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CHAPTER

5

SOCIAL AND CULTURAL DRIVERS BEHIND THE SUCCESS OF PES

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CONTENTS

ABSTRACT

Despite the potential for social and cultural drivers to profoundly affect PES outcomes, these issues are often neglected in programme design. A discussion is presented of some key motivational drivers that can impact stakeholders' interest towards PES programmes and that affect stakeholders' engagement in and commitment beyond these programmes. In particular, the stakeholders' interest will be highly influenced by non-economic considerations, cultural links between local identity and land use, diminishing altruistic actions through motivational crowding out, developing competition in the place of cooperation, mistrust of government agencies, failing to account for existing social and institutional frameworks, and the important role of capacity building. A fundamental issue is that participants in PES are unlikely to get involved solely for economic reasons; indeed, participation in PES is rarely cost-effective compared with alternative land uses. Offering non-financial benefits in PES programmes, such as capacity-building, is likely to be pivotal to stakeholders' engagement in and commitment beyond the programmes. Some suggestions are also presented for incorporating the social context into the PES design and implementation process to enhance investment efficiency and long-term ecological benefit.

INTRODUCTION

Consider the following hypothetical scenarios: a PES system in Australia creates antagonism when it becomes apparent that one landholder is being paid for management actions which a neighbour has been doing for years without any financial incentive. A PES scheme aiming to encourage biodiversity conservation in Vietnam requires villagers to cease farming practices that form a part of their identity as land users. A reverse auction in India faces a stumbling block when it becomes apparent that the majority of landholders are putting everything they earn into efforts to move away to an urban settlement. In all of these plausible scenarios, PES schemes may struggle to achieve the desired ecosystem services outcome due to neglect of the local social context and motivational drivers. Here, it can be argued that the social dimensions of PES can play a critical role in determining our ability to realize ecological objectives. PES is being used to pursue an increasing array of ecosystem service goals by governments and non-governmental organizations in both the developed and developing country contexts. The ecosystems services being paid for include biodiversity, carbon capture, watershed management, soil conservation and erosion control and, more recently, landscape

Key motivational drivers trigger stakeholders' interest in PES, as well as engagement and commitment in and beyond PES programmes

beauty. This diversity adds significant complexity to discussions surrounding socio-cultural and motivational issues that contribute to PES success. As such, a discussion is presented on what is believed to be the key 'intangible' issues contributing to PES that have traditionally been undervalued in the design of PES initiatives. These include key motivational drivers that can impact stakeholders' interest towards PES programmes and that affect stakeholders' engagement in and commitment beyond these programmes. In particular, the stakeholders' interest will be highly influenced by non-economic considerations, cultural links between local identity and land use, diminishing altruistic actions through motivational crowding out, developing competition in place of cooperation, mistrust of government agencies, failing to account for existing social and institutional frameworks and the important role of capacity building.

This discussion informs a scaffold of suggestions for thinking about how these issues might be built into the PES design and implementation process, intended to be applicable across a range of socio-cultural settings.

RAISING STAKEHOLDERS' INTEREST TOWARDS PES PROGRAMMES

Real people are not always economically rational operators

It is self-evident that for PES schemes to achieve their stated objectives, individuals or collectives have to actually want to participate in the initiative. While this basic premise of PES assumes it is the financial payment providing the encouragement to people to protect or enhance a natural resource (Van Hecken and Bastiaensen, 2010), it may not be the sole participatory driver. The 'value' placed on ecosystem services by communities often extends beyond direct use values, encapsulating existence value, non-use and option use values (Chee, 2004). Capturing and reflecting these multiple values in PES may be critical in attracting land users to participate in a scheme. Financial incentives may also be insufficient to mask potential conflict or mistrust between the agency offering the scheme and the intended participants. Programmes offering financial incentives to farmers for water quality improvements in the USA failed to achieve sufficient participation for this very reason (Breetz *et al.*, 2005). Farmers viewed the policy and the lack of consultation in its development as inequitable, contributing to the already-strained relations between farmers and programme coordinators. Moreover, the means by which the programme was communicated to farmers inhibited their ability to imagine how the programme might actually operate in the context of local conditions and their individual properties. In the case of a scheme that is poorly communicated to potential participants or a lack of trust between landholders and scheme administrators, individuals may view a programme as too risky to adopt.

The assumption is that people will rationally weigh the economic costs and benefits of programme participation before deciding to participate masks the potential complexity of motivational drivers. PES may require alterations to behaviour or land-use practices, which may be strongly embedded in the identity of local people (Wendland, 2008). For example, farmers, family forest owners and local communities may have generational linkages to certain methods of harvesting, food production and land management that constitute more than simply an income, but rather a way of life. A PES scheme that takes limited account of such a context may be less attractive to potential participants, despite the opportunity for economic benefit. The relevance of non-financial motives is further emphasized when one considers the alternative scenario; people can also be willingly participate in PES programmes despite the money they receive being less than the opportunity cost forgone from not farming or exploiting the land in the manner they otherwise would (Kosoy *et al.*, 2010). Landholder motivations can vary markedly across different regions and global contexts, but also within a single geographical location. The USA, UK and Australia, like many post-industrial nations, are experiencing a shift in property ownership, with rural areas of high amenity value recording significant levels of in-migration from non-farming landholders (Barr, 2005; Gill *et al.*, 2010). PES programmes that target biodiversity gains in rural areas with a decreasing presence of agriculture would need to be cognisant that property owners may have heterogeneous, non-farming-related property management goals. Landholders in these regions may lack the practical land management capacity required to undertake management actions present in a more traditional farming landscape (Pannell *et al.*, 2006).

Targeting PES schemes for different groups of stakeholders requires considering different sets of motivational drivers

On the flip-side, highly productive agricultural areas in large parts of world, including Australia and the USA, have been purchased by large agri-corporations (UNCTAD, 2009). Targeting PES schemes to each of these very distinct groups — hobby farmers and agri-corporations — will require consideration of a very different set of motivational drivers. Different incentives may be required to draw participation and the level of information and training support offered to participants will also need to be considered. For example, hobby farmers choosing to move from the city to take up a rural lifestyle may be more likely to respond positively to non-financial incentives, such as advice from extension officers. Agri-corporations may be motivated by financial incentives, but may require continued payment to ensure the longevity of investments. In the sections below, some of the major pitfalls of ignoring the social dimensions and motivational drivers for participation in PES schemes are highlighted and some ways forward are suggested.

Motivational crowding-out

Motivational crowding-out is a known phenomenon, where altruistic motives are replaced by self-interested, extrinsic motivations. Motivational crowding-out can also relate to ecosystem services and can be triggered by a poor non-participatory implementation of PES schemes. Ecosystem services are common goods in that society at large benefits from their provision. It may be the case that individuals and communities are altruistically motivated to provide carbon capture or biodiversity ecosystem services out of a sense of moral or ethical responsibility (Bowles, 2008).

Understanding the existing motivations for the adoption of pro-conservation behaviour can prove invaluable. There is a possibility that many of the conservation actions required of a community involved in PES are already being conducted prior to the introduction of an economic incentive to do so (Murray *et al.*, 2007). If a PES programme is only seeking to recruit select individuals or landholders within a given community, they may be receiving a financial reward for the same practice that others are intrinsically motivated to do. The danger in such a scenario is that this intrinsic motivation will be undermined, as individuals' motivations become more orientated towards self interest, rather than a moral responsibility (Bowles, 2008).

