

# Design of pro-poor REDD+ interventions and benefit distribution systems for the Yucatan Peninsula, Mexico



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# Acronyms

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APDT	Public agent for territorial development ( <i>Agente Público de Desarrollo Territorial</i> )
CFM	Community forest management
CIGA	Centre for Research in Environmental Geography ( <i>Centro de Investigaciones en Geografía Ambiental-UNAM</i> )
CONAFOR	National Forestry Commission ( <i>Comisión Nacional Forestal</i> )
D&D	Deforestation and degradation
ECOSUR	El Colegio de la Frontera Sur
ENAREDD+	National REDD+ Strategy ( <i>Estrategia Nacional para REDD+</i> )
FCPF	Forest Carbon Partnership Fund (of the World Bank)
INFyS	National forest and soils inventory ( <i>Inventario Nacional Forestal y de Suelos</i> )
IRE	Initiative for Emissions Reductions ( <i>Iniciativa para la Reducción de Emisiones</i> )
IUCN	International Union for Conservation of Nature
LIP	Local investment program ( <i>Programa de inversión local</i> )
NTFP	Non-timber forest products
OTC	Community Land-Use Zoning Plan ( <i>Ordenamiento Territorial Comunitario</i> )
PROCAMPO	Program of direct support for the countryside ( <i>Programa de Apoyos Directos al Campo</i> )
PROFEPA	Federal Attorney for Environmental Protection ( <i>Procuraduría Federal de Protección al Ambiente</i> )
REDD+	Reduction of Emissions from deforestation and forest degradation, conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks.
REL	Reference Emissions Level

SAGARPA	Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food ( <i>Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación</i> )
SEDESOL	Ministry of Social Development ( <i>Secretaría de Desarrollo Social</i> )
SEMARNAT	Ministry of Environment and Natural Resources ( <i>Secretaría de Medio Ambiente y Recursos Naturales</i> )
UNAM	National Autonomous University of Mexico ( <i>Universidad Nacional Autónoma de México</i> )
UNFCCC	United Nations Framework Convention on Climate Change

# Executive Summary

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This document discusses the potential for designing pro-poor systems for the distribution of benefits derived from the reduction of emissions from deforestation and forest degradation, conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks (REDD+) in the Yucatan Peninsula (comprised by the states of Campeche, Quintana Roo and Yucatan), Mexico. The 'benefits' referred to here are the financial flows that result from international performance based payments.

Although most of the forest areas in the Yucatan Peninsula fall within territories held by *ejidos*, by no means all the families living in these communities have *ejidatorial* rights either to land for cultivation or to sale of products from communally held forest; some have much larger holdings than others and some are completely without rights to land and to other resources. A major problem in designing pro-poor benefit systems is that in general deforestation is carried out by the richer people within communities, who have more land and capital. Although some poorer families may in practice be engaged in activities that cause degradation, such as shifting cultivation and firewood gathering, this tends to be on a relatively small scale. Hence there is a dilemma or trade-off involved in selection

of REDD+ activities which are both effective in reducing emissions and in directly benefiting the poor.

Several general approaches could be taken to deal with this problem. REDD+ interventions could be targeted primarily at areas (e.g. municipalities) which have particularly large numbers of poorer/marginalised people, in the hope that this would ensure that more of the poor are engaged, but this strategy is not recommended since even in these areas there is a risk that the richer families might dominate. The second strategy is to invest in REDD+ activities which have a greater chance of involvement of the poor, e.g. improvements to shifting cultivation, and clean-up operations after hurricanes. The third is to distribute the benefits independently of activities which directly impact carbon flows, e.g. in communal facilities such as schools and health posts, such that both richer and poorer people may benefit. A combination of these strategies is of course possible.

The paper describes the technical and legal constraints associated with benefit distribution in general and outlines current plans for REDD+ early action in the Peninsula, under which local development agencies will help *ejidos* draw up broad plans for sustainable

rural development which may include many activities in addition to those that directly save carbon. Performance in carbon terms will be assessed at state level using a reference level which covers only deforestation (not degradation or forest enhancement), and the resulting funds (from the World Bank's FCPF) will be used as capital to finance these activities. This means that ejidos that are able to increase their carbon stocks and measure these increments in a credible manner could also market the resulting carbon credits on voluntary markets, independently of the national REDD+ scheme. Although the benefits derived from the sale of these carbon credits are unlikely to benefit the poorest families.

A socioeconomic analysis of the drivers of deforestation and degradation identifies the activities in which poor people are more engaged than richer, and following this an analysis is made of the interventions that would most benefit the poor. This indicates that in general, improved harmonization of public programmes for rural development is necessary for any sort of poverty alleviation, and that provision of micro-insurance to promote small family scale enterprises might relieve what pressures are placed on forests by poorer people. Also it is relevant to remind

that hurricanes are a recurring phenomenon in the Peninsula and that the poor are particularly vulnerable. A concerted policy to deal with the after-effects while minimising further carbon losses could involve employment of poor people in clearance of deadwood and removal of creepers in hurricane damaged areas. Charcoal production is a income-generating activity for poor people but is mostly illegal; the bureaucracy involved in obtaining permits means that dealers are able to capture the majority of the profits and interventions to improve efficiency of production are impossible. Improved policy on charcoal is long overdue in the Peninsula and this could be an important REDD+ activity. More sustainable timber production methods may save carbon but are unlikely to deliver benefits to the poor. Rules which ensure that employment opportunities e.g in paid nursery work and reforestation are open to non-rights holders as well as to *ejidatarios* could help to bring a greater share of REDD+ benefits to poor families.

# 1. Introduction

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The aim of this short report is to propose some practical possibilities for a ‘pro-poor’ approach to benefit sharing and implementation of the reduction of emissions from deforestation and forest degradation, conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks (REDD+) in the Early Action Areas of the Yucatan Peninsula (comprised by the states of Campeche, Quintana Roo and Yucatan), Mexico. The proposals are based on extensive work undertaken by the authors on benefit sharing, particularly an analysis of drivers of deforestation and degradation and the analysis of potential interventions in the Peninsula from the perspective of poverty (Balderas Torres, Skutsch and de los Ríos Ibarra, 2016), the document “Challenges for pro-poor benefit sharing schemes in the implementation of REDD+ in Mexico” (<https://portals.iucn.org/library/sites/library/files/documents/ST-GFE-no.02-En.pdf>) (Balderas Torres and Skutsch, 2014); a paper reviewing technical and legal challenges (Skutsch, Balderas Torres and Carrillo, 2015); and a paper reviewing the relationships between deforestation and poverty in the Peninsula (Skutsch and Balderas Torres, 2015); all of which were developed under the project “REDD-Plus benefits:

Facilitating countries and communities in the design of pro-poor REDD-Plus benefit sharing schemes” with IUCN. Additionally, materials produced throughout the project by Juan Carlos Carrillo (CEMDA), Gill Shepherd and Luciana Ludlow Paz (IUCN) were used, in addition to extensive literature.

