fig. 2: PES program design

Source: Engel, Pagiola, and Wunder (2008), 665.[41]

This internalization is achieved through a system of payments made either directly between users and providers or through an intermediary such as a government or a Non-Governmental Organization (NGO). If made directly, payments (or other methods of remuneration) are made by those who are benefiting from the ecosystem service to those who are

[39] Engel, Pagiola, and Wunder (2008), 665.
[40] Ibid,
[41] Adapted from: Pagiola S. and Platais G., "Payments for Environmental Services: From Theory to Practice." Washington: World Bank, 2007.

in control of the service to ensure that the owner continues to allow for the provision of the services.[42] As seen in the diagram above, the payment amount is dependent on the difference in value between the action of conservation as compared to the value of the non-conservation option (the opportunity cost). Participants are usually compensated for at least the opportunity cost of the limitations to their actions however payments are often differentiated based on other factors to ensure the service is provided.[43] Where an intermediary is involved the style of payments can vary as intermediaries can act brokers or, in the case of governments, levy a tax that supports the program.[44] These intermediaries can also lead to additional benefits for users such as better prices or stronger local institutions.[45] Many PES programs however, are created as hybrid programs where both government and non-government actors are involved and where program financing comes from a wide variety of sources (users, private firms, international NGO's or governments).[46]

2.3 The Challenge of Dual Outcomes

As will be explored in greater detail in the final part of this literature review, achieving multiple outcomes through one program or policy is not always thought to be the most effective.[47] This is often applied in PES programs as the relationship between poverty reduction and environmental conservation within the mechanism is not traditionally seen as mutually beneficial or reinforcing. In PES programs, development goals tend to be secondary to environmental goals. However, in certain situations, such as in developing countries, poverty reduction often remains an important secondary goal. While this is the case, evidence suggests that there are only a few contexts in which development goals and environmental efficiency can be successfully achieved simultaneously.[48] In addition, the extent to which conservation and

[42] Wunder (2005), 5.
[43] Sven Wunder, "The Efficiency of Payments for Environmental Services in Tropical Conservation: Essays," *Conservation Biology* 21, no. 1 (2007): 51.; Peter Newton et al., (2012), 128.
[44] Jan Börner et al., "The Effectiveness of Payments for Environmental Services," *World Development* 96 (2017): 359.
[45] Emilie Beauchamp, Tom Clements, and E. J. Milner-Gulland, "Assessing Medium-Term Impacts of Conservation Interventions on Local Livelihoods in Northern Cambodia," *World Development* 101 (2018): 204.
[46] Peter Newton et al., "Consequences of Actor Level Livelihood Heterogeneity for Additionality in a Tropical Forest Payment for Environmental Services Programme with an Undifferentiated Reward Structure," *Global Environmental Change* 22, no. 1 (2012): 128.
[47] David Zilberman, Leslie Lipper, and Nancy Mccarthy, "When Could Payments for Environmental Services Benefit the Poor?," *Environment and Development Economics* 13, no. 3 (2008): 256.
[48] Cyrus Samii et al., "Effects of Payment for Environmental Services (PES) on Deforestation and Poverty in Low- and Middle-Income Countries," *Campbell Systematic Reviews*, 2014, 7.

poverty alleviation can be 'forcibly' linked is often doubted and some believe that trade-offs between the two goals outweigh any potential synergies.[49] Nevertheless, arguments have also been made concerning why poverty *should* be a focus of PES programs, pointing to its morality and to the need of benefiting the local community in order to ensure the long-term sustainability of the program.[50] Here, some authors believe that programs like PES can be the most successful when they are constructed and implemented in a participatory way while being aware of the local institutional context, systems of power, intrinsic norms, and broader socio-economic trends. It is said that PES would thus have greater focus on the overall balance of outcomes rather than focusing primarily on the programs' ability as an instrument for conservation.[51]

Despite the small amount of evidence, PES programs have been shown to have a generally positive impact on poor participants (or at least cause no harm) when they are successfully integrated into the community and if they are properly designed and managed.[52] To achieve this success, programs often must adjust their design or implementation as the poor are rarely the first to benefit due to barriers such as lack of program knowledge and high opportunity costs.[53] When adjusting their design, participation is considered the most important factor in balancing efficiency and equity. If the poor can participate and they overlap with areas of high environmental value, PES programs should indeed be able to achieve some win-win scenarios.[54] Key factors that impact the participation of the poor in PES programs are said to be transaction costs and land tenure regulations.[55] Thus, the mechanism must ensure that it is attractive enough for potential participants to join and that it's barriers to entry are sufficiently low that poor land-holders are able to join.[56] Achieving these higher rates of participation is often done through

[49] Wunder (2005), 1.
[50] Maryanne Grieg-Gran, Ina Porras, and Sven Wunder, "How Can Market Mechanisms for Forest Environmental Services Help the Poor? Preliminary Lessons from Latin America," *World Development* 33, no. 9 SPEC. ISS. (2005): 1512.
[51] See: Maurice A Rawlins and Leon Westby, "Community Participation in Payment for Ecosystem Services Design and Implementation : An Example from Trinidad," *Ecosystem Services* 6 (2013): 117–21; Wegner, "Payments for Ecosystem Services (PES): A Flexible, Participatory, and Integrated Approach for Improved Conservation and Equity Outcomes."
[52] Börner et al. (2017), 371.
[53] S. Engel, S. Pagiola, and S. Wunder (2008), 672.
[54] S. Pagiola et al. (2005), 237; S. Engel, S. Pagiola, and S. Wunder (2008), 672.
[55] Stefano Pagiola, "Guidelines for ' Pro-Poor ' Payments for Environmental Services," *Environment Department, World Bank*, no. April (2007): 1.
[56] Wunder. (2013), 232.

specific program design factors and, as will be shown, certain design changes can also make programs more equitable.

Another method to achieve livelihood goals is through stronger relationships with local institutions. For example, land-tenure is a common issue for PES program implementation but if the appropriate links to local institutions are made to help define and strengthen land tenure, programs have been shown to be more efficient and equitable.[57] This strategy also includes dealing contractually with community organizations rather than with each participant (especially when many small landholders are participating), and liaising with local institutions that have a stronger understanding of local contexts.[58] If the program uses a single, well-run intermediary that has knowledge of environmental contracts and local traditions, it can significantly reduce the program's transaction and implementation costs.[59] Potential issues with asymmetric access to information can also be solved through better information sharing with local community organizations.[60] However, many of these adaptations that have been shown to improve program equity could also potentially subtract from the programs' environmental conservation efficiency. Such trade-offs are often seen as an impediment to program success. However, a focus solely on environmental effectiveness can undermine program credibility and sustainability as well as crowd-out local motivations for conservation "due to perceived unfairness" whereas striving for a balance between both outcomes can crowd-in positive motivations.[61] This debate has led some to conclude that "policymakers promoting [PES] programs should be realistic and not expect implementing agencies to meet multiple social goals with a single policy tool."[62]

Finally, as seen below, programs can also impact non-participants and have indirect impacts on other livelihood outcomes. PES programs have been shown to impact non-participants by crowding-in or out conservation motivations, disrupting local labour needs, and potentially creating issues with social cohesion.[63] Programs must thus be aware of their impact

[57] L. Bremer et al. (2014), 127-128; A. Hejnowicz et al, (2014), 93.
[58] Rohit Jindal, "Carbon Sequestration Projects in Africa: Potential Benefits and Challenges to Scaling up," *Earthtrends* 32 (2006): 126.
[59] A. Hejnowicz et al, (2014), 93.
[60] Ibid, 88.
[61] J. Börner et al. (2017), 364; L. Bremer et al. (2014), 123.
[62] Alix-Garcia et al. (2015), 7.
[63] S. Pagiola (2007), 2.

on non-participants and may even look to offer alternate employment through the program as land monitors.[64]

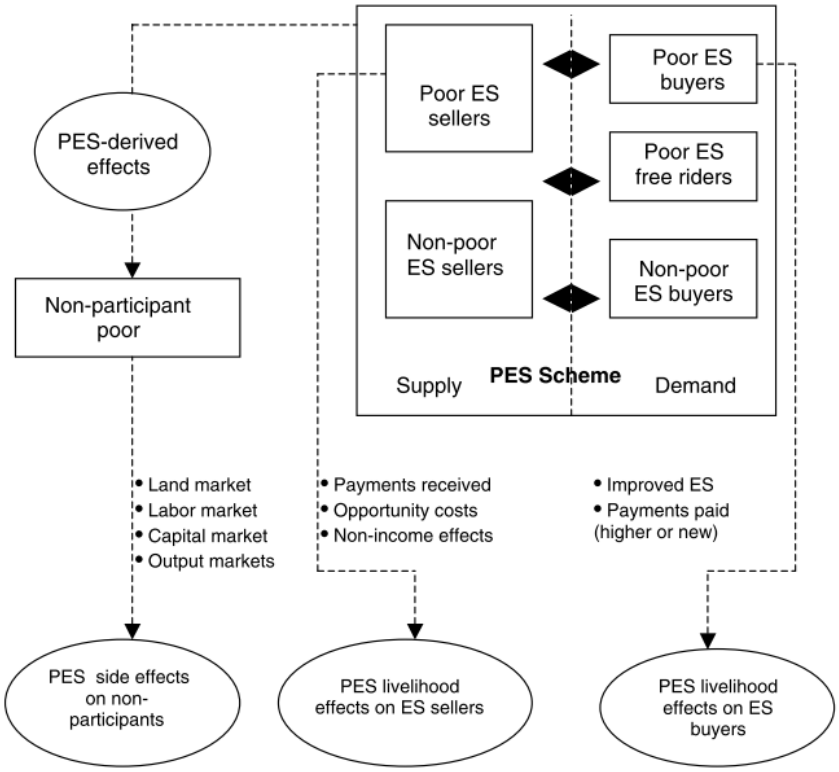

Fig. 3: Impact of PES on the poor, *Source: Wunder, 2008, p287*

The literature also shows that in terms of environmental impact PES programs have been generally found to have a positive, if small, impact on the environment. For example, programs in Mexico and Costa Rica were found to have substantial impacts on slowing deforestation rates but exhibited a wide variance in their social impact on participants.[65] It is also recognized that PES programs impact livelihoods in a wide variety of ways and that not all are well understood. Programs primarily impact livelihoods through their payments but can also positively impact communities through in-kind payments, such as the clarity and security of property rights, the building of human capital through the diversification of employment, the support and creation of

[64] S. Wunder (2008), 293.
[65] Jason Scullion et al., "Evaluating the Environmental Impact of Payments for Ecosystem Services in Coatepec (Mexico) Using Remote Sensing and on-Site Interviews," *Environmental Conservation* 38, no. 4 (2011): 426; Bruno Locatelli, Varinia Rojas, and Zenia Salinas, "Impacts of Payments for Environmental Services on Local Development in Northern Costa Rica: A Fuzzy Multi-Criteria Analysis," *Forest Policy and Economics* 10, no. 5 (2008): 283.

local institutions and development, and by diversifying household income.[66] Thus, while payments for ecosystem services are said to have the potential to achieve both outcomes, this is not always something that is possible or that is strived for. The literature is also divided as to if PES program should even attempt to achieve both simultaneously. However, in developing countries a conservation program's impact on local livelihoods is often a critical question that can often not be avoided.[67] Achieving dual outcomes is therefore an issue that PES programs have continued to be linked with and that will continue to be relevant in program implementation and design.

2.4 Designing for Effectiveness and Equity

As noted, only a small (but growing) number of programs have existed for a sufficiently long period of time to allow for proper impact evaluations to be conducted. While this is the case, many PES programs have been the subject of case studies to create a better understanding of how the "theoretical elegance of PES meets the messiness of the real world."[68] This section will examine the conclusions from this literature, identifying key aspects of design and implementation of PES programs in developing countries as they relate to the balancing of program outcomes.

Program design has been one of the most written about areas in PES research, including how to achieve a balance of outcomes through design changes. Here, it is shown that programs often attempt to influence their outcomes by adapting to local issues and obstacles in order to ensure that the desired efficiency is achieved. Greater program equity is also often targeted by adjusting design. In terms of program financers, government-financed programs are said to be potentially less efficient due to potential political-pressures but can scale up more effectively, however concerns with payment equity are an issue with national-level programs.[69] Program

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[66] See: L. Tacconi et al. (2013), 738; Börner et al. (2017), 371; Stewart Lockie, "Market Instruments, Ecosystem Services, and Property Rights: Assumptions and Conditions for Sustained Social and Ecological Benefits," *Land Use Policy* 31 (2013): 97; Arturo Balderas Torres et al., "Payments for Ecosystem Services and Rural Development: Landowners' Preferences and Potential Participation in Western Mexico," *Ecosystem Services* 6, no. December 2013 (2013): 72.

