Mixed land cover, Copalita watershed, SMS.
Photo: Northwestern University/Michael K. McCall

Suggested Citation:
McCall MK, Bermudez R, Granados J. 2017. 'Signing up to PES' - Why communities participate in PES programmes in Mexico. In: Namirembe S, Leimona B, van Noordwijk M, Minang P, eds. *Co-investment in ecosystem services: global lessons from payment and incentive schemes.* Nairobi: World Agroforestry Centre (ICRAF).

CHAPTER 20

‘Signing up to PES’ - Why communities participate in PES programmes in Mexico

Michael K McCall, Rafael Bermudez and Janik Granados

Highlights

- PES in Mexico is evolving to support social welfare and ES ‘co-investment.
- ‘Willingness to accept’ of PES is influenced by capacity and interest of rural community.
- ‘Capacity’ includes experience, leadership, trust in NGOs, and knowledge.
- ‘Interest’ relates to current livelihoods and potential benefits and costs.
- PES needs more flexibility to accommodate socio-cultural differences.

20.1 Introduction

This chapter observes grounded knowledge about the motivations of actors - primarily communities with communal lands – in joining PES schemes, and the drivers and constraints affecting the decision. The chapter is not concerned with measuring or explaining the performance of participants or the environment in PES programmes, and it does not refer to actors dropping out of PES programmes. The question we address is ‘what makes a community participate in PES, whilst others do not?’

Studies in PES about ‘choice and decisions’ are usually about the outsider actors’ ‘willingness to pay’, and not about the community/local actors’ ‘willingness to accept’, for example, see the recent review of ecological services and PES in Latin America by Balvanera et al (2012)[1]. Moreover, many ‘willingness to pay’ studies are models based primarily on theoretical estimates of “opportunity costs”. But “opportunity costs” - more appropriately termed “alternative opportunities” for the local decision-makers, - are not the only factors driving people to join or not to join.[2,3]

20.2 A Framework for determinants of the decision to participate

Stefano Pagiola and Sven Wunder developed the idea of three explanatory dimensions of desire, ability and eligibility[4,5,6,7,8], and later applied[2], Dyer et al (2012)[9], and Hendrickson and Corbera (2015)[10] in Mexico. Some other researchers have addressed this question of ‘willingness to accept’ in Latin America.[11,12,13,14]

Using our adaptation of this model, we investigate what factors determine – hinder or encourage –the decision process to participate in a PES programme or project, and to persevere with the administrative, organisational and political efforts to enter into a PES

programme. To explain participation of an actor in a PES programme, we argue that it is determined by two primary dimensions (Table 20.1):

(i) the **Capacity** for people to apply for and join a PES scheme (also termed Ability), i.e. the necessary capacities that they hold; and

(ii) the **Interest** (or desire) to join - i.e. the real interests that they already have, or might find, in joining the scheme.

Additionally, (iii) in order to enter a scheme, actors must also meet the conditionality of **Eligibility** - that is, the criteria adopted for the particular PES scheme and prioritised by the PES agencies. But this factor is largely outside the control of the potential applicants.

Table 20.1 The three dimensions clearly interact and are often co-dependent, as we see in the case study

Dimensions	Factors
Capacity (Ability) of the actor to join	• Organisational, administrative, management capacity and skills • Social capital, e.g. social cohesion, trust, (e.g. in institutions) • Transaction (joining) costs • Some prior knowledge (about PES and institutional requirements)
Interests (desire) of the actor in joining	• Taking stock of current activities • Opportunity costs - of not using other land uses, etc. • Territory and Land interests • Co-complementary political interests, e.g. access to government support programmes
Eligibility of the actor to join	• Meeting geographical and social criteria set by the programme. • Adjusting responses to meet the specified criteria

We employ this conceptual frame in a case study of PES programme participants in a large watershed in Oaxaca, Mexico. The three dimensions clearly interact and are often co-dependent, as found in the case study.

20.2 PES trajectory in Mexico

CONAFOR's (Mexico's National Commission for Forestry) objectives for their PES programmes have been to improve environmental services (ES) for providing not only national (e.g. water and biodiversity), but also global (e.g. biodiversity and carbon) benefits. Mexico's programme started in 2003, initially focused on conserving tropical and temperate forests for hydrological environmental services (PSAH). In 2004, the programme added carbon capture and biodiversity environmental services, and agroforestry (PSA-CABSA). But carbon was soon dropped and agroforestry merged into 'biodiversity'. As of 2015, PES supports two modalities: PSAH for conserving forest cover, recharging aquifers and springs, and preventing soil erosion; and Biodiversity Conservation to promote the conservation of wildlife in forest ecosystems and in agroforestry.

In Mexico, both PES paradigms of 'compensation', as a payment for acceptance of restrictions, and 'co-investment', involving 'flexible contracts' relying on community management with just broad performance sanctions, can be seen[15,16,17]. Whereas the original intentionality was 'compensation', it has elided over time in response to feedback on its functioning. The PES approach has morphed into `co-investment` for good forest management in general, with nominal ties to services (water or biodiversity), but without the underlying principle of

payment for results. This reward system for sound management utilises a set of good practices (the 'Operational Rules') intended to deliver non-specific environmental sustainability.

