



Economic Analysis of Income Dynamics as a Baseline Input for Conservation Incentive Programs

Authors: Dr. Amy Rogers, Brittany Sprecher, and Lauren J. Lambert

ITTO Small Project RED SPD 055/11 Rev.4 (F)

Integrating Sustainable Livelihoods, Environmental Mortgages, and Science-based Reforestation for Tangible Forest Conservation Change in the Ecuadorian Chocó

Implementing institutions : Fundación Equilibrio Azul
 Av Amazonas 2915 e Inglaterra, Esq
 Edificio Inglaterra, Piso 2. Quito, Ecuador
 Phone +593 22431097
 Email felipe@equilibrioazul.org

Pinchot Institute for Conservation
 1616 P St NW, Ste 100 Washington, DC 20036
 Phone +1 (202)797-6580
 Fax +1 (202)797-6583
 Email arogers@pinchot.org

Advanced Conservation Strategies
 PO Box 1201, Midway, Utah 84049
 Phone +1 (607)227-9768
 Email jdonlan@advancedconservation.org

Place and date : Esmeraldas, Ecuador; November 27, 2014
 Disclaimer : Copyright © 2014
 This Completion Report is part of ITTO RED-SPD
 055/11 Rev.4(F):Integrating Sustainable Livelihoods,
 Environmental Mortgages, and Science-based
 Reforestation for Tangible Forest Conservation
 Change in the Ecuadorian Chocó

Scientific & technical personnel : Dr. Amy Rogers, Brittany Sprecher, Lauren J.
 that contributed to this report Lambert, and Dr. Jason Scorce



Project number : RED SPD 055/11 Rev.4 (F)
 Host government : Ecuador
 Starting date of the project : August 24, 2012
 Executing agency : Fundación Equilibrio Azul
 Project coordinator : Dr. Amy E. Rogers
 Duration of the project : 24 months

Table of Contents

Executive Summary	4
1. Introduction	5
2. Applied Methodology	7
3. Data Presentation	9
4. Analysis & Interpretation	12
5. Conclusions	13
6. Recommendations	14
7. Implications for Practice	14
Bibliography	15
Annex	16

Executive Summary

The intent of this technical report is to provide a detailed illustration of how the economic analysis of income dynamics can be properly applied for effective incentive program design. In reality, the relative success of each conservation incentive program is fundamentally dependent on how well a strategic approach responds to local livelihood dynamics, deforestation drivers, existing incentives, and culture.

The primary aim of this economic analysis was to better understand the specific income dynamics that drive deforestation in forest-dwelling communities of the Ecuadorian Chóco. For this region, cacao and timber represent the two predominant sources of the cash economy that characterizes most remote rainforest communities. We sought to document and analyze the economic drivers that underlie use patterns for each as a source of subsistence income, both to establish a baseline understanding of the currently immature and inefficient local cacao market as a candidate for livelihood sustainability and to accurately determine the opportunity cost of avoided logging.

Qualitative and quantitative data were collected over the course of ten months and involved interviews lasting approximately thirty minutes each with 29 individuals from the project's two pilot communities. These interviews aimed to quantify the details of profit margins versus required investments for timber extraction and cacao production. Five variables were identified as the predominant factors influencing timber income: wood cut being sold, harvest period, tree size, selling location, and intermediary buying prices. Cacao production was slightly more straightforward, with four predominant variables: relative harvest levels, required harvest investment, intermediary buying prices, and selling location.

Findings definitively confirm that a revamped cacao market system can absorb the opportunity cost of avoided logging within one to two years of incentive program establishment, and exceed combined timber and cacao earnings by more than double within three years of incentive program establishment. In short, although daily cacao earnings are by far the more lucrative and more stable income option, severely limited production levels currently result in the use of timber as a supplemental income source for more than half of each year. This problem is compounded by the instability of supply-and-demand-driven cacao purchase prices, formidable product transport challenges, and a lack of local processing facilities to enable export-level quality and volume. The collective result is a lack of economic incentive to properly tend to plantations, which ultimately leads to more timber extraction via temporally-restricted cacao harvests. Together, these factors help to explain why local forest-dwelling communities continue to log despite a return of meager daily earnings and highly significant investment risk.

This investigation served to elucidate the specific economic circumstances driving continued timber extraction in the region, which in turn facilitated the development of a detailed roadmap for the implementation of efficient solutions that could be channeled through the incentive program's livelihood improvement benefits.

1. Introduction

The design of conservation incentive programs—and in particular, innovative approaches to conservation incentives—is a fundamentally iterative process, the success or failure of which hinges upon how well incentive design responds to the case-specific circumstances driving environmental degradation in the area to be conserved. Adaptive design is of paramount importance. Whereas it is oftentimes possible to gain a very informative picture of a problem's principal components during the pre-project phase through secondary research and straightforward preliminary observations, there are several critical components that require a deeper level of investigation (typically, via primary research) in order to accurately determine the appropriate incentive design. Here, we discuss one such component—a baseline understanding of existing income dynamics—as a means of determining the opportunity cost of avoided logging, and to ensure that the selected incentive mechanism creates a scenario under which forest conservation definitively becomes the more economically strategic option.

The Problem

In low-income nations, efforts to alleviate poverty often produce incentives to degrade the local environment, and efforts to protect the environment often fail to improve livelihoods. Current strategies for tropical forest conservation have struggled with this challenge. Now commonly implemented in developing nations, 'indirect approaches' to conservation promote alternative livelihoods that reduce the use of local natural resources, such as non-timber forest product marketing, sustainable agriculture, and eco-tourism. However, on-the-ground efforts during the past several decades have revealed that alternative livelihoods do not guarantee a concurrent decrease in environmental degradation; most often, these approaches have failed to protect biodiversity and ecosystems to the extent needed (Agrawal and Redford 2006). Recently, incentive payment approaches have been advocated and explored as a more direct means to environmental protection, including payment for ecosystem services, restricted land easements, and performance-based payments for biodiversity. The last of these approaches, such as paying directly for number of forest hectares conserved in critical climate refugia, is the most direct and cost-effective way to protect an environmental asset.

Incentive payments, however, are not livelihoods, and do not take into account the development needs of local inhabitants (Agrawal and Redford 2006). Rather, they are short-term payments (typically annual) that rely on a long-term funding stream, translating into a high-risk scenario for ephemeral incentives (West 2007). Unless continued, these lump or one-time payments do not create sustainable incentives for the long-term protection of an environmental asset (Kinch 2006). Direct payment schemes can also be complicated by other factors, such as ethical issues due to economic differences between "buyer" and "seller" nations. In some cases, government policies can complicate or prohibit direct payment schemes. Lastly, these schemes often require legal land tenure for payments—a condition that does not coincide with the reality of natural resource expanses in most developing countries, where the poorest of the population settle out of economic necessity.

An alternative approach that circumvents each of these loopholes is the environmental mortgage—a strategy that leverages affordable investments in sustainable, low-impact livelihoods to create perpetual incentives for natural resource conservation by providing forest-dwelling communities with access to

specific livelihood improvement needs in exchange for community-level conservation commitments (Mandel et al. 2009). This model directly addresses the three causes identified by the REDDES Thematic Programme Document as leading to a reduced quality and quantity of forest environmental services in ITTO producing member countries: persistent poverty coupled with lack of alternative livelihoods, insecure land tenure and inadequate financing mechanisms for SFM or reforestation, and a fundamental disconnect between compensation for environmental services and the communities that maintain them (ITTO 2009). This ITTO Small Project sought to comprehensively develop and pilot the environmental mortgages concept via its application to forest-dwelling communities in the Mache-Chindul Ecological Reserve of Esmeraldas Province, Ecuador.

Origins of Mache Chindul Reserve

Starting in 1964, the area now comprised by Mache-Chindul Reserve was targeted as part of an Agrarian Reform program aimed at converting unproductive lands into agriculture. Under this program, colonization was incentivized via the promise of legal land title for double the area that a colonist 'worked' (i.e. deforested). Colonists rushed into the area from neighboring Manabí province, where a majority of forested lands had already been converted to pasture. The colonization/deforestation process was allowed to proceed for several decades before the Ecuadorian government began to receive international pressure to conserve the area's Chocó forests due to their extraordinary levels of endemism (Dodson & Gentry 1991). Ecuador's response was to "erase" the agency that had made the land title promises and declare the 121,000-hectare area an Ecological Reserve in 1996. Most of the existing inhabitants, dispersed across the reserve in an estimated 80+ small villages, remain to this day (MAE 2005).

Landholders, with the exception of a small proportion that acquired their legal titles early on, have been told repeatedly by the Ministry of Environment that no individual titles will be given, but the Reserve's management plan affords a formalized, albeit vague "recognition" of the communities as a whole. This management plan, finalized around 2007 and now out of date (MAE 2005), is the area's only guiding document.

Deforestation Drivers in Ecuador

According to the FAO, approximately 9,865,000 hectares (35.6%) of Ecuador's surface area was forested in 2010 (FAO 2010). Of this, just under half is classified as primary forest. During the past two decades, Ecuador lost an average of 1.43% of its forests per year, tallying up to 28.6% of the total (Butler 2006). Approximately 80% of this deforestation took place on the coast, with selective logging heavily affecting what remains (as a benchmark, up to 47% estimated to be affected in 1993; Butler 2006). Of the coast, Esmeraldas Province has the highest annual deforestation rate (4.07%), with 674,953.50 hectares of remaining forest estimated in 2000 and between 13,735.30 and 27,470.60 hectares deforested every year since. Compounding this problem is the reality that conservation initiatives in the region are few and far between.

Much of the deforestation is indirectly caused by land tenure conflict--members of the country's poorest sector either squat on, or buy without title, lands that they then proceed to deforest because a) due to their lack of legal collateral, they have no funds for livelihood improvement options and agricultural

mainstays all have periods of scarcity, b) it has been culturally drilled into their consciousness that "unworked" land is free for anyone's taking, or c) they reason that since it is a question of time until they are kicked off their land, efficient exploitation is the only economic strategy that makes sense (Morales et al. 2010). All of the reserve communities that we interviewed described one or more of these dynamics when discussing reasons for the need to deforest.