[67] Clements and Milner-Gulland, "Impact of Payments for Environmental Services and Protected Areas on Local Livelihoods and Forest Conservation in Northern Cambodia." *Conservation Biology,* Vol. 29, no. 1, 78.

[68] Engel, Pagiola, and Wunder (2008), 672.

[69] Engel et al. (2008), 666; Calvet-Mir and N. Gross-Camp (2015), 156; Matthew Sommerville et al., "Impact of a Community-Based Payment for Environmental Services Intervention on Forest Use in Menabe, Madagascar," *Conservation Biology* 24, no. 6 (2010): 1489.

targeting also impacts the balance of program outcomes, with targeting of environmentally sensitive areas being more effective but less equitable (and vice versa). Considering payments, the differentiation of payments according to individuals transaction costs has been shown to increase payment effectiveness however this often comes at a higher implementation cost and potentially less equitable welfare outcomes.[70] In terms of payment size, the smallest possible would be the most efficient, however this would also minimize any poverty alleviation impacts.[71] Finally, payment type can also impact program effectiveness, with some findings pointing to the use of in-kind payments as having a greater impact on poverty than direct cash payments.[72] Payments are also implicated with contract length. Regular payments in sync with a medium to longer-term (10-30 years) contract length has a positive impact on livelihood outcomes. However, this must be balanced with the need to front-load payments in order to compensate participants for any up-front costs they may face.[73]

PES design is also centered around the conditionality of payments – paying only if services or input-proxies are delivered. Stringent conditionality is often linked with program effectiveness. However, defining specific ecosystem services in this area and measuring outcomes has proven to be difficult.[74] Ensuring conditionality also comes at an increased program cost. This must be monitored to ensure that locals can participate, which is crucial to achieving both environmental and development goals. Key factors driving participation include using simple, flexible rules and procedures; ensuring effective information sharing and communication between resource managers, intermediaries, and government; and using small community groupings to achieve consensus concerning payment and responsibility distribution.[75] Another key aspect of PES design is their ability to be additional to the practices that currently exist. This is often referred to as additionality and can be understood as changes in ecosystems

[70] Börner et al. (2017), 360.
[71] Ibid, 364.
[72] Grima et al. (2016), 31.
[73] Luca Tacconi, Sango Mahanty, and Helen Suich, "The Livelihood Impacts of Payments for Environmental Services and Implications for REDD+," *Society and Natural Resources* 26, no. 6 (2013): 733–44, *Society and Natural Resource*, Vol. 26, no. 6 (2013), 740; Sattler et al. (2013b), 42; Grima et al. (2016), 31.
[74] Timm Kroeger, "The Quest for The 'optimal' payment for Environmental Services Program: Ambition Meets Reality, with Useful Lessons," *Forest Policy and Economics* 37 (2013): 67; Sven Wunder and M. Albán, "Decentralized payments for environmental services: The cases of Pimampiro and PROFAFOR in Ecuador," *Ecological Economic*, Vol. 65, no. 4 (2008).
[75] N. Kosoy et al. (2008), 2083.

that would not have occurred without the implementation of the program.[76] Striving for the greatest additional impact often leaves out those who would benefit most from being a part of the program such as the poor small landholders who would negatively impact the efficiency of the program should they participate. Many of these people simply do not constitute a credible threat to the ecosystem and thus there is less of a need change their actions. Because of this problem some PES programs have actually been shown to negatively impact local equity if they are not properly implemented.[77]

As previously mentioned, a significant amount of research has been conducted concerning PES program design. While this is the case, stringent impact evaluations of a programs' social impact are few and far between meaning that much of the research has yet to be proven beyond a few specific cases.[78] Beyond design changes, interaction with local institutions has also been shown to have the potential to play an important part in balancing program effectiveness and equity. This is because few design changes can be applied across multiple different cases since the context of each program is often unique.[79] Whether it be the institutional structure or the market context, PES programs have recognized that it is vital to have a positive relationship with local institutions should they be successful. This includes successfully balancing program outcomes.

2.5 PES Programs and Local Institutions

Institutions have been defined in many different ways; in political science the understanding of institutions tends to see them as organizations and structures however, in economics and sociology, institutions are more typically portrayed as rules.[80] This paper understands institutions as organizations or groups of actors rather than rules as its focus will be on examining the interactions between various actors in PES programs and local institutions. PES programs themselves can also be seen as institutions with an established framework and governance structure. Their framework and perspective often differs based on their goals and

[76] Alain Karsenty et al., "The Economic and Legal Sides of Additionality in Payments for Environmental Services," *Environmental Policy and Governance* 27, no. 5 (2017): 423.
[77] Ibid, 424; L. Calvet-Mir et al. (2015), 157.
[78] Clements (2015), 78.
[79] Drew E. Bennett and Hannah Gosnell, "Integrating Multiple Perspectives on Payments for Ecosystem Services through a Social-Ecological Systems Framework," *Ecological Economics* 116 (2015): 175.
[80] Arild Vatn, "Institutions," *Internet Encyclopaedia of Ecological Economics*, 2006, 2.

perspectives of the instrument. This has led to a heterogeneity in program composition and structure, changing how individual programs interact with other institutions.[81] Here interaction will be understood as any liaising or contact between the leading PES program operator and local institutions as part of the planning, creation, or implementation of the PES program.

Common institutions that are part of the design and implementation of PES programs in developing countries include local community organizations such a resource management bodies and groups of landowners; governments of various levels; and other non-governmental actors. These institutions can also have various levels of formality and operate in many different channels. While the function of these institutions can also vary widely, a common role is that of intermediary. As intermediaries, these local institutions often serve to represent the interests of the poor although the potential of intermediaries to improve PES programs is based directly on their motives and capabilities.[82] In addition, how the intermediary is situated in the institutional context of the region is important due to their ability to influence knowledge sharing within their networks as well as their ability to influence the inclusion of small land-holders .[83] However, only a small number of papers have examined the role of intermediaries in developing countries and few specific conclusions have been reached concerning either their role or their impact on programs.[84]

A key distinction in the context of PES programs is who is responsible for implementation; government, users, private industry, or Non-Governmental Organizations (NGOs). While in Coasean theory service users and providers would trade directly, in reality, PES programs are usually facilitated using support from various NGOs or through governments themselves.[85] These links to local institutions are therefore crucial to the implementation and achievement of program outcomes, and make the implementation of PES programs in the context of weak institutions particularly difficult.[86] The capacity of local institutions can determine the

[81] Drew E Bennett and Hannah Gosnell, "Integrating Multiple Perspectives on Payments for Ecosystem Services through a Social – Ecological Systems Framework," *Ecological Economics* 116 (2015): 173.
[82] Samii et al. (2014), 18.
[83] Sarah Schomers et al., *How Local Intermediaries Improve the Effectiveness of Public Payment for Ecosystem Services Programs: The Role of Networks and Agri-Environmental Assistance*, *Sustainability (Switzerland)*, vol. 7, 2015, 13858.
[84] Hejnowicz et al. (2015), 8.
[85] Genowefa Blundo-Canto et al., "The Different Dimensions of Livelihood Impacts of Payments for Environmental Services (PES) Schemes: A Systematic Review," *Ecological Economics* 149, no. March (2018): 160.
[86] Clements et al. (2010), 1283.

ability of a large portion of new programs, from the ability to issue collective contracts to the ability to guarantee payments or sanction those who break contracts.[87] Local intermediaries have also been shown to decrease costs and help create trust among parties but this could also mean less efficiency by adding an additional step to transactions.[88] The importance of local institutions to PES is therefore well documented, however their role in balancing program outcomes is less well known. This paper will look to add to the literature by filling this gap and identifying positive styles of interaction.

3. Theoretical Framework

The paper will be framed conceptually and theoretically in two ways. First, the need for sustainable human development alongside environmental conservation, and the understanding that these two concepts are inherently linked, will be couched in Duraiappah's adaptation of Amartya Sen's capabilities framework.[89] Here human development will be based on a capabilities framework that understands development as being linked to a person's capability to live a good life as defined in terms of the set of valuable 'beings and doings' that can be achieved through various freedoms. That is to say, it is not people's access to the necessary resources that defines human's wellbeing, rather it is their capability to use these resources to achieve the kind of lives that they have reason to value. For Duraiappah, this is understood to be achieved through a number of key freedoms, such as well-being freedom, the freedom to have valuable functionings, and agency freedom, the freedom to choose and achieve the goals one considers important.[90] Here, it is not only the freedom that is important but also "the processes that allow freedom of actions and decisions, and the actual opportunities that people have, given their personal and social circumstances."[91] The work of Duraiappah clearly shows that ecosystem services play an integral role in achieving these freedoms in situations that require both development and conservation through what he calls "ecological surety". Ecological surety is a concept that encompasses not only ecological security and its provision of the key regulating,

[87] Luca Tacconi, Sango Mahanty, and Helen Suich, "The Livelihood Impacts of Payments for Environmental Services and Implications for REDD+," *Society and Natural Resources* 26, no. 6 (2013): 741.
[88] Sattler et al. (2013), 36; Nelson Grima et al., "Payment for Ecosystem Services (PES) in Latin America: Analysing the Performance of 40 Case Studies," *Ecosystem Services* 17 (2016): 31..
[89] See: Amartya Sen, *Commodities and Capabilities*, New York: Oxford University Press, 1999.
[90] Anantha Duraiappah and Arun Abraham, "Ecological Surety and Capabilities: Normative Issues," *International Conference on the Capability Approach*, no. September (2004), 20.
[91] Sen (1999), 20.

supporting, and enriching services but also the processes through which they are achieved. Ecological surety is also seen as a freedom in and of itself. This process must be achieved "through participatory processes involving individuals in local communities together with other stakeholders with interests in the use of these ecosystems."[92] Only then, Duraiappah believes, will conditions be created for symmetrical access and distribution, allowing issues of equity and justice be addressed. Participatory approaches to achieving greater freedom and thus greater development are therefore key to any development strategy. This includes incorporating local measures of progress and ensuring that program evaluation reflects this manner of measurement.[93]

This paper will thus understand ecosystem services as a key part of ensuring ecosystem surety and thus as playing an important part in ensuring that people's capabilities are realised. The focus on local institutions reflects this need for participatory processes in the implementation of PES programs. This use of capabilities framework encapsulates the understanding that environmental conservation is not implemented in a vacuum and that human development as understood through capabilities must be incorporated into conservation programs. Poverty should therefore not be seen as unidimensional, rather, the impact of poverty is a multifaceted and complex limiter to people's capabilities.[94] Following this, the examination of poverty, equity, and well-being outcomes will be referred to as social or livelihood outcomes. These livelihoods are understood to be "capabilities and means of living embedded within a paradigm of equity and sustainability."[95]

Second, while this paper recognizes the importance of linking environmental and livelihood outcomes for PES programs, programs often see both outcomes as separate, yet parallel, goals.[96] As shown, this has led to the debate over the theoretical perspective of efficiency versus equity. Some programs tend to work towards these goals with the understanding that a policy mix such PES can effectively meet both goals, while others follow

[92] Duraiappah (2004), 15.
[93] Anantha Kumar Duraiappah, Pumulo Roddy, and Jo-ellen Parry, "Have Participatory Approaches Increased Capabilities?," *International Institute for Sustainable Development*, no. June (2005): 1.
[94] Leimona et al., "Fairly Efficient, Efficiently Fair: Lessons from Designing and Testing Payment Schemes for Ecosystem Services in Asia." *Ecosystem Services*, Vol. 12 (2015), 17.
[95] Genowefa Blundo-Canto et al., "The Different Dimensions of Livelihood Impacts of Payments for Environmental Services (PES) Schemes: A Systematic Review," *Ecological Economics* 149, no. March (2018): 160.
[96] Leimona et al. (2015), 17.

the understanding that to be effective each policy goal should have a specific policy instrument.[97] These methods reflect differing notions of policy design; that of Lehmann's belief in the ability of policy mixes in instances where market failures are cause by multiple reinforcing factors, and of Tinbergen's emphasize on the difficulty of reaching more than one objective with a single policy.[98] It is understood that PES programs can either be a narrow, environmentally-focused program as established through the definition used by Sven Wunder, or can be seen as a mix of cross-compliant policies that are a policy mix rather than a single economic instrument.[99] This paper will thus frame its understanding of the differing methods in which multiple objectives can be met in these two conceptual frameworks. Here the paper finds its relevance to the question of PES efficiency by showing that PES programs may solve their distributional failures by interacting with local institutions.