PES advocates contend that markets in biodiversity, carbon storage, and hydrological services can produce both conservation and sustainable development[18,19,20], but there are activist and theoretical critiques of PES in México from frames of globalisation, deep ecology and indigenous cultural (land) rights[1,21,22,23,24]. Critics see environmental/ecosystem services as co-produced by nature and campesino communities; ecosystems values contribute to local livelihoods, biodiversity, and culture, and cannot be quantified and sold. We do not resolve that debate here, either theoretically or with evidence of the actual impacts of PES, but it is significant that these debates are not only implanted in national PES discourse, but also alive in the consciousness of well-informed local communities.

20.2.1 Focus on social communal property

The PES programme was originally designed in 2003 to support conservation practices and control detrimental land use changes in significant environmental areas, by incentivising forest owners. The programme compensates prioritised forest land covers within a property holding. Mexican nationals as individuals or collectivities (communities or associations) can participate. Over 55% of standing forests in Mexico are held under two social property tenure types - ejidos (legislatively created by the State for the property-less after the Mexican Revolution), and indigenous communities; the rest are held by private owners or the state. The socio-cultural, political significance of communal property and its relation to ES and carbon stock are strongly emphasised in PES documentation.[18]

PES for tourism - golf courses are heavy water consumers, Crucecita

20.2.2 Focus on poverty

In the early phases, the focus was primarily on hydrological services of forests - thus on forest land cover, deforestation status, proximity to Natural Protected Areas and National Mountain Programmes, and overexploited aquifers[25]. In a second phase, however, social factors became more prominent for PES eligibility. Social indicators which reflect poverty levels were introduced during 2006 with the aim of reaching poorer forest owners[20], though they are

measured only at Municipality level (Deprivation Index of CONAPO). The largest share of PES payments has gone to areas of high or very high social marginality (70-85% of enrolled hectares in the early years). An indigeneity indicator (CDI and INEGI) was introduced to further emphasise social conditions; the combination permitting the programme to identify highly deprived areas.

20.2.3 Focus on forest conditions and opportunity costs

The World Bank's evaluation in 2007 veered towards less emphasis on poverty reduction, and re-direction to targeting areas with potentials for conserving or developing ES. Therefore, indicators of forest condition and deforestation risk calculations were added into the selection. The justification was that the lower the opportunity cost, then the lower the risk of deforestation. Incentives need to be at least equal to the opportunity cost of the land use being promoted, no matter who is the landholder; thus, both the selection criteria and the level of payments were based on opportunity costs.[1,21,23,24]

The deforestation risks index was calculated based on an econometric analysis of 1994-2004 deforestation patterns. Opportunity costs were estimated by calculating the net profits obtained from agriculture and livestock operations near forested areas that would be foregone[26,27], this is the "fair price" for PES considered sufficient for 'willingness to accept'. Thus, CONAFOR initially established PES payments based on the presumed opportunity costs of converting forest land to maize - at US$36.40 / ha for cloud forest (argued as the most significant for maintaining river flows[28,29], and US$27.30 per ha for all other forests[21,26,30]. This calculation excluded compensating areas with negative value (opportunity cost minus potential PES payments) even if such areas showed ecological importance, because they would be uncompetitive against crop – livestock production.[2]

Arguments continue as to whether the PES programmes should be primarily poverty-reduction oriented, or, aimed at maximising potentials for conserving and developing ES.

20.2.4 Financing Source

The Federal government channels a share of national water use fees to the PES programmes. All drinking water users (domestic, commercial, industrial, urban public) and most bulk water users (irrigation, industry) pay for water consumption. The actual collection of fees is very low[29], and arable and livestock farmers, (by far the largest and responsible for 80 % of consumption), do not pay for water.[26]

20.2.5 PES process summary

Table 20.2 PES Process Summary

Application	*Ejidos*, indigenous communities and smallholder forest owners are invited annually to apply for funding to participate. Participants must have legalized land certification under RAN and PROCEDE - the federal programme for regularizing parcel titles for individual, community and *ejido* land holders.
Application	Hiring advisors (NGOs, *técnicos*), is mandatory – the PES rules and procedures are not otherwise accessible.
Selection	Selection is by a National Technical Committee which judges feasibility based on criteria and indicators.
Payments	Payments are differentiated by level of eligibility focussing on importance of ecosystems and the degree of threat.
Payments	Payments are made per hectare i.e. per unit land, and not per project or on labour inputs. The minimum eligible size in 2004 was 50 ha. of forest, the smallest area observable then with satellite images[29]. In 2009, the minimum land area increased to 100 hectares; thus, poorer communities with smaller plots of land were discouraged.
'Operational Rules' guidelines	Participants are required to follow 'good management' procedures designated in the OR Guidelines[25]
Verification	Monitoring and assessment are not of specific ES outputs – such as water quantity, or biodiversity, or tonnes CO_2. Rather, they are general forest quality assessments. Monitoring also verifies specific activities under the OR, such as land clearance bans and signposting[25]
Verification	The forest cover and land use are verified annually by CONAFOR through satellite monitoring and / or field visits. If commitments are fulfilled, annual payments are guaranteed for 5 years;
Payments	If obligations are not completed correctly and forest losses or changes in land use are detected, consequences range from temporary suspension to full cancelation[26]
Verification	Compliance levels are very high and loss in forest cover is often unintentional due to forest fires, or external timber theft or livestock in the forest[26,31].