Low opportunity costs in northwest Ecuador incite further exploitation of forests as lands are clear-cut for monocultures (primarily African Palm and eucalyptus) and pastureland. The reason for this conversion is cited in Mache Chindul's Management Plan, which describes average per-hectare land sale prices of \$345 for pasture, \$291 for cacao, and \$272 for standing forest (MAE 2005). This began in the 1980s, when the opening of the Esmeraldas-Borbon road initiated the sale of cacao to intermediaries (Dodson & Gentry 1991). By the 1990s the price of cacao fell significantly on what were already aging cacao plantations, many of which were destroyed by the worst El Niño episode in decades. The result: timber extraction replaced cacao as the region's predominant source of income (Nelson & Galvez 2000). Compounded by the government's refusal to acknowledge the existence of communities in the reserve at that time (including denial of all basic services), logging firms were soon welcomed as a means for facilitating penetration roads.

Research Aim

The primary purpose of this economic analysis was to better understand the specific income dynamics that drive deforestation in forest-dwelling communities of the Ecuadorian Chóco. For this region, cacao and timber represent the two predominant sources of the cash economy that characterizes most remote rainforest communities. We sought to document and analyze the economic drivers that underlie use patterns for each as a source of subsistence income, both to establish a baseline understanding of the currently immature and inefficient local cacao market as a candidate for livelihood sustainability and to accurately determine the opportunity cost of avoided logging. This baseline allowed us to quantify the degree of economic improvements that the first several years of the incentive program would catalyze under new cacao price points, buyer consistency, and projected volume increases.

2. Applied Methodology

Qualitative and quantitative data for the economic portion of this study were collected over the course of ten months and involved interviews lasting approximately thirty minutes each with eleven members from the pilot community of Mono Bravo and 18 members from the pilot community of Guayacan.¹ These two communities are both located in the reserve's central-western interior, close to the headwaters of the Sucio and Muisne rivers and bordering the reserve's core of intact forest. They were selected for this investigation based on four criteria: substantial remaining forest assets, a pre-existing focus on cacao as an income source, notable "social capital" or community union, and location within reserve boundaries. The interviews with these 29 individuals targeted timber extraction and

¹ Interviewed community members represented the total number of full-time resident heads-of-households. In both communities, approximately half of the landholders now live in urban areas as a result of income opportunities.

cacao production, the region's two predominant livelihoods, and aimed to quantify the details of profit margins versus required investments for each.

Several additional, in-depth interviews were also conducted over multiple hours with the following three key stakeholders in order to clarify specific areas of income data and define key variables affecting price points: an intermediary broker of cacao and timber, a technical expert in cacao production, and the community president of Mono Bravo—also a logger and cacao farmer. These interviews served further our conceptual grasp of how the two livelihoods differ in practice and how economic incentives specifically drive community members to continue unsustainably harvesting tropical timber despite multiple logistical challenges and investment risks.

Five variables were identified as the predominant factors influencing timber income dynamics: wood cut being sold, harvest period, tree size, selling location, and intermediary buying prices. Wood cut being sold is segregated into three categories: softwood boards, hardwood boards, and larger hardwood cuts (i.e. substantive structural supports). Harvest period is defined as either wet season or dry season, as precipitation levels are the determining factor of greatest influence over relative ease or difficulty of transport. Each wood cut sold/harvest period combination is then further influenced by tree size, selling location, and intermediary buying prices. For the purposes of this analysis, tree size is divided into large (yielding at least 80 cut boards, roughly >30cm diameter at breast height) versus small (yielding fewer than 80 cut boards, roughly <30cm diameter at breast height) categories. Selling locations are broken down into 3 categories: on-site community sales (Mono Bravo), nearest frontier town selling point (San Jacinto), and selling point at junction with paved transport road (Boca del Sucio). Intermediary buying prices have been classified as one of two polar extremes, either best case price point scenario or worst case price point scenario.

All graphical depictions of timber income presented in this report have been scaled to a standardized level of 200 wood cuts to facilitate direct comparison; this quantity was selected based on the finding that it is the most common quantity of timber sold per event. It should also be noted that interviewed community members stated that frequently it is only the first person that comes into contact with a buyer that receives the high price point; subsequent sellers are often forced to accept the lowest price point or return home with their wood. As such, it is likely that estimates of timber income are inflated under the present analysis.

Cacao production presented a slightly more straightforward scenario with four predominant variables influencing income dynamics: relative harvest levels, required harvest investment, intermediary buying prices, and selling location. For this region, the annual duration of a typical cacao season is approximately six months, during which time harvest levels can range from low to normal to high. More specifically, a low cacao harvest produces new fruit every fifteen days, a normal cacao harvest produces new fruit every eight days, and a high cacao harvest produces new fruit every six days. Intermediary buying prices have been analogously classified as they were for timber (i.e., best case vs. worst case scenarios), as was selling location (on-site community sales, nearest frontier town, and junction with paved road, respectively). Required harvest investment was characterized by two categories: additional

labor hired or no additional labor hired. Graphical depictions of cacao income presented in this report have been scaled to a standardized level of 300 pounds of wet cacao to facilitate direct comparisons, given that this is the most common quantity sold at a time.

3. Data Presentation

Worst-case and best-case scenarios for annual timber earnings were calculated by creating a factorially-combined grid of harvest period, wood cut being sold, and selling location income values, within which tree size and intermediary buying price were equally weighted (i.e. uniform probability distribution) due to a lack of reliable frequency data. For each wood cut being sold, season-specific income was calculated as a function of the total estimated number of days per year that an average logger can engage in timber extraction: income interviews revealed a typical rate of 2.5 completed logging ventures during the dry season and five completed logging ventures during the rainy season. These rainy season and dry season values were then added to calculate minimum and maximum annual timber income values.

Minimum and maximum annual cacao earnings were calculated using a factorial combination of harvest production level, required investment, and buying price as determining factors, with selling location held constant. More specifically, the two extreme price points shown (Figure 1) are represented by low harvest level/high investment/worst buying price and high harvest level/low investment/best buying price.

Whereas existing best-case annual income scenarios were quite comparable between timber and cacao, with both earning approximately \$3,000, cacao was the clearly better income option for worst-case

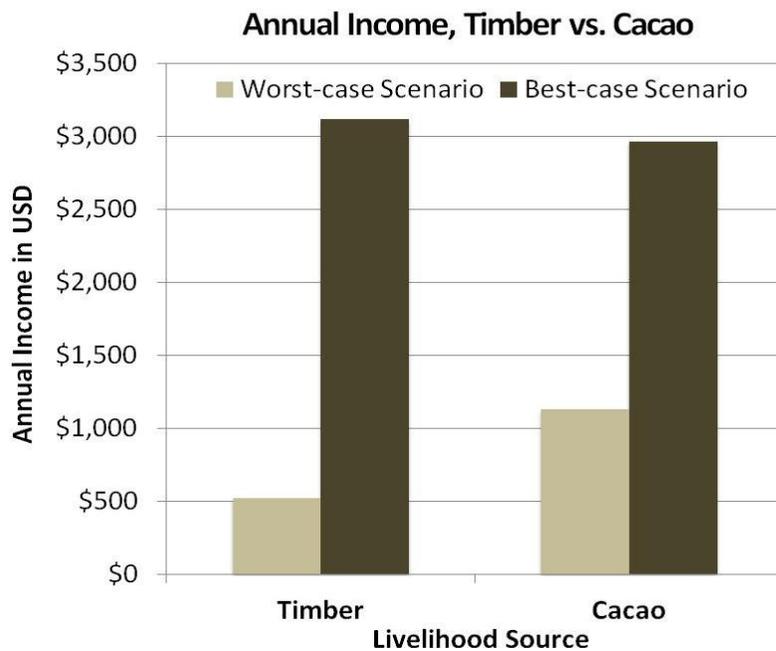


Figure 1. Minimum and maximum annual incomes from timber versus cacao in the Mache-Chindul Ecological Reserve, Ecuadorian Chocó. Values based on the range possible when taking all predominant influential variables into account.

annual income scenarios at roughly \$1,100 compared to timber's meager \$500 (Figure 1). For both cacao and timber, the difference between annual extremes was dramatic, with worst-case earnings representing a third or less of best-case earnings. In the case of timber, worst-case annual earnings resulted from softwood boards being sold on-site in the community during the rainy season plus softwood boards being sold in the nearest frontier town (and requiring land rather than river transport) during the dry season. Best-case annual timber earnings resulted from

large wood cuts being sold at the paved road junction during the rainy season plus hardwood boards being sold on-site in the community (and no land transport required) during the dry season. In the case of cacao, worst-case annual earnings resulted from low harvest production and low intermediary buying prices.

An examination of variations in daily earnings provides further insight into the relative risks and benefits of timber versus cacao as a livelihood source. Daily timber income ranges from a rock-bottom low of \$5.35 in accrued debt (for hardwood boards from small trees during dry season, paid at lowest buying price and sold in nearest frontier town) to a best-case scenario of \$34.21 in profits (for large woods cuts from large trees during wet season, paid at highest buying price and sold at the paved road junction; Figure 2). Daily cacao income ranges from a minimum of \$50 (lowest buying price, sold on-site, additional harvest labor hired) to a maximum of \$76 (highest buying price, sold at paved road junction, no additional labor hired; Figure 2). Therefore, differences in daily earnings for the two income sources are so extreme that there is no overlap in price ranges—cacao is definitively the more lucrative source of daily income. Daily cacao

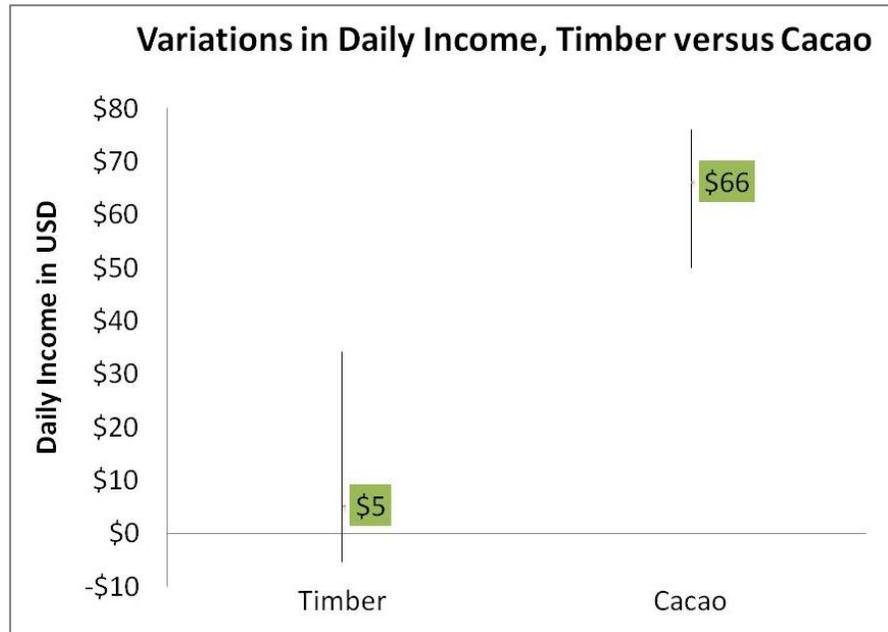


Figure 2. Variations in daily timber versus cacao earnings in the Mache-Chindul Ecological Reserve, Ecuadorian Chocó. Vertical lines show income ranges for each livelihood; green boxes display median values. Negative values indicate debt accrued.