4. Research Design and Methodology

This paper examines how PES programs have interacted with local institutions, policies, and programs to determine the extent to which these linkages help, or hinder, the achievement of program goals. While there exists a strong literature concerning PES programs in general and a growing amount of program evaluations, few sources have examined interactions between programs and local institutions. With a large amount of cases existing but little overarching analysis present, an examination of these cases could lead to new conclusions being made. This paper therefore looks to add to the literature by broadly examining how PES programs have linked with local institutions and to determine how these partnerships have impacted programs outcomes. While concrete causal links may not be established due a to a lack of specific and comparable data, general conclusions and questions for further research can be drawn concerning the impact of interactions.

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[97] Jan Börner, Eduardo Marinho, and Sven Wunder, "Mixing Carrots and Sticks to Conserve Forests in the Brazilian Amazon: A Spatial Probabilistic Modeling Approach," *PLoS ONE* 10, no. 2 (2015): 2.
[98] David Zilberman, Leslie Lipper, and Nancy Mccarthy, "When Could Payments for Environmental Services Benefit the Poor?," *Environment and Development Economics* 13, no. 3 (2008): 255.; Börner et al. (2015), 2. See: J. Tinbergen, *Economic Policy: Principles and Designs,* Amsterdam: North Holland, 1956; and P. Lehmann, "Justifying a policy mix for pollution control: a review of economic literature," *Journal of Economic Surveys*, 26 (2012): 71–97.
[99] See Wunder (2005), and Barton (2017), 404.

A thorough literature review is first presented before five cases are explored for a deeper examination of program implementation. These five cases were identified and analysed for details concerning program interactions. These cases include large programs such as the federal PES programs in Mexico, Ecuador, and Costa Rica, as well as two smaller programs that did not use federal funds. Following this, results were compared between different sources within each case to achieve general conclusions concerning each case. Conclusions were then compared across all other cases to draw an overall picture and to reach conclusions concerning the impact of program interactions.[100] Cases were selected from the literature based on their relevance to the topic as well as the information available in each case. Large programs such as Programa Socio Bosque in Ecuador and Pago por Servicios Ambientales Hidrológicos (PSAH) in Mexico were also chosen due to their close links to community organizations due to the history of communal land ownership in the country, as well as the abundance of available literature.[101] Other cases were used to achieve a diversification of the style of implementation, including different implementing organizations and different countries.

The evidence in this paper is based on experiments and analysis conducted by other authors on PES programs in developing countries. It is therefore important to note that evidence was not necessarily drawn from causal links, rather, it was drawn from the available observations made by each sources' author concerning local institutions and program outcomes. Due to the wide variety of PES programs and the correspondingly large variance in interactions between programs and local instructions, it was found that few cases are directly comparable through identical indicators. While the indicators may not be the same across all cases, the outcomes of these interactions are generally comparable by grouping outcomes by area of impact. Relevant conclusions were drawn from this comparison of outcomes based on program interaction with local institutions.

Case Selection

To find the proper selection of source material a literature search was conducted by drawing on various databases. These sources correspond to individual cases, with each case

[100] See: Robert K. Yin, "Case Study Research: Design and Methods," Washington: Sage Publications, Inc., 2014.
[101] A Caro-Borrero et al., "'We Are the City Lungs': Payments for Ecosystem Services in Theoutskirts of Mexico CityAngela," *Land Use Policy* 43 (2015): 140.

describing a specific PES program. More than one source can be used per case. This was followed by a filtering out of cases which do not meet the necessary conditions in order to arrive at a sample of literature references which correspond to several individual PES cases. Duplicates were removed. The case was the primary unit of analysis.

To be included, cases must:

1) Fit within a broad definition of a PES program as defined by *Muradian et al. (2010)*
2) Include sufficient detail concerning local institutions and interactions between the programs and these institutions; and
3) Include sufficient detail concerning program outcomes.

Sufficient detail was defined as a level of detail where the interacting institutions were readily apparent, how the interaction took place was identified, and if the indicator measured could be linked to the interaction that took place.

Case Studies

Cases were constructed using the source material gathered through the review of the literature as outlined above. Within each case a number of variables were extracted for comparison based on what was available in the source material. The characteristics and indicators below were compared and outcomes based on interactions were identified:

Table 1: List of Variables

Variable	Description	Indicators
Program	Name of the PES program in question.	-
Country	Country of operation.	-
Program Operator	The institution that is leading the implementing of the PES program in question. Used to identify the implementing body that will be interacting with local institutions.	Government-led, User-led, NGO-led

Local Institutions Involved	The local institution that is interacting with the program operator. Used to identify what type of local institution is interacting with the implementing body.	Civil society, NGOs, Public/Governmental Bodies, Regional organizations, Assemblies, Multistakeholder bodies, Unofficial bodies, Participant Groups etc.
Method of Interaction	How was the institution involved in the implementation of the PES program? What role did the institution take?	Implementer, partial implementer, consultant, contractor, intermediary, etc.
Phase of Program	During what phase was the interaction with the local institution taking place? Used to indicate at what point the interaction took place and if the interaction was continuous or discrete.	Planning, Implementation, Enforcement, Measurement, Throughout
Outcomes Measure	What outcome was measured in the source. This variable is dependent on the findings produced by each source.	Variable (examples include: participation, participant satisfaction, change in land-use behaviour, and social benefits)
Results	What results are found by the source. Results are tied to the interactions however are not necessarily been proven to be causal.	-
Source	Particular source used	-

Once a list of sources was established, cases were built that reflected individual PES programs. Analysis was then conducted within cases by linking observed interactions with program outcomes using the indicators available in each source. This analysis yielded a basic understanding of what local institutions are present in each case and how they interacted with the

PES program as well as the outcome of the interaction. The results section below outlines what the findings were in each individual case before a discussion section compares and analyses the results.

Comparative Analysis

Additional analysis was conducted, where possible, between cases using comparable outcome indicators. Using an understanding of the logic behind the impact of interactions with local institutions on development objectives in PES programs, along with a review of the existing literature, a hypothesized relationship between the two variables was established. This hypothesis was used as tool for comparison with the empirical evidence found in the case studies. This cross-case synthesis was used to examine the validity of any hypothesized correlations and the potential validity of counter explanations. Here, results depended on the outcomes measured by each source and impacts were determined using available conclusions in source material and were based on the available indicators measured in each source.

The following sections will outline findings and discuss. Here, the focus will be on understanding which local institutions are present and how they interact with the overarching PES program operator. As previously described, institutions will be defined as organizations or groups of actors whereas interaction will be understood as any liaising or contact between the leading PES program operator and local institutions as part of the planning, creation, or implementation of the PES program.

5. Results

Using the data collected by Calvet-Mir et al. (2015) and others in a search of the literature, a wide range of programs were identified. These programs are not evenly distributed and are concentrated in Central and South America with fewer programs being found in sub-Saharan Africa and South-East Asia.[102] The programs in question have been developed by a variety of institutions, with local NGOs and federal governments being the most common program owners. Many of the programs operating in these countries have been implemented at the community level due to the prevalence of communal property rights and land-tenure systems

[102] Calvet-Mir and N. Gross-Camp (2015), 152.

that are situated within social relations at the community level.[103] Thus, we see that many similar local institutions play a role in the development and implementation of the programs. Using existing literature, it was possible to identify these local institutions as well as to determine the role that they played. The table below lays out these findings. Note that the role of an intermediary differs from that of a consultant in that intermediaries are liaising between participants and program officials whereas consultants are providing information or services that are not directly part of program implementation but that are often necessary (i.e.: training).

Table 2: List of Cases

Country	PES Program	PES Developer	Local Institution Involved	Role Local Institution
Mozambique	Nhambita carbon project scheme	NGO	Local Communities	Intermediary
Namibia	Community- based NRM payments program	Federal Government	Local Communities	Participants
South Africa	Working for Water payments program	Federal Government	Local Contractors and Agencies	Participants (Sellers)
Tanzania	Uluguru mountains watershed payments scheme	NGO	Local Communities	Intermediary
Madagascar	Mantandia PES project scheme	NGO	Local Communities; Local NGOs	Participants; Consultants
Rwanda	Nyungwe national park payments scheme	NGO	Communities; Organization of Communities	Participant; Intermediary
Ecuador	Socio Bosque payments program scheme	Federal Government	Communities	Implementer

[103] Sarah Milne and Bill Adams, "Market Masquerades: Uncovering the Politics of Community-Level Payments for Environmental Services in Cambodia," *Development and Change* 43, no. 1 (2012): 134.

Brazil	Bolsa Floresta payments program scheme	Sub-National Government	Communities	Intermediary
Colombia	RISEMP project scheme	Multi-lateral Organization	Local NGO	Implementer
Bolivia	Los Negros watershed payments scheme	NGO	Local NGO	Implementer
Honduras	Jesus de Otoro watershed payments scheme	Sub-National Government	Council of Communities	Implementer
Belize	Rio Bravo carbon project scheme	NGO	Local NGO	Implementer
Guatemala	Las Escobas watershed payments scheme	NGO	Local NGO; Local Company	Implementer; Participant (Buyer)
Nicaragua	San Pedro del Norte watershed payments scheme	Sub-National Government	Local Community Committee	Implementer
Costa Rica	PES national program scheme	Federal Government	Local NGO; Organization of Communities	Consultants; Implementer
Mexico	National program of payments for hydrological services	Federal Government	Communities and Organization of Communities; Regional Communities; CSOs	Implementer; Intermediary; Consultants
Mexico	Fondo Bioclimatico carbon project scheme (Scolel Te)	NGO	Local CSO; Regional Organization;	Implementer; Consultants and Intermediary
Mexico	Monarch Butterfly Fund payments scheme	NGO	Local NGO	Partial Implementer

Cambodia	NGO-driven community- based payments scheme	NGO	Communities	Participants

Source: Calvet-Mir et al. (2015)

As seen above, many PES programs rely on local institutions in some fashion to be successfully implemented. There are two groups of local actors that tend to be involved in PES programs. First are the local communities where the program is being implemented, usually represented by municipal assemblies or committees, as well as community organizations such as regional coalitions. Perhaps the most widely present group of local institutions, communities and their representing organizations, often play a crucial role in all aspects of the PES program creation and implementation. As shown below, community organizations are found to usually play the role of implementer, intermediary, or participant, with fewer examples being found of communities acting in a purely consultative role. This is unsurprising as communities are, as previously mentioned, often the primary level of operation of PES programs. As implementers, communities take control of most if not all aspects of program implementation. They act as the conduit through which household or community participation is approved, they can control who makes the necessary land-use changes (and if possible what land-use changes occur), and are often responsible for the distribution of payments received through participation in the program.[104] As an intermediary, communities and community organizations act as points of contact for implementing organizations and offer a stage on which these organizations can address local households and other potential participants. Here, the project authorities often initiate the program through local community meetings where they are able to contact potential participants. This is seen in the Nhambita PES-Project in Mozambique for example where households volunteered for participation through the local community council.[105] Finally, communities can act as program participants if the program accepts communal participation, such as exists in Ecuador's Socio Bosque.[106]

[104] See: Lucia Almeida-Leñero et al., "Not the Same for Everyone: Community Views of Mexico's Payment for Environmental Services Programmes," *Environmental Conservation* 44, no. 3 (2017).
[105] Ravi Hegde and Gary Q. Bull, "Performance of an Agro-Forestry Based Payments-for-Environmental-Services Project in Mozambique: A Household Level Analysis," *Ecological Economics* 71, no. 1 (2011): 123.
[106] See: Felipe Murtinho and Tanya Hayes, "Communal Participation in Payment for Environmental Services (PES): Unpacking the Collective Decision to Enroll," *Environmental Management* 59, no. 6 (2017).