20.3 Case study - research methods

The research objects were grounded case studies of the community processes of prior assessments and joining. To complement the findings, we refer to other broader studies, notably by CONAFOR and Alix- García et al (2005)[29], McAfee and Shapiro (2010)[21], Alix- García et al (2013)[19], Shapiro-Garza (2013a, 2013b)[23,24], and others.

Eight localities in the Copalita Basin in Oaxaca State were selected distributed across the watershed - 49000 people and 294 localities in 2005. Criteria for selecting the communities were: geographical location and altitude in the basin, productive activities, accessibility, current participation in national PES, and the internal organizational structure. A first visit established connections with community authorities and CONAFOR staff. Discussions were held with NGOs and government staff in watershed management and forestry at local and regional levels. Local dynamics, social customs and behaviour towards the environment were identified during community visits. In a second visit on-site, semi-structured interviews were applied with key informants and community leaders, with questionnaires, and observation in community meetings. Localities are referred to by acronyms, for confidentiality (Table 20.3).

In four of the eight localities, the community governments are *ejidos* with collectivities in the form of *asambleas* (community Assemblies). The Assemblies provide guidance and decision-making for PES and designate functions to members to handle demands of PES programmes.

The four other localities have larger-scale Municipal Authorities.

Table 20.3 Research sites, Copalita Basin, Oaxaca

Locality	Community (*ejido*) or municipality		Position in Copalita watershed
BJ	*ejido*	466 *ejidatarios*	Low-mid
PH	Municipal		Mid
SFL	*ejido*	217 *ejidatarios*	Mid
SMRH	Municipal level		Upper
SMS	Municipal		Upper
SMX	*ejido*	862 ejidatarios	Low-mid
SPA	ejido	700*ejidatarios*	Upper

Maize, coffee and apples are harvested in the upper watershed; coffee and maize in the middle; and maize, tropical fruits and coffee in the lower. Ranching is not significant in Copalita since livestock are kept at household scale.

20.4 Results

We look at the factors which render a community or individuals more or less likely to apply to participate, in terms of 'capacity' and 'interest', following Table 20.1.

20.4.1 Dimension: Capacity, resources, knowledge

Information requirements and sources
Administrative requirements during the application process include completing the application form and technical appendix, and evidence of land tenure / property rights, community-territorial land use plans (OT), and maps of the proposed forest land units to be allocated (polygons). Collective applicants must provide Minutes of the Assembly meetings, including a majority approval.

There are many more data required by CONAFOR and the Technical Committee to assess the applications, including: land tenure and boundary delineations, forest cover and land use, aquifer status, deforestation risk, water quantity and quality, Natural Protected Areas, degree of indigeneity, socio-economic data especially poverty, potential markets for ES, formal and informal institutions. Their sources include remote sensing imagery, SEMARNAT, CONAGUA, CONABIO, CONAFOR, INEGI and RAN.

Other Mexican case studies from the early phases reported that from 1,173 applications for PES only 19% passed the first filter and less than 3% made it through the implementation phase. Those low success rates were attributed to handling capacity in applications, omissions in documentation, or making applications without meeting eligibility criteria[2, 26]. But the system has greatly improved, and the proportions of sound applications much increased. *Técnicos* and applicants apparently have learned the application procedures and official

designation of eligible areas, and CONAFOR has improved its communication skills. By 2012-2013, one of every four feasible applications was accepted.

Organizational capacity

Internal organizational capacity - which includes the qualities of individual leaders is a must in order to achieve eligibility[26, 30]. Copalita communities have improved significantly over past years. In three *ejidos*, the PES implementation process was guided by a local NGO, GAIA (Grupo Autonomo para la Investigacion Ambiental). GAIA initially channelled PES programme information to Assemblies; then once the Assembly made its decision, GAIA assisted in planning and designing management practices to meet PES standards. GAIA's community-based involvement - pre-dating PES - prepared participatory land-use plans for ES, such as provision of clean water, under a programme called SICOBI. Senior CONAFOR figures recognize the significance of intermediary NGOs in community technical assistance and monitoring, according to McAfee and Shapiro.[21]

There are no official posts responsible for environmental issues in the municipalities of Copalita (except for SMS which has an honorary environmental official), although they have responsibility to provide basic services like drinking water, sewage and parks. Organizational capacity was significantly lower in localities in the middle and upper Sierra and remote areas, than in the lower watershed, and, the three localities in the municipal authorities showed poor organizational capacity.