One of the biggest concerns posed by motivational crowding-out is that the cumulative losses of ecosystem service benefits caused by diminishing altruistic motivations are greater than the benefits produced by those participating in PES. Once intrinsic motivations have been discouraged, the resulting landholder disillusionment with the process or with the scheme administrators involved appears to be difficult to reverse (Hatfield-Dodds and Proctor, 2008). Disillusioned landholders may also be less inclined to participate in future initiatives. The risk of eroding altruistic motivations highlights the need to assess the extent to which PES schemes can balance competition for funds with collaborative management practices at a landscape or regional scale. By recognizing existing intrinsic motives, PES programmes can be designed to build on existing voluntary efforts, rather than discouraging them. Simply replacing voluntary motives with extrinsic incentives does not represent efficient or effective policy and potentially proves counter-productive to conservation goals (Hatfield-Dodds and Proctor, 2008). Structuring programmes to pick up on existing intrinsic motives for sustainable practices is likely to have a greater chance of success (Clements *et al.*, 2010).

Motivational drivers triggered by cooperation versus competition

Collective action by communities for the management of ecological resources is a strong and established tradition in many parts of the globe. This encompasses a spectrum from indigenous communities in a communal land rights context, to volunteer watershed management groups

amidst private property rights regimes. The extent to which community-based natural resource management across differing land tenure systems could be undermined by selective payments to individuals within a collaborative network could impact on the success of a PES scheme. Competition may be introduced into the process at three distinct phases: (a) access to a programme that may have limited funds available; (b) defining land tenure where it was previously undefined; and (c) the equity of the amount of payments received by each individual participant (see also Chapter 3 "Opportunities and gaps in PES implementation and key areas for further investigation").

Within a system of customary land tenure, there may be little incentive to clearly define property rights and boundaries, as no economic incentives exist to do so (Wendland, 2008). PES schemes have the potential to provide that incentive, inducing a change to social perceptions of ownership and property rights (Gong *et al.*, 2010). Avoiding disputes over property boundaries and a consciousness of the capacity to alter communal property rights regimes should be addressed when considering how PES contracts are going to be structured (Kosoy *et al.*, 2007). This may involve payments into a community fund for ecosystem services to be delivered by the whole community, rather than through discrete contracts with individuals. Alternatively, in the context of reverse auctions, preference could be given to contractors who present combined bids that span a target region to encourage collaboration. Whatever the format, it seems clear that land tenure arrangements need to be determined and defined before PES contracts are entered into, as PES participation may increase the value of the land and raise the potential for associated tenure disputes.

PES implementation can trigger competition in potential participants in access to the programme under certain conditions

Depending on the land tenure and management context, the structure of payment mechanisms can impact local normative behaviour. A programme that encourages cooperation may see normative benchmarks for sustainable land management strengthen, giving participants a standard against which they can assess their own performance (Lokhurst *et al.*, 2010). One criticism of reverse auctions as a PES mechanism is the confidentiality and individuality of the bidding process, as well as potentially limited awareness of fellow participants. It may be difficult to build on local normative behaviour when neighbours are unaware of each others' activities.

PES programmes may also encounter problems from strategic behaviour by potential participants who seek to take advantage of the introduction of an economic incentive for land management (Ferraro, 2001). Landholders may respond to incentives by degrading their land, in the hope of receiving payments for future programmes. Landholders with existing capital may also engage in land speculation with the intention of attracting PES payments across multiple land parcels. Ferraro (2001) raises the issue of in-migration motivated by PES; people might immigrate to a location where a PES programme is being considered, in the hope of being granted property rights for their allocation as part of the implementation process.

Despite the potential for rupturing collective action efforts, PES can also open lines of communication between ecosystem service users and providers. This may be especially relevant in contexts where water quality, biodiversity and land-use practices of poorer communities in mountainous upper catchment regions are impacting wealthier end-users of those services. For example, PES appears to have played some role — while difficult to quantify — in creating greater awareness of the interconnectedness of resource management and community development issues in Honduras (Kosoy *et al.*, 2007). End-users pay a small surcharge on their water bills, which is paid to upland farmers to limit conversion of forest to coffee plantations, with the intention of improving the quality of drinking water (see also Case Study 12 "PES for improved ecosystem water services in Heredia town, Costa Rica").

The influence of existing institutional frameworks and social networks on participatory motivations

What has come before in terms of development projects, land-use policy or incentive schemes will likely have an impact on how communities respond to a new PES scheme. This includes influencing the individuals who are likely to actually participate in a programme. As Daniels *et al.* (2010) found in the case of Costa Rica's forestry PES scheme, landholders who were previously involved with incentives or conditional forestry subsidies were disproportionately represented in PES. Moreover, 60 percent of landholders not involved in PES in the same province were completely unaware of the existence of the programme. In the case of PES in Vietnam, early community perceptions of the objectives of the programme were shaped by the widespread implementation of an existing illegal forestry monitoring programme, which employed a number of people in villages across the region (Petheram and Campbell, 2010). This highlights the extent to which institutional path dependency and existing social networks can dictate participatory outcomes. This is not always a bad thing; using existing networks may provide an appropriate avenue for targeting individuals and communities who are appropriate candidates for participation. However, PES schemes need to be cognisant of individuals and communities outside of established social and institutional frameworks, and who may be the custodians of ecological assets that are crucial to the success of the project. Given that the pursuit of additionality is considered a key component of PES, engaging these 'outsiders' may help to achieve ecological gains that would not have otherwise occurred without financial incentives.

PES design should involve the actual custodians of ecological assets deemed crucial in the preservation of ecosystem services

Connecting to landholders outside of existing social and institutional networks can add an extra layer of organizational complexity to PES schemes. This complexity can be heightened when

a strong sense of community mistrust — warranted or unwarranted — may be present towards the conservation agency, government department or private institution that is behind the PES initiative. Private land conservation programmes in the USA appear to have had some success with using intermediaries that were already trusted by the community (such as respected local farmers or foresters) as the communicators of such programmes. The first point of contact with a potential participant can be a crucial determinant in programme adoption (Wilcove and Lee, 2004). While non-governmental organizations (NGOs) often act as intermediaries for PES programmes in developing nations, organizations with existing social and trust networks established may be in a good position to begin discussions with the community about the potential for PES schemes.

The legitimacy of the PES scheme amongst the community may be just as important as the perceived legitimacy of the agency providing it. In some cases, a PES programme may be proposed in region where pre-existing voluntary conservation initiatives have been in operation for a number of years. De-emphasizing a long standing programme in which people have invested a substantial amount of their time and money in favour of a PES scheme may leave some communities feeling disenfranchised. Devising ways of integrating PES with an existing successful programme with a governance structure that could make PES implementation viable could prove a more efficient way of delivering outcomes on the ground.

ENSURING STAKEHOLDERS' ENGAGEMENT IN PES PROGRAMMES

If stakeholders are not involved in the design and implementation processes of a PES scheme, the likelihood that participants will adhere to the requirements of a contract is reduced. This is often the result of landholders not being fully aware of the contractual requirements until after agreeing to participate, at which time it might be realized that they do not possess the capacity to complete the tasks.