There are three fundamental ways in which REDD+ can contribute to poverty alleviation. The first is through the implementation of interventions that target spatially poorer regions; the second involves selection for implementation of activities that specifically involve the poor in any given region, and the third works by distributing the (financial) benefits associated with the resulting carbon gains independently of the activities themselves, so that the poor might become recipients of such funds even if not directly involved in the activities. These represent three different positions on how benefits can be distributed and should not be confused. The report is structured as follows. A brief overview of some of the main challenges is given, before explaining the architecture of the benefit sharing system envisaged by CONAFOR and how this is expected to develop in the Early Action Areas in the Yucatan Peninsula under the Initiative for Reducing Emissions (IRE), proposal to the Forest Carbon Partnership

Fund (FCPF). Then the types of activities under REDD+ that could benefit the poor are discussed, starting with a short section which summarises the evidence on the link between poverty and deforestation and continuing with an examination of the main drivers of deforestation and degradation in the Peninsula to determine the role of poorer people. This highlights the underlying problem with pro-poor benefit distribution for the case of the Peninsula, namely that in general it is not the poor but the better-off people who are responsible for most deforestation. Afterwards, an exercise is carried out to evaluate the potential of different REDD+ interventions to benefit the poor. Additionally, some characteristics that interventions could include in order to reach the poor more effectively are described. In the conclusions, some suggestions are made both for the implementation of a pro-poor REDD+ approach and for a pro-poor benefit sharing mechanism.

## 1.1. The problems in a nutshell

In designing an operable system for the distribution of benefits in the REDD+ early action areas in the Yucatan Peninsula, one has to take into account the fact that the possibilities are highly constrained although there is some room for manoeuvre. This is partly because policy on the benefit sharing issue has already been promulgated by Mexican national authorities, most notably CONAFOR (CONAFOR 2014a; 2014b; Graf, 2015; Skutsch, Balderas Torres and Carrillo, 2015). In addition, it should be noted that although from a theoretical point of view there are many ways of distributing REDD+

funds, in reality some of these are virtually impossible from a technical point of view, while for others the costs of implementation would be prohibitive (Skutsch, Balderas Torres and Carrillo, 2015). There are also legal considerations relating to rights to the benefits from forests, which can not be ignored (Carrillo, 2014; Skutsch, Balderas Torres and Carrillo, 2015). Moreover, in order to evaluate the potential of REDD+ benefits to alleviate poverty in rural areas it is necessary to determine first to what extent the poor contribute to emissions, second, how the current scheme for benefit distribution considers the poor, and thirdly what impact REDD+ interventions could have on vulnerable groups. Finally, there is the question of the scale of resources available and the institutional arrangements needed to maximise potential impacts on the poor.

It is important to point out from the beginning that in this report, the '*distribution of benefits*' in REDD+ refers to the distribution of carbon performance-related funds coming from international sources as a result of achievements against the national baseline or reference emissions level (REL). In Mexico there are important legal aspects relating to this since the General Law for Sustainable Forest Development details that the financial benefits of environmental services should flow to the owners of the forests. In the context of 'pro-poor REDD+' this may face different challenges, since the owners of the forests (within *ejidos* and communities, the *ejidatarios/comuneros* and elsewhere, private property owners) are by no means necessarily the poorest in rural society at the local level.

It is clear that if the poor are not responsible for emissions from deforestation and forest degradation it may be difficult to direct a large share of carbon benefits to them either in activities to reduce deforestation and degradation or in benefit sharing schemes based on carbon rights and performance (Skutsch and Balderas Torres, 2015). The other side of this coin is that if REDD+ is designed to mainly target the poor, it may totally miss the actors who cause the major part of the emissions. Nevertheless, considering the deep prevalence of poverty in many rural areas, and the understanding that if not engaged in deforestation, the poor may be involved in degradation, it is possible that at least part of carbon benefits would reach them.

In Mexico, the discussion regarding REDD+ implementation has moved from a carbon-focused approach to one which is aimed much more broadly at rural sustainable development and which could potentially include a poverty focus. In this discourse, lowering carbon emissions is seen as a consequence of sustainable rural development but not the main or only objective. For example, in a report on the REDD+ strategy for the Yucatan Peninsula (ECOSUR, 2012) commissioned by the governments of the three states, SEMARNAT and CONAFOR, there is little discussion about the dynamics of carbon stocks and

none at all about how these are likely to be affected by the interventions proposed, which are themselves very broad. The proposed interventions encompass among other things: preparation of OTCs<sup>1</sup>, alignment of public policies, improving agricultural productivity to ensure food security, sustainable cattle rearing, making beekeeping competitive, stabilising the agricultural frontier, increasing the area under payment for environmental services, sustainable forest management with participatory planning for management and conservation, restoration of landscapes in tourist area, environmental education, among others. Contribution to the capture of greenhouse gases is just one goal within a very long list of possible interventions. An important driver of deforestation and degradation may be population growth but demographic policy does not seem to be included comprehensively as a strategy in REDD+. Economic performance may be another indirect driver of emissions. For instance when the tourism industry is buoyant it attracts labour and reduces intensity of agricultural activities, but when this sector is in crisis (due to global economic downturns, post-hurricane effects, or recently due to the sargasso), unemployment in the Riviera may increase and people might go back to their communities and resume farm-based activities.

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1 OTC: A spatially explicit land use and development plan at local level.

## 2. Constraints and opportunities for pro-poor benefit distribution

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### 2.1. The architecture of REDD+ benefit distribution as envisaged by CONAFOR

National policy (CONAFOR 2014a; 2014b; Graf, 2015) implies that the reductions in emissions due to reducing rates of deforestation and degradation (D&D) are the property of the nation, not of the individual ejido, community or landowner, although legally these actors have the rights to all the financial benefits that are derived from the climatic benefits produced by their forests. There is a subtle distinction here, and further legal clarification may be required. The reason why CONAFOR has taken this position, for example in the ENAREDD+, is because:

- ◆ it is impossible in the legal sense to determine individual owners of the carbon 'saved' through reduced emissions, since this is a counterfactual entity (it doesn't exist in the sense of material property): *(Individualised) property rights cannot exist for something which is not a designated entity, either in the form of property or of usufructure* (Carrillo, 2015).
- ◆ deforestation is in principle illegal without an official permit, and thus the state cannot countenance paying rewards to forest owners for not deforesting (CONAFOR, 2014a).
- ◆ unless a baseline is constructed for each and every property, it would be impossible to know which owners have not deforested but would have done so in the absence of REDD+ (Balderas Torres and Skutsch, 2012); the cost of individual baselines could be prohibitive, and in any case there is no historical data on deforestation rates of individual properties on which to construct them.
- ◆ it is necessary to include accounting for leakage in the assessment of reductions of emissions (i.e. geographical displacement of activities which cause deforestation and degradation); this can only be done at a higher geographical level, such as the state or national level. Emission reductions can therefore only be claimed at this level (CONAFOR, 2014a).