Social capital: Trust in local intermediaries and facilitators

The PES programme operates without local dedicated staff from CONAFOR. Only where NGOs or *técnicos* are really active do communities have solid support in applying to join[30, 31]. In the cases of *ejidos* and communities successful in their applications, the majority of the preparation and paperwork had been carried out by intermediaries (and the reverse in the cases of unsuccessful applicants)[19], which shows the advantage, even necessity, of outside assistance from NGOs. Poorer communities in Copalita struggle to afford the costs of *técnicos* and external support.

If the community does not have strong internal bonds with a transparent organisation, individual private interests linked to the currently dominant political party come out on top. In Copalita this can be observed in the upper watershed. Moreover, respondents claim that official communications and support are pro-actively directed more towards potential applicants belonging to the current ruling party; opponents may be ignored or their applications filed away.

Transaction joining costs

Transaction costs, including the costs to the PES programme itself and costs imposed on participants, are significant and hinder the ability to participate. Transaction costs nationally amounted to about US$5.6 per hectare, including 4% for administration[29,32].Transaction costs in arranging and signing contracts are high because legal process costs are independent of the size of the land unit enrolled. A heavy transaction cost for participants is the requirement to have management plans prepared by certified forest engineers (*técnicos*).

Common property applicants incur the time cost of lengthy community assemblies to discuss joining, not unexpectedly given the complexity of decision-making with large numbers of voting *ejidatarios*. Applicants from communal properties also spend considerably more time acquiring the relevant documents, than do private households. On average, the time required for communities to complete the application is more than two working weeks.

Participants must cover travel costs including board and lodging to PROCEDE and other government offices for up-to-date land titles. In Copalita, the highest costs faced during the

whole process are for travel from localities to the State capital, Oaxaca, especially crucial early visits to the CONAFOR regional office. SMRH and others reported that participation was severely limited by individual resources, only those who could afford to visit CONAFOR regional offices secured access to information and project applications. SICOBI has proposed a collective organization of members to improve the efficiency of individual trips, by concurrently dealing with other business.

Understanding PES and environmental services
Around half of interviewees in the Municipal sample blamed their poor knowledge about PES on the lack of knowledgeable staff and poor information dissemination about environmental issues and opportunities in programmes.

In SM:

Particularly about PES, nobody from CONAFOR's staff has ever visited us here to talk about the programme, and explain what we need to do. If CONAFOR has ever sent information related to it, it has never been delivered to us by our authorities.

Responses to a survey question concerning environmental services and PES showed a strong correlation with community organizational capacity. People in *ejidos* with Assemblies showed more specific and precise knowledge about environmental conservation and forest services and a higher interest in PES. They also understood more quickly the concomitant limitations if they were to implement PES. Partly this is a result of their history with external NGOs. However, fewer than 10% of *ejido* households expected that they would be "selling" ES after the programme ended.

20.4.2. Dimension: Interests, desire

Opportunity costs and expectations of labour costs under PES
PES payments per hectare were initially established by CONAFOR based on calculated opportunity costs of converting forest land to maize (Section 2.3 above). But how local inhabitants see alternatives, and thus, opportunity costs or benefits are more complex; they consider a range of 'subsistence' and 'cash' crops, livestock, forest and other natural resource products, as well as off-farm income, and government programmes. Farm production and productivity vary according to terrain, elevation, accessibility, organizational capacity, and labour availability which is radically affected by high out-migration of male and female youth.

Community members are aware of the high costs and time of the maintenance and operations required under PES. The actual physical activities that participants need to carry out under the OR are often forgotten about in more abstract discourses about PES programmes, that is, the land clearance, forest cleaning and land preparation for reforestation, check dams, fire lines, patrols and signage against illegal logging and cattle encroachment, pest control, as well as investments in physical capital, and maintenance and repair of machinery or vehicles. Implementation of these activities is checked in the annual CONAFOR verifications, though not necessarily in every site.

PES participants in Copalita stated that almost half of their total PES income must go on the conservation activities required in the Operational Rules (OR). This is confirmed by national findings that communal property forest owners spent 46% of their total PES receipts on labour[32]. In PES programmes, the median ratio of labour costs to payments is 0.75 - including unpaid labour valued at the minimum wage[29]. PES participants averaged MX$ 156000 per year in paying forest maintenance labour, thus, compared with non-beneficiaries who averaged only MX$ 46000 in 2011, participating in a PES more than triples labour

expenditures. Lack of capital or income (PES payments) to cover the costs of labour and management practices is often farmers' primary constraint in forest conservation.

On the other hand, in many places, conditions for more market-oriented farming or ranching are not promising and so the compensation offered by PES can be higher than the opportunity costs[3]. But, we must be aware of local specificities. SPA community in the upper watershed dedicated a similar area to PES conservation as to maize and coffee combined, nevertheless, the SPA Commissioner had serious concerns about meeting PES requirements.