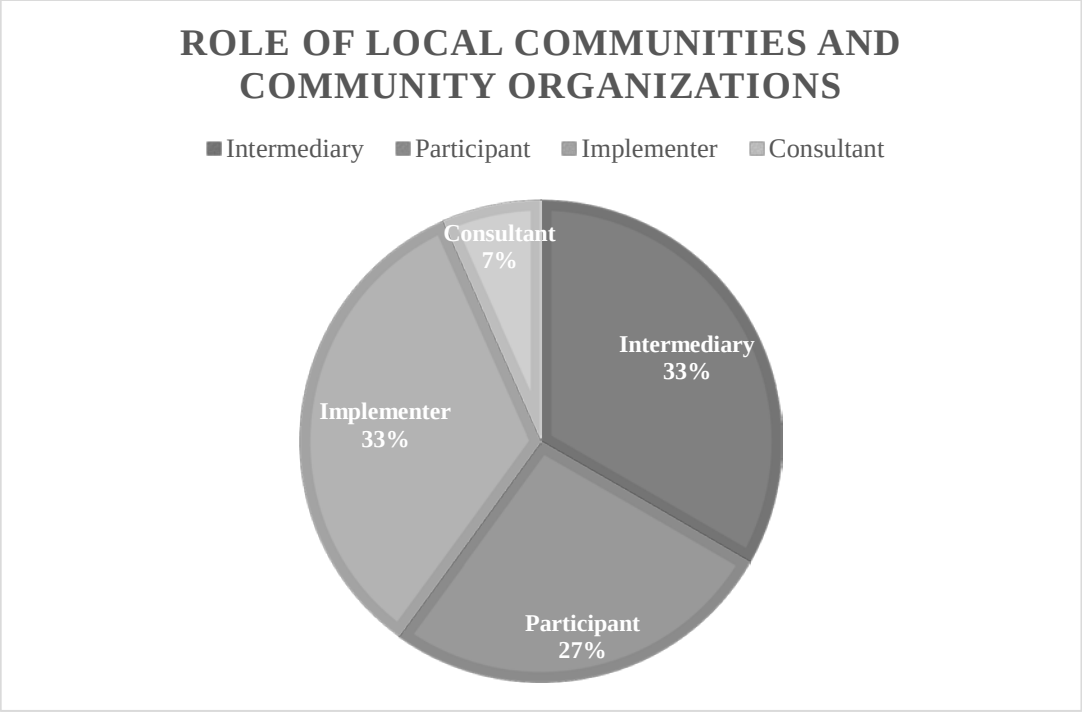

Fig 4. Role of Local Communities and Community Organizations

The second group, local NGOs and CSOs, are also often present in PES programs. These organizations vary widely across all PES program however, most are found to play one of two roles, that of implementer or that of consultant. Local and regional NGOs are often initiators of PES programs and thus often take the primary role in implementing the program. This is particularly true in smaller programs that operate on a local or regional scale. As implementers, NGOs may link the program to an international funding source while initiating contact between buyers and sellers before working with both groups to facilitate the program. For example, in Colombia the local NGO *Centro Agronómico Tropical de Investigación y Enseñanza (CIPAV)* applied for funding through the World Bank's Regional Integrated Silvopastoral Ecosystem Management Project (RISEMP) to implement a PES program in the Quindío watershed.[107] As consultants on the other hand, NGOs often fill gaps and address needs that may not be met by program implementers such as training and capacity building. These services are common in programs that require participants to learn new activities or land-use practices and can be seen in

[107] Pagiola et al. (2005), 208.

such programs as Costa Rica's federal PES program and Namibia's community-based natural resource management payment program.[108]

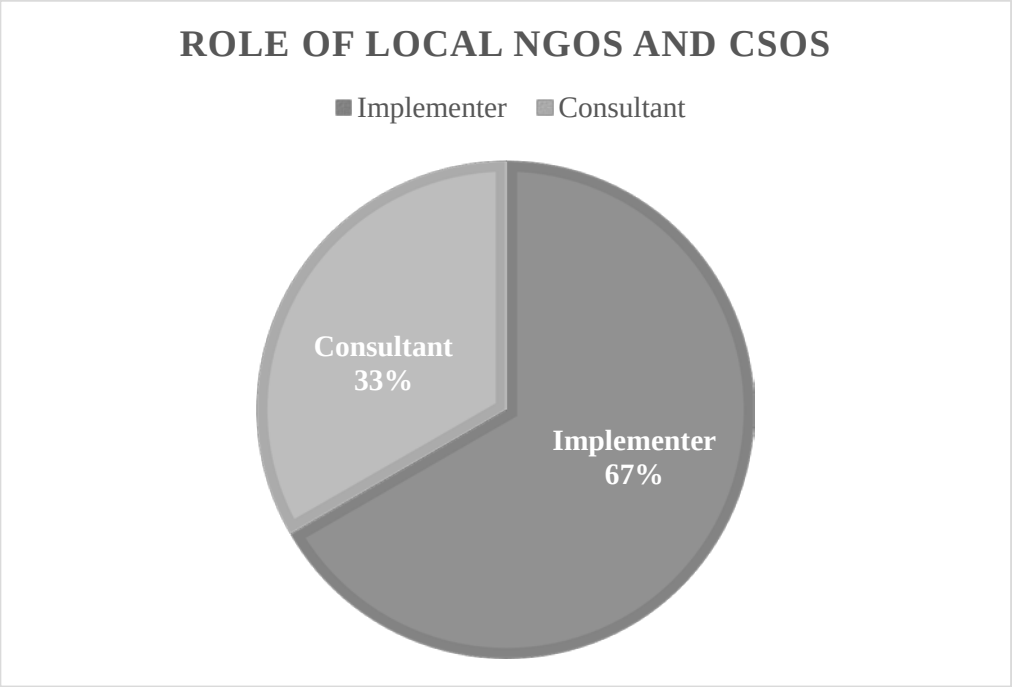

Fig 5. Role of NGOs and CSOs

The role of these local institutions can be seen as local actors responding to needs of local participants or of program implementers. As local authorities and trusted bodies, communities and their associated organizations often take on the responsibility of implementing PES programs and act as a liaison between program officials and participants. In their role as either an implementer, participant, or intermediary, local institutions are thought to promote greater access to PES programs as well as to promote greater equity within the program. However this is often only true among participating land-holders, and it is thought that the presence of local institutions can at times exacerbate existing inequalities should they exclude the land-less and marginalized.[109] As intermediaries and consultants, communities can advocate for local values and share local realities with program officials which can lead to more well-tailored programs and often increase program sustainability, a benefit that has also been found to exist when local

[108] See: Miriam Miranda, Ina T Porras, and Mary Luz Moreno, "The Social Impacts of Carbon Markets in Costa Rica: A Case Study of the Huetar Norte Region," *Forestry*, no. July (2004); and Robin Naidoo et al., "Namibia's Community-Based Natural Resource Management Programme: An Unrecognized Payments for Ecosystem Services Scheme," *Environmental Conservation* 38, no. 4 (2011).
[109] Calvet-Mir et al. (2015), 152.

NGOs act as consultants.[110] NGOs on the other hand often find themselves implementing PES programs due to their initiative and drive to tackle conservation issues. NGO driven programs are found to be generally smaller than public programs but often can be more specific. Their specificity helps target the program towards a certain goal and can circumvent weak local governance, often leading to a program that more closely reflects Wunder's narrow definition of PES programs that is more focused on conservation outcomes rather than social outcomes.[111] Indeed, the division seen here between community-led and NGO-led program is similar to that found by Ezzine-de-Blas et al. (2016) who characterise PES programs as generally falling in one of three groupings: "agri-environmental public PES," "NGO-led biodiversity PES," or "Private commercial carbon and water PES."[112]

After this review of the literature, five cases were chosen for further examination. Each case was informed by several sources that provided evidence as to the outcomes of interaction between program implementers and local institutions. Federally-funded (public) programs include *Pago por Servicios Ambientales Hidrológicos* in Mexico, the *Programa Socio Bosque* in Ecuador, and the *Programa por Pago de Servicios Ambientales* in Costa Rica. User-financed and NGO-led programs are the *Acuerdos Recíprocos por el Agua* in Bolivia and the *Scolel Té* program in Mexico. This list of programs was chosen as it includes both government-led and NGO-led programs. In addition, all the roles identified above are found in these case studies. The programs have been broken down by primary funder and implementer, that being either government or users (through NGOs). This dichotomy is made as there tends to exist fundamental differences in these two different styles of programs as is seen in the research of Ezzine-de-Blas.[113] Government-financed programs tend to be the product of political needs and traditionally focus on a wider array of outcomes whereas user-financed tend to be closer to the classic 'single buyer for a single service' program.[114] In addition, the dichotomy serves to highlight potential differences in interactions found. In each case the program is introduced

[110] Tracey Osborne and Elizabeth Shapiro-Garza (2018), 95.
[111] Sommerville et al. (2010), 1495; and Ezzine-De-Blas et al., "Global Patterns in the Implementation of Payments for Environmental Services," *PLoS ONE* 11, no. 3 (2016): 9.
[112] Ezzine-de-Blas et al. (2016), 9.
[113] See: Ezzine-De-Blas et al., "Global Patterns in the Implementation of Payments for Environmental Services," *PLoS ONE* 11, no. 3 (2016):
[114] S. Wunder, S. Pagiola, and S. Engel (2008), 835.

before the local institutions in question are identified and their methods of interaction with the PES program are explored. Results are summarized in table format.

5.1 Government-Financed/Public Programs

Public payments for ecosystem services program are often some of the largest in existence due to the capacity available through federal governments. Government-financed programs tend to encompass a greater number of ecosystem services, as seen in the case of Costa Rica's federal program, while often financing their program at least in part through a mandatory user fee or tax.[115] These public programs may also have less well-defined objectives but are often more service-oriented than user-finance programs as the government seeks to ensure that multiple services can be implemented through the programs to give its users greater economic and social benefit. This focus on services combined with an apparent unwillingness to sanction non-compliant users has led to theorizing that public PES programs tend to be less efficient than their private counterparts.[116] In order facilitate these larger programs, federal governments often make use of various intermediaries who can connect providers with program officials and ensure proper program implementation.[117] The findings in this section reflect this strong use of intermediaries with multiple different local institutions playing a role in the implementation of each program. As shown below, these institutions are generally seen to have a positive impact on social program outcomes through stronger knowledge sharing and more equitable distribution of program benefits. While this is the case, fewer conclusions are reached concerning environmental program outcomes.

Table 3: Government-led program findings

Institution	**Method of Interaction**	**Results**
	Pago por Servicios Ambientales Hidrológicos (Mexico)	
Local Assemblies	Direct implementer of PES program	Greater community economic benefits; more equitable distribution of benefits; Stronger program knowledge by

[115] S. Wunder, S. Pagiola, and S. Engel (2008), 839.
[116] Vatn (2010), 1249; S. Wunder, S. Pagiola, and S. Engel (2008), 843.
[117] Sarah Schomers et al., *How Local Intermediaries Improve the Effectiveness of Public Payment for Ecosystem Services Programs: The Role of Networks and Agri-Environmental Assistance, Sustainability (Switzerland)*, vol. 7, 2015, 13857.

		participants; greater support of new conservation activities; *Greater inequality between landowners and the landless*
Regional Coalition on Natural Resources	Specialised Intermediary and Consultant	Stronger environmental outcomes; Greater program adaptation to local circumstance; Sharing of local knowledge and conservation practices
Civil Society Organizations	Consultant	Stronger program knowledge by participants; wider sharing of conservation practices and sustainability practices
Agrarian Communities	Direct Implementer of PES program	Greater equity within the community landowners; Stronger program knowledge by participants; *Greater inequality between landowners and the landless*
Programa Socio Bosque (Ecuador)		
Local Communities Governance Bodies	Direct implementer of PES program and Participant	Strength of community institutions positively influences household land-use change; Greater understanding of program rules; Stronger sharing of economic co-benefits; Greater knowledge transfer; Greater number of communities participating
Indigenous Community Bodies	Direct implementer of PES program and Participants	Greater communal benefit; Greater monetary transparency; Greater program adaptability; Stronger institutional support; *Increase in issues with elite capture; Exacerbate existing community inequalities*
Programa por Pago de Servicios Ambientales (Costa Rica)		
Local NGOs	Consultants	Stronger support of conservation activities; greater knowledge sharing; increase in participation; lowering of transaction costs; increased capacity of local institutions; Crowding-in of non-participants

Forestry Agents	Contractors	More efficient monitoring and sanctioning; Lower overall operational costs; greater focus on program outcomes
Local Cooperatives and Agricultural centres	Direct Intermediary/Implementer	Intermediaries vary based on values; greater focus on program goals; legitimizes local institutions

Pago por Servicios Ambientales Hidrológicos (Mexico)

The national hydrological PES program in Mexico, *Pago por Servicios Hidrológicos* (PSAH), is one of many federally funded PES-like programs in the country and one of the largest PES programs in the world by geographical area and by funding.[118] Beginning in 2003 as a five-year program by the National Forestry Commission (CONAFOR), the program has the primary goal of "conserving forests to improve water quality and quantity for downstream communities and secondary social goals of maintaining rural incomes and reducing poverty."[119] The program's operational budget comes partly from a federal water fee; however, the fee was quickly found to be insufficient to meet program costs. To solve this issue, CONAFOR looked to transition program management to the community level after the first five years but in reality this has rarely happened, with the federal government continuing to fund the program with the help of some international NGOs.[120] While community organizations like *ejidos*, the traditional form of communal land tenure organization found in Mexico, and indigenous agrarian communities have not taken over fully funding the program, they have become the primary implementers of the federal program.