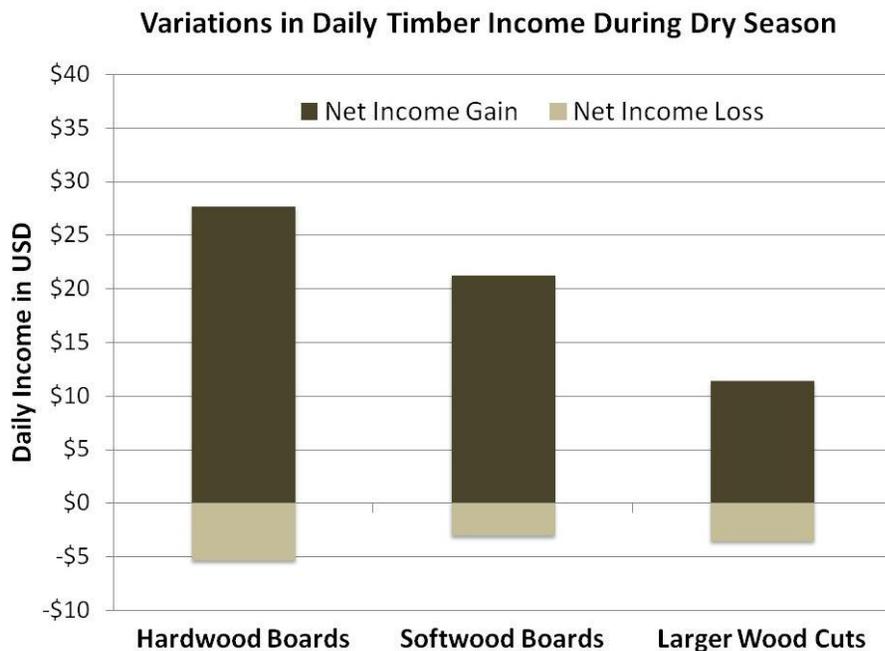
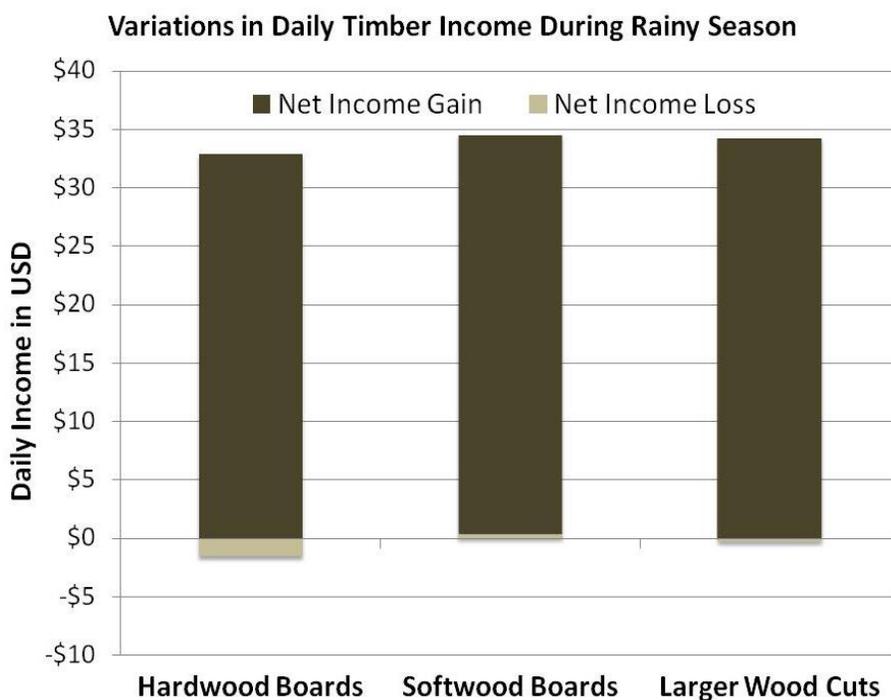


Figure 3. Variations in daily dry season timber earnings as a function of wood cut sold, Mache-Chindul Ecological Reserve, Ecuadorian Chocó. Net income losses represent accrued debt.

earnings are also less variable than daily timber earnings (with a total range of \$26 compared to \$40, respectively; Figure 2), meaning that cacao is also the more stable source of daily income.



Incorporating the influences of season, wood cut being sold, and selling location offers further insight into the fluctuations of daily timber income trends. Generally speaking, net income gains for all possible wood cuts are higher, and net income losses lower, during the rainy season than during the dry season (Figures 3 & 4). Variations amongst earnings as a function of wood cut sold is much higher in the dry season than in the rainy season. Whereas the net income gain for hardwood boards is little affected by season, net income gains for

Figure 4. Variations in daily rainy season timber earnings as a function of wood cut sold, Mache-Chindul Ecological Reserve, Ecuadorian Chocó. Net income losses represent accrued debt.

softwood boards and especially for larger wood cuts, are markedly reduced during the dry season (Figures 3 & 4). Therefore, there is a strong interaction effect between wood cut sold and season. Also worth noting is the fact that five of six season/wood cut combinations run the risk of resulting in accrued debt rather than profit (Figures 3 & 4).

Comparisons of current income scenarios with those that are predicted under the incentive program benefits that result from this ITTO Small Project reveal that when revamped, cacao income alone can replace the two prior livelihood sources combined. During the first post-pilot year, worst-case revamped cacao market income nearly replaces both worst-case cacao and timber traditional market incomes combined (\$1,643), with an estimated \$1,466 resulting from buyer price increases and stability alone (Figure 5). Best-case income scenarios during the first post-pilot year are slightly less comparable but follow a similar trend, with revamped cacao earnings totaling \$4,633 and traditional cacao plus timber earnings totaling \$6,077. During the third post-pilot year, when cacao harvest production increases resulting from incentive program benefits can reliably be taken into account, annual income from the revamped cacao market alone will more than double that which is possible under traditional cacao and timber market earnings combined (\$13,900 versus \$6,077; respectively; Figure 5).

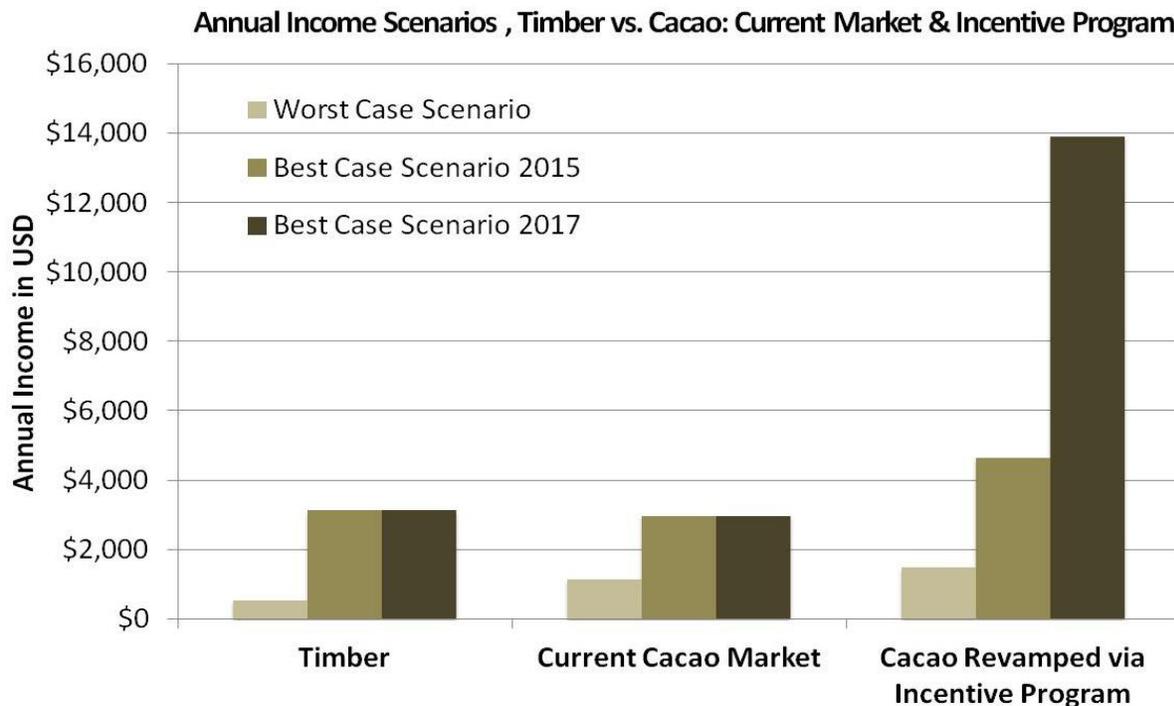


Figure 5. Variations in annual earnings as a function of livelihood (timber vs. cacao), all predominant influential variables (best- vs. worst-case scenarios), and time since incentive program establishment (pre-establishment, one year post-establishment, and three years post-establishment). Mache-Chindul Ecological Reserve, Ecuadorian Chocó.