The combination of these factors implies that individual *ejidos* participating in REDD+ will not be able to receive benefits in proportion to



to their carbon performance in reducing D&D; other criteria will have to be used, and these may be decided at the state or local level. On the other hand, carbon which is accumulated within growing trees can be considered 'property' of the owner of the trees, since this is factual and can be physically measured on site. Provided a baseline reflecting 'business as usual' carbon growth rates can be agreed for an individual parcel of forest (e.g. typical mean annual increment for the forest type when no intervention occurs, derived from secondary sources of information), increases above this baseline could legally be attributed to the owner (Graf, personal communication). Such increases are moreover unlikely to create leakage, so direct payments to communities for forest enhancement is feasible both politically and technically. Although for the time being the policy being promulgated in Mexico at the international level is pivoted only around calculation of reduced emissions from deforestation as measured against state and national RELs (CONAFOR, 2014a), a combination in which reductions in emissions are attributed to the state but carbon increments are attributed to the owner of the trees would be possible (the "Two can Tango" model as presented in Balderas Torres and Skutsch, 2014).

## 2.2. Benefit distribution within the Early Action Areas

Mexico is participating in the FCPF Carbon Fund of the World Bank and is implementing an Initiative for Reducing Emissions (IRE) (CONAFOR, 2014b) which in addition to the Yucatan Peninsula includes the states of Chiapas and Jalisco as Early Action Areas.

Potential carbon impacts of initial activities of the IRE are estimated at around 1.75 MtCO<sub>2</sub>e/yr and are valued at \$25 USD/tCO<sub>2</sub>e, although the FCPF will provide initially only 27% of the resources, which will be complemented by Mexican funds. The objective of the IRE is to pay for the additional cost of sustainable management compared with business as usual practices; the payments will be based on achievements relative to the national REL and made over to a central (national) authority. As noted above, owners of the forest resources (*ejidos/comunidades*) and the legal possessors of the resource (e.g. individual *ejidatarios/comuneros*) have legal rights to the financial benefits from environmental services generated by these resources, though they are not considered the *owners* of emissions reductions. The IRE however indicates the need to balance individual and community interventions and that while rights to financial benefits from environmental services as such reside with the forest owners, it will be necessary to devise options to compensate or reward the collective effort made by groups without rights to land. For this reason the IRE states that the money received from the Fund will be used to pay for 'investments' (rather than rewards or compensation, this is an important distinction) at the level of the ejido/community/landowner to promote better natural resource management and sustainable rural development (CONAFOR, 2014b).

Hence, the implementation of the IRE at the local level will be based on the preparation of local investment plans (LIPs). The elaboration of these plans will be coordinated by public agents for territorial development (APDTs, e.g. intermunicipal associations or CONABIO's Mesoamerican Biological Corridor); these

plans will be prepared by committees of *ejidos* interested in participating within the early action areas. Under the scheme currently being proposed the initial funding for REDD+ implementation will not come from carbon finance at all but only from regular budgetary sources, though CONAFOR expects that after one to three years carbon based finance will complement these public funds. The aim is to commence activities that provide social benefits and higher contributions to rural development while indirectly addressing drivers of emissions. Thus, initially investment plans will focus on the selection of existing public programs of the different ministries, which could be used to promote local low carbon rural sustainable development according to local needs. In a second stage, the plans might include new activities to ensure the continuity of activities implemented. Once the investment plans have been prepared these will be reviewed and approved by state level committees. Based on the authorised investment plans, *ejidos*, communities and landowners will apply to the corresponding public programs; if the application is successful they will receive the funding to start implementation. After one to three years, when carbon performance is assessed at regional level, the subsequent results based funding would be channelled through the APDT. Relevant local stakeholders, public agencies and the APDTs will decide how to share these financial benefits, although they will be considered as investments for further sustainable development efforts. At present there are no rules or even suggestions about how carbon benefits will be shared at the local level among different stakeholders, including the poor.

It is clear that performance will be assessed against the national or state level

RELS (CONAFOR, 2014c) which do not include forest enhancements, so individual *ejidos*, communities and landowners would in principle be free to market any increases in carbon stocks on e.g. the voluntary carbon market, although how this could be arranged has not been specified. One possibility would be a national broker who would facilitate the sale of such 'carbon credits' abroad. Another option is that individual and independent projects are registered with CONAFOR to avoid any double counting and guarantee environmental integrity. The mixed model, in which carbon savings from reduced D&D are attributed to the state or country, and carbon enhancements to the community, was first characterised as "Splitting the Difference" (Balderas Torres and Skutsch, 2012), and later developed as the "Two can Tango" model in the paper "Challenges for pro-poor benefit sharing schemes in the implementation of REDD+ in Mexico" (<https://portals.iucn.org/library/sites/library/files/documents/ST-GFE-no.02-En.pdf>) (Balderas Torres and Skutsch, 2014).

LIPs might be elaborated by *ejido* committees and as noted above, initial interventions will focus on those that are already financed in existing public programs. These could provide support at *ejido* level, e.g. from CONAFOR; to individual producers, from the Ministry of Agriculture, Livestock, Rural Development, Fisheries and Food (SAGARPA), and for other actors who are not necessary holders of land rights, e.g. from the Ministry of Social Development (SEDESOL). The main idea is that greater coherence could be achieved between these different funding streams if there is a common, territorially-based plan at the community level, proposed and supported by the community

itself, which would enable the alignment of what are now often conflicting subsidies<sup>2</sup>. However, it should be understood that this is only an initial step which leaves out relevant actors in the private (secondary sector), financial and social sectors (consumers) who may later become engaged in different activities to address the drivers of emissions.

The APDTs will validate the plans put forward by *ejido* committees. *Ejidors* (and other local actors, such as individual *ejidatarios*, private landowners, etc.) will apply, as they normally do, to the public programs. A pro-poor implementation of REDD+ could be promoted at this stage if there were specific criteria to support the financing of investment plans in poorer zones within the Early Action Areas, although this does not guarantee of course that within these areas the poorest population groups are involved. Whether there will be sufficient budget from these different ministries to support this approach, and whether inter-ministerial agreements on investment in REDD+ will be achieved and be effective, remains to be seen.

After 1-3 years, *ejidos* and individuals who have successfully implemented LIPs in areas may receive additional funds from the results-based carbon finance from the FCPF (though not in proportion to their own carbon performance, as this will not be measured at the local level)<sup>3</sup>. At this point, decisions would

have to be made by state and local committees about how to share these benefits. It would first be necessary to share the benefits between the different *ejidos* and other landowners within the area covered by the state baseline, which is not simple as there will be no baselines at the level of properties (see point 3 on page 4 above) and then within each *ejido*, among the inhabitants. As the law now stands, only holders of rights to forest land have the rights to carbon benefits, and as discussed in detail throughout the documents prepared by IUCN and partners, landless (i.e. poorer groups) may be excluded from direct access to REDD+ carbon benefits. Local committees could however define pro-poor criteria for benefit sharing, and for example they could require that funds are used (in part) to finance pro-poor REDD+ activities; to reward different stakeholders based on participation/input costs; to hire members of poorer groups in the job openings created by implementation of REDD+ activities; and to provide social public services (education, health, capacity building), which would also benefit non-rights holders. It remains to be seen how much autonomy *ejidos* may exercise in such decisions.