The system of *ejidos* can trace its roots back to the agrarian reform won in the Mexican revolution and are the most common local partner for the national PES program. These institutions are traditionally organized through a general assembly comprised of elected officials which are legally designated to make decisions concerning community life. However, not all individuals within the community are represented in these assemblies as only those with formal

[118] Caro-Borrero et al. (2015), 139.
[119] Katharine R.E. Sims et al., "Improving Environmental and Social Targeting through Adaptive Management in Mexico's Payments for Hydrological Services Program," *Conservation Biology* 28, no. 5 (2014): 1152
[120] García-Amado et al. (2011), 2362.

land tenure rights have full voting rights.[121] The communal nature of the *ejidos* and their history of ensuring collective rights for the local indigenous and poor has also meant that they have been instrumental in changing the focus of PSAH from an efficiency and market focus to a focus on community needs. Additionally, their participation means that program outcomes rely heavily on the local implementation by these organizations and that the corresponding local community assemblies have been the primary point of contact for PES programs in Mexico such as PSAH.[122] Both indigenous agrarian communities and *ejidos* are responsible for implementing large parts of the program in their local context.[123]

The federal government transmitting much of the responsibilities to local institutions is a common interaction strategy in government-financed PES programs. In the case of PSAH, the relationship between the federal government and the local communities is such that the local communities can often be considered an extension of the implementing institution. The responsibilities the community assemblies assume include deciding if the community would enrol in the program, assigning conservation activities to members of the community through individual's contribution to communal labour, and distributing any payments that are gained through these activities.[124] Meanwhile, conducting monitoring and sanctioning often remain under the control of federal officials or through local forestry officers due to the levels of expertise needed to conduct these activities.

In the case of the PSAH program, findings were consistent across many different sources. It was found that using a community organization as the primary implementer of the program led to greater economic benefits for the community and these benefits were shared more equally among program participants. Moreover, there was increased knowledge of both program details and related conservation practices, as well as a greater willingness to support these conservation activities. Greater internal community organization through local institutions may also be responsible for superior economic benefit to the community and a higher number of households

[121] Lucia Almeida-Leñero et al., "Not the Same for Everyone: Community Views of Mexico's Payment for Environmental Services Programmes," *Environmental Conservation* 44, no. 3 (2017): 201.
[122]Diana Denham, "Community Forest Owners Evaluate a Decade of Payments for Ecosystem Services in the Mexican Cloud Forest: The Importance of Attention to Indigenous Sovereignty in Conservation," *Society and Natural Resources* 30, no. 9 (2017): 1066.
[123] Denham (2017), 1068.
[124] García-Amado et al. (2011), 2363.

being able to benefit from the program through increased income.[125] The greater knowledge of the program and conservation activities was found to also lead to generally more support for sustaining these conservation activities even in the absence of the PES program.[126] While using a local intermediary generally increased the benefits for many community members, there were also drawbacks. It was found that much of the information sharing, including training and other interactions, were highly centralized within those who are already in power – the members of the local assembly. Knowledge concerning the availability of resources and support offered by federal officials and, most importantly, any monetary benefits gained through the program, were often not available to those without official land tenure. This has negatively impacted the program's ability to reduce poverty as it contributed to greater inequality between land owners and the landless poor. Concerning the environmental impact of the program, it was found that due to their lack of knowledge, marginalized community members were also more likely to halt any land-use changes induced by the program after its termination.[127]

As part of PSAH, local institutions were also used as consultants and acted as a specialized intermediary. This kind of collaboration took place with local Civil Society Organizations (CSOs) and regional coalitions. Examples of these institutions include the CSO *GeoConservcion* in Oaxaca and Chinantla and the Committee on Natural Resources of the Chinantla Alta (CORENCHI, using the Spanish acronym) respectively. *GeoConservacion* has worked with PSAH for over 12 years while CORENCHI was established by four Chinantec communities in order to leverage their combined 22,000 hectares of cloud forest to demand government priority.[128] These institutions were not directly implementers of the program, but rather acted as intermediaries between the federal government and the implementing communities. They also offered technical and information support to local assemblies and advocated for local priorities in negotiations with federal officials.[129]

[125] Karla J. Rodríguez-Robayo and Leticia Merino-Pérez, "Preserve and Produce: Experience in Implementing Payments for Environmental Services in Two Indigenous Communities in the Northern and Southern Ranges of Oaxaca, Mexico," *Journal of Sustainable Forestry* 9811 (2018): 8.
[126] García-Amado et al. (2011), 2366
[127] Almeida-Leñero et al (2017), 202.
[128] Denham (2017), 1067.
[129] Karla J. Rodríguez-Robayo and Leticia Merino-Pérez (2018), 13.

The participation of local CSOs and regional coalitions strengthened conservation outcomes, increased adaptability of the program to local circumstances, and improved sharing of knowledge and local practices with federal and local officials. The leadership of CORENSHI and its work with the federal government's PES program led to the successful implementation of the program in target communities and important gains in environmental and livelihood outcomes. Their collaboration allowed the program to be adapted for local circumstance and go beyond the prescribed program design. For example, CORENSHI ensured conservation work took place through the mechanism of communal work (*tequios*) and allowed the recognition of firebreaks as a conservation activity. Furthermore, CORENSHI acted as an intermediary in the disbursement of payments, allowing money to be set aside for community projects and the common good before it was distributed to households.[130] In Oaxaca, the partnership with CSOs over a sustained period of time has allowed two separate communities to gain national recognition from their implementation of sustainable development and conservation strategies such as PSAH. Therefore, implementing organizations helped the communities support a positive perception of the programs and influenced the participation of key actors.[131] Overall, the link with local institutions has allowed for a wider and more sustained implementation of the PSAH program as it has built trust and spread knowledge in participating communities.

Programa Socio Bosque (Ecuador)

For the ecologically diverse state of Ecuador, the growing rate of deforestation between 1990 and 2000 led to the creation of a national payments for ecosystem services program in 2008. *Programa Socio Bosque* (PSB) was launched with dual goal of "preventing the destruction and degradation of native ecosystems, and increasing income and human capital in the poorest communities of Ecuador."[132] PSB is a federally implemented program with voluntary participants that are given either individual or communal contracts that stipulate specific land-use restrictions with the goal of improving ecosystem conservation. The program specifically targets the ecologically sensitive regions that are located in some of the poorest regions in the country. Like many PES program in developing countries, the program is not linked to markets but

[130] Denham (2017), 1070.
[131] Karla J. Rodríguez-Robayo and Leticia Merino-Pérez (2018), 15.
[132] Felipe Murtinho and Tanya Hayes, "Communal Participation in Payment for Environmental Services (PES): Unpacking the Collective Decision to Enroll," *Environmental Management* 59, no. 6 (2017): 941.

instead, attempts to incentivise conservation activities through payments. While the program is open to both individual and communal contracts, roughly 88% of the conservation land is under community contracts.[133] The preference for community contracts is the result of many local indigenous communities that use a communal form of land tenure participating in the program. Similar to the PSAH in Mexico, the local community is represented in interactions with the federal government by an elected body, which also acts as the primary implementer of PSB in their communities.[134] However, unlike in the case of PSAH, communities that would like to be a part of the program must develop an investment plan that outlines how the incentives given to the community through the program will be spent. The implementation of these plans is monitored by federal officials.[135]

These local indigenous governance bodies are responsible for the majority of the implementation of the PSB program in much the same way that was outlined in the case of the PSAH program. It was found that because of the direct interaction of the community body with the federal government, households tended to know more about the program and benefitted more equitably from the program.[136] The prescribed household land-use changes were also more effectively implemented in that households more often would successfully implement the desired changes. Further, with the addition of local community meetings to the implementation process, more households were encouraged to join due to their consensus-building ability. The higher level of organization in local institutions also helped encourage other communities to participate in PES programs.[137] Through stronger interaction with more organized local executive bodies, PES programs' rules could be more effectively passed on to target households along with greater understanding of program implementation and enforcement. In addition, participants believed that the stronger ties with the community organization allowed for the clarification of local land-use rules as well as allowed for community leaders to better take care of their communities.[138] Overall, it was found that local organizations and governments play an important role in encouraging communities to join. This is due to their ability to explain the process and aid in

[133] Hayes et al. (2017), 429.
[134] Murtinho and Hayes (2017), 942.
[135] Torsten Krause and Lasse Loft, "Benefit Distribution and Equity in Ecuador's Socio Bosque Program," *Society and Natural Resources* 26, no. 10 (2013): 1173.
[136] Murtinho and Hayes (2017), 943.
[137] Murtinho and Hayes (2017), 943.
[138] T. Hayes (2017), 439.

knowledge transfer to local households.[139] These greater rates of participation as well as more effective implementation of land-use changes has meant that the program is closer to achieving both of its stated goals.

Given the importance of the relationship of indigenous communities with the federal government in Ecuador, a substantial part of the literature has focused on how these community organizations have implemented PSB. With the integration of the community organizations into the program, studies found that local indigenous customs and knowledge were better considered in the planning of program implementation, allowing for communities to decide what part of their land they would enrol in the program and ensuring that benefits were distributed equally. Similarly, in non-indigenous communities the use of investment plans also ensured that communities shared the benefits of the program in an equal and transparent manner.[140] Additionally, the benefits of interacting directly with local community institutions as opposed to individuals were pointed out to be a greater use of monetary gains to fund investments that benefited the whole community, a greater sharing of knowledge, and a strengthening of organization and institutions. However, it has also been identified that there is an increased possibility of issues with elite capture due to the centralization of information and benefits. In addition, the program interacting with these communities rather than through individuals directly can exacerbate existing inequalities.[141]

Programa por Pago de Servicios Ambientales (Costa Rica)

Like PSB, the Costa Rican *Programa por Pago de Servicios Ambientales* (PSA) was established in 1997 with the shared goals of economic growth, social equity, and environmental protection due to growing concerns at the rate of deforestation that was taking place in the country. Today, the program more specifically targets four ecosystem services: carbon sequestration, protection of water resources, protection of biodiversity, and provision of natural scenic beauty for scientific and tourism purposes.[142] The program was established by the federal government and operated by the arms-length public forest funding institution FONAFIFO

[139] Murtinho and Hayes (2017), 952.
[140] Free de Koning et al., "Bridging the Gap between Forest Conservation and Poverty Alleviation: The Ecuadorian Socio Bosque Program," *Environmental Science and Policy* 14, no. 5 (2011): 539.
[141] Krause and Loft (2013), 1180.
[142] Melissa Bollman and Scott D. Hardy, "Evaluating Institutional Performance: Payments for Environmental Services in Costa Rica," *Latin American Policy* 3, no. 2 (2012): 196.

(*Fondo Nacional de Financiamiento Foresta*) and is financed by a mix of international sales tied to climate mitigation efforts as well as a compulsory 3.5% on fossil fuels paid by all Costa Ricans.[143] The PSA uses voluntary contracts with individual land owners and, while the funding and administration of the program is primarily the responsibility of FONAFIFO, much of the actually implementation of the program is done through intermediaries, such as local NGOs, forestry agents called *Regentes*, and local cooperates.[144] To be a part of the program, individuals must apply through FONAFIFO as well as have a technical study of the lands in question completed by a forestry agent. To help with the process, local NGOs often offer technical and information support.[145]

Consultants like NGOs play an important part in the implementation of the PSA for FONAFIFO because prospective participants often lack the knowledge and capacity to complete the necessary steps to enrol in the program. Thankfully, local NGOs like the Foundation for the Development of the Central Volcanic Mountain Range (FUNDECOR) and the Forest Development Commission of San Carlos (CODEFORSA) act as intermediaries with the objective "to guide producers to participate in national conservation and forestry development projects."[146] Through their work with the PSA and other programs, these NGOs have developed a strong reputation for their capacity in changing local economic condition and applying and teaching technical conservation knowledge. They both offer technical assistance to PSA participants such as completing paperwork and teaching conservation techniques to poorer and less educated applicants.[147] FUNDECOR also supports local businesses facilitate environmental contracts and provides small and medium sized land holders with a free consultancy service.[148]

In their study, Locatelli et al. (2008) found that the interaction between these NGOs and the primary implementer of the PSA increased participation in the program while promoting greater knowledge of the program by participants, often crowding-in other households. It was also found that these organizations lowered program transaction costs, increased the capacity of

[143] Ibid.
[144] Aske Skovmand Bosselmann and Jens Friis Lund, "Do Intermediary Institutions Promote Inclusiveness in PES Programs? The Case of Costa Rica," *Geoforum* 49 (2013): 52.
[145] Locatelli et al. (2008), 276.
[146] Miriam Miranda, Ina T Porras, and Mary Luz Moreno, "The Social Impacts of Carbon Markets in Costa Rica: A Case Study of the Huetar Norte Region," *Forestry*, no. July (2004), 35.
[147] Locatelli et al. (2008), 276.
[148] Miranda et al. (2004), 14.

other local institutions, and led to an increase in support for conservation practices. Participants who used these institutions found that they knew more about the program, which built capacity of poor participants to implement the necessary conservation practices. The support of these local institutions was often seen as essential as almost no local farmer has experience with a PES program.[149] Additionally, the success of PSA in dealing with local institutions has led to further growth of other local institutions who have begun to assist in areas of need such as setting up carbon offsets markets. The relationship with local institutions has also led to strong skills and experience for participating communities such as community group work. Finally, it was shown that land owners often overcame their doubts of the program with the help of local NGOs.[150]

A second important collaboration in the implementation of the PSA program is with key local professional contractors such as forest agents, or *regentes.* These forest agents implement important operation-level activities such as collecting physical characteristics of land parcels to complete the necessary land management plan for potential participants before they can apply to the program. These actors are the primary source of important ecological information that the PES program is based on. They collect the initial assessment of the land and monitor the land throughout the duration of the contract. The use of contractors has allowed for fewer levels of interpretation of this important information thus giving fewer mistakes to the central PSA officials. This also means that there are fewer opportunities for conflict between actors. Using local actors and institutions for monitoring has also added to the ease and cost of monitoring and sanctioning in the program. Bollman and Hardy (2012) found that the use of *regentes* lowered overall operational costs of the program by lowering information costs, helps ensure program participants meet program criteria, and increase the effectiveness of program monitoring, elements that could positively impact the programs push for environmental protection and greater carbon sequestration.[151]

The final actor examined in the case of the PSA are the intermediaries used for the implementation of the program. Much like in Mexico and Ecuador, a portion of the contracts given out as part of the PSA program are implemented through the use of intermediaries. In

[149] Locatelli et al. (2008), 284.
[150] Miranda et al. (2004), 28.
[151] Bollman and Hardy, "Evaluating Institutional Performance: Payments for Environmental Services in Costa Rica." *Latin American Policy,* Vol. 3, No. 2 (2012), 199.