Community consultation provides an opportunity to gauge the capacity of landholders to participate in a PES programme, while also providing a space in which misunderstandings about the programme can be rectified and existing attitudes and concerns within the community about pressing land management issues can be determined. The ability to deal with unforeseen issues that could inhibit adoption or adherence to PES contracts may help to mitigate the risk of PES failures. A scoping study that encapsulates these social dimensions should be included alongside biophysical assessments of the suitability of a location for PES (Petheram and Campbell, 2010). Scoping might identify a host of governance and land tenure conflicts that need to be resolved before PES could be implemented without fear of initiating community tensions.

Community consultation also provides an avenue for local knowledge about ecosystems and land management to be integrated into PES design. Imposing a method of practice that is

not suited to local conditions may prove counterproductive and diminish community trust or confidence in the scheme. Engaging stakeholders can be valuable in identifying local practices that can be integrated into PES programme design. Integrating local knowledge and practices could prove pivotal to local people buying into the objectives of the programme. A PES programme aimed at biodiversity conservation in northwestern Ecuador spent nearly 12 months working with local communities before contracts were established; this shows the importance of a thorough and honest engagement that is not simply an exercise in pacifying community concerns (Wendland, 2008).

FOSTERING STAKEHOLDERS' COMMITMENT BEYOND PES PROGRAMMES

As is reinforced by the OECD (2010), once payments for ecosystem services cease, individuals may lose the motivation or capacity to continue providing those services. Continuous payments and additional funding clauses are suggested as a way of increasing the likelihood that gains will be permanent. However, in a review of 13 different PES programmes globally (Wunder *et al.*, 2008), nine had contract periods of ten years or less. While three of the nine had renewal clauses for extension of contracts, it suggests that finite contract periods are currently a political reality in many cases. Assuming a continuing trend of finite contract periods, the question then becomes one of how the likelihood of permanency can be enhanced in the event of payment termination or renegotiation of contract conditions.

Establishing capacity building and offering non-financial benefits in PES programmes is also likely to be pivotal to providing prolonged and sustainable changes to land-use practices. Individuals and communities may not have the capacity to actually undertake the actions required through PES without increased knowledge, training and equipment. Determining the non-financial constraints to practice change could be identified in a scoping study. Non-financial benefits may help to build greater community resilience and reduce sole reliance on direct payments for producing ecosystem service benefits (see also Chapter 6 "Landscape labelling approaches to PES: Bundling services, products and stewards").

Capacity building and non-financial benefits are pivotal to providing prolonged and sustainable changes to land-use practices

While fostering stewardship amongst participants is no guarantee of permanency, it may increase the likelihood of continued gains. Moreover, if PES programmes allow for clarification and greater security of land tenure, while increasing the capacity of landholder to deal with land management issues, increased stewardship may be a beneficial by-product (Muradian *et al.*, 2010). Increasing the level of ownership that individuals and communities have in their PES project may help to foster this sense of stewardship.

One interesting question raised by PES is whether programmes that are simply aimed at use avoidance (e.g. stopping logging or farming) can be sustained in the long term. It may be a reality for some communities that the withdrawal of PES will necessitate the resumption of previous practices to maintain livelihoods. Ultimately, multi-dimensional programmes that do not rely solely on the avoidance of the use of a particular resource may prove more sustainable. This issue is neatly captured by a quote from a villager in Petheram and Campbell's research into the potential for PES in a highland region of Vietnam: "Even if the government pays, the peoples' habit is to grow crops. People don't want to sit here and do nothing" (Petheram and Campbell, 2010).

The extent to which identity and existence is tied to land use will undoubtedly play a role in PES success, especially when the actions being requested require a sudden and complete change in long established resource use traditions.

OVERALL EFFECT OF MOTIVATIONAL DRIVERS ON PES SUCCESS

PES schemes have been heralded as a mechanism for achieving greater economic and ecological efficiency in environmental investment (OECD, 2010). However, perceived efficiencies can be quickly eroded through failure to understand the social dimensions of PES. Motivational crowding out is one example of the unintended consequences of PES that can have lasting effects on the success of natural resource management initiatives.

Understanding and responding to the intangible motives for PES participation can substantially improve the economic and ecological efficiency of investments. As Kosoy *et al*. (2007) point out, the opportunity costs that are forgone as part of PES participation are often higher than the PES payments, so something in addition to financial incentives must be driving decisions. Anecdotal evidence from reverse auction tender programmes in Australia suggests that some landholders willingly change their practices when provided with information and assistance from extension officers as part of the bidding process. This accords with evidence from family forestry properties in the USA, where extension services were rated by landholders as more critical than financial incentives for practice change (Kilgore *et al*., 2007). This also raises the question of whether PES programmes are paying participants too much. Would participants be just as happy with less money and more investments in improving their knowledge and capacity? Moreover, given the apparent importance of extension, are PES programmes that neglect to include such a focus as part of participation setting up the participants for failure?

Opportunity costs are often higher than PES payments, so something else must be driving interest and participation

Given that financial constraints often play a role in natural resource management decisions in government, it will be useful to identify PES designs that achieve superior ecological outcomes with the equivalent amount of money. It is argued that researching the social landscape before launching a PES scheme will provide insights that can substantially improve the economic and ecological efficiency of investments both in the short and longer terms.

INCORPORATING THE SOCIAL DIMENSION AND MOTIVATIONAL DRIVERS INTO PES DESIGN

A general framework for PES implementation is destined to fail on the ground. The variation in socio-economic drivers, attitudes and motivation between individuals and communities globally means the design and implementation of PES must consider the social dimension in order to reduce the risk of inefficiencies and failure to produce the desired outcomes. While this is something that PES practitioners and intermediaries are acutely aware of, PES design at an institutional level is only beginning to grapple with these inherent complexities. We argue that each time a PES programme is designed and implemented, it is necessary to integrate the social landscape with the biophysical landscape. Below we outline some guidelines for PES that are intended to help both reveal and navigate through the conflicts and intangibles discussed above.

Scaffold of key questions and suggestions

a. **A scoping study of the social dimensions of PES** should be included alongside biophysical assessments of the suitability of a location for PES. Questions that should be posed include:
   - Have there been previous experiences with natural resource management policy that will influence participation? Are there obstacles that have to be overcome to regain trust? Is there potential to crowd out existing intrinsically motivated conservation action?
   - Are property rights well established? Will they need to be clarified before PES is introduced? Is there potential for PES to create conflict around property rights? Is it possible to target groups of landholders in a cooperative arrangement?
   - Can existing networks and trusted agency/landholder relationships be utilised to communicate the broader programme goals, or even to garner interest in participating in stakeholder engagement for the development of shared goals? Are 'outsiders' going to be important to broad programme objectives?
   - What is likely to drive participation? Are landholders predominantly families running marginal businesses, hobby farmers, agri-business? Will landholders respond to investments in improving their knowledge and capacity as part of the financial incentives offered?