Rio Copalita water uses

"We were reluctant to participate in PES before because of all the official commitments we had to sign up for. We enrolled after a new Assembly board was elected. We realized then, we didn't have official vehicles to patrol, to remove vegetation, to open fire breaks or create live fire barriers. Our human capital is focused on our own crops and MX$*120 per day is not as attractive as it sounds. It seems to be not enough to convince people to help us out with all the activities. We don't even have a computer or office materials, and our links with the municipal authorities aren't quite strong to request a commission to help us in the process."*

Many of the land / conservation management labour tasks are being carried out anyway with or without the PES programme because they are "simply good management" and very many communities are good managers. The activities have many side benefits. The additional labour under the OR is simultaneously protecting the forest against fires, illegal external logging, pests and disease and thus an investment in future harvests. A community leader in Chihuahua explained why his *ejido* had chosen to enter PSAH: "*It was precisely because of the high incidence of forest fires. You need to take care of your resource, no? To have funds given to you to take care of it, how wonderful.*"[21]

Land rights and cultural imperatives

In Mexico's *ejido* and indigenous community tenure situation, substantive land rights are not such an immediate issue[33]. PROCEDE promoted and strengthened the security of land tenure by regularizing land units since the early 1990s, long before the PES programme. Though PROCEDE can also be seen as a mechanism to facilitate the division and sale of formerly communal lands, which renders it a potential threat to tenure security. By 2013 the ORs were including a clause clarifying that the programmes are not, and should not be, affecting extant land tenure. This concern strongly supports a finding from our fieldwork that many communities still have concerns about tenure and property rights when they contemplate involvement in a PES[34]. Notable are the contested access and use rights in community forest areas if these become designated as areas protected under PES; prominent in much of Mexico, although not much in Copalita, are restrictions to cattle grazing in forests, not least because cattle owners tend to be richer and more powerful.

A conjecture would be that PES-type support to community forest continuity helps to maintain the reality and the vision of *ejidos*. Field observations and anecdotal information in many places in Mexico suggest that the *ejido* social and land structure is cracking under great stresses. Out-migration rates of the young are high, leaving big gaps in the labour available for farm activities. Parcelisation of formerly-communal land under PROCEDE was key, succeeded by *dominio pleno* and / or by illegal land sale agreements. This is being followed by *de facto* parcelisation of the communal lands, especially *ejidal* forests, as *ejidatario* families unofficially but effectively sub-divide the communal forest area with tacit approval of the Assembly[2,35,36]. Thus, it is claimable that a major factor in maintaining the idea and practice of the *ejido* is the advantage (or requirement) of *ejido* status in order to access certain government programmes – including PES programmes, where *ejidos* and indigenous communities receive higher priority.

Political interests

Greater interest in participating in PES-type programmes with monetary incentives was found in localities with lower organizational capacity, like in the upper Copalita watershed. This fits with findings in other upper watersheds which tend to be less productive, and whose inhabitants seek monetary alternatives[37]. The potential implications of joining a PES that might affect access to other government programmes like PROGAN, need to be carefully calculated before signing an accord.

20.4.3 Dimension - eligibility

This factor is not completely outside the influence of the communities themselves. Eligibility can be ambiguous and therefore manipulable. There is flexibility over time in the criteria and applicants' degree of eligibility can be adjusted. In practice, if communities can collaborate with an NGO or *técnico*, they may have opportunities to steer their survey responses and the factual data towards eligible membership of a programme. Community members take eligibility seriously when they reach the decision (after considering interests and assessing capacity) that they want to go ahead with the application.

The addition of social indicators as criteria for targeting brought wider inclusivity. Eligibility was changed from being primarily based on ecological values, to social, poverty, deprivation criteria. This was a radical change in the ideology and operations of PES in Mexico, and eligible areas have increased substantially. Between 2003 and 2009 the target areas grew 34 times in Oaxaca State (from 68000 ha in 2003 to 2329000 ha. in 2009), while in Copalita, the increment was 14 times (from 22000 ha. in 2003 to 312000 ha. in 2009).

20.5 Conclusions

This chapter examines the significance of factors which can explain why communities enter into a PES programme, that is, the decision-making of actors considering joining PES projects prior to their actual performance in PES activities. It is based on grounded knowledge about the motivations of communities with communal lands, and the drivers and constraints affecting them.[38]

We can draw initial conclusions on all dimensions. Community capacity has to be sufficient to manage the tasks of applying, joining, and continuing in a PES programme, and the leaders and any NGOs need the trust and confidence of community members. The interest dimension implies that a community, i.e. its leaders, understand the trade-offs between what they could gain and what they might lose by signing up. In any concrete situation, both of these are complex and can be evaluated in different frames. Though the eligibility factor is in principle outside the decision-making ambit of the communities, there is scope for moving between different eligibility criteria.

20.5.1 Capacity to join, and foreseeing the capacity to persevere

While considering participation, community members perceive the difficulties of adapting themselves and their practices into PES policies and regulations. Potential participants assess whether they will be able to influence PES rules, and how their internal institutions would be affected by them. The managerial, financial and knowledge capacity of communities and their leaders are thus central to the willingness to join. Capacity is greater in communities which have successfully navigated similar programmes and bureaucracy, for instance, in certification processes for timber or NTFPs which are more demanding and expensive than signing up to PES.