4. Analysis & Interpretation

Together, results of the annual and daily timber versus cacao income analyses reveal several key patterns that can be used to shed light on existing livelihood choices. First, whereas direct comparison of annual incomes alone would suggest very similar best-case earning scenarios via timber or cacao (Figure 1), analysis at the daily level indicates that cacao is by far the superior income option, whether under ideal or worst-case conditions (Figure 2). The fact that annual and daily trends could be so different is attributable to the proportion of the year during which each respective livelihood can be practiced. Because economic incentives for the proper tending of plantations have been lacking, current levels of cacao production are extremely low in both pilot communities; as a result, cacao is harvested in an opportunistic "gathering" manner rather than via deliberate cultivation. Resultant sub-optimal production levels equate to only five to six months of harvest per year, of which about three months produce substantive levels. Assessments via inspection by experienced cacao technicians indicate that the tripling of current harvest levels within a two-year period is a realistic goal for these plantations, given a standard program of tree trimming and organic fertilizer application.

Based on this limited availability, timber is used as an income supplement for most of the year, despite its rock-bottom daily earnings and high investment risk. This reality is underscored by the fact that logging continues despite a worst-case annual income that is less than half the value of worst-case cacao earnings that can be acquired under current low production levels (Figure 1). A number of factors heavily influence the end result of timber extraction profitability, with transport efficiency, access to

appropriate buyers, and wood cut efficiency (relative to tree size) at the top of the list. Transport efficiency is arguably the single most important factor due to its disproportionate influence on required investment costs. Whereas transport costs little to nothing when wood can be floated downstream (i.e. after rains), land transport via pack animals when rivers are dry can be extremely expensive and often results in accrued debt rather than profit (Figure 3). Very worth noting, however, is the fact that although rainy season conditions act to create roughly equal maximum possible net gains irrespective of wood cut sold, the inherent risk of a net zero daily earnings exists for every single selling scenario (Figure 4). This underscores the fundamentally unpredictable nature of timber extraction as a livelihood option, in most cases due to the sheer complexity of challenges that must be overcome before an actual payout is secured.

It follows that the most straightforward proactive step to converting the current cacao market into a sustainable livelihood option is to increase production levels, thereby extending the proportion of the year during which cacao harvest is possible. This alone, even under current price points and pricing instability, would directly reduce deforestation by diverting attention away from the less lucrative income option (timber) and toward the already more stable and less investment-heavy income option (cacao). In addition to the validity of temporal cacao harvest extension as a means to reduce annual logging pressures, increased and consistent cacao purchase prices can have a similar effect by increasing net gains irrespective of harvest duration. Under the present project's established incentive program, we have secured a confirmed contract with an international buyer that will increase annual cacao earnings to a level approaching that of current cacao and timber earnings combined (year 1 post-pilot; Figure 5). These direct sales will also eliminate the role of intermediary brokers, creating an autonomous community micro-enterprise that is not bound by the laws of supply and demand. By unifying these two solutions, in effect creating a three-fold increase in cacao harvest production that is purchased for higher and stable prices, this project's incentive program legacy promises to generate annual incomes that are more than double those currently possible via cacao and timber combined (year 3 post-pilot; Figure 5). As such, not only will the opportunity cost of avoided logging be effectively absorbed by a single sustainable livelihood, but local socioeconomic conditions will experience a dramatic improvement.

5. Conclusions

Findings of the present economic analysis definitively confirm that a revamped cacao market system can absorb the opportunity cost of avoided logging within one to two years of incentive program establishment, and exceed timber and cacao earnings combined by more than double within two to three years of incentive program establishment. This investigation served to elucidate the specific economic circumstances driving continued timber extraction in the region, which in turn facilitated the development of a detailed roadmap for the implementation of efficient solutions that could be channeled through the incentive program's livelihood improvement benefits. In short, although daily cacao earnings are by far the more lucrative and more stable income option, severely limited current production levels result in the use of timber as a necessary supplemental income source for more than half of each year. This problem is compounded by the instability of supply-and-demand-driven cacao

purchase prices, formidable product transport challenges, and a lack of local processing facilities to enable export-level quality and volume; the collective result is a lack of economic incentive to properly tend to plantations, which ultimately leads to more timber extraction via temporally-restricted cacao harvests. Together, these factors help to explain why local forest-dwelling communities continue to log despite a return of meager daily earnings and highly significant investment risk.

6. Recommendations

The intent of this technical report is to provide a detailed illustration of how the economic analysis of income dynamics can be properly applied for effective incentive program design. In reality, the relative success of each and every conservation incentive program is fundamentally dependent on how well a strategic approach responds to the specifics of local livelihood dynamics, deforestation drivers, existing economic incentives, and culture. As stated in the introduction, an iterative process of adaptive design is critical. Each economic analysis of income dynamics will be both project- and site-specific.

7. Implications for Practice

Toward the aim of facilitating the advancement of conservation incentive programs as a tangible solution to the now-common conservation-poverty dilemma that characterizes tropical forests, we have developed a set of user-friendly design guidelines based on the learning process from this project (Annex 1).

In the simplest general terms possible, this economic analysis was applied as follows to effect tangible on-the-ground progress in incentive program design:

- a) First determine the opportunity cost of deforestation-based income sources for the target population of interest, paying careful attention to the predominant factors that lead to variations in earnings. Once the complexity of deforestation-based income is fully understood, calculate minimum and maximum annual incomes. The latter should be considered the opportunity cost that must be absorbed by the new sustainable livelihood option.
- b) Next, analyze current income dynamics for the existing livelihood that is to be revamped into a sustainable alternative, again paying close attention to the predominant factors that lead to variations in earnings.
- c) Identify components of the current value chain with the greatest margin for increases in earnings.
- d) Conduct due diligence through both secondary research and first-hand investigation to determine the most feasible and efficient action steps toward revamping the value chain. Once identified, these action steps should form the core of livelihood benefits offered through the incentive program in exchange for conservation commitments.
- e) Develop a detailed roadmap of the implementation steps required to provide identified livelihood benefits. Simultaneously develop a plan for how conservation-livelihood trades will specifically be broken down (i.e. what services in exchange for what area conserved, terms of agreement).

Bibliography

Agrawal, A. and Redford, K. 2006. **Poverty, development, and biodiversity conservation: shooting in the dark?** Working Paper 26, pp. 1-58. Wildlife Conservation Society, Bronx, NY, USA.

Butler, R. 2006. **Statistics: Ecuador**. Retrieved from Mongabay.com on 30 November, 2014 from <http://rainforests.mongabay.com/deforestation/archive/Ecuador.htm>

Dodson, C. H., and Gentry, A.H. 1991. **Biological extinction in western Ecuador**. Annals of the Missouri Botanical Garden 78: 273-295.

Food and Agriculture Organization of the United Nations (FAO). 2010. **Global Forest Resources Assessment 2010, Main Report**. FAO Forestry Paper 163. Rome, Italy.

International Tropical Timber Organization (ITTO) 2009. **Reducing deforestation and forest degradation and enhancing environmental services in tropical forests (REDDes)**. ITTO Thematic Programme Document, Yokohama, Japan. 22 pp.

Kinch, J. 2006. **A socio-economic assessment of the Huon Coast Leatherback Turtle Nesting Beach Project**. Final technical report to the Western Pacific Regional Fishery Management Council, Honolulu, Hawaii, USA. 60 pp.

Mandel, J.T., Donlan, C.J., Wilcox, C., Cudney-Bueno, R., Pascoe, S., and Tulchin, D. 2009. **Debt investment as a tool for value transfer in biodiversity conservation**. Conservation Letters 2: 233-239.

Ministerio del Ambiente del Ecuador (MAE). 2005. **Plan de manejo y gestión participativa de la Reserva Ecológica Mache-Chindul 2005–2010**. Alianza REMACH, Quito, Ecuador. 168 pp.

Morales, M., Naughton-Treves, L., and Suarez, L. (Eds.) 2010. **Seguridad en la tenencia de la tierra e incentivos para la conservación de bosques**. ECOLEX. Quito – Ecuador.

Nelson, V. and Galvez, M. 2000. **Social impact of ethical and conventional cocoa trading on forest-dependent people in Ecuador**. Natural Resources and Ethical Trade Programme, University of Greenwich, UK. 29 pp.

West, P. 2007. **Conservation is our government now: The politics of ecology in Papua New Guinea**. Duke University Press, Durham, NC, USA.

Zambrano-Barragan, C. 2010. **National forest and climate policy in Ecuador: perspectives for REDD+ and social participation**. Programa Derechos, Cambio Climático, y Bosques – ECUADOR. Centro de Planificación y Estudios Sociales, Rainforest Foundation Norway. Quito, Ecuador.

Annex

Design Guidelines for Value Transfer Mechanisms for Incentive-based Pro-poor Biodiversity Conservation Schemes (Version 1.1)²

TABLE OF CONTENTS

Abbreviations Used.....	17
Possible value transfer mechanisms for pro-poor conservation practitioners	17
Cash	17
Advantages	18
Disadvantages	18
Required organizational capacities	19
Desirable community traits.....	19
Productive assets	20
Advantages	20
Disadvantages	21
Required organizational capacities	22
Desirable community traits.....	22
Services.....	23
Advantages	24
Disadvantages	25
Required organizational capacities	25
Desirable community traits.....	26
Access to credit	26
Advantages	27
Disadvantages	28
Required organizational capacities	29
Desirable community traits.....	29
Decision-Support tools.....	30
Cash	30
Productive assets	32
Services.....	33
Access to credit	34
Potential partnership discussion framework.....	35
Root causes of poverty and environmental degradation	35
Relationship between conservation and poverty reduction	36



² This document was developed by two members of the project's core scientific and technical team, Dr. Josh Donlan (Advanced Conservation Strategies) and Andrew Tulchin (Social Enterprise Associates) based on learning gained during RED SPD 055/11 Rev.4(F), and is currently being edited for publication. Suggested citation is as follows: *Advanced Conservation Strategies & Social Enterprise Associates. 2013. Value transfer mechanisms for incentive-based pro-poor conservation schemes. Working Paper*

ABBREVIATIONS USED

CCT	Conditional cash transfer
MFI	Microfinance institution
PES	Payment for ecosystem services
PPC	Pro-poor conservation
VTM	Value transfer mechanism

POSSIBLE VALUE TRANSFER MECHANISMS FOR PRO-POOR CONSERVATION PRACTITIONERS

Practitioners wishing to implement incentive-based PPC schemes will need to perform a thorough analysis of the natural capital, the community in which it resides, and the dynamics between the community and its environment. The community in question should be party to this analysis; in many cases the primary determinant of which VTM to employ in a community should be the community itself. However, before practitioners can begin to discuss program ideas with a community, they must have a thorough understanding of their organizations' own competencies and resources.