b. PES can be thought of as an **instrument of behavioural change**. There is a large literature around the use of social psychology principles to achieve behavioural change, with frameworks such as Community-Based Social Marketing (CBSM) (McKenzie-Mohr and Smith, 1999) having the potential to guide programme development. Some key elements of CBSM include setting clear goals, identifying and overcoming obstacles, encouraging public commitment making, creating norms and providing tailored feedback. Some powerful insights can flow from adopting this approach. For example, it may become apparent that obstacles to achieving land-use change are not purely financial, so education and extension may need to play a role. Another insight may relate to norms: PES schemes that utilise reverse auctions that are undertaken competitively and confidentially will struggle to create norms because neighbours will not be aware of each others' activities.
c. **Involving stakeholders in the development of PES programmes** is likely to create goodwill and establish relationships with landholders that will be invaluable in the implementation phase (Cooke *et al.*, in review).
d. **Defining clear objectives** is critical to determining how best to engage landholders. For example, if an objective of the scheme is to target spatially prioritised zones, it may be critical to ensure participation from specific landholders or it could be desirable to engage groups of landholders. Social objectives will also influence programme design: How prominent are pro-poor objectives? Will the programme target those who have not participated in other schemes? Is the objective to encourage change in those who may have historically neglected land (achieving additionality) or is the programme a reward for good land management practices?
e. **PES is not the only mechanism for achieving land-use change** and may not be the most efficient and effective approach in all situations. Simple models of ecological and social processes can be used to evaluate the efficiency of PES over alternative policy approaches (see, for example, Ferraro and Pattanayak, 2006; Polasky *et al.*, 2005). Elements of other policy approaches (regulation, voluntary extension programmes) can be built into PES to increase participant capacity and the sustainability of outcomes.

CONCLUSIONS

By highlighting the array of local social context and motivational dimensions that can shape the success of PES schemes, we have sought to demonstrate the need for more nuanced thinking about policy design and implementation. A useful way of conceptualising the range of issues discussed here is to consider engaging with landholders, communities, existing policy frameworks and other relevant stakeholders as a risk aversion strategy. It is argued that the risk of failure in terms of inefficiency and damaging perceived legitimacy of policy amongst the community can be reduced by an early and honest engagement with affected communities. Indeed, as the examples cited here suggest, it is crucial for achieving tangible social and ecological gains that advance sustainable land management in communities across the globe.

REFERENCES

Barr, N. 2005. *The changing social landscape of rural Victoria*. Bendigo, Victoria, Department of Primary Industries.

Bowles, S. 2008. Policies designed for self-interested citizens may undermine 'the moral sentiments': Evidence from economic experiments. *Science*, 320: 1605–1609.

Breetz, H.L., Vanden, K.F., Jacobs, H. & Schary, C. 2005. Trust and communication: Mechanisms for increasing farmers' participation in water quality trading. *Management Review*, 81(2): 170–190.

Chee, Y.E. 2004. An ecological perspective on the valuation of ecosystem services. *Biological Conservation*, 120: 549–565.

Clements, T., John, A., Nielsen, K., An, D., Tan, S. & Milner-Gulland, E.J. 2010. Payments for biodiversity conservation in the context of weak institutions: Comparison of three programs from Cambodia. *Ecological Economics*, 69(6): 1283–1291.

Cooke, B., Langford, W.T., Gordon, A. & Bekessy, S. In review. Positioning ecological objectives in a social context: The design of private land conservation programs – a review. *Journal of Environmental Planning and Management*.

Daniels, A.E., Bagstad, K., Esposito, V., Moulaert, A. & Rodriguez, C.M. 2010. Understanding the impacts of Costa Rica's PES: Are we asking the right questions? *Ecological Economics*, 69(11): 2116–2126.

Ferraro, P.J. 2001. Global habitat protection: Limitations of development interventions and a role for conservation performance payments. *Conservation Biology*, 15(4): 990–1000.

Ferraro, P.J. & Pattanayak, S.K. 2006. Money for nothing? A call for empirical evaluation of biodiversity conservation investments. *PLOS Biology*, 4(4): 482–488.

Gill, N., Klepeis, P. & Chisholm, L. 2010. Stewardship among lifestyle oriented rural landowners. *Journal of Environmental Planning and Management*, 53(3): 317–334.

Gong, Y., Bull, G. & Baylis, K. 2010. Participation in the world's first Clean Development Mechanism forest project: The role of property rights, social capital and contractual rules. *Ecological Economics*, 69(6): 1292–1302.

Hatfield-Dodds, S. & Proctor, W. 2008. *Delivering on the promise of stewardship issues in realising the full potential of environmental stewardship payments for landholders and the land*. CSIRO Australia.

Kilgore, M.A., Greene, J.L., Jacobson, M.G., Straka, T.J. & Daniels, S.E. 2007. The influence of financial incentive programs in promoting sustainable forestry on the nation's family forests. *Journal of Forestry*, 4(8): 184–191.

Kosoy, N., Martineztuna, M., Muradian, R. & Martinezalier, J. 2007. Payments for environmental services in watersheds: Insights from a comparative study of three cases in Central America. *Ecological Economics*, 61(2–3): 446–455.

Lokhorst, A.M., van Dijk, J., Staats, H., van Dijk, E. & de Snoo, G. 2010. Using tailored information and public commitment to improve the environmental quality of farm lands: An example from the Netherlands. *Human Ecology: An Interdisciplinary Journal*, 38(1): 113–122.

McKenzie-Mohr, D. & Smith, W. 1999. *Fostering sustainable behavior: An introduction to community-based social marketing*. 2nd Edition. Gabriola Island, B.C., New Society.

Muradian, R., Corbera, E., Pascual, U., Kosoy, N. & May, P. H. 2010. Reconciling theory and practice: An alternative conceptual framework for understanding payments for environmental services. *Ecological Economics*, 69(6): 1202–1208.

Murray, C., Sohngen, B. & Ross, M.T. 2007. Economic consequences of consideration of permanence, leakage and additionality for soil carbon sequestration projects. *Climate Change*, 80(1-2): 127–143.

OECD. 2010. *Paying for biodiversity: Enhancing the cost-effectiveness of payments for ecosystems services* (available at http://www.oecd.org/publishing/corrigenda).

Pannell, D., Marshall, G., Barr, N., Curtis, A., Vanclay, F. & Wilkinson, R. 2006. Understanding and promoting adoption of conservation practices by rural landholders. *Australian Journal of Experimental Agriculture*, 46(11): 1407–1424.

Petheram, L. & Campbell, B.M. 2010. Listening to locals on payments for environmental services. *Journal of Environmental Management*, 91(5): 1139–1149.

Polasky, S., Nelson E., Lonsdorf, E., Fackler, P. & Starfield, A. 2005. Conserving species in a working landscape: Land use with biological and economic objectives. *Ecological Applications*, 15: 1387–1401.

UNCTAD (United Nations Conference on Trade and Development). 2009. *World investment report: Transnational corporations, agricultural production and development, 2009* (available at http://unctad.org/docs/wir2009_en.pdf).

Van Hecken, G. & Bastiaensen, J. 2010. Payments for ecosystem services in Nicaragua: Do market-based approaches work? *Development and Change*, 41(3): 421–444.

Wendland, K. 2008. Rewards for ecosystem services and collective land tenure: Lessons from Ecuador and Indonesia. *Tenure Brief*, 9: 1–10.