2009, it was found that 20% of all contracts were implemented by 20 different intermediaries including cooperatives, agricultural centres, and environmental organizations.[152] These intermediaries facilitate group contracts in a sustainable way, giving support to groups and communities who may otherwise not have been able to successfully implement the program. As they facilitate all facets of the program, intermediaries were found to decrease barriers to participation as well as lower costs associated with monitoring and sanctioning. [153] Bosselmann and Jund (2013) also found that the differences within each intermediary do impact the inclusiveness of the program. This is because the intermediaries tend to target those individuals and households that are already in their existing local networks due to greater cost effectiveness and the promotion of their legitimacy among their clients. Additionally, it is shown that intermediaries are influenced, and influence participants, due to their role are PES implementers. They tend to take the PES regulations to heart and focus on attaining what is desired by the federal officials rather than having the overarching goal of environmental conservation or social development as their primary purpose. This includes how the government believes achieving these goals should be done and it thus can reinforce existing inequalities in some cases.[154]

5.2 User-Financed/NGO-led Programs

User-financed PES programs are programs where the service buyers are also the users of the resource and provide the payments that incentivise environmental conservation practices. These programs are often differentiated from government and third party financed programs where program funding is provided by a non-local organization.[155] However, for this analysis the distinction will be based not only of who is funding the program but also by who has the authority to make decisions concerning the implementation of the program, as well as if users have the ability to voluntarily enter into and continue participating in the program. Consequently, programs like Mexico's *Scolel Té* and Bolivia's *Acuerdos Recíprocos por el Agua* are considered user-financed because both have been implemented through local institutions and decision-making power rests in the hands of local participants or local organizations.[156] User-financed

[152] Bosselmann and Jund (2013), 53.
[153] Ibid.
[154] Ibid.
[155] Subhrendu K. Pattanayak, Sven Wunder, and Paul J. Ferraro, "Show Me the Money: Do Payments Supply Environmental Services in Developing Countries?," *Review of Environmental Economics and Policy* 4, no. 2 (2010): 259.
[156] Engel, Pagiola, and Wunder (2008), 666.

programs have also been theorized to be more efficient than government-financed programs because of their ability to be more focused on environmental conservation by avoiding the 'political drift' toward a larger number of desired outcomes that are common in government-financed programs.[157] User-financed PES programs that are closely integrated with local organizations also tend to reflect the social needs of the community, meaning although they may not target the poor or have equity as a program outcome, they tend to be implemented in a way that does result in social co-benefits to participants.[158]

Table 4: NGO-led program findings

Institution	Method of Interaction	Results
	Acuerdos Recíprocos por el Agua (Bolivia)	
Local NGO	Originator and Implementer	Greater adaptability to local conditions, stronger trust of participants, greater sustainability, increased participation, strengthens other local institutions, greater knowledge; *increased inequality*
Environmental Committees and Councils	Consultant	Diversification of payment type (more efficient payments); greater adaptation
	Scolel Té (Mexico)	
Local Association	Consultant	Greater inclusion of local values; *Undermining of the authority non-local governing bodies*
Local CSO	Overall Implementer	Increased participation, Increased length of participation, increase in knowledge of the program, stronger links between local institutions, greater sustainability, increase in importance of balance of outcomes

[157]Sven Wunder, "When Payments for Environmental Services Will Work for Conservation," *Conservation Letters* 6, no. 4 (2013): 231.
[158] Tanya Williams ,"A Qualitative Analysis of Effectiveness , Efficiency and Equity of Payment for Ecosystem Services in a User-Financed and a Government-Financed Program By," Rochester: Proquest LLC, 2016.

Regional Organizations	Consultants and Partial Implementer	Greater trust of implementing institutions and of the program as a whole; increased equity

Acuerdos Recíprocos por el Agua (Bolivia)

The *Acuerdos Recíprocos por el Agua* (ARA) program was initiated in 2003 after farmers in the downstream community of Santa Cruz began experiencing low water flow. The purpose of the program is to "protect the water supply through the protection of upstream forests and creating an enabling environment for downstream water users to contribute to such forest protection."[159] With facilitation from the local NGO Fondación Natura Bolivia (FNB), downstream farmers set up a PES-like program that rewarded upstream farmers for the preservation of the cloud forest on their land. Today, the program has evolved to include what are known as Reciprocal Watershed Agreements (RWAs). These agreements compensate upstream farmers with non-monetary payments of beehives, apiculture training, and barbed wire in return for the use of conservation practices on their land.[160] The program in Santa Cruz is organized and implemented by the FNB with start-up financial aid from the United States of America Fish and Wildlife Service and the local Municipality of Pampagrande. The program is voluntary for upper watershed landowners who can join at the established payment rate. These owners can also choose which plots of land they would like to enrol in the program. The implementation of the program has been primarily undertaken by the FNB acting as a local coordinator of participants and financial providers, as well general project management. In addition, certain local environmental committees have acted as consultants during the negotiation of the terms of the program.[161]

The fact that the originator and coordinator of the PES program is a local organization was beneficial in two ways. First, it allowed the program to be flexible and adapt to participant needs. For example, by first implementing a pilot with the help of the municipality of Los

[159] Tanya Williams (2016), 39.
[160] Ibid.
[161] Nigel M. Asquith, Maria Teresa Vargas, and Sven Wunder, "Selling Two Environmental Services: In-Kind Payments for Bird Habitat and Watershed Protection in Los Negros, Bolivia," *Ecological Economics* 65, no. 4 (2008): 679.

Negros, the FNB was able to determine that in-kind payments were in demand from participants and that trust would be an early barrier to program implementation. In response, the program was able to be implemented with the use of local community councils to build trust as well as have payments be differentiated based on what was demanded by participants.[162] Second, it allowed the program to increase its sustainability because of sustained local support through stronger inter-community relationships. The expanded integration of local institutions and decision making bodies through the leadership of a local institution was also found to improve the recognition of marginalized communities and persons within the participating communities. In addition, upstream and downstream communities tended to recognize each other more allowing for greater trust to be built between communities as well as between their local decision making bodies. This in turn led to stronger social outcomes as participants perceived the benefits of the program to be more equally distributed.[163] This continued trust building facilitated the strengthening of program sustainability as participants began voluntarily asking for longer contracts, something that was not initially done due to local fears of land appropriation. Finally, the use of local institutions meant that non-participants, the traditionally marginalized, were able to participate in at least some way due to greater access to local employment opportunities related to the program. Nevertheless, inequalities between land-owners and recent immigrants were indeed widened at times due to the exclusion of landless citizens.[164]

The use of local organizations over national institutions in the process of implementation has also allowed for more direct coordination between user, sellers, and organizers due to their proximity. This has allowed for greater program flexibility and coordination with local circumstances as is shown with the use of non-monetary payments. While this is the case, the program was found to have higher than average transaction costs due to the low number of enrollments.[165] Further, negative impacts of the use of local institutions were found to be the increased marginalization of certain non-landowners and recent immigrants who were both not often able to participate in the program. Additionally, it was found that if the local institution was

[162] Asquith, Vargas, and Wunder (2008), 678.
[163] Florence Bétrisey, Christophe Mager, and Stephan Rist, "Local Views and Structural Determinants of Poverty Alleviation through Payments for Environmental Services: Bolivian Insights," *World Development Perspectives* 1 (2016): 9.
[164] Asquith, Vargas, and Wunder (2008), 679.
[165] Tanya William (2016), 62.

not transparent with their use of program funds, users tended to quickly lose the faith and trust that had been built.[166] While there were some issues that came from the implementation by a local NGO, its ability to achieve a sense of recognition between the two parties allowed the NGO to achieve its stated goal of setting up a payment program between the two communities.

Scolel Té (Mexico)

The Scolel Té program began in the late 1990's and is now one of the longest running carbon forestry programs in the world. The program focuses on enrolling small-holder farmers to produce carbon offsets through agroforestry practices. It also emphasises the local development benefits that have been linked to the program. The program began with eight coffee-growing farmers as a pilot before expanding to cover more than 9,000 hectares today in parts of Chiapas and Oaxaca.[167] Originally called the *Fondo Bioclimático Carbon Project*, the program originates through a partnership between the Edinburgh Centre for Carbon Management (ECCM) and a local credit union of coffee growers called PAJAL. After the pilot phase, the involvement of the national government ministries and international funding partners increased. However, in 1997 and 1998 organizational changes between participating parties led to the creation of a regional community services organization (CSO) called AMBIO, which today is the primary project management organization.[168] Additionally, while AMBIO is the primary manager of the program, local rural organizations with closer ties to participants play an important part in liaising between program managers and participating communities in the implementation of the program.[169]

Local institutions have been key throughout the creation and implementation process for *Scolel Té*. The pilot program began by linking the organizing NGO at the time, *Fondo Bioclimático*, with a local association of coffee growers, PAJAL, who provided significant guidance from a local point of view. The link allowed for greater incorporation of local values

[166] Florence Bétrisey, Christophe Mager, and Stephan Rist (2016), 10.
[167] Tracey Osborne and Elizabeth Shapiro-Garza, "Embedding Carbon Markets: Complicating Commodification of Ecosystem Services in Mexico's Forests," *Annals of the American Association of Geographers* 108, no. 1 (2018): 92.
[168] Esteve Corbera, Nicolas Kosoy, and Miguel Martínez Tuna, "Equity Implications of Marketing Ecosystem Services in Protected Areas and Rural Communities: Case Studies from Meso-America," *Global Environmental Change* 17, no. 3–4 (2007): 372.
[169] Esteve Corbera, Katrina Brown, and Neil W. Adger, "The Equity and Legitimacy of Markets for Ecosystem Services," *Development and Change* 38, no. 4 (2007): 598.

and needs into the implementation of the pilot project such as the sale of fruit from local trees by service providers, which gave individual participants a greater chance to earn an income from being part of the program. However, the move towards international carbon markets in 1997 and the technical expertise required meant that decision making power was transferred away from project participants and local governance structures to new international partners.[170] This move from associations with very close local connections meant these carbon-offset producers would not only have more limited choices in carbon sequestering activities but would also have little influence in program design. In addition, the choice of the program in later years to work directly with individuals rather than through local institutions because of historical disagreements between these institutions meant "Scolel Té has effectively challenged internal institutions and further undermined traditional governance structures and practices."[171] Osbourne (2018) found that the tension with local authorities due to the focus on individual producers rather than local institutions has negatively impacted the ability of participating farmers to harvest their timber because it has led to institutions like traditional agrarian authorities withdrawing harvesting permits, ultimately limiting the expected financial benefits of the program as well as its viability and sustainability.[172]

Though the program's management structure evolved with the creation of AMBIO in 1997, the organization is still considered to be local due to its proximity to the region and the role of local implementers as part of the program's participation in Plan Vivo, an international carbon sequestration project.[173] In more recent years, after the dispute with PAJAL during the pilot phase due to its exclusion from the expansion of the program, it was found that the use of AMBIO, as a local CSO, benefitted the program in a number of ways and influenced a greater number of individuals to participate in the PES program. While economic and land-use factors still have a strong influence on levels of participation, AMBIO's use of technical assistance, as well as their targeting of important local individuals enabled them to leverage social motivations to encourage greater participation. [174] This crowding-in of local influential figures also facilitated

[170] Tracey Osborne and Elizabeth Shapiro-Garza (2018), 95.
[171] Ibid, 96.
[172] Ibid.
[173] Cary Y. Hendrickson and Esteve Corbera, "Participation Dynamics and Institutional Change in the Scolel Té Carbon Forestry Project, Chiapas, Mexico," *Geoforum* 59 (2015): 65.
[174] Ibid, 69.

greater synergy with other local conservation programs and even led to continued implementation of conservation practices by individuals after they have officially ended their participation in the program. The strong relations developed by AMBIO over many years also mean that levels of trust increased to a point where participants no longer believe the program is attempting to appropriate their land. Overall, AMBIO situated the program in the local context, ensuring local needs were met and improved the social co-benefits in numerous ways, such as the enabling participants to plant more financially beneficial trees and strengthening local institutions.[175] This has meant that the program has had greater success in achieving the desired local development benefits.