This section presents four broad categories of VTMs, with the aim of creating a framework PPC practitioners can use to evaluate the viability of each for their organizations and the communities they hope to serve. This is not intended to be a tool practitioners use to identify natural capital to conserve, or communities with which to work. Rather, this section is aimed at practitioners who have already had some engagement with a community and have identified environmental degradation, poverty, and the linkage between the two as community issues.

Value can be transferred to sellers of ecosystem services in the following forms: cash, productive assets, services, and access to credit.

CASH

Cash is frequently deployed as a value transfer mechanism in the conservation space in PES programs—the transfer of value from the buyer of ecosystem services to the seller is usually a cash transaction (Engel, Pagiola, & Wunder, 2008). While some CCT practitioners have also had success with in-kind payment of immediate consumables³ like rice or wheat, the majority of CCT programs that have been studied and found to be effective also involve cash transfers. Best practices suggest that cash is a superior

³ Consumable transfers used to be preferred by governments who feared the misuse of cash by recipients, but the success of cash transfers in recent history suggests that fear is unfounded—while undesirable consumption (e.g. alcohol, tobacco) sometimes increases as a result of cash transfers, it does not do so disproportionately to increased consumption of desirable goods and services like food or health services (Fuller, 2013). Therefore, the decision to transfer value with consumables instead of cash should be pragmatic, not based on any ideology.

transfer mechanism to in-kind consumables unless recipients of payments are not able to purchase what they need easily with cash, or security concerns or geography make cash transfer undesirable.

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none"> ● The poor know best how to help themselves ● Easily adjusted if necessary ● Well-understood ● Technological innovation is making cash transfers easier, even in remote areas 	<ul style="list-style-type: none"> ● No graduation ● Difficult to sustain financially ● Vulnerable to market fluctuations ● Might create dependency ● Most likely to face fraud problems ● Potential equity issues

ADVANTAGES

The main advantage of cash as a VTM is that the poor know how to help themselves, and cash is often the best way to facilitate this. Fuller (2013) suggests that all nonprofits with a focus on poverty alleviation should use cash transfer as a benchmark against which to measure all development aid—cash is the preferable VTM unless it is determined that the nonprofit can do more for the poor with a dollar than the poor can do for themselves.

In many cases, the payments in a PES system compensate recipients for the opportunity costs they incur by not degrading their natural capital for its extractive value. Cash is the ideal mechanism to accomplish this, because payments can theoretically be adjusted as opportunity costs change, perhaps indexed to global commodity prices. However, this flexibility requires the administering organization to be financially sophisticated enough to adjust payments quickly enough to keep the program healthy.

Mobile phone penetration and technological innovation involving mobile phone cash transfers such as Safaricom’s M-Pesa program in Kenya make it increasingly easy to transfer funds even in remote regions (Buku & Meredith, 2013; Suri, Jack, & Stoker, 2012). With M-Pesa, cash is physically deposited and withdrawn by customers via a network of more than 35,500 agents, which are located at fueling stations, grocery stores, Safaricom dealers, and other easy-to-access locations. The program has seen rapid adoption. Since its launch in 2007, M-Pesa has facilitated more \$1.4 trillion in peer-to-peer SMS transfers for over 15 million customers (Buku & Meredith, 2013). Around 80% of Kenya’s population uses mobile money services, a fact which has revolutionized many aspects of daily life in the country, and which has helped participating households cope with and spread risk (Suri, Jack, & Stoker, 2012). The undeniable success of M-Pesa has been difficult to recreate outside Kenya to date (Buku & Meredith, 2013), but it stands as encouraging proof of concept—transaction costs of using cash as a value transfer mechanism are likely to decrease in the future, even in remote areas.

DISADVANTAGES

Although CCT programs have not been around long enough for studies to determine whether they are effective at breaking the intergenerational cycle of poverty, doing so is a goal that informs program design. This is why payments in programs like Oportunidades are tied to school attendance and medical checkups for children. Some people will probably always be poor, so there will always be a need for poverty alleviation programs, but if CCT programs are effective, they will slowly chip away at the conditions that necessitate them in the first place. One might optimistically predict payouts to decrease over time.

It is difficult to draw a parallel to PES in this respect. Even a successful PES program is unlikely to make itself less necessary. In fact, global economic realities will probably dictate that the opportunity cost of conservation will continue to increase, and therefore a simple PES program that aims to compensate communities or individuals for conserving ecosystem services will need to increase payouts over time to remain effective. This has obvious implications for program funding. Organizations wishing to administer cash-based PES programs will have to be financially sophisticated and have diversified and reliable funding sources.

Some suggest that the use of cash as a VTM might create dependency (Medeiros, Britto, & Soares, 2008; Robertson & Wunder, 2005) and fail to promote economic development for the poor. In the case of a homogenous agricultural community of smallholders whose primary economic activity is harmful to the environment, cash payments in exchange for not producing might lead to undesirable social outcomes. This is a tension between conservation and poverty reduction—practitioners who view conservation as a tool for poverty reduction will consider this outcome a failure (Roe & Elliott, 2006). Practitioners who view poverty as a critical constraint on conservation (Adams et al., 2004) will also recognize this outcome as undesirable. Individuals or communities will be less likely to become dependent on cash transfers if there are a variety of economic activities available to the community.

Most PES schemes require enforceable land tenure to be effective. Equity issues arise from these requirements: poor smallholders are less likely to have formal land tenure (Muradian et al., 2010).

Of all the VTMs discussed here, cash is most likely to create fraud problems for a PPC scheme. Fraud can occur at the transfer recipient level, but also at program agent, politician, other intermediary levels (Lindert, Linder, Hobbs, & De la Brière, 2007).

REQUIRED ORGANIZATIONAL CAPACITIES

Use of cash as a transfer mechanism requires sufficient cash flow to be able to provide regular, timely payments to program participants. It also requires infrastructure to facilitate those transfers (e.g. local banking capacity, mobile phone penetration, distribution stations). Therefore, organizations should not consider cash transfer PES systems unless they have multiple, stable sources of income that can reasonably be expected to provide long-term—and potentially increasing—payments to providers of ecosystem services, and access to payment-facilitating infrastructure.

Because of the risk of fraud, organizations deploying cash transfers as a VTM will need to devote significant resources to oversight to keep fraud in check.

DESIRABLE COMMUNITY TRAITS

PES is not a one-size-fits-all model—it is a tool best matched to an ecosystem in which the benefits of services are seen as externalities by the managers of that ecosystem (Engel, Pagiola, & Wunder, 2008). Therefore, for cash to be a viable VTM for PPC, the environmental asset being protected must be

imperiled by the community’s routine economic activities, and the benefits of the asset’s continued existence should be seen by the community as externalities. In this case, transfer values must exceed the opportunity costs of conservation. Therefore, consensus must be reached within the community and between the community and the PPC organization about the community’s opportunity costs.

The lack of clear and enforceable property rights is considered a real impediment to PES implementation (Muradian et al., 2010). A good candidate community for cash transfers has formal land tenure.

In order for cash to be a desirable VTM, there must be a functioning market in the community at which ecosystem managers can convert the cash they receive for conservation to goods and services they value.

Of all the VTMs, cash has the highest risk of fraud. The administering organization will have to devote resources to oversight, but a high level of social capital in the community is also desirable to help minimize fraud.

PRODUCTIVE ASSETS

Occasionally, practitioners and communities that control some environmental asset might agree that an appropriate VTM is an appreciable, or productive, asset. One case in which this decision was made is a payment for watershed services (PWS) scheme in Bolivia’s Los Negros valley, where 42 farmers are paid to 2774 hectares of watershed. The buyers in this PWS scheme are twofold: the US Fish and Wildlife Service, which has a broader interest in conservation of biodiversity, and downstream irrigators, who are the direct users of the watershed services being paid for (Asquith, Vargas, & Wunder, 2008). The PWS recipients in this scheme specifically rejected cash as a VTM out of fear that it would be spent immediately and create no lasting value. They opted instead to receive payments in the form of artificial beehives—one for each 10 hectares of watershed enrolled per year. Training in apiculture is also made available to recipients of the beehives to help them achieve high returns on their hives (Robertson & Wunder, 2005). In the case above, beehives presented a new alternative economic activity to the farmers in Los Negros. Productive assets can augment current economic activities.

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none"> ● Source of continued income ● “Demonstration effect”—more “wow” per dollar ● Can help build relationships when communities mistrust cash transfers ● Can introduce alternative, more sustainable economic activities into a community 	<ul style="list-style-type: none"> ● Require labor inputs and upkeep costs ● Require skill to produce value ● Difficult to give conditionally in practice ● Not easily subdivided—less program flexibility ● Less liquid than cash

ADVANTAGES

If managed with care, productive assets can become a source of continued income. This can be appealing to sellers of ecosystem services, especially if they are not convinced that the PES scheme is built to last

and provide similar future income. It becomes something the recipient must care for, which is particularly relevant to the goals of conservation. In cases where there is limited local capacity for saving, investment, and entrepreneurship, asset transfer might provide a more lasting value to the community than cash transfer. (Robertson & Wunder, 2005)]

Low-value in-kind transfers such as beehives—valued at \$35—provide a “demonstration effect” that similarly valued cash transfers do not (Robertson & Wunder, 2005). Therefore, payment in the form of productive assets might be an attractive option for program administrators with severe budget constraints.

Sellers of ecosystem services sometimes reject cash as a transfer mechanism out of fear that such payments will lead to land expropriation, whether or not this fear is rational (Robertson & Wunder, 2005). In such cases, where building trust with ecosystem services sellers is an issue, in-kind transfers are a less threatening way to establish a strong relationship.

Productive assets can introduce alternative economic activities that are compatible with conservation. These activities have the potential to replace environmentally harmful economic activity. Further, an asset like a beehive provides a lasting incentive to conserve the bees’ forest habitat (Robertson & Wunder, 2005). Of course, the incentives that come along with an asset used as a VTM must be given significant consideration: incentivizing farmers to preserve forest by providing them with cattle would be self-defeating.