Wilcove, D.S. & Lee, J. 2004. Using economic and regulatory incentives to restore endangered species: Lessons learned from three new programs. *Conservation Biology*, 18(3): 639–645.

Wunder, S., Engel, S. & Pagiola, S. 2008. Taking stock: A comparative analysis of payments for environmental services programs in developed and developing countries. *Ecological Economics*, 65(4): 834–852.

PES FOR IMPROVED ECOSYSTEM WATER SERVICES IN PIMAMPIRO TOWN, ECUADOR

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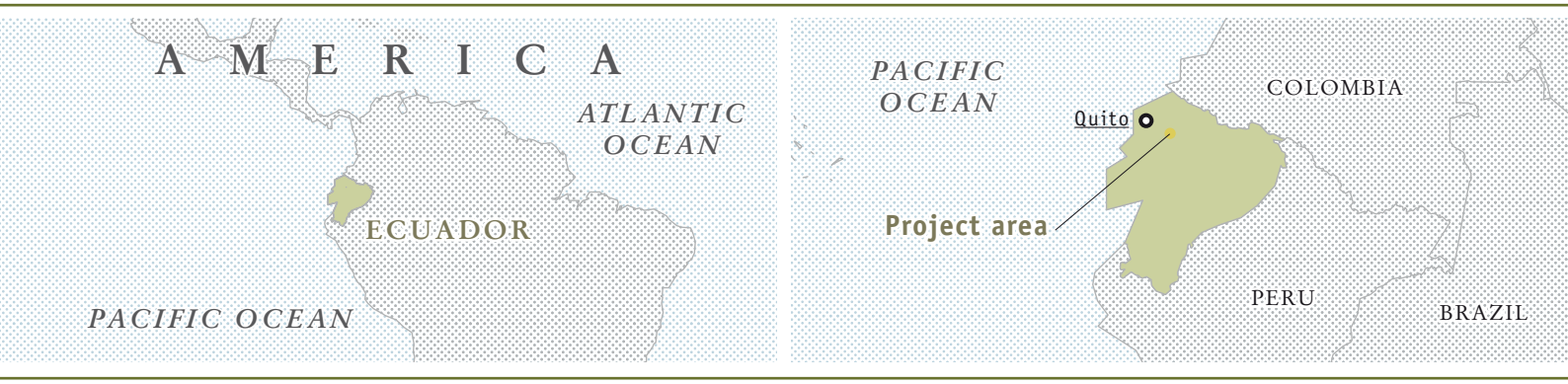

The Pimampiro PES Initiative was launched in the 2000, as part of the larger Nueva América forest project, an FAO-funded project for community forest management that worked with the Nueva América Association (ANA). Based on an interest in improving the water supply quality and quantity to the town of Pimampiro, this user-financed PES scheme has been as a result of direct negotiation between the municipality of Pimampiro and a couple of dozen farmer families upstream (members of the Nueva América Association), who have signed five-year contracts on an individual basis (IIED, 2007; Wunder and Albán, 2008).

The Nueva América forest, some 32 km from the town of Pimampiro, lies at between 2 900 and 3 950 metres above sea level, in the upper watershed of the Palahurcu River (Figure 22). Although the programme initially targeted 27 farming families owning a total area of 638 hectares, the programme had 19 families participating in 2007, representing 496 ha, or 77 percent of the total area.

The participating landowners agree to protect the native forest and Andean alpine grass (páramo) vegetation from deforestation and land conversion. A fund, the "Fondo para el pago por servicios ambientales para la protección y conservación de bosques y páramos con fines de regulación de agua" was initially established to finance the PES payments, with an investment of USD 15 000 from the Inter-American Foundation (USD 10 000), via CEDERENA (an NGO that evolved from the FAO-funded project) and the FAO-funded Community Forest Project (USD 5 000).

Jointly managed by CEDERENA and the municipality's newly-established environmental department (UMAT), this seed fund is pooled with money collected from the 20 percent increase in municipal water use charges.

The municipality collects an average of USD 1.20 per water-user family per month for the average use of 30 m^3 of water per month. Payments to landowners are made on a quarterly basis through the local offices of the Banco de Fomento. To receive payment, each landowner must sign a renewable five-year agreement with the municipality of Pimampiro.

Payment categories vary according to the condition of the ecosystem they agreed to protect, on a simple cost per land area model: USD 1.00/ha/month for undisturbed páramo or primary forest; USD 0.75 ha/month for old secondary forest; and USD 0.50 ha/month for new secondary forest.

One of the more interesting findings of this scheme has been that the 1 331 water users in the town agreed to pay more on their water bill for both watershed protection and improved infrastructure after a flooding event reduced running water to only two hours three days a week, thus alerting them about the risks to their water supply. While the impacts of the PES scheme have not been measured, hydrological modeling of the watershed showed that over the decade of duration it probably reduced sedimentation by more than 25 000 tonnes (affecting both water quality and damage risks to infrastructure), while dry-season flows were only marginally higher (0.5 percent) (Quintero *et al.*, 2009).

Participant farmers in the scheme receive an average of USD 21.10 per month, equivalent to about 30 percent of their monthly household expenditure and used to cover basic expenses and the families' short-term needs, such as food, agricultural production, health and education (Echavarría *et al.*, 2004).


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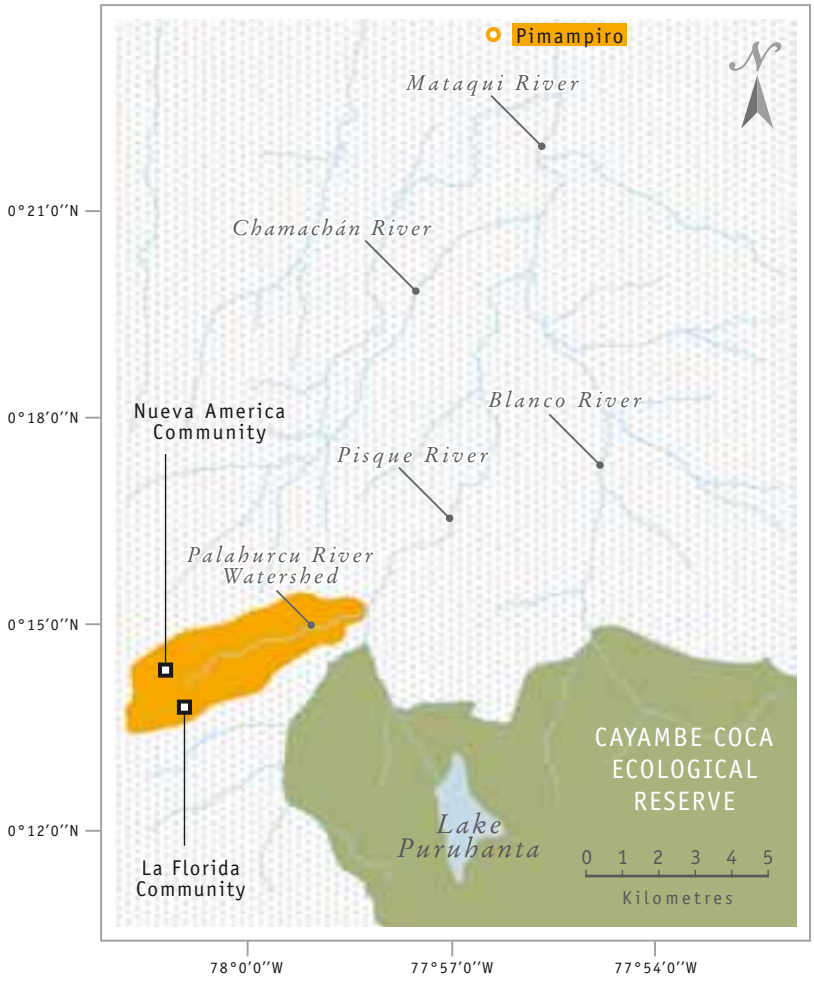
Although the scheme has likely resulted in an ongoing significant improvement in water quality (and perhaps quantity) reaching the town, it is impossible to quantify deterministically just how much improvement has occurred. However, the scheme has seen a noticeable reduction in the frequency and intensity of encroachment on forest and páramo land, and monitoring by the municipal environmental department has demonstrated low levels of violations to the agreements in terms of slash-and-burn practices, unauthorised selective timber extraction, and soil and undergrowth extraction.