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2 Pronatura Yucatan Peninsula and IUCN developed a document which details the steps to generate a territorially-based plan, available at: [https://www.iucn.org/sites/dev/files/content/documents/2016/ppp\\_plan\\_de\\_gestion\\_territorial\\_0.pdf](https://www.iucn.org/sites/dev/files/content/documents/2016/ppp_plan_de_gestion_territorial_0.pdf)

3 The procedures currently being proposed are somewhat different from those suggested in the proposal for the IRE submitted to the FCPC (CONAFOR,

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2014b) in which the APDTs are responsible for drawing up the community level plans, with participation from the communities themselves, and for bringing these together into investment plans for larger areas. In this scheme, the plans that are considered most adequate by the advisory council would receive funds to carry out the activities proposed in the plans and the APDTs would guide and monitor the *ejidos* and communities in the implementation of these activities. The main implication of this earlier proposal is that there would be a basic fund for REDD+, through a kind of annual revolving fund using capital from the Carbon Fund, although regular government programmes would provide additional sources of money. At this point in time it is not possible to determine which of these two models will be adopted officially.

## 2.3. Pro-poor approaches

Prospects for development can be linked to the ownership of productive assets, basic services and economic activities that enable accumulation processes. In Balderas Torres, Skutsch and de los Ríos Ibarra (2016), section 3.2, the main assets that different population groups within a community typically hold and how it would affect their capital accumulation potential are identified. These include land, entitlement as *ejidatario*, education and training for employment, connections and links to markets and importantly extended family networks. Although for the purposes of the current analysis it is assumed that the poorest are families living in the community but without *ejidatario* rights, although it is incorrect to assume that all *ejidatarios* are 'rich'. Though without doubt, processes of accumulation have been going on such that some *ejidatarios* have been able to expand their resources while others have lost or sold land; the extent of inequality will vary from community to community. Also, the implications of the land trade and privatization as a process that might be decapitalising members of *ejidatarios* and communities in the long term are discussed in Balderas Torres, Skutsch and de los Ríos Ibarra (2016).

In section 4.5 of Balderas Torres, Skutsch and de los Ríos Ibarra (2016) the different niches for intervention under REDD+ are described by identifying potential approaches that could promote individual actions, collective actions (targeting *ejidos*, communities and cooperatives) and private actions (involving private firms, the financial sectors and the value chains and consumers of different products). The impact that these

different options could have on the poor are evaluated. For instance, it is highlighted that there are different types of *ejidos* depending on population, land area, forest per capita and capacity for social organisation. These factors are crucial to the way that REDD+ interventions are selected and to their chances of success. One common problem is the difficulty of organizing collective action due to low levels of social capital. Many efforts have been made to support the development of *ejido*-level productive enterprises but this is a slow and difficult process. Farmers do not usually perceive themselves as entrepreneurs and strategic long-term decision-making is difficult under *ejido* processes.

Studies made on the causes and possible solutions to poverty in Mexico point out that governmental efforts have articulated their programs either around individuals or around whole *ejidos* and communities (Székely 2005, cited in Balderas Torres, Skutsch and de los Ríos Ibarra, 2016). These strategies seem to overlook the fact that the basic productive unit in rural areas is the household and that the family is the first and strongest local institution of the poor. If it is not possible to incorporate the poor as individuals in the formal job market and offer them regular off-land wages, one option for a pro-poor approach would be to improve the productive and development prospects of households considering the family as the basic institution for interventions. However, the family is not mentioned as an institution either in the "Vision for REDD+" or in the drafts of the national strategy. In contrast, in this report strong family networks are identified as a crucial initial asset of the poor in rural areas.

### 3. Constraints and opportunities for REDD+ activities and interventions which could benefit the poor

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As discussed in Skutsch and Balderas Torres (2015), not all people living in rural communities can be considered poor. First of all some communities are intrinsically poorer than others. Those which are smaller and more isolated are known to be more 'marginalised', although there is some doubt about whether this also means they have lower incomes (for an extended discussion on this, see Skutsch and Balderas Torres, 2015). Yet it is clear that there are different groups of people who are struggling to get out of poverty. In the Yucatan Peninsula these usually include recent immigrants, landless, *milperos*, *carboneros* and traditionally the *chicleros* (Balderas Torres, Skutsch and de los Ríos Ibarra, 2016). Moreover, within communities there is an on-going process of class formation in which rights holders (*ejidatarios*) are usually better-off than *posesionarios* or *avecindados*, who have no formal rights to land; but among the *ejidatarios* there are also economic differences and land holdings are no longer equally distributed. The probability of being poor increases drastically for households with land endowments of less than 2 ha (Finan, 2005, quoted in Balderas Torres, Skutsch and de los Ríos

Ibarra, 2016), although the relationship of land holding to poverty is not linear, and other factors such as education level (particularly of women), play an important role. Access to land can substantially increase the welfare of households even at small scales (e.g. 1 ha).

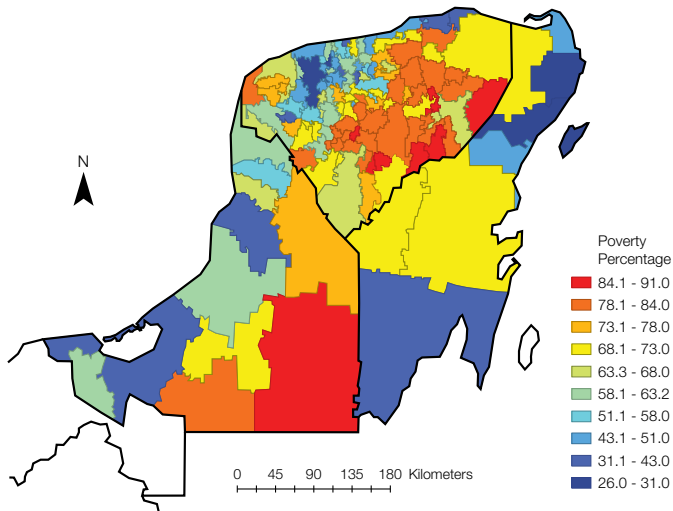
As discussed at length in Skutsch and Balderas (2015), a fundamental difficulty in designing pro-poor distribution systems for REDD+ is that it may not be the poorer *ejidos* or communities that are causing most of the deforestation and degradation, and within *ejidos* that are deforesting, in general it is not the poorer members of the population who are responsible for this. A system which provides investments targeted at those communities and those people whose activities lead to deforestation and degradation runs the risk of providing funds to better-off communities and to better off people within the communities. On the other hand, a system which provides investments targeted at poorer groups in the population runs the risk of failing to be effective in reducing emissions. This dilemma or trade-off needs to be dealt with before any pro-poor

REDD+ strategy can be designed. In theory there are at least three geographical levels at which the relationship between loss of forest resources and poverty could be examined; the municipal level, the *ejido* level and the intra-community level.