Finally, there were several local organizations that aided in the early implementation of the *Scolel Té* program. Corbera et al (2007) found that the existing relationships between these local institutions impacted the ability of PES programs to reach their desired outcomes.[176] It was also found that program legitimacy gained through the trust of participants is dependent on the existing relationship between local institutions. Past differences between institutions can negatively impact the implementation of PES programs as it can mean that local participants and other organizations lost trust in the implementing institution. However, a strong history of partnership between institutions can help the implementation through increased levels of trust. It can also mean that the program is more sustainable as the stronger link with local institutions can lead participants to both stay in the program longer and continue implementing conservation practices after the completion of the program. However, if the local organization does not challenge local inequalities and practises of marginalization, the program may reinforce these inequalities through the centralization of information and the failure to break local customs. In the early stages of the program, it was found that *Fondo Bioclimático* "failed to build more participatory mechanisms for project management and decision making which grasp local dynamics and complexities and promote more legitimate and equitable outcomes."[177] Thus, while it is possible for local institutions to promote more equitable practices, if the institutions are poorly managed, they can also reinforce negative program outcomes and harm the ability to achieve the desired program outcomes.

[175] Cary Y. Hendrickson and Esteve Corbera (2015), 69.
[176] Esteve Corbera, Katrina Brown, and Neil W. Adger (2007), 607.
[177] Ibid, 606.

6. Discussion

The results found in the five cases examined help give a general picture of some of the impacts of local institutions on PES program outcomes. They also show two distinct methods of interaction. The high-level impacts of interactions with local institutions were found to result in greater participation, increased program sustainability, more equitable livelihood outcomes, and more effective conservation activities. Many of the impacts were found to be quite similar across multiple cases as well as across both public and NGO-led programs. Most notably, participation in PES programs was found to be encouraged by the presence and inclusiveness of local institutions. Through greater knowledge sharing, combined with the resulting increase in program adaptability to local circumstances and increase in payment equity, a greater number of local landowners looked to participate in the program. Perhaps unsurprisingly, another one of the most common benefits of the presence of local institutions throughout all methods of interaction was that participants were more aware of the details of the program. Each of the five programs examined showed evidence that program participants learned more about the program and its purpose, goals, and methods due to the involvement of a locally situated institution. This increased level of knowledge in participants or prospective participants means that they were less likely to believe that the program was looking to take their land or remove them and were thus more likely to participate.[178]

The reverse was also found to be true in all cases, that local institutions were able facilitate the incorporation of local knowledge and practices into program implementation and design. This addition of local knowledge often meant that the program could better adapt to the specific local realities and, where possible, integrate local conservation practices into the program.[179] The greater sharing of local knowledge and the subsequent program adaptation was, in each of these cases, found to promote the more effective and sustainable use of conservation practices as participants were now more familiar with the necessary land-use changes. This change was also found to result in stronger support of these conservation practices by participants who were therefore more likely to sustain these practices for a longer period of time.[180] While there is yet little explicit evidence that suggests that environmental indicators

[178] Asquith, Vargas, and Wunder (2008), 678.
[179] See: Denham (2017), 1070.
[180] García-Amado et al. (2011), 2366

directly benefitted from local institutions, this increased support for conservation activities combined with more sustainable programs indicates that a positive impact on environmental outcomes could occur in the future.

Greater program sustainability was also found to be tied to the strengthening of local institutions that occurred due to their participation in the PES program. Almost all cases reported that the institutions that were involved benefited through either the gaining of legitimacy as perceived by locals or through increased trust due to the positive outcomes achieved by the program.[181] This in turn led to participants being more willing begin or extend their participation in the program. Finally, one of the most common results was found to be the increased equality of program benefits across a wider range of program participants. When implementing PES program, local institutions - particularly local governing bodies - are often responsible for the distribution of payments or have decision-making power over how the payment is spent. As these bodies are traditionally led by a communal assembly of local land-owners, it was often decided to use the payments to finance efforts that benefited the community as a whole. In addition, when payments are to be distributed to individual landowners, the use of an intermediary can ensure that payments are more equally distributed amongst participants.[182] However, it was also consistently found that this use of an intermediary could increase inequalities that already existed within the community, such as those between landowners and the landless. These already marginalized groups would not usually have a seat on the local assembly and thus are not often able to participate in the program nor in the sharing of its benefits. The gap can thus be further widened should local institutions reinforce this historical divide between citizens and centralize the information gains and economic benefits of the programs.[183]

6.1 Methods of Interaction

While many of the impacts of local intermediaries were found to be similar in both public and NGO-led programs, two distinct methods of interaction were found. Local institutions were found to act either as a delegated implementer of the program or as limited intermediaries such as consultants or contractors. Delegated implementers of a PES program are local institutions

[181] See: Asquith, Vargas, and Wunder (2008), 679.
[182] Karla J. Rodríguez-Robayo and Leticia Merino-Pérez (2018), 8.
[183] Krause and Loft (2013), 1180.

that are responsible for the overall local implementation of the program whereas intermediaries compliment the implementation of the program by liaising between program officials and participants or by providing services that are necessary for the program to be successful. These interaction strategies were found in both public and NGO-led programs. This indicates that local institutions adapt to both program and community needs and stand to benefit both the program and the community.

6.1.1 Delegated Implementation

In many cases, local institutions are used to implement most facets of the payment program. It was shown that certain landownership methods such as the communal ownership found in Mexico and Ecuador lends themselves to this style of implementation as there already exists local-level institutions that have authority over broad pieces of land. In other smaller examples, it was found that the originating NGO often continued to implement the program even after external funding or leadership took over due to their on-the-ground expertise and knowledge. In delegated implementation, local institutions implement the program on behalf of the program owner. In the cases of public programs, there is a clear delegation from central government to local government institutions however, where the program owner is a private organization, this can come in the form of a partnership or agreement between the local NGO and an international carbon market for example.[184] In this kind of interaction, the local institution is traditionally in charge of all operations after the program is created, facilitating any necessary land-use change and dispersing the payments or other benefits. These institutions are thus well situated to have a strong impact on program outcomes.

Having a local implementer of the program was found to impact programs' social outcomes quite strongly. These outcomes were usually quite broad such as PSAH's "goal of maintaining rural incomes and reducing poverty" or *Programa Socio Bosque's* target of "increasing income and human capital in the poorest communities of Ecuador."[185] The social co-benefits were improved through the increase in participation, sustainability, and equity that these local actors encouraged. In the case of PSAH and PSB, the local facilitation of the program by community assemblies meant that there was an increase in the sharing of program knowledge

[184] Hendrickson (2015), 65.
[185] Felipe Murtinho and Tanya Hayes (2017): 941;.Katharine R.E. Sims et al., (2014): 1152

leading to greater understand and trust of the program by the local population. Here both programs saw an increase in participation as well as a greater sharing of program benefits between all participants leading to increased rural incomes, as was the target of both programs.[186] In addition, programs achieved greater social equity because of their interaction with local implementers, at least among existing land-owners. As was noted, this method of interaction also led to increased inequality between land-owners and the landless as it caused the already existing gap to widen. Finally, Costa Rica's PSA could achieve their program aim of greater economic growth in participating communities in part due to the lowering of implementation costs that came through the technical and knowledge support offered by implementing institutions.[187] In NGO-led programs, Scolel Té's attempt to increase development benefits profited from the local NGO's ability to blend program implementation with the provision of technical assistance and the targeting of important local figures through program outreach. This close support available to the local participants when needed led to stronger development goals as reflected in greater program participation and sustainability. [188]

The program's environmental goals however, were found to have fewer direct benefits linked to the use of local institutions. This was perhaps due to the difficulty in collecting data on environmental indicators and the corresponding lack of data found in the available literature. What the findings did indicate was that local institutions had a positive, if indirect, impact on the program's environmental targets. The increase in participant's knowledge concerning the program, as well as their ability to share their knowledge with the program, led to a greater support of conservation activities in the cases of Mexico, Ecuador, and Bolivia. In these cases, it was found that participants showed greater support for conservation activities which results in a greater number of successful land-use changes as well as more effective enforcement of these changes.[189]

6.1.2. Consultants, Contractors, and other Intermediaries

The second primary method of interaction with local institutions was found to be through the use of consultants, contractors, and other specialized intermediaries. These are the

[187] Bosselmann and Jund (2013), 53.
[188] Cary Y. Hendrickson and Esteve Corbera (2015), 69.
[189] García-Amado et al. (2011), 2366; T. Hayes (2017), 439.

institutions that provide specialised services to aid in the implementation of the program. They often fill gaps that the local implementer cannot meet or cannot offer as effectively as the institution. They can also provide important information to program implementers as was shown by PAJAL, the local association of coffee growers in the case of Scolel Té who provided significant guidance from a local point of view. Others provide a service that is crucial to program success such as the role played by the *regentes* in Costa Rica's PSA who facilitate the monitoring and sanctioning of enrolled land. Finally, these institutions liaised between participants and program officials when necessary to support to the implementation of the program. These institutions were found to play an important part in the programs even if they were not responsible for the implementation of the program. As was found with local institutions who act as implementers, intermediary institutions were also found to have a more prominent impact on programs' social outcomes than their environmental outcomes.

While the outcomes found in the case of intermediary institution were less comparable due to the highly specific nature of many of the intermediary institutions, it was found that these institutions generally had a positive impact in many of the cases' social outcomes. This was primarily due to the greater adaptability to local issues that was achieved through the consultation process with intermediaries. Here it was found that when local knowledge and local issues were shared with the implementer, the program became better suited to the specific local situation and thus a greater number of landowners participated in the program for longer periods of time. For example, in the case of Scolel Té, local consultants allowed the program to accept the sale of fruit from local trees by service providers as a conservation activity, which gave individual participants a greater chance to earn an income, one of the program's central goals.[190] Participation was also found to increase when intermediaries lowered the cost of participation or provided services that lowered the barriers to implementation.[191] In addition, local intermediaries were able to amplify the recognition achieved by participants and their communities due to their connection to a wider network of conservation specialists. The national recognition achieved by two communities in Oaxaca as part of the PSAH program allowed the program to reach a wider

[190] Tracey Osborne and Elizabeth Shapiro-Garza (2018), 95.
[191] Bollman and Hardy (2012), 199.

audience and resulted in greater local support for the program, increasing the program's sustainability and its ability to reduce poverty.[192]

Local intermediaries were found to impact a programs' environmental outcomes through similar means. This ability to encourage program adaptation as well as participation in the program has meant that a larger number of participants were more likely to effectively implement the desired land-use changes, allowing programs to move closer to their desired environmental outcomes. Specifically, it was found that this adaptability meant that communities were able to include traditional conservation techniques as part of the program and participants were thus much more supportive of the program's implementation. This occurred, for example, in Oaxaca when interaction with the local organization CORENSHI allowed for the recognition of firebreaks as a conservation activity as part of the PSAH program.[193] In addition, consultants in the case of the PSA in Costa Rica were able to share conservation techniques and skills with new participants to the program which improved the programs' ability to conserve forests.[194] However, as was previously discussed, concrete metrics to measure environmental outcomes are rarely found in the literature and, in the cases examine in this paper, none were directly linked to the use of local institutions as intermediaries.