DISADVANTAGES

Productive assets require labor inputs and upkeep costs, which increase the opportunity cost of conservation for the seller of the ecosystem services (Robertson & Wunder, 2005).

Assets are not equally useful to all recipients. They will produce little or no value for an unskilled manager.

Transferring productive assets on a conditional basis is difficult in practice. In Bolivia, the administering organization determined early on that although their stated policy was that beehives would be recaptured by the organization if farmers violated their agreements not to deforest, doing so would have unacceptably very high political costs (Robertson & Wunder, 2005). The practical realities of asset recapture might slowly erode the program’s effectiveness over time as word spreads that violations are not punished.

Assets are also less easily subdivided. In the case of the PWS system in Bolivia, for example, a farmer could not set aside 5 hectares for a year and receive half a beehive. He would, instead, have to set aside those 5 hectares for two years before receiving payment (Robertson & Wunder, 2005).

While assets can be sold on a secondary market, they are not as liquid as cash.⁴ Further, the use of assets in a PES scheme might overwhelm the local market for that asset. If everyone in a small village is trying to sell beehives, sellers will realize little or no value for their assets. This underscores the importance of deciding on a VTM with a great deal of input from the community. In the PWS scheme in Bolivia, a number of value transfer options were discussed, road improvements, marketplace construction, bridge construction, and barbed wire for property lines (Asquith, Vargas, & Wunder, 2008).

⁴ If many recipients are turning around and sell the asset for cash, that indicates that cash (or a different asset) might have been a better VTM in that context.

REQUIRED ORGANIZATIONAL CAPACITIES

An organization will only have success using productive assets as a VTM if it is able to demonstrate the value of that asset. Most productive assets will not produce value for their owners without skilled management. Organizations deploying productive assets as a VTM should be prepared to train recipients in the use and maintenance of their new assets.

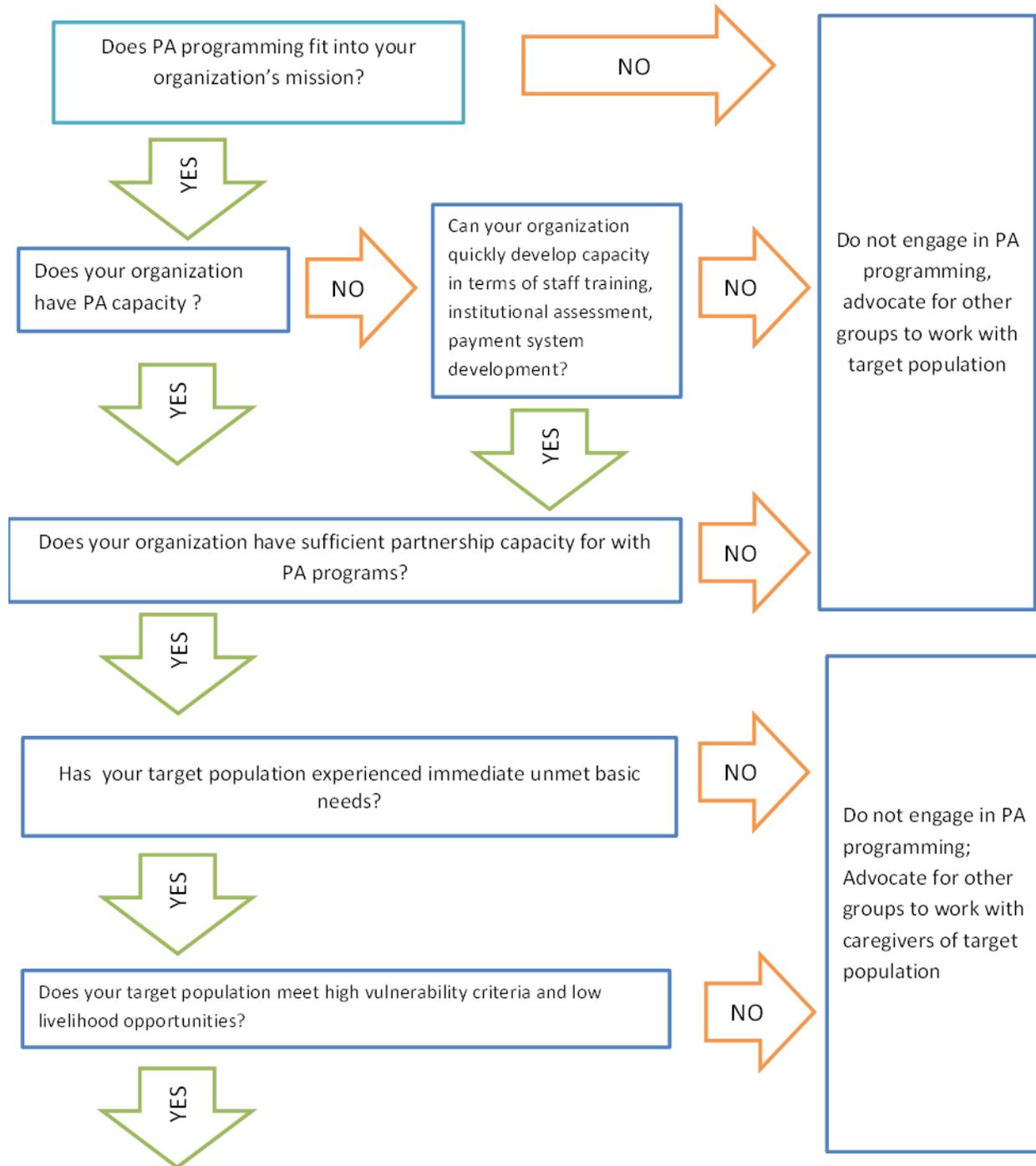
DESIRABLE COMMUNITY TRAITS

Communities will only be receptive to productive assets as an incentive if they are open to diversifying their economic activities and understand the value that can be created with the new assets. The community must also have access to a market that is willing to pay them for the goods and services their new assets are capable of producing (e.g. if beehives are used as a VTM, value is only created if the recipients of the beehives are able to sell the honey they produce, especially if they do not consume much honey themselves).

Not all members of the community will be equally able to create value from a productive asset. Therefore, the asset should be compelling to a large enough portion of the community that a secondary market for the productive asset is possible—the scheme will benefit from additional participants that, although they do not want the asset for its primary value, are able to sell it to access value.

Because asset recapture is likely to be infeasible in practice, a high level of social capital in the community will serve as an additional—and possibly necessary—driver of compliance after the assets are transferred.

Productive Assets (PA) Decision Tree – Organizational Capacity & Targeting



SERVICES

Because of the success of CCT, the prevailing sentiment in modern poverty alleviation—especially in Latin America—is that the poor can usually do more for themselves with cash than can be done for them with equivalently valued services (Santos, Paez-Sousa, Miazagi, Silva, & Medieros da Fonseca, 2011). However, there are often services that a poor community is unable to provide for itself. If a need for a particular service is evident in a community that manages ecosystem services, the provision of that service or services might be an appropriate way to transfer value through a PPC scheme.

Services can be broken into two categories: income-improving services and non-income-improving services. Income-improving services include technical assistance (e.g. to increase agricultural yields, to improve quality through processing) and market access services, whereby a major market participant provides access to substantial selling opportunities. Non-income-improving services include social goods like health services and education, which are not linked to income but which all communities need and which might, in certain situations, prove to be powerful incentives.

<i>Income-improving services</i>	<i>Non-income-improving services</i>
<ul style="list-style-type: none"> • Market access services (e.g. advanced purchase commitment, price premium) • Technical assistance to improve quantity or quality of product 	<ul style="list-style-type: none"> • Health services • Education services

Most services that could be provided as incentives in a PPC scheme are well understood in the practitioner community, and the breadth of possibilities is outside the scope of this work. However, the concept of conditional market access service might benefit from some illustration. In 2001, with the help of Conservation International, Starbucks Coffee Company announced new purchasing guidelines aimed at more sustainable coffee production. The company scored suppliers on a 100 point scale: 50 points for environmental impacts, 30 for social conditions, and 20 for economic issues. Suppliers who met all Starbucks’ requirements became preferred suppliers, receiving priority in Starbucks’ purchasing queue (Austin & Reavis, 2004). The income-improving service in this model is simply the guarantee of purchase at favorable prices, which is provided on the condition that the supplier meets Starbucks’ and Conservation International’s sustainable production guidelines.

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none"> • Complement other VTMs well • Partner organizations might help diversify funding sources • Might change behavior beyond life of PPC scheme 	<ul style="list-style-type: none"> • Difficult to provide conditionally in practice • Difficult to value • Might exclude some community members • Non-liquid and non-transferable • Increased risk of conflict between providing organizations

ADVANTAGES

Services need not comprise the entirety of a PPC scheme’s incentives; services are likely to complement other VTMs well. Some level of technical assistance services should probably be bundled with most productive assets, for example.

Because provision of multiple services will probably require a coalition of organizations to participate in a PPC scheme, the scheme might have more diversified funding sources and therefore be more able to withstand occasional funding interruptions.

Technical assistance services have the potential to change the way an economic activity is carried out, even beyond the lifetime of the PPC scheme. To the extent that new techniques achieve both greater sustainability and greater income, communities are incentivized to continue them.

In the case of market access services through a large corporation like Starbucks, funding is relatively secure. As the end provider of value to the community, Starbucks benefits not only from bringing a high quality product to market, but also from the public relations generated by such a program. Starbucks will, for the foreseeable future, be purchasing great quantities of coffee, and selling cups at a premium to customers who are willing to pay well above commodity prices for coffee with a story.

DISADVANTAGES

Many will find applying conditionality to provision of certain services (especially non-income-improving ones like health or education services) morally problematic. Even those who view poverty alleviation only as a means of achieving environmental conservation will struggle with the implications of program failure. If an organization cannot agree internally and with all its partners that it is willing to withhold services if conservation goals are not achieved, it should not consider service provision as a VTM.

Because the goal of any VTM is to encourage conservation in a community of ecosystem managers, any VTM must be more valuable to that community than practices that will degrade the environment. Because some services are difficult to value—there is surely value in bettering the education of young people in a community, but reasonable people will disagree about dollar amounts—it will be a challenge to establish a level of service provision that achieves the goals of a PPC scheme.