As regards the contribution of the poor to forest degradation, Figure 1 shows the relative concentration of poverty of different municipalities within the Peninsula, with a clear

prominence in the centre and southeast of Yucatan and in Calakmul in Campeche<sup>4</sup>. Figure 2 shows the losses and gains of vegetation as registered between the first and second rounds of the national forest inventory (INFyS) between 2004-7 and 2009-13. Red and orange shades show plots which registered losses (this is a sign of forest degradation), greens and blues gains (i.e. forest enhancements).

**Figure 1:** Percentage of population living in poverty by municipality in the Yucatan Peninsula



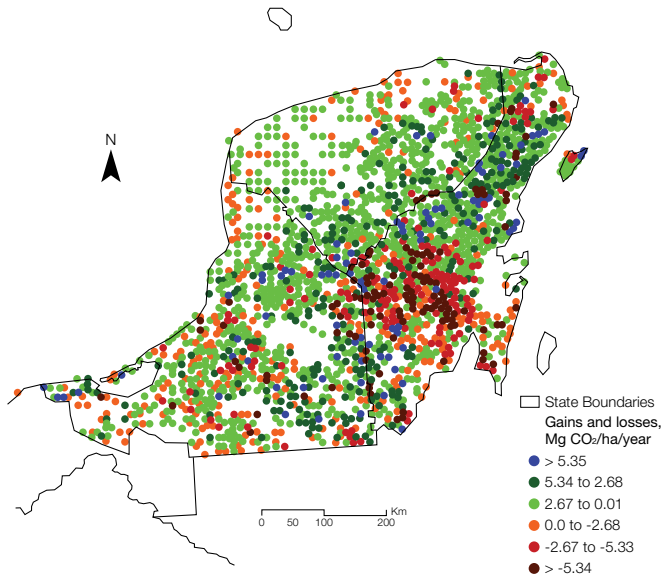
Source: CONABIO, 2010.

4 The levels of poverty per municipality as shown in this map are heavily influenced by the size of the cities within them. For a fair comparison in the context of REDD+, the incomes only of the rural population should be shown, current work on this is being undertaken by the authors.

Although no quantitative conclusions can be drawn from this, given the scale of the measurements made in INFyS (plots are located at 5km intervals in *selva mediana* and *alta* and at 10 km intervals in *selva baja*), it nevertheless indicates that there may be a higher incidence of losses in central Quintana Roo, particularly in Felipe Carrillo Puerto, as well as scattered incidence of losses throughout Campeche and in northern Quintana Roo. Throughout the *selva mediana* subcaducifolia belt in the centre of the Peninsula there appear to have been fewer losses but considerable gain. The resolution of this data is not sufficient to carry out any sort of statistical analysis but at first sight there does not appear to be any spatial coincidence of either poverty or wealth with loss of forest

stocks, at this scale. This is not to say that there is no relationship between poverty and forest degradation, only that it is not evident *at this scale of analysis*. The areas of greatest loss in fact correspond better with hurricane paths, see Skutsch and Balderas Torres (2015); moreover this is an area where cattle grazing has been signalled a major cause of deforestation (though not of degradation). There may be other processes leading to degradation that might have not been captured by the INFyS data (because they may be too small in time or in space to be picked up by the INFyS survey), which could relate to poverty, and these dynamics certainly deserve further investigation through analysis at the level of the community itself.

**Figure 2:** INFyS plots registering losses and level gains of biomass



Source: CIGA-UNAM, based on preliminary data from INFyS.

Whether the selection of poor municipalities would favour an effective implementation of REDD+ depends on the carbon benefits that could be obtained. In many areas deforestation is caused by better off agents and engaging them would be necessary to reduce larger amounts of emissions (e.g. from clearance for commercial agriculture). But on the other hand, a large number of poorer actors might also in aggregate be producing a substantial level of emissions through degradation processes (e.g. some forms of subsistence agriculture) and thus addressing these would help to reduce overall emissions. It should not be forgotten that there are other dynamics by which members of poorer areas are deforesting, for instance by

renting pastureland to cattle rearers (e.g. in the Calakmul Area, Radel et al., 2013, cited in Balderas Torres, Skutsch and de los Ríos Ibarra, 2016). Thus the evaluation of whether the poor are contributing to carbon emissions needs to take into consideration a local analysis of land use change and changes in carbon stocks; unfortunately, there is little information on this. Additionally, one major difficulty in addressing poorer groups is that the national REL does not include emissions from degradation. Thus carbon gains from activities to tackle these emissions cannot be incentivised (with carbon based resources), either from the IRE (which focuses on deforestation) or the carbon markets (which allows valuing carbon enhancements).

**Table 1:** Involvement of richer and poorer groups in deforestation drivers in the Yucatan Peninsula.

Immediate driver	Examples of <i>ejidos</i> involved	Poor <i>ejidos</i> or richer <i>ejidos</i> ?	Poorer individuals or richer individuals within <i>ejidos</i> ?
Clearance for commercial agriculture.	For grains, in central Campeche municipalities Hopelchen (Xmaben), Champotón (Maya Tekum), Escárcega, N. Candelaria (Las Ceibas); sales or rental of ejido land. For fruit cultivation: Oxkutzcab, Santa Elena.	Most expansion of commercial agriculture is on private properties rather than in <i>ejidos</i> , or on land rented from <i>ejidos</i> to commercial concerns. Fruit cultivation is expanding in south west Yucatan state within <i>ejidos</i> . These are relatively wealthy <i>ejidos</i> .	Only <i>ejidatarios</i> (owners) will benefit from such sales/rental agreements. Better off <i>ejidatarios</i> are involved.
Large scale pasture development.	Tizimín, Champotón, Escárcega.	Most large scale pasture development is not in <i>ejidos</i> but on private properties.	
Land speculation, urban development and growth of tourist resorts.	Cantamayec, Chumayel, Cancún and Playa del Carmen.	Location is the key factor, not relative wealth.	Affects all, but only <i>ejidatarios</i> will benefit from sales of land.



### 3.1. Main drivers of emissions and the poor in the Yucatan Peninsula

The identification of potential of REDD+ interventions suitable for targeting the poor first requires identifying which drivers involve the poor, before an evaluation can be made of the impact of specific interventions on their

livelihoods. Tables 1 and 2 present data from field studies on the main drivers of deforestation and degradation respectively, and the relative involvement of richer and poorer *ejidos*, and richer and poorer people within *ejidos*, while Table 3 presents a general poor-poor analysis of drivers derived from work presented in Balderas Torres, Skutsch and de los Ríos Ibarra (2016).