From an agricultural standpoint, as noted above, this scheme was also part of a larger sustainable development initiative in the area. Under this larger project, participants had the opportunity to access technical assistance and capacity building on agro-ecology (e.g. the creation of organic family gardens) and agroforestry projects (medicinal plants collection and commercialisation and the production of highly-valued ornamental plants, such as orchids).

Figure 22

Location of a key area within the catchment of the Palahurcu River for the maintenance of watershed services to the town of Pimampiro



Adapted from original map provided by Sven Wunder

Previous pages (from left to right):

↖ Pristine forests are increasingly logged by the Nueva America community that owns the upper Palahurcu watershed.

↖ Example of *páramo* vegetation, a neotropical ecosystem of high-altitude valleys and plains covered mainly by grasslands and sparse shrubs.

Current pages (from left to right):

→ The municipality of Pimampiro draws most of the water for its 13 000 inhabitants from the Palahurcu Watershed.

→ Water from the Palahurcu River is also used for irrigation.

REFERENCES

Echavarría, M., Vogel, J., Albán, M. & Meneses, F. 2004 The impacts of payments for watershed services in Ecuador. Emerging lessons from Pimampiro and Cuenca. Markets for Enviromental Services Series, No. 4. London, Environmental Economics Programme, IIED (also available at http://pubs.iied.org/pdfs/9285IIED.pdf).

IIED (International Institute for Environment and Development). 2007. Ecuador – Pimampiro. Watershed markets: Case studies. London, IIED (also available at http://www.watershedmarkets.org/casestudies/Ecuador_Pimampiro_E.html).

Quintero, M., Wunder, S. & Estrada, R.D. 2009. For services rendered? Modeling hydrology and livelihoods in Andean payments for environmental services schemes. *Forest Ecology and Management*, 258:1871–1880.

Wunder, S. & Albán, M. 2008. Decentralized payments for environmental services: The cases of Pimampiro and PROFAFOR in Ecuador. *Ecological Economics*, 65(4): 685–698.

FARMER'S PREFERENCES AND PERSPECTIVES ON PLANTING ADDITIONAL TREES ON THEIR FARMS, LAKE VICTORIA BASIN, WESTERN KENYA

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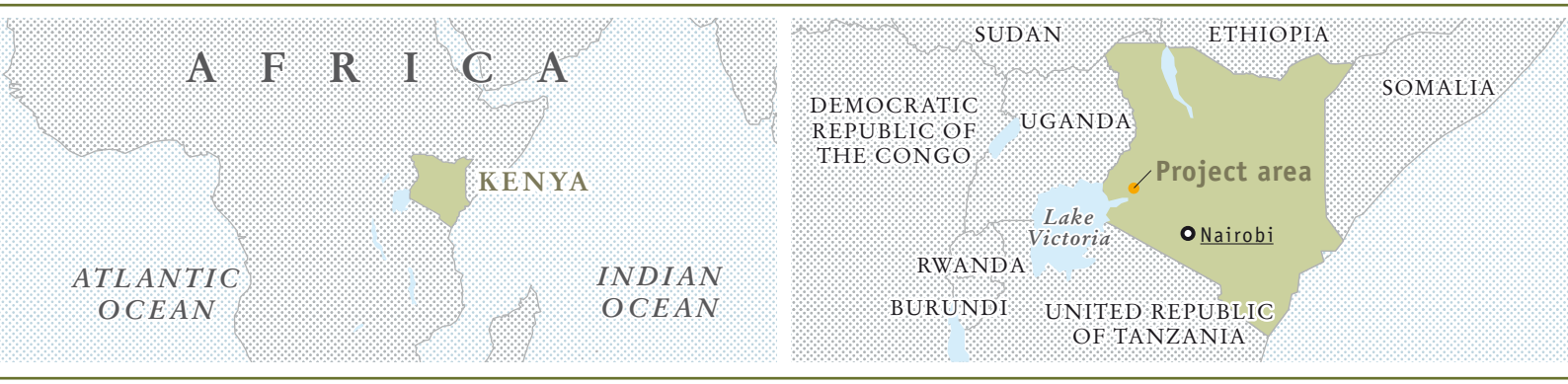


The World Agroforestry Centre (ICRAF) has been conducting research on land management in the Lake Victoria basin since 1999. Early research showed the nature and extent of land degradation, the potential for agroforestry to reduce land degradation and the links between land degradation and the pollution and eutrophication problems in Lake Victoria. That research also shows that sediments and nutrients from the Nyando and Yala basins aggravate the degraded ecological conditions of Lake Victoria, as well as the likelihood of a resurgence of water hyacinth (*Eichhornia crassipes*) invasion.

Water hyacinth, native to South America, was probably introduced to the lake in the 1980s from Rwanda via the Kagera River. In 1998, the free-floating perennial weed had covered a surface of 20 000 hectares, creating a thick mat that even prevented fishermen from launching their boats. This exotic floating vegetation has completely altered the native species composition of the lake, creating a proliferation of blue-green algae and record rates of fish species extinctions. In 2001, the invasion was controlled by the use of an Australian hyacinth-eating insect (the *Neochitina* weevil), but a resurgence of infestations was observed in 2006 and in the following years. Continuous sound management is needed today to contain the ecological and economic damage and loss.

The Nyando and Yala watersheds each occupy about 3 500 km^2 and have a high population density, which in some areas can exceed 1 200 persons per km^2. During the last 30 years the drastic alteration of land cover caused by a high deforestation rate has significantly increased the level of runoff, especially in the extensively cultivated areas, which are located in the middle section of each of the two watersheds (Figure 23 and 24). The steep slopes that characterise both watersheds make them particularly vulnerable to soil erosion. The landscape, particularly in Nyando, is marked by erosion features, such as rills, badlands and gullies. Varying with the recorded precipitation rate (1999-2005) in Nyando, the sediment yield was estimated at between one and three million tonnes per year, while in Yala it was between two and three million tonnes per year.