The contributions of external NGO and *técnicos* cannot be over-estimated. Indeed, the complexities of accessibility to PES for ordinary applicants, in terms of the language and platforms employed, can seem designed to make external assistance essential.

Barriers to participation remain for more marginalised groups who have less capacity to formalize applications. Although CONAFOR's basic informative material is, in principle, available to all in the Copalita basin, capacities could be enhanced by better information, technical training and interim financial support targeted at weaker communities.

3D model of land use and PES activities, SMS

20.5.2 Interests and eligibility interact

The specific grounded interests of communities are central - their socio-cultural values, economic priorities, livelihoods, resource management practices and territorial strategies. Potential applicants estimate the complex trade-offs between their current livelihood activities – labour inputs, risks, returns, socio-cultural and collateral benefits, and what alternative opportunities they realistically expect from signing up to PES regulations and payments. The costs of 'good' forest management as required in the OR, as well as the transaction costs of enrolling with CONAFOR - not least, the costs of external *técnicos* who may charge 1/3 of the payment to elaborate and sign the annual documents need to be included in the trade-off calculations.

Though the immediate costs of signing up are small compared to the eventual payments, the full costs of the additional labour to meet implementation regulations are relatively very large. As the CONAFOR evaluation itself states, "*... widespread belief amongst beneficiaries that programme payments are intended to cover the labour necessary to manage their forest sustainably, and not as a compensation for the opportunity costs of foregoing forest clearing ...*".[19]

The decisions are not only market-driven, however. A concern is what difference a PES accord may make to gendered land entitlements and previous easier access to specific resources. Rural women are knowledgeable and engaged in specialised forest-based livelihoods such as managing NTFPs, firewood and livestock forage[39,40]. Their access to these could easily be restricted by PES-type regulations, leading to livelihoods degradation and loss of specialised skills. The sustainability of women's activities depends on the character of gender equity in community decision-making.[41,42]

20.5.3 Responsiveness and flexibility in PES tools

The drivers of degradation and deforestation vary geographically, and change unpredictably over time. Currently prominent in affecting decision-making, but not recognised in the criteria and incentives, are for example: reduced environmental degradation in areas losing working populations through migration, and, security issues affecting *ejidal* forested areas which are inaccessible or carry extortion `taxes` in *narco*-controlled spaces. Decision-making in at least one *ejido* in Copalita was being swayed by *narcos* who cultivate drugs on the upper slopes.

PES policies aimed at influencing "willingness to accept" need implementation mechanisms which can respond effectively to local specificities and to changes in drivers. Such responses would be more effective if PES programmes could be decentralized for local representatives to have greater influence over selection criteria and application.

Acronyms and translations

CDI	Comisión Nacional para el Desarrollo de los Pueblos Indígenas / National Commission for the Development of Indigenous Peoples
CONABIO	Comisión Nacional para el Conocimiento y Uso de la Biodiversidad / National Commission for Knowledge and Use of Biodiversity
CONAFOR	Comision Nacional Forestal / National Commission for Forestry
CONAGUA	Comisión Nacional de Agua / National Commission on Water
CONAPO	Consejo Nacional de Poblacion / National Population Council
Ejido	Common land tenure system in Mexico around shared lands (cultivated, pasture, forest) with comunal decision-making processes. Cultivated land is usually divided into separate family holdings. *Ejidatarios* are legal landowners and decisions regarding land use are made in *ejido* assemblies
GAIA	Grupo Autonomo para la Investigacion Ambiental (NGO)
INE/INECC	Instituto Nacional de Ecología y Cambio Climático / National Institute for Ecology and Climate Change
INEGI	Instituto Nacional de Estadistica, Geografia e Informática / National Institute of Geography, Statistics, and Information Systems
NTFP	Non-timber forest product
OR	Operational Rules (of the PSA programmes of CONAFOR)
OT	Ordenamiento Territorial (Comunitario)
PROCEDE	Programa de Certificación de Derechos Ejidales y Titulación de Solares / Program for the Certification of Ejido Land Property Rights. Programme for Granting Land Rights and Land Plots Registration
PROGAN	Producción Pecuaria Sustentable y Ordenamiento Ganadero y Apicola / Livestock Productivity Incentives Programme
PRONAFOR	Programa Nacional Forestal / National Forest Programme
PSA – CABSA	Programa para Desarrollar el Mercado de Servicios Ambientales por Captura de Carbono y los Derivados de la Biodiversidad y para Fomentar el Establecimiento y Mejoramiento de Sistemas Agroforestales / Payments for Biodiversity, Carbon and Agroforestry Services
PSAH	Programa de Pago por Servicios Ambientales Hidrológicos / Payments for Hydrological Environmental Services Program
RAN	Registro Agrario Nacional / National Agrarian Register
SEMARNAT	Secretaría de Medio Ambiente y Recursos Naturales / (Federal) Secretariat for the Environment, Natural Resources
SICOBI	Sistema Comunitario para la Biodiversidad (NGO programme)
técnicos	Technically-trained personnel in forestry, agriculture, etc. May be members of the community, but usually are independent

References

[1] Balvanera P, Uriarte M, Almeida-Leñero L, Altesor A, DeClerck F, Gardner T, ... Vallejos M. 2012. Ecosystem services research in Latin America: The state of the art. *Ecosystem Services* 2:56–70.