Provision of non-income-generating services could fail as a VTM if those services are valued highly by some, and not at all by others within a community. For example, education services might be valued by community members with children, and not valued by those without children. It is even possible that those without children would feel cheated by and develop resentment towards educational services as a VTM.

Schemes that offer a wide variety of services as VTMs will probably involve a coalition of partner organizations to provide those services. This will necessitate a great deal of attention paid to coordination and management by the lead organization, which might require additional personnel and funds to be diverted to program management, and not the provision of services.

It is always possible for tensions to emerge between partner organizations due to fundamental mission disagreements or more workaday concerns, and this possibility is increased with each additional partner. Practitioners considering provision of services they do not have internal capacities to provide should choose their partners carefully to mitigate this risk. The lead organization should ensure that all parties agree about where the project falls on Roe and Elliott's (2006) PPC continuum.

REQUIRED ORGANIZATIONAL CAPACITIES

Many organizations considering service provision as a VTM will have the provision of that service at the core of their mission, and will have built their organizations around the effective provision of that service. For example, an organization that offers health services as a VTM probably employs doctors, nurses, or

other health practitioners for that purpose, and probably offers a similar suite of health services in each community in which it works. It is unlikely that the same organization would also provide technical assistance for improving agricultural production.

This is not to say that organizations that are not built around the provision of a particular service cannot offer services as VTM. It is certainly possible that the health-focused organization discussed above might identify a need for agricultural technical assistance and seek a partner to provide that service. Therefore, the ability to identify partners—and work constructively with them—is an important organizational capacity for service provision as a VTM.

In the special case of market access services, organizations must have the ability to purchase and market the products produced by the community. It is better if this is accomplished through established channels such as the Starbucks model discussed above, in which there is little risk of the purchaser of goods disappearing and uprooting the entire PPC scheme in the process.

DESIRABLE COMMUNITY TRAITS

For service provision to be a viable VTM, a need for particular services must be identified in the community, and the community must agree that receiving those services on a conditional basis would be valuable enough to make them engage in good conservation practices. Therefore, the most important traits a community must have for services to be an ideal VTM are the need for a service, internal recognition of that need, and cohesive agreement about the value of meeting that need.

ACCESS TO CREDIT

Many potential sellers of ecosystem services face the same barriers to conventional credit that traditional microfinance customers face: they do not own property that would be acceptable as collateral, and they have no credit history. For this reason, access to credit might be a compelling incentive to conserve valuable ecosystem services and promote economic development.

ACS has proposed a conservation scheme inspired by microfinance: environmental mortgages (Mandel et al. 2009). In an environmental mortgage scheme, a community-held natural asset is capitalized, and that capital is made available to the local community and individuals within that community through microfinance mechanisms—small loans and other livelihood development investment instruments. The asset is closely monitored, and the capital made available to the community is linked directly to the quality of the asset. In this way, communities are rewarded for environmental stewardship with additional access to credit, and penalized with less access to credit should the targeted asset degrade.

One way to conceptualize an environmental mortgage scheme is that the natural capital becomes wealth for the community that cares for it, not simply income. It is an asset, not simply a source of income—it is stock, not flow. Because loans must be paid back, lent funds are likely to be invested to increase income by improving product quality or increasing productive capacity. Because the future availability of credit is dependent on the continued health of the natural asset, these income improvements are less likely to come at the expense of the environment.

A community is a good candidate for an environmental mortgage program if its primary economic activities pose a threat to the health of its environmental assets, but small alterations to those economic activities might create economic and environmental win-wins. Environmental mortgage schemes have not

yet been piloted and studied, but the following hypothetical scenario is one in which an environmental mortgage scheme might be effective.

A hybrid species of cacao plant called CCN-51 that thrives on direct sunlight has recently gained popularity in cacao farming communities in Ecuador. Although CCN-51 cacao is of a poorer quality than Nacional—the local, traditionally shade-grown species—it is believed to produce greater yields (Bentley, Boa, & Stonehouse, 2004). Therefore, if local cacao farming communities cannot access markets that will pay premium prices for Nacional, economic incentives exist for them to raze rainforest canopy, their valuable environmental asset, and plant CCN-51 in order to increase cacao yields.

If the community views the rainforest itself as a source of wealth and income, however, the incentive to clearcut is abated. If the value the rainforest produces for the community is greater than the opportunity cost of not realizing the extra yield from CCN-51, the forest might remain.

In this hypothetical environmental mortgage scheme, the portion of rainforest canopy that the community has actual or de facto control over is capitalized by a conservation organization (with funds from donations or sales of carbon offsets). The community would be able to take out small loans against the capitalized value of the rainforest canopy. The canopy is closely monitored, and the amount of available credit fluctuates proportionally with the canopy’s health.

Farmers are able to use this access to credit to increase their shade-grown Nacional yields, or to refine their harvesting and processing practices to make their Nacional yields meet the standards necessary to sell them at a price premium, further increasing income. All the while, the rainforest canopy, upon which the access to credit relies, becomes ever more valuable to the community.

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none"> ● Microfinance has been successful in reducing poverty ● Clear and enforceable property rights are not necessary ● Unlikely to create dependency ● Funds might be recoverable in event of program failure 	<ul style="list-style-type: none"> ● Untested ● Ability to fund uncertain ● Difficult to value ● Might exclude some community members ● Vulnerable to market fluctuations ● Unlikely to be able to follow all microfinance best practices

ADVANTAGES

As Mandel et al. (2009) point out, access to credit might be a superior VTM to cash in communities where there are not clear and enforceable property rights. A capitalized community asset from which a community can borrow does not require property rights, just de facto management ability.

There are some concerns that CCT schemes can create transfer dependency, a poverty trap. This is most likely to occur when increases in income are directly linked to decreases in transfer benefits (Lindert, Linder, Hobbs, & De la Brière, 2007). Although sufficient study has not been done on PES to determine

whether it is susceptible to the same danger, the similarities between CCT and PES suggest that it is at least a possibility, especially in cases where smallholder farmers are compensated not to produce, or to produce less than they otherwise would and no alternative economic activities are viable or available. Because loans are of a determinate length and are meant to be used to some income-generating end, the microfinance industry has not had to address dependency as a poverty trap. Therefore, access to credit as a VTM is probably not in danger of creating the same dependency dynamic.

An interesting advantage to access to credit in general, and specifically environmental mortgages, is that funders might be able to recover their funds in the event of program failure. If a fund is capitalized based on the health of an environmental asset and that asset is destroyed, the money is not destroyed. Contrast this with PES schemes, in which transferred funds are unrecoverable. In PES, donors give hopefully and payments are meted out conditionally. In environmental mortgages, the donor gives conditionally. This distinction might aid in securing funding for a pilot PPC scheme that uses access to credit as a VTM.

DISADVANTAGES

The primary disadvantage to using access to credit as an incentive for PPC schemes is uncertainty: environmental mortgages are untested. There are many parallels between microfinance and environmental mortgages, but many questions remain.

An established pipeline of funds for capitalizing environmental mortgage schemes does not exist, so an organization seeking to pilot an environmental mortgage program will have to do significant development. It might be possible to excite private donors about a new VTM, but organizations might also consider following the Plan Vivo model of selling emissions offset certificates, or biodiversity banking, a market mechanism by which developers pay to offset potential biodiversity losses that might result from their projects (Kumaraswamy & Udayakumar, 2011). However, a number of concerns exist about the effectiveness of biodiversity banking as it is currently formulated (Bekessy et al., 2010; Walker, Brower, Stephens, & Lee, 2009). Practitioners wishing to pilot an environmental mortgage program might not want to rely on an embattled mechanism for their own funding.

There are a number of imaginable scenarios in which access to credit could quickly become unattractive relative to an asset's extractive value. This could occur due to a spike in global commodities markets, or due to an inability to achieve satisfactory returns on investments made with that credit. In the former case, the cost of borrowing could be indexed, inversely, to the relevant global commodity price. In the latter case, access to credit would need to be paired with technical assistance and/or market access services. In either case, anticipating the point at which incentives flip would be a nontrivial task—access to credit is more difficult to quantify than, say, cash transfers. Tipping points would likely vary from community to community, and individual to individual, just as internal rates of return vary from organization to organization and individual to individual.

Implementing and administering an environmental mortgage scheme would require some level of financial sophistication. If this is not present internally, a partner MFI in the area might be able to assist, but if an MFI is already operating nearby then the incentive of access to credit is dampened to the extent that the MFI in place is making credit available to the target community.

Microfinance practitioners overwhelmingly prefer to lend to women, who are considered most likely to invest in the family and thereby break the poverty cycle (Brau & Woller, 2004). In the case of environmental mortgages or other microfinance-inspired conservation themes, it is unclear if this convention can be followed. The access to credit in an environmental mortgage scheme is meant to

incentivize good environmental stewardship, e.g., producing shade-grown cacao rather than clearcutting canopy to produce higher yields. If it is men who make the decisions germane to conservation, e.g., whether to deforest a parcel of land, it follows that men are the ones who must be incentivized in an environmental mortgage scheme. More research is necessary to understand whether this presents a serious problem in an environmental mortgage scheme.

Practitioners interesting in piloting the environmental mortgage concept will need to be clear about whether their primary motivation is poverty reduction or conservation. If the asset is damaged through no fault of the community participating in the environmental mortgage program (e.g. natural disaster, roving bandits), the organization administering the environmental mortgage will need to decide whether to continue lending to the community in the hopes of capital recovery, or to stop lending once the protected asset has been destroyed. This is a problem that exposes some tension within PPC: different practitioners will react differently depending on where they fall on the continuum proposed by Roe and Elliott (2006). Those whose overarching motivation is conservation might be willing to close down shop, while those whose primary goal is poverty reduction might not.

REQUIRED ORGANIZATIONAL CAPACITIES

Organizations considering an environmental mortgages or other credit-access VTMs must be financially sophisticated and well-versed in microfinance best practices, or have access to a partner MFI who is not already making credit available to the target population. Because no established funding mechanisms for environmental mortgages exist, an organization should only consider access to credit as a VTM for PPC if they are confident in their ability to secure sufficient funds to capitalize a natural asset.

DESIRABLE COMMUNITY TRAITS

If an MFI is already providing the community access to credit on any significant scale, then a PPC scheme offering more of the same might be able to distinguish itself with lower borrowing costs, but access to credit will be a less attractive VTM than it would be in a community with no access to credit. Therefore, especially if an organization is piloting a new instrument like an environmental mortgage, it will want to identify a community that is not currently receiving access to credit.