**Table 2:** Involvement of richer and poorer groups in degradation drivers in the Yucatan Peninsula.

Immediate driver	Examples of <i>ejidos</i> involved	Poor <i>ejidos</i> or richer <i>ejidos</i> ?	Poorer individuals or richer individuals within <i>ejidos</i> ?
Reduced fallow lengths in shifting cultivation	Dependence on SC is most common in <i>ejidos</i> with no opportunities for commercial agriculture or timber sales, particularly in the <i>acahuales</i> (which are fallow areas/secondary forest) of Yucatan state. Reduction in fallow is regularly reported in these zones: Cantamayec, Chulul	These tend to be poorer communities	Reduced fallow is connected with lack of labour and receipt of PROCAMPO <sup>5</sup> , relating mostly families to with migrant males, i.e. in general, poorer families
Increased area under shifting cultivation	There is little evidence that areas under SC are increasing, rather the opposite	If it does occur, more likely to be in poor communities	Poorest individuals within <i>ejidos</i> unlikely to have rights to expand SC
Overgrazing by small scale cattle owners	Little evidence of this driver in the region		
Unsustainable management for timber/illegal logging	Petcacab, Tres Garantías, Caobas, Los Divorciados, Plan de la Noria, Manuel Ávila Camacho	There is some evidence that <i>ejidos</i> with relatively large endowments of forest are able to manage their resources better, and become relatively richer as a result, but management is the key factor. Economies of scale will be important in long run viability of these industries	Management (sustainable or unsustainable) is in the hands of <i>ejidatarios</i> and benefits will flow to these members of the community, not the poorest
Unsustainable management of non-timber forest products (NTFPs) (i.e. Chicle)	Does not appear to have resulted in much degradation in recent years. Some loss of chicle trees for poles		
Unsustainable firewood extraction for trading	Observed mainly around Mérida, in e.g. Hucnucmá, Cantamayec, Cholul, but is not always unsustainable		Is an activity mainly of older and poorer people
Charcoal production	LoI-Bé, Bolmay, San Antonio Chuc		Usually carried out by poorer people
Hurricanes and related fires	Although hurricanes are natural, much of the damage that follows is due to fires unless dead wood is removed: in parts of the Peninsula invasion of vines is also seen which suppresses tree recovery	Hurricanes impoverish communities as capital is destroyed; can occur in both richer and poorer <i>ejidos</i>	Affects all, but not essentially caused by human agents

5 PROCAMPO: National programme for support to agriculture, particularly for small farmers.

In Table 3, each driver is evaluated qualitatively in terms of (1) the potential carbon gains that could be produced per hectare if tackled effectively, (2) the potential area for intervention in the peninsula, (3) the relative

costs to address it and (4) the potential to address the poor. Each factor is evaluated using a value of 1, 2 or 3 for small, medium and high respectively.

**Table 3:** Potential targeting of poor groups, with respect to each of the main drivers of emissions in the Yucatan Peninsula.

Driver to be treated:	Emission Process	Potential Carbon Gains per ha	Potential Area for Intervention	Relative Costs	Potential to target Poor Groups	Probable overall effectiveness in terms of reduction of emissions while targeting poor groups	Rank of effectiveness in targeting poor groups
Shifting cultivation, subsistence agriculture	Degradation	Medium	High	Low	High	High	1
Hurricanes	Degradation	High	High	Medium	High	High	1
Firewood collection	Degradation	Low	High	Low	High	Moderate-high	3
Charcoal Production	Degradation	Low	High	Low	High	Moderate-high	3
Cattle rearing and pasture development	Deforestation	High	High	Medium	Medium	Moderate-high	3
Commercial agriculture	Deforestation	High	High	Medium	Low	Moderate	6
Forest management (timber)	Degradation/Deforestation	Medium	High	Medium	Medium	Moderate	6
Ineffective Governance Schemes	Degradation/Deforestation	High	High	High	Medium	Low to moderate	6
Public programs and subsidies	Deforestation	High	High	High	Low	Low	9
Urbanisation	Deforestation	High	Low	High	Low	Low	10

The drivers that most linked to the poor are shifting cultivation (subsistence agriculture), hurricanes, firewood collection, charcoal production and cattle rearing and pastureland development (particularly small-scale cattle-rearing and clearings for the rental of pastureland).

Degradation due to shifting cultivation takes place mainly in the central part of Yucatan in the indigenous area, in areas where cycles have been shortened, although there is some doubt about whether this generates system-wide losses of carbon; this is a topic which requires much more research. Potential

carbon gains per hectare under REDD+ are moderate and area potentially large.

Firewood collection does not in general lead to degradation, except where it is being traded to cities, and major degradation usually only occurs where land is in the hands of absentee landlords following sales for speculative purposes. Charcoal production is causing degradation in some places; these activities are traditionally developed by poorer groups throughout the peninsula. Small carbon gains are possible under REDD+ but spread out over a large area.

Natural disasters (hurricanes) affect all poor groups throughout the peninsula. There is a reduction in the options for rural livelihoods by reduced forest related income, damage to the production of *milpa*, honey, chewing gum and chicle, problems due to loss of infrastructure and accessibility and reduction of tourism activity when the hotels and beach shores are affected; REDD+ interventions to reduce the impact of natural disasters on the poor can make a huge difference on their livelihoods (See Balderas Torres, Skutsch and de los Ríos Ibarra, 2016). Potential carbon gains under REDD+ are defined as high because if appropriate management is not given to resources, carbon stocks may not recover; moreover a deficient management of areas affected by disturbances can produce large forest fires. The urgency of recovering the livelihoods in the short term through agriculture can also drive deforestation processes.

As pointed out already, poorer groups may be affected by pastureland development especially in the Calakmul area and La Montaña. This is a poor region where land conversion is linked to emigration dynamics

and labour scarcity (pastureland rental); most of the inhabitants are immigrants without prior knowledge of local best sustainable practices and may not know other alternative development options.

Lastly, another option to target poor actors relates to initiatives targeting selective logging in forest *ejidos*, especially small *ejidos* or *ejidos* with small forest areas with poor CFM governance (in Campeche and Quintana Roo). Degradation in these areas occurs due to the lack of control of extraction fronts. Additionally, when forests are no longer economically attractive, i.e. when valuable species are gone, the distribution of forests in small patches is associated with problems of economies of scale and silvicultural management, thus the risk of deforestation is higher. CFM is a labour intensive activity and favours wealth distribution as opposed to large scale privately controlled commercial plantations which are more capital intensive (Bowen, 2014 in Fernández Vázquez and Mendoza Fuente, 2015), although usually the wealth remains in the hands of those in the community with rights.

Activities associated with deforestation emit more carbon per hectare than those that result in degradation. In the short-term, and in the specific locations where deforestation is occurring, higher carbon gains could therefore be made if these drivers were halted. However, it may be difficult to identify exactly which areas are likely to be deforested, while degradation takes place much more widely and a large part of the forest resources are already degraded. It is clear moreover that deforestation is much more associated with richer groups than with poorer ones.