[2] Kosoy N, Corbera E, Brown K. 2008. Participation in payments for ecosystem services: Case studies from the Lacandon rainforest, Mexico. *Geoforum* 39:2073–2083.

[3] Costedoat S, Corbera E, Ezzine-De-Blas D, Honey-Rosés J, Baylis K, Castillo-Santiago M. 2015. How effective are biodiversity conservation payments in Mexico? *PLOS ONE* 10(3):e0119881. doi:10.1371/journal.pone.0119881.

[4] Pagiola S, Arcenas A, Platais G. 2005. Can payments for environmental services help reduce poverty? An exploration of the issues and the evidence to date from Latin America. *World Development* 33(2):237–253.

[5] Pagiola S, Rios A, Arcenas A. 2008. Can the poor participate in payments for environmental services? Lessons from the Silvopastoral Project in Nicaragua. *Environment and Development Economics* 13(3):299–325.

[6] Pagiola S, Rios A, Arcenas A. 2010. Poor household participation in payments for environmental services: Lessons from the Silvopastoral Project in Quindío, Colombia. *Environmental and Resource Economics* 47(3):371–394.

[7] Wunder S. 2008. Payments for environmental services and the poor: Concepts and preliminary evidence. *Environment and Development Economics* 13:279–297.

[8] Southgate D, Wunder S. 2009. Paying for watershed services in Latin America: A review of current initiatives. *Journal of Sustainable Forestry* 28:497–524.

[9] Dyer G, Matthews R, Meyfroidt P. 2012. Is there an ideal REDD program? An analysis of policy trade-offs at the local level. *PLOS ONE* 7(12):e52478. doi:10.1371/journal.pone.0052478.

[10] Hendrickson C, Corbera E. 2015. Participation dynamics and institutional change in the Scolel Té carbon forestry project, Chiapas, Mexico. *Geoforum* 59:63–72.

[11] Zbinden S, Lee D. 2005. Paying for environmental services: An analysis of participation in Costa Rica's PSA program. *World Development* 33(2):255–272.

[12] Barr R, Mourato S. 2009. Investigating the potential for marine resource protection through environmental service markets: An exploratory study from La Paz, Mexico. *Ocean and Coastal Management* 52(11):568–577.

[13] Milder J, Scherr S, Bracer C. 2010. Trends and future potential of payment for ecosystem services to alleviate rural poverty in developing countries. *Ecology and Society* 15(2):4.

[14] Börner J, Wunder S, Wertz-Kanounnikoff S, Tito M, Pereira L, Nascimento N. 2010. Direct conservation payments in the Brazilian Amazon: Scope and equity implications. *Ecological Economics* 69(6):1272–1282.

[15] van Noordwijk M, Leimona B. 2010. Principles for fairness and efficiency in enhancing environmental services in Asia: payments, compensation, or co-investment? *Ecology and Society* 15:407–417.

[16] Namirembe S, Leimona B, van Noordwijk M, Bernard F, Bacwayo KE. 2014. Co-investment paradigms as alternatives to payments for tree-based ecosystem services in Africa. *Current Opinion in Environmental Sustainability* 6:89–97.

[17] Leimona B, van Noordwijk M, de Groot R, Leemans R. 2015. Fairly efficient, efficiently fair: Lessons from designing and testing payment schemes for ecosystem services in Asia. *Ecosystem Services* 2:16–28.

[18] Reyes JA, Gomez JP, Muis RO, Zavala R. 2012. *Potential of environmental services in the social property of Mexico*. (English summary). Mexico, DF: National Agrarian Registry (RAN) – Inter-American Institute of Cooperation on Agriculture (IICA) Project. Retrieved from http://www.ran.gob.mx/ran/index.php/iicapotencial-serv-amb

[19] Alix-García J, Aronson G, Radeloff V, Ramirez-Reyes C, Shapiro E, Sims K, Yanez-Pagans P. 2013. *Evaluation of CONAFOR's payments for hydrological services program 2003-2010.* Guadalajara: CONAFOR, Comisión Nacional Forestal de México.

[20] Sims K, Alix- García J, Shapiro-Garza E, Fine L, Radeloff V, Aronson G, ... Yañez-Pagans P. 2014. Improving environmental and social targeting through adaptive management in Mexico's payments for hydrological services program. *Conservation Biology* 28(5):1151–1159.

[21] McAfee K, Shapiro E. 2010. Payments for ecosystem services in Mexico: Nature, neoliberalism, social movements, and the state. *Annals of the Association of American Geographers* 100(3):579–599.