Conventional microfinance wisdom states that a high level of social capital is important—it reduces information costs for the lender, and increases social pressure to repay loans in a timely manner. Questions have been raised in academic circles as to whether social capital matters as much as microfinance practitioners believe (Ito, 2003), but it would still be better to have high social capital in a community than not to pilot a credit-access PPC scheme there.

One advantage of environmental mortgages, in theory, is that enforceable property rights are not necessary (Mandel, et al., 2009), which would make access to credit a viable VTM in some communities in which cash is not one. A community receiving access to credit does not need official property rights, just de facto control of the natural capital being preserved. Communities that are somewhat isolated are also desirable—as isolation is a guard against “roving bandits” from outside the community who might try to capture the extractive value of the environmental asset.

DECISION-SUPPORT TOOLS

Which VTM or VTMs to offer is a decision that must be made on multiple levels. The first is the organizational level—an organization considering incentive-based PPC must evaluate its own ability to deploy each VTM. Second is the community context level—each PPC scheme will be different at this level, and will rely on the community stakeholder support for its success. A program will only work if the VTM recipients value the incentive; the final program decisions will have to involve the community.

The following sections will help practitioners assess the viability of offering the four broad VTM categories, first at the organizational level, then at the community context level. At each level, a number of statements germane to particular VTMs are made. Practitioners can either check the box next to a statement, affirming it, or describe their organizations’ response if they cannot affirm it. Responses may include partnering with other organizations that can provide needed capabilities, or other organizational responses (e.g. a community does not have the expertise to profit from a productive asset, but the organization can provide complementary technical assistance). If an organization has to leave more than 2 boxes unchecked for a particular VTM, it should probably not consider deploying that VTM.

Many organizations that choose to run PPC schemes will forge partnerships to boost capacity and mitigate risk. While partnerships can make PPC schemes possible where they might otherwise not be and expand the range of VTMs available, partnerships also introduce complexity and the risk of inter-organizational conflict. To mitigate this risk, all potential partners should engage in open and frank communication about their conception of PPC. Irreconcilable disagreements between organizations in these conversations—one organization sees poverty reduction as a way to conserve and another sees conservation as a way to reduce poverty, for example—should be taken very seriously as reasons not to partner. The frameworks proposed by Adams et al. (2004) and Roe and Elliott (2006) are a good starting point for these discussions. A brief worksheet based on these frameworks can be found at the end of this section.

CASH

Organization

If you are unable to check any box, explain how your organization will respond to that difficulty (e.g. partnership with another organization). If you have to leave any boxes unchecked, you should reconsider using cash as a VTM.

<i>Condition</i>	<i>Check</i>	<i>Response</i>
1. My organization has multiple, stable funding sources that are available for PPC projects	<input type="checkbox"/>	
2. My organization has experience administering cash transfer programs	<input type="checkbox"/>	
3. My organization has the resources to devote to fraud prevention measures.	<input type="checkbox"/>	

Community

Rate your confidence on a 1–5 scale (1 = not confident; 5 = completely confident) that the community meets each of the following conditions. For any conditions with confidence ratings less than 5, indicate how your organization will respond to increase that confidence level or mitigate that difficulty. If there are two or more conditions about which you are not able to reach high levels of confidence, you should reconsider using cash as a VTМ.

Condition	Confidence	Response
1. The community’s primary economic activity currently contributes to environmental degradation	—	
2. The goods and services the community values are available for purchase at market	—	
3. Infrastructure exists that will enable regular, reliable cash transfers (e.g. banking services, mobile phone penetration)	—	
4. The community is able to reach internal consensus about the opportunity costs of conservation	—	
5. My organization is able to reach consensus with the community about opportunity costs of conservation and a fair transfer amount and schedule	—	
6. My organization understands the market for the goods the community produces, and is able to react to changes in that market that might change the efficacy of previously agreed-upon payment amounts	—	
7. There are clear and enforceable property rights in the community	—	
8. The community has a high level of social capital	—	

PRODUCTIVE ASSETS

Organization

If you are unable to check any box, explain how your organization will respond to that difficulty (e.g. partnership with another organization). If you have to leave any boxes unchecked, you should reconsider using productive assets as a VTM.

Condition	Check	Response
1. My organization is familiar with the operation of this productive asset	<input type="checkbox"/>	
2. My organization can demonstrate the benefits of this asset	<input type="checkbox"/>	
3. My organization is able to provide technical assistance related to the use of this asset	<input type="checkbox"/>	

Community

Rate your confidence on a 1–5 scale (1 = not confident; 5 = completely confident) that the community meets each of the following conditions. For any conditions with confidence ratings less than 5, indicate how your organization will respond to increase that confidence level or mitigate that difficulty. If there are two or more conditions about which you are not able to reach high levels of confidence, you should reconsider using productive assets as a VTM.

Condition	Confidence	Response
1. The community has demonstrated an interest in diversifying its economic activity	—	
2. The community has the technical ability to profit from the use of this productive asset	—	
3. There is a functioning market for the products or services this asset will help participants generate	—	
4. There is a high level of social capital in the community	—	

5. There is a secondary market for the productive asset itself	—	
6. With this productive asset, my organization can provide more value to the community per dollar than the community could provide for itself per dollar	—	

SERVICES

Organization

If you are unable to check any box, explain how your organization will respond to that difficulty (e.g. partnership with another organization). If you have to leave any boxes unchecked, you should reconsider using services as a VTM.

Condition	Check	Response
1. My organization's core capability is the provision of a service	<input type="checkbox"/>	
2. My organization is willing to provide this service conditionally and withdraw it if conservation goals are not met	<input type="checkbox"/>	

Community

Rate your confidence on a 1–5 scale (1 = not confident; 5 = completely confident) that the community meets each of the following conditions. For any conditions with confidence ratings less than 5, indicate how your organization will respond to increase that confidence level or mitigate that difficulty. If there are two or more conditions about which you are not able to reach high levels of confidence, you should reconsider using services as a VTM.

Condition	Confidence	Response
1. My organization has identified a need or needs within the community that cannot be addressed by cash transfer	—	

2. The community agrees that it has these needs	—	
3. The community would value services that address these needs	—	
4. With this service, my organization can provide more value to the community per dollar than the community could provide for itself per dollar	—	

ACCESS TO CREDIT

Organization

If you are unable to check any box, explain how your organization will respond to that difficulty (e.g. partnership with another organization). If you have to leave any boxes unchecked, you should reconsider using access to credit as a VTM.

Condition	Check	Response
1. My organization is familiar with microfinance best practices	<input type="checkbox"/>	
2. My organization has identified funders who are interested in conditionally capitalizing loan funds that are tied to the health of natural assets	<input type="checkbox"/>	

Community

Rate your confidence on a 1–5 scale (1 = not confident; 5 = completely confident) that the community meets each of the following conditions. For any conditions with confidence ratings less than 5, indicate how your organization will respond to increase that confidence level or mitigate that difficulty. If there are two or more conditions about which you are not able to reach high levels of confidence, you should reconsider using access to credit as a VTM.

Condition	Confidence	Response
1. The community is relatively isolated	—	

2. There is a high level of social capital in the community	—	
3. If there are not enforceable property rights, the community has de facto control of an important environmental asset	—	
4. If there are currently any MFIs providing access to credit in the community, their reach is minimal	—	

POTENTIAL PARTNERSHIP DISCUSSION FRAMEWORK

Partnerships between organizations should only be entered after a careful vetting process. A robust literature exists to provide guidance through partnering negotiations; synthesizing it is outside the scope of this document. However, when partnering in the specific context of PPC, practitioners must engage in discussions about how they view both the root causes of poverty and environmental degradation, and the relationship between the fields of conservation and poverty reduction. These discussions will help the organizations to avoid some conflicts in the context of the PPC schemes they create together, and navigate those conflicts that still arise. Strong disagreements should be seen as reasons not to partner.

ROOT CAUSES OF POVERTY AND ENVIRONMENTAL DEGRADATION

The following broad questions are intended to spark conversations in which each organization outlines its working assumptions about the root causes of the problems PPC aims to address, and how those assumptions inform the solutions they deploy.

Poverty

What are the root causes of poverty?

Why is poverty reduction important?

Why is poverty reduction difficult?

How should the preceding responses inform our poverty reduction efforts?

Conservation

What are the root causes of environmental degradation?

Why is conservation important?

Why is conservation difficult?

How should the preceding responses inform our conservation efforts?

RELATIONSHIP BETWEEN CONSERVATION AND POVERTY REDUCTION

The following brief worksheet, based on frameworks from Adams et al., (2004) and Roe and Elliott (2006), is suggested as a way to begin discussions about the relationship between the fields of conservation and poverty reduction.

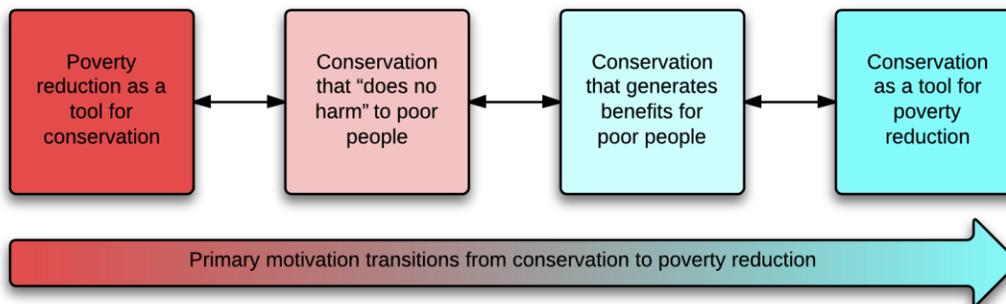
For each statement, indicate the level to which you agree or disagree on a scale of 1–5 (1 = Disagree completely; 5 = Agree completely)

<i>Statement</i>	<i>Agreement level</i>
Poverty reduction and conservation are separate policy realms	—
Poverty is a critical constraint on conservation	—
Conservation should not compromise poverty reduction	—
Poverty reduction depends on living resource conservation	—

With which statement do you agree most? Why?

With which statement do you disagree most? Why?

Where does your organizational focus fall on the following continuum?



Why?