6.3 Balancing Program Outcomes

In both methods of interaction, it was found that social co-benefits and the stated livelihood outcomes of PES programs benefited to a greater degree than the stated environmental outcomes. The primary impact of the use of local institutions on the balance of outcomes was a shifting of emphasis to livelihood outcomes as seen through the focus on the programs' potential social and economic benefits. Local institutions did this by tending to focus on ensuring that the programs were accessible to local people as well as ensuring that the program adapted well to the local context and that participants benefited from the program in an equal manner. The resulting benefits tended to be, as was shown, principally concentrated on the livelihood outcomes of the PES programs in question although it is hypothesised that environmental outcomes may benefit in the long run. Strong participation and adaptation of the program as well as greater trust of institutions due to the role of local institutions served to ensure that participants accrued greater

[192] Karla J. Rodríguez-Robayo and Leticia Merino-Pérez (2018), 15.
[193] Denham (2017), 1070.
[194] Locatelli et al. (2008), 276.

access and benefits from the program. This can be seen as somewhat unsurprising given that many of the local institutions in question were formed by local citizens and represented local interests. This can most clearly be seen in the cases of PSAH and PSB where local community councils composed of land-owners were given the responsibility of implementing the program. In the case of PSAH, it is recognized that local institutions played an important role in shifting the programs outcomes away from ecological conservation to a more socially focused mandate which was also seen by theorists to be a shift away from an economically optimal program.[195] Thus, the hypothesis that interaction with local institutions would ensure a stronger balance of program outcome does not necessarily hold true as local institutions tend to shift the focus of the program to the livelihood outcomes rather than focusing directly on ensure a balance of outcomes. However, this shift of program focus can in fact be seen as ensuring that social outcomes reach the same level of importance as environmental outcomes in PES programs as compared to the traditional focus on the efficiency of environmental conservation. Thus, in time the hypothesis could hold true as these programs begin to achieve a greater balance of outcomes.

While local landowners generally benefitted from greater access and benefits, local institutions did not positively impact program's social outcomes at all times. As was seen in many cases, the role played by local institutions also served to exacerbate existing inequalities between land-owners and the landless in communities. These results support existing findings in the area that show that community politics combined with the engagement of land-owners by PES programs as a single entity has worked to "silence certain voices and claims, while privileging others."[196] Beyond this issue however, in both types of programs (public and NGO-led) it was shown that local institution's impact on the dissemination of program knowledge and encouraging of program adaptability was able to ensure a positive impact of program's livelihood outcomes for landowners as well as increased participation and program sustainability. However, while this focus on program co-benefits may have meant that programs were less environmentally supportive or less efficient, the environmental outcomes of each program may actually stand to benefit due to the aforementioned increase in program participation and program sustainability. Finally, because of the instruction in conservation

[195] Samii et al. (2014), 48.
[196] Milne and Adams, "Market Masquerades: Uncovering the Politics of Community-Level Payments for Environmental Services in Cambodia." *Development and Change*, Vol 43, No. 1 (2012), 133.

activities offered by certain local actors, as well as the greater sharing of knowledge concerning the programs, it was shown that participants tended to implement specific land-use changes more effectively.[197] Thus, while local institution's emphasis on the livelihood outcomes of PES programs may see PES programs shift away from the optimal balance of outcomes, the programs' increased participation and greater sustainability could lead to important environmental gains. While this could be the case, the need to focus on either environmental outcomes (as is the case when balancing outcomes using program design) or livelihood outcomes (as is the case when local institutions implement programs) emphasises that trade-offs between program outcomes still occur.

As previously illustrated, PES programs have traditionally looked to achieve balance in their outcomes by either improving program design or through a focus on achieving non-monetary benefits through partnership with local institutions. It was hypothesized that the use of local institutions to balance program outcomes would result in a focus on non-monetary benefits due to the strengthening of the participating institutions. This was compared to the efforts made through program design which were shown to be focused primarily on finding efficiencies to achieve the desired environmental outcomes while attempting to increase participation rates to balance local social benefits.[198] Common design changes were found to be the differentiation of payments, targeting of geographical areas, varying contract lengths, and lowering of barriers to participation. Here, the lens was very much focussed on first achieving greater efficiency and effectiveness while balancing the social potential of PES by attempting to include as many participants as possible. The results of this research, as outlined above, show that the role of local institutions may also share a similar focus on increasing participation. While local institutions and land tenure systems were indeed strengthened due to their important role in the cases examined, it was unclear if this strengthening led to a clarification of tenure rights or if actors other than traditional land-owners benefited from this. While this is partly due to the length of time needed for these changes to occur, evidence suggests that any clarification of land tenure rights would only benefit existing land holders who would then become eligible for participation in the program. Thus, the hypothesis holds partly true. However, it did not speak sufficiently to the role played by local institutions in increasing participation and the sharing of knowledge nor,

[197] Locatelli et al. (2008), 276.
[198] Kroeger (2013), 67.

as mentioned above, do local institutions focus on balancing outcomes. Rather, they shift the focus away from environmental outcomes to livelihood outcomes.

6.4 Situating the Findings

As was shown, participation was found to be the focal point for both methods of balancing program outcomes and this is an important link to make with existing literature. Both methods attempt to increase the ability of locals to participate in the program and thus gain access to its benefits. This is consistent with most of the earlier work on balancing program outcomes and how PES programs could benefit the poor. As Wunder (2008) argues, in order to ensure the most benefit to the poor through PES programs, it is most important to focus on increasing the scale of programs.[199] Here, local institutions were found to address some, but not all, of the issues surrounding participation. While they do tend to lower participation costs and other barriers, the issue of land tenure rights is often not completely solved through the interactions with local institutions.[200] This push to improve access and participation in PES programs however, comes from a different thought process when attempted through program design as compared to the same push by local institutions. The literature shows that the push by design theorists to increase participation is often couched in the need to increase the program's ability to achieve greater environmental impact. Here, the livelihood benefits of PES programs are clearly secondary to focus on achieving the desired environmental outcomes efficiently.[201] While this is the case, designing the program to induce greater participation is often understood to be necessary even if it is seen as potentially reducing environmental effectiveness.[202] On the other hand, the importance of participation through local institutions is seen to be very much a part of the attempt to ensure greater social co-benefits in a more participatory way. In addition, these efforts are often combined with work to ensure that participants are receiving sufficient payment in the form that is most needed, be it monetary or non-monetary.[203] To better reach this goal, local institutions could also look to expand their focus to include the landless and those with weak land-tenure rights, an issue that both methods of balance continue to struggle with.

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[199] Wunder (2008), 295.
[200] Stefano Pagiola, "Guidelines for ' Pro-Poor ' Payments for Environmental Services," *Environment Department, World Bank*, no. April (2007): 1.
[201] Pagiola (2005), 249.
[202] J. Börner et al. (2017), 2.
[203] Samii et al. (2014), 48.

This focus on the livelihood outcomes first and foremost differentiates the actions of local institutions from that of program design theorists. Perhaps the greatest differentiation between the two methods is the incorporation of local voices in the creation and implementation of PES programs that is established through local institutions. As was shown, the work of local institutions evolves more naturally from local needs as compared to the changes implemented using design theory. They can thus be seen as being more participatory than other efforts to achieve greater balance of program outcomes.

The fact that local institutions lead to more participatory processes in the changes to programs is an important distinction to make. This participatory process is key for ensuring that the changes are more effectively tailored to the situation and that participants will be more likely to support the program. Incorporating local views and desires in PES programs allows for greater freedom of agency in participants who can now not only determine their valued objective but also achieve these valued ends. This links back to the work of Duraiappah who emphasises the importance in the ability to choose an end goal as well as the freedom to achieve this goal. In the case of PES programs, being more participatory allows for key freedoms to be achieved by the local population that go above and beyond the simple realization of ecological surety. It is not only the ability to successfully achieve ecological surety that allows for people to flourish but also the ability to first choose it as a valued end. Including participatory methods in the implementation of PES programs allows participants to not only achieve their well-being freedom, but also achieve what Duraiappah calls "control agency freedom which is the real opportunity to achieve one's valued broader ends (including well-being) oneself; and effective agency freedom which is the real opportunity to have one's broader ends (including well-being) achieved precisely because they are one's ends."[204]

Finally, it was found that one of key outcomes of the participatory interaction with local institutions was greater longer-term support of the program and thus greater program sustainability. These findings are supported by other literature that suggest that the incorporation of community-level organization and technical knowledge can create the potential for program sustainability.[205] The increased program length combined with a larger number of participants

[204] Duraiappah and Abraham (2004), 20.
[205] See: Mariana Nava-López et al. "Decentralizing Payments for Hydrological Services Programs in Veracruz, Mexico: Challenges and Implications for Long-term Sustainability," *Society and Natural Resources,* (2018), 1.

and more support for the land-use changes involved in PES programs can also indicate that, if programs are indeed environmentally additional, environmental outcomes will also benefit. Thus, Lehmann's logic concerning policy mixes can be effectively applied to the case of PES programs when in situations where programs are correcting for multiple market and governance failures and thus have multiple program goals.[206] As PES program can often be considered as a number of cross-compliant policies in a policy mix when attempting to achieve multiple outcomes, it is shown that programs can indeed achieve a level of balance between program outcomes when using local institutions to address these multiple outcomes.[207] This is opposed to the situations in which PES programs are seen to focus only on one outcome, usually environmental conservation, where the work of such authors as Tinbergen and Pigou who argue that "in the presence of only one target, such as pollution control, a single policy was sufficient" could apply.[208]

This paper has attempted to fill a gap in the research concerning the role of local institution in PES programs as this is not currently well understood. It is important to better understand how these institutions impact program outcomes as theories used to design PES programs have often failed to take into account local institutional structure and contexts.[209] In PES and development literature in general it is understood that local institutions and participation are vital to program success however, in the case of PES programs, this importance is often not well qualified.[210] This paper has thus attempted to show how local institutions influence PES programs' ability to balance their outcomes. The findings in the paper show that local institutions are key to ensuring the participatory creation of locally adapted programs that put local needs to the fore. This builds on literature that points to the ability of intermediaries to provide greater networks and competencies to local participants.[211] In addition, the results found here reinforce some of the recognized benefits of local institutions, specifically surrounding the benefits they give to improving program participation by building local confidence in the program as is explored by Kosoy, Corbera, and Brown (2008).[212] While this is the case, many of the specifics

[206] Lehmann (2012), 71.
[207] Barton (2017), 404.
[208] Lehmann (2012), 72.
[209] Samii (2014), 20.
[210] Dougill et al. (2012), 3178.
[211] Schomers (2015), 13858.
[212] Kosoy et al (2008), 2074.

of these benefits, such as their direct impact on household income or amount of ecosystem services provided, are not clear. More research is therefore needed concerning the specific quantitative impacts of local institutions as the results found in this paper often only show changes in perceptions and local support of programs. This research would allow specific styles of successful interaction to be pinpointed. Finally, and more broadly, this work can be aligned with that of Community-Based Natural Resource Management (CBNRM) and other collective land management systems where it has been shown that participatory processes and ensuring community ownership over an intervention can lead to greater program success.[213]

7. Conclusions

This paper found that while local institutions tended to focus on livelihood outcomes over environmental outcomes, this focus ensures that programs achieve greater participation, equity, and more longer-term sustainability. Thus, it is understood that programs that use local institutions could have greater impacts on both desired goals as they can achieve a greater long-term viability. To expand on these ideas, more research must be done into the specifics of PES program integration within the local context, specifically into the distinct impact of certain local institutions in order to ensure that local integration is done in a fashion that benefits all participants. In addition, greater work could be done to examine if it is possible to design a PES programs that the landless and marginalized poor can both participate in, and benefit from. Further work could also therefore explore questions concerning what it means to the most effective given these results. Should PES programs shift away from their conception as an efficiency-focused market instrument to one where local needs are afforded as much importance as environmental outcomes? The results in this paper might suggest that PES programs should focus on a method of creation, design, and implementation that encourages participation from the target community in every aspect of the program as these participatory approaches have been shown to increase local capabilities.[214] These approaches however should be balanced with work by program officials to ensure that local institutions and actors are inclusive and open and are acting in the interest of the entire community. Here, local institutions can fill the gap to represent

[213] Thomas G. Measham and Jared A. Lumbasi, "Success Factors for Community-Based Natural Resource Management (CBNRM): Lessons from Kenya and Australia," *Environmental Management* 52, no. 3 (2013): 649.
[214] Duraiappah, Roddy, and Parry, "Have Participatory Approaches Increased Capabilities?"*International Institute for Sustainable Development*, June 2005, 27.

and support those without land or those who are not represented by local institutions. Questions could also be asked of the evaluation of PES programs as to date these programs are often not created with sufficient livelihood indicators in mind. The importance of conserving natural ecosystems and the services they provide will only continue to grow and ensuring that PES programs are able to succeed in developing countries is therefore paramount to conserving some of the most biologically diverse areas of the planet.

8. Acknowledgements

I would like to thank both my supervisor, Geoff McCarney, and reader, David Runnalls, for their time and effort supporting me throughout this project.

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