[22] Cabello J, Gilbertson T. 2012. A colonial mechanism to enclose lands: A critical review of two REDD+-focused special issues. *Ephemera* 12(1/2):162–180. Retrieved from http://www.ephemerajournal.org/contribution/colonial-mechanism-enclose-lands-critical-review-two-redd-focused-special-issues

[23] Shapiro-Garza E. 2013a. Contesting market-based conservation: Payments for ecosystem services as a surface of engagement for rural social movements in Mexico. *Human Geography: A New Radical Journal* 6(1):134–150.

[24] Shapiro-Garza E. 2013b. Contesting the market-based nature of Mexico's national payments for ecosystem services programs: Four sites of articulation and hybridization. *Geoforum* 46:5–15.

[25] CONAFOR. 2004-2012. *Guía de Mejores Prácticas de Manejo* (GMPM), *correspondiente a las áreas de pago diferenciado 3, 4, 5 y 6.* Guadalajara: CONAFOR, Comisión Nacional Forestal de México. Retrieved from www.conafor.gob.mx/apoyos/index.php/inicio/download/457

[26] Muñoz-Piña C, Guevara A, Torres J, Braña J. 2008. Paying for the hydrological services of Mexico's forests: Analysis, negotiations and results. *Ecological Economics* 65:725–736.

[27] INE/INECC. 2011. Index of Economic Pressure to (Risk of) Deforestation. INE-IRDef-2.0.1. 16 Diciembre 2011. Retrieved from http://www.inecc.gob.mx/irdef-eng

[28] García-Coll I, Martínez A, Ramírez A, Niño Cruz A, Juan Rivas A, Domínguez L. 2002. La relación agua-bosque: Delimitación de zonas prioritarias para pago de servicios ambientales hidrológicos en la cuenca del río Gavilanes, Coatepec, Veracruz. In H. Cotler (Comp.). *El manejo integral de cuencas en México: Estudios y reflexiones para orientar la política ambiental*. Mexico DF: Secretaría de Medio Ambiente y Recursos Naturales. p.113–128.

[29] Alix-García J, de Janvry A, Sadoulet E, Torres J. 2005. *An assessment of Mexico's payment for environmental services program.* Rome: FAO, Agricultural and Development Economics Division, Comparative Studies Service.

[30] IIED. 2012. *Payments for watershed markets: Case studies: Mexico- National PSAH Programme.* London: IIED, International Institute for Environment and Development. Retrieved from http://www.watershedmarkets.org/casestudies/Mexico_National_PSAH_eng.html

[31] Bayon R. 2004. Case study: The Mexico Forest Fund – Katoomba Group's Ecosystem Marketplace. Retrieved from http://www.ecosystemmarketplace.com/articles/case-study-the-mexico-forest-fund/

[32] COLPOS. 2004. *Ejercicio fiscal 2003. Evaluación del programa de pago de servicios ambientales hidrológicos* (PSAH). *Reporte Final para CONAFOR, Comisión Nacional Forestal de México.* Texcoco: Colegio de Postgraduados (COLPOS). Retrieved from http://www.conafor.gob.mx/portal/docs/subsecciones/areas/evaluaciones/2003/search=%22PSAH%20%2B%20costos%22

[33] Corbera E, Estrada M, May P, Navarro G, Pacheco P. 2011. Rights to land, forests and carbon in REDD+: Insights from Mexico, Brazil and Costa Rica. *Forests* 2:301–342.

[34] McCall MK. 2016. Beyond 'Landscape' in REDD+: The imperative for 'Territory'. *World Development* 85:58–72. DOI: 10.1016/j.worlddev.2016.05.001.

[35] Kelly J, Herlihy P, Smith D, Viera A, Hilburn A, Cendejas G. 2010. Indigenous territoriality at the end of the social property era in Mexico. *Journal of Latin American Geography* 9(3):161–181.

[36] Rodriguez M. 2012. Social change and land tenure regimes in Mexico. *GeoJournal* 77(5):633–649.

[37] Bray D, Merino-Pérez L, Barry D, eds. 2005. *The community forests of Mexico: Managing for sustainable landscapes*. Austin: University of Texas Press.

[38] Honey-Rosés J, Pendleton L. 2013. A demand driven research agenda for ecosystem services. *Ecosystem Services* 5:160–162.

[39] López C, Chanfón Küng S, Segura Warnholtz G, eds. 2005. *La riqueza de los bosques Mexicanos: Mas allá de la madera. Experiencias de comunidades rurales*. Bogor: CIFOR/ CECADESU-SEMARNAT/ PROCYMAF II-SEMARNAT/Instituto Nacional de Ecología.

[40] Marshall E, Newton A. 2003. Non-timber forest products in the community of El Terrero, Sierra de Manantlán Biosphere Reserve, Mexico: Is their use sustainable? *Economic Botany* 57:262–278.

[41] Bee B. 2015. Who reaps what is sown? A feminist inquiry into climate change adaptation in two Mexican ejidos. *ACME* 12:131–154.

[42] Larson A, Dokken T, Duchelle A, Atmadja S, Resosudarmo I, Cronkleton P et al. 2015. The role of women in early REDD+ implementation: lessons for future engagement. *International Forestry Review* 17(1):43–65.