In general, poor actors may earn short-term benefits from the processes driving emissions, particularly from degradation, but in general in the long term they may face negative consequences as a result (loss of productive assets). The main drivers with a higher impact on the poor relate to hurricanes, firewood and charcoal collection and shifting cultivation. It is important to remark that although land-trade has a large impact on processes de-capitalising certain social groups in rural areas and promoting landlessness, it is only an intermediary step in the processes driving emissions of deforestation for commercial activities and as part of real state speculation. It would seem futile to try to control land trade as means to reduce carbon emissions in REDD+ if alternative low carbon sustainable and productive practices are not developed first. However, it is a factor that underlies other drivers, and should not be overlooked.

### 3.2. REDD+ activities with potentially pro-poor impacts

The poor are defined here as those groups with incomes below the poverty line: as mentioned above, they are usually (but not always) landless and are devoted to subsistence activities (e.g. firewood, charcoal, small scale cattle rearing, shifting agriculture).

Based on the description of the different drivers of emissions Balderas Torres, Skutsch and de los Ríos Ibarra (2016), identify, evaluate and discuss specific REDD+ interventions from a pro-poor viewpoint; a summary of this analysis is presented in the following sections. Interventions that are able to reach poorer groups and contribute to various dimensions of capital (i.e. natural, social, human, productive, financial and political/power), and those which are part



Photo: Emilio de los Ríos Ibarra

of subsistence strategies, are ranked more highly in the evaluation of their pro-poor potential. The interventions are ordered on the basis of this final mark. Table 4 below presents the REDD+ interventions which potentially could have higher pro-poor potential (for details of the methodology and scoring scheme employed, see Balderas Torres, Skutsch and de los Ibarra Ríos (2016).

**Table 4:** REDD+ interventions with highest pro-poor potential.

REDD+ Intervention	Contribution to the 5 livelihood dimensions <sup>6</sup>	Total effectiveness (Intervention Characteristics)*	No of Poor Groups Benefited*	Pro-Poor Potential (relative score/100)*
Harmonise, simplify and align subsidies and public programs for rural development, coordination across and within governmental levels.	100%	8	11	88.0
Articulate rural sustainable development strategies around needs at family level.	100%	8	11	88.0
Micro-insurance schemes for housing, <i>milpa</i> , CFM, honey production, cattle, chewing gum.	83%	8	11	73.3
Increase size of solares in <i>ejido</i> population centres (community land use plans).	83%	8	11	73.3
Improve CFM in small <i>ejidos</i> (control extraction fronts, small scale plantations, agroforestry).	67%	9	11	66.0
Develop local industry and workshops around the timber industry to add value to local products.	67%	9	11	66.0

*Continue*

6 "The combined capital index, also referred to as 'livelihood dimensions', is estimated through a multi-criteria analysis based on the description of the different stakeholders and their assets. The criteria for analysis of assets and benefits received by social actors are: the magnitude or relative importance, whether the assets is physical or intangible, tradable, represents access to liquid cash, it is renewable or if it is related to a subsistence activity. Additionally assets and benefits are described according to the type of the capital to which they relate: natural, social, human, productive or financial; a sixth category is added to describe if the benefit/asset increases the level of power of the social groups. Power, productive, and financial capitals have higher weight in the combined index since they can be used in more immediate ways to satisfy urgent needs, on the other hand human, social and natural capitals are necessary enabling conditions and constraints which have effect in the longer term (Balderas Torres, Skutsch and de los Ríos, 2016)."

\* "The characteristics of the interventions are assessed in terms of the scale (large, moderate or small for which they receive a mark of 3, 2 or 1, respectively), the time frame of the benefits (long, mid or short terms, for which they also receive 3, 2 or 1 points accordingly) and whether it is tradable, creates opportunities for new jobs, offers liquid benefits or contributes to subsistence practices (for each of these the intervention receives an additional point). Then the product of the combined capital index (also referred to as livelihood dimensions) and the mark on the characteristics of the intervention (the long term effect) is multiplied by the number of poor social groups each intervention could reach. At the end the interventions are ordered considering this final mark."

Continuation

REDD+ Intervention	Contribution to the 5 livelihood dimensions	Total effectiveness (Intervention Characteristics)	No of Poor Groups Benefited	Pro-Poor Potential (relative score/100)
Technology transfer for forest based, farm and non-farm activities.	67%	9	11	66.0
Support for transport services and better links to markets.	83%	7	11	64.2
Earmark contribution to NFF to offset land use changes within same jurisdictions.	83%	7	11	64.2
Simplify regulations (i.e. timber, charcoal, firewood, chewing gum, production and transportation; consider small-scale practices).	83%	7	11	64.2
Promote voluntary carbon market for sequestration practices (restoration, reforestation, afforestation).	83%	7	11	64.2
Regularisation of land access (recognise <i>avecindados, posesionarios</i> ).	83%	8	9	60.0
Allow the division of <i>ejido</i> holdings among heirs.	83%	8	9	60.0
Best practices for <i>milpa</i> production to increase productivity (fallow, soil, water management).	67%	8	11	58.7
Strengthen APDTs (negotiation skills, strong technical authoritative opinion and budget).	67%	8	11	58.7
Local health and education services.	67%	8	11	58.7
Innovate education and research programs to increase sustainable productivity of rural groups.	67%	8	11	58.7
Human and social development project to empower local population in alliance with local groups.	67%	8	11	58.7
Formalise commercial firewood market in cities.	67%	8	11	58.7
Silvopastoral management.	67%	8	11	58.7
Saving and investment strategies compatible with sustainable practices.	67%	8	11	58.7
Micro-credits/finance.	67%	8	11	58.7
Private participation in the voluntary carbon market.	67%	8	11	58.7

The most important pro-poor interventions relate to the harmonisation of public action for rural development, the articulation of development policies around family level needs, and the provision of micro insurance services as a strategy to prevent losses in case of natural disturbances, namely hurricanes; these schemes focus on the different productive activities and assets of the poor. Their importance resides in the fact that the

public sector is paramount in terms of creating the enabling conditions for the development of the poor (as there are no incentives for private actors to cover these needs since they are not profitable), second that the poor have diverse needs and productive strategies in different time periods, and third, the fact that after a hurricane these households will be much worse-off given the loss of their productive assets and livelihoods. In

general these interventions do not discriminate among local groups (*ejidatarios* versus non-*ejidatarios*) and could be used by each group according to their specific needs. The preparation of shelters and general contingency plans can also benefit all the population. It is important to include guidelines and activities for the post-management of the emergency to allow the recovery of economic activities but also of carbon stocks and forest cover. One transversal enabling condition is local social agreement for the inclusion of different social groups in each of the activities that might otherwise be restricted to *ejidatarios*, for instance. It is clear that the relevance of each intervention will change according to the specific conditions of a community or *ejido*. Considering the relatively high importance that access to even small areas of land can have to landless groups, one policy that deserves to be explored is the increase of the *solar* and *traspatio* areas (housing and home garden areas, respectively) in *ejido* settlement centres; this will help increasing in home food production and could be implemented along with capacity building on best agroforestry practices. Later there are other possible interventions related to land access and organisation of local activities; local land use plans can include the clear definition of areas and rules for accessing different resources, to develop specific activities (e.g. forest management, charcoal production, reforestation practices) and to grant informal access to land to the landless (land rental within communal parcels).