The first phase of research on land degradation led to two follow-up studies. In 2007-2008, ICRAF conducted an integrated study of trends and trade-offs between ecosystem services in the Yala and Nyando River Basins. Since 2005, ICRAF and the Kenya Agricultural Research Institute (KARI), with funding from the World Bank, have been implementing the Western Kenya Integrated Ecosystem Project (WKIEP). The goal of WKIEP is to establish a mechanism that rewards farmers for undertaking agroforestry practices in the Nyando and Yala basins. It is hoped that appropriate agroforestry practices will help to restore highly degraded areas, enhancing carbon stocks and reducing erosion at the site level, while also reducing sedimentation at the watershed level. Within the WKIEP project a survey, led by R. Jindal at Michigan State University, was conducted amongst 277 farmers in the Nyando and Yala Watersheds in 2005. The aim of the survey was to investigate farmers' willingness to plant additional trees on their farms to reduce siltation and nitrogen and phosphorous in-flow into Lake Victoria coming from the two rivers.

The trade-off study shows that the mid-altitude parts of the Nyando Basin are increasingly cultivated with maize, which in 2006 already covered 93 percent of the total agricultural land and had replaced minor cereal and cash crops, such as millet, pyrethrum, potatoes, cassava, Napier grass and wheat. Tea plantations are also important high income crops that are often found close to the remaining forest patches in the upper sections of the watersheds. In particular, the Yala Basin has recorded a large increase in tea production from 2.9 percent of the area of the basin in 1997 to 5.3 percent in 2006. In the Yala basin, tea has replaced sugarcane plantations in some parts, a better crop than tea for erosion control. In the Nyando Basin, sugarcane still occupies the whole central-western part of the watershed.

Both the Nyando and Yala Rivers convey large water flows; river flooding is common and large swamps are found around their lower sections before flowing into Lake Victoria. In the Nyando Basin, from 1991 to 2006, natural wetlands decreased from 1.93 percent to 0.40 percent of the watershed area due to the increasing cultivation of rice and other irrigated crops.

The spatial analysis of the land use occurring in different sections of the two watersheds revealed that some areas are intensively cultivated with high productivity crops, mainly tea, but

Current pages (from left to right):

→ Water hyacinth (*Eichhornia crassipes*) is an exotic aquatic plant, accidentally introduced into the Lake Victoria, which has proliferated enormously, disrupting the main biological processes of the lake.

→ The thick mats created by the water hyacinth often represent a major problem for the launching of fishing boats.

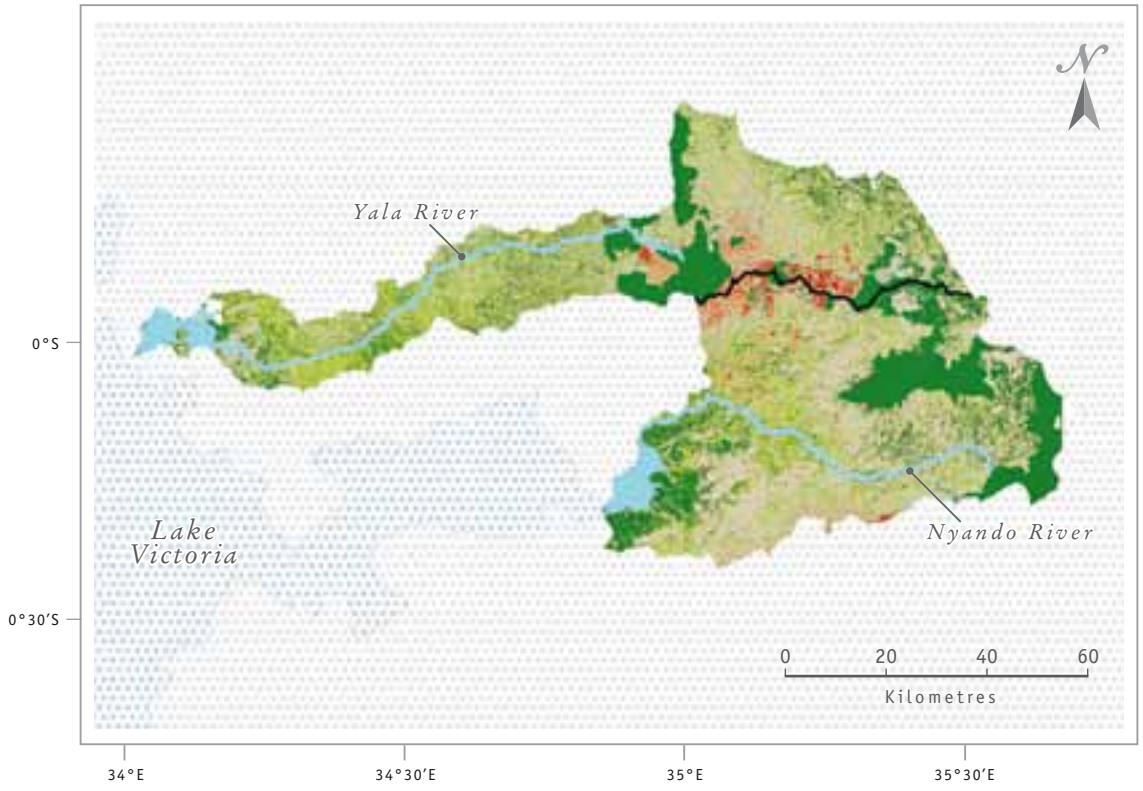
also coffee, fruit and woodlots. In these areas, the maximisation of provisioning services (i.e. cash crops) has resulted in a severe alteration of regulating services (i.e. erosion control). Other areas, mainly found in the low and mid-altitude zones of the two watersheds, are characterised by the same disruption of regulating services; however, in these areas, the decline in soil fertility caused by runoff cannot be handled due to the low household income and poor investment opportunities ('poverty traps').

Thus, the need to explore the potential of a PES scheme to provide incentives to develop agricultural practices aimed at coupling agricultural production and income generation with the restoration of regulating services in the Nyando and Yala watersheds was highlighted. In particular, a field survey carried out by the WKIEP project investigated farmers' attitudes and perspectives towards reforestation programmes. The two watersheds were sampled in randomly selected sub-locations. In each sub-location, the furthest point from the main road accessible by car was identified and from there three interviewers walked in opposing directions to interview the first five households encountered in each direction. The respondents (n=277) were asked to express their preferences on the number of seedlings and tree species they would be willing to plant under three different scenarios (note: payments would only be made six months after the seedlings were planted and on the basis of the actual number of surviving seedlings):

a. they would have to pay ten Kenyan shillings (Ksh.) per seedling
b. they would receive free seedlings
c. they would receive ten Kenyan shillings (Ksh.) per seedling

The results of the survey (Table 7) showed that if farmers had to buy seedlings, they were willing to plant an average of 44 seedlings per household (representing a type of baseline scenario). However, the number of planted trees would increase if the interviewed farmers received free seedlings or if they received direct incentives. Econometric techniques were used to control for the effect of some characteristics of the households and the analysis showed that farmers were willing to plant about 18 more trees for every Kenyan Shilling of direct payment made to them.

Figure 23
Land cover of the Nyando and Yala watersheds in 1973



LEGEND

Forest & Woodland	Agriculture	Swamp
Bushland	Tea	Boundary between Yala and Nyando

Adapted from original map by Miika Mäkelä (ICRAF)

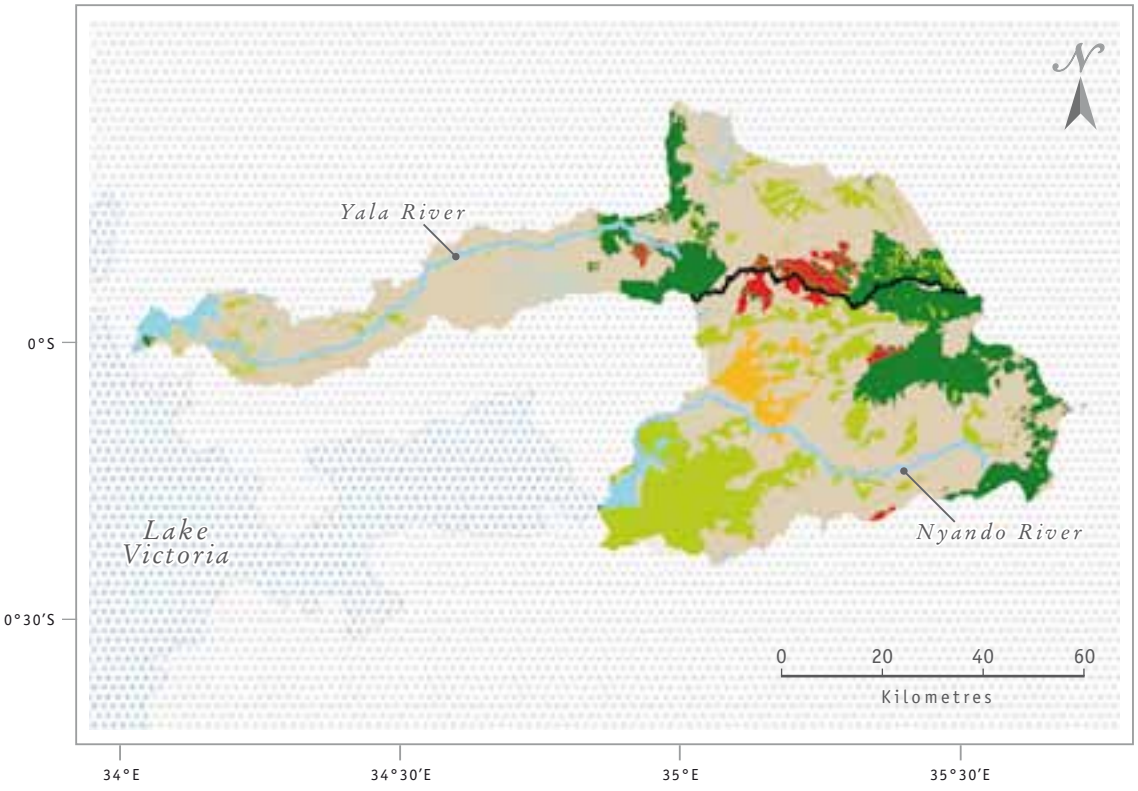
Current pages (from left to right):

→ Extreme soil erosion in the Lake Victoria Basin causes millions of tonnes of topsoil to be washed into the Nyando and Yala Rivers every year.

→ Poor soil conservation agricultural practices on steep slopes has led to accelerated rates of erosion.

→ Alteration of the geomorphology and gully erosion in the Nyando and Yala Watersheds is a clear sign of severe land degradation and disruption of many ecosystem functions in both watersheds.

Figure 24
Land cover of the Nyando and Yala watersheds in 2003



LEGEND

Forest & Woodland	Agriculture	Swamp
Bushland	Tea	Boundary between Yala and Nyando

Adapted from original map by Miika Mäkelä (ICRAF)

Table 7
Preferences of the interviewed farmers on the number of seedlings and tree species to plant on their farms

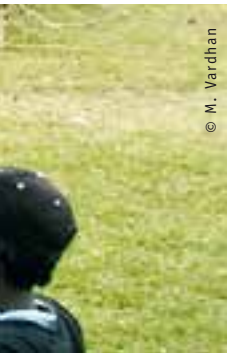
	Paying 10 Ksh. per seedling	Receiving free seedlings	Receiving 10 Ksh. per seedling
Mean number of seedling demanded	44	203	245
Standard deviation	116	426	494
% of respondents that chose at least one exotic timber species	62%	86%	82%

Note: Ksh. = Kenyan shillings
Source: Jindal, 2008

In particular, the willingness for planting trees was strongly influenced by: gender (males were willing to plant almost 100 more trees each than females), age (younger respondents were more likely to plant trees than older respondents), labour supply (each additional member with full-time involvement in agriculture was willing to plant an average of 21 trees per household) and secure land tenure (secure tenure determined an average increase of 50 trees per household).

A strong preference for timber species was recorded. In particular, males were more likely to prefer timber trees than females. According to an existing local custom, women belonging to the Luo tribe are not supposed to plant timber trees and are also restricted from visiting agricultural fields during certain times.

In choosing timber tree species, the majority of the interviewed farmers included at least one exotic timber species (*Eucalyptus* spp., *Casuarina equisetifolia* and *Gravellia pteridifolia*) under all presented scenarios. The choice of exotic species is probably linked to their fast growth rate from which farmers can expect higher returns.



Current pages (from left to right):

→ Focus group with women to understand their priorities regarding natural resource management in the Lake Victoria Basin.

→ Reforestation with native species is crucial to maintaining the functionality of ecosystems.

The exploratory findings of this study show that incentives in the form of a seedling subsidy can increase the likelihood of reforestation programmes. However, a well-designed PES scheme should always include ecological awareness and participatory consensus about the need to reforest with native tree species. In the Nyando and Yala Basins, an increased use of *Eucalyptus* trees, consequent to the government prohibition to log native forest species, has already been reported. Farmer preferences for exotic species is alarming considering the long-term ecological disaster associated with the use of exotic species on drylands and the already degraded ecological conditions of the Lake Victoria basin.

Usually, farmers' preferences are assessed through a contingent valuation method, in which respondents state the amount they would be willing to pay for a good, or the amount they would be willing to accept as a compensation for voluntarily giving up a good. An alternative approach is to assess farmers' preferences by asking respondents to choose between two versions of a rewarding scheme that differ by a certain attribute level. Offering farmers the choice between different scenarios can reveal important information about their preferences, their priorities and belief systems.

REFERENCES

Cheboiwo, J.K. & Langat, D. 2008. *Analysis of principles and potential partnerships for tree out-grower schemes in western Kenya*. Paper presented to the 4th KEFRI Scientific Conference, 6–9 October 2008, KEFRI, Muguga.

ICRAF. 2006. *Improved land management in the Lake Victoria basin: Final report on the TransVic project*. ICRAF Occasional Paper, No. 7

Jindal, R. 2008. *Exploring demand for forestry in Lake Victoria basin, Kenya: An econometric approach*. Paper presented at the Joint Annual Meeting of the Agricultural & Applied Economics Association and the Association of Environmental and Resource Economists, July 2008, Orlando, USA.

Swallow, B.M., Sang, J.K., Nyabenge, M., Bundotich, D.K., Duraiappah, A.K. & Yatich, T.B. 2009. Tradeoffs, synergies and traps among ecosystem services in the Lake Victoria basin of East Africa. *Environmental Science and Policy*, 12: 540–519.

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