Other activities with high pro-poor potential are the promotion of community enterprises and cooperatives, particularly at family level, to add value to local production; for this

financial access through micro-credit can be promoted, provided membership of the cooperatives and micro-credit is not restricted to those with land entitlements. A fourth group of valuable activities will be those that build capacities of the poor related to best agroforestry and *milpa* practices in parcels and solares. It is important to reinforce efforts to increase education levels and access to health services. The promotion of family scale workshops and increases of productivity in agricultural practices are oriented to provision of a surplus of income to cover immediate needs, and it is important to orientate households on the best options to invest this modest capital; the financial sector can contribute in this context if investment strategies accessible to the poor and compatible with sustainable practices can be devised. Otherwise processes of capital accumulation may follow the known paths of focusing on cattle and land for agriculture which will continue driving carbon emissions.

The objective of promoting best practices for *milpa* systems and subsistence agriculture practices is to increase productivity; this could perhaps be achieved through the increase of fallow cycles of shifting agriculture (ideally to 25 years), although more research is urgently needed to assess more precisely the link between yields, cycle length and average carbon stocks, as well as the role of agricultural subsidies in promoting shorter and longer cycles. An important driver of shortened *milpa* cycles appears to be PROCAMPO since this requires land to be in production every five years. Best practices also need to consider soil and water management. It is however not clear whether shortened cycles increase or decrease emissions at the landscape scale.



Opportunity costs associated with commercial agriculture and urban/tourist development are probably too high to be counteracted by voluntary incentives to control deforestation. In this case it is necessary to fortify monitoring and enforcement systems to control land use changes (i.e. deforestation). Approved land use changes that occur following the institutional procedures would require contribution to the National Forest Fund. Ideally it would be desirable to earmark these resources to be used to finance activities to compensate for the environmental services lost within the same jurisdictions (e.g. early action area).

Other potential REDD+ interventions identified here based on the description of the drivers of emissions in the above mentioned report, may not have very high impact on the poor but nevertheless deserve to be mentioned. These are: support for the promotion of CFM enterprises and the possibility of designing a voluntary compliance program oriented to the forest sector to reduce monitoring and compliance costs (i.e. similar to the program of Clean Industry, *Industria Limpia* of PROFEPA).

In this context policies such as PES may have the potential to match opportunity costs in the rental of pastureland for cattle-rearing. In Jalisco farmers rent the land to cattle-rearers during the off-season for about \$1000 per ha per cycle (Borrego and Skutsch, 2014); in the central part of Campeche and Quintana Roo where development of pastureland for rental is a problem it might be possible to design PES to contribute to prevention of deforestation. This type of strategy could be used also to delay the clearance of fallows in shifting agriculture.

The promotion of economic activities outside the domain of the *ejido* assembly/committees is symptomatic at the micro-scale of the dismantling of the active economic functions of the government at national and state level. Most economic activity is now developed by the private sector and the function of the government is that of a regulator, provider of some public services and law enforcer. According to the options for addressing emissions as listed above, *ejido* committees/assemblies still play a relevant role as regards the definition of land use plans and local rules and governance, but it seems their importance as economic actors –aside land trade and privatisation and reception of public subsidies- is diminishing.



## 4. Discussion

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### 4.1. Involvement of the poor in deforestation drivers

Deforestation occurs when forest areas or *acahuales* (which are fallow areas/secondary forest) are converted to non-forest uses. This may occur on privately owned properties, for example, on ranches in which trees are cleared for more intensive uses of land by the owners, or on ejidal land, particularly when this is sold or rented to commercial agricultural producers, cattle-rearers or to speculators. The driving forces in deforestation relate to the profitability of large scale mechanised agriculture in selected, suitable locations, to the maximisation of potential revenues while labour is minimised, or to the presumed future value of land around urban areas; in all cases, the process depends on availability of capital for the purchase or rent of the land. The driving agents are commercial enterprises.

It is not clear what REDD+ activities could be introduced to damp the economic processes by which *ejidos* are trading their land to more commercial users, or in rarer cases, such as fruit production in SW Yucatan state, converting it themselves into more commercial production. It is in any case debateable whether such exchanges should be discouraged, given food security issues. In any case, the financial benefits from such sales go into the pockets of *ejidatarios*; but it should not be overlooked that this money may be spent on consumer goods rather than invested, thus resulting in long term decapitalisation as land is usually the most important local asset. The poorer inhabitants of the villages who have no land rights are not involved in the decisions to sell the land and will not receive any of this money. They may however benefit from employment in the new agricultural enterprises. The *ejidatarios* may also end up as labourers. Some have evidently chosen this route in order to finance the education of their children and to ensure that the next generation is not dependent on the land.

## 4.2. Involvement of the poor in degradation drivers

It is clear that REDD+ activities could be more effectively used to reduce degradation and perhaps to stimulate forest enhancement processes than to put a brake on deforestation. It is also evident that a range of people within *ejidos*, both richer and poorer, are involved in these activities, so in principle there is some scope for REDD+ activities to include poorer people in this respect.

Though a venerable, respected and sustainable cultivation system under low density conditions, shifting cultivation (*milpa*) is today associated with more traditional production and communities that depend on it are indeed mostly the poorer communities of the Peninsula. It does not appear to be expanding currently, even under population growth conditions, not least because ejidal land entitlements are not divisible, but also because

younger men seem more reluctant to engage in this traditional activity. Where cycles are shortening and fallow periods are being reduced, this is most likely either the result of public subsidies, particularly PROCAMPO, which effectively limits the cycle to five years, or the result of labour shortages (themselves due to temporary male labour migration, mostly within the state itself), since cutting old growth *acahual* entails much more labour than young *acahual*. The impact of shortened fallows is likely to be felt on agricultural yields, but the net impact on carbon stocks, as noted above, is not clear. While obviously stocks will be lower on the area that remains part of the cycle, other areas may be abandoned and hold more stocks than they would have done earlier. Interventions by REDD+ into *milpa* systems therefore need to take this wider picture into account. There is little evidence that small scale cattle rearing, which occurs alongside the cultivation phases of *milpa*, was damaging carbon stocks at present.



Photo: Emilio de los Rios Ibarra

Unsustainable forest management for timber is widely held to be a cause of degradation, but this holds mainly in the areas of *selva mediana perennifolia*, not across the whole Peninsula. Following attempts to support management at community level, some villages (such as Noh Bec) have been successful in keeping the rate of extraction down to sustainable levels, although it is acknowledged that owing to earlier poor management during the concessions period, the forests are still degraded (in the sense that they are missing the largest trees and the most valuable species, which may take 50 years or more to re-grow). As a general rule it appears that *ejidos* with larger forest areas (and more forest per capita) are more likely to succeed in management, although there are many examples of failures due to internal strife (Balderas Torres, Skutsch and de los Ríos Ibarra, 2016). What is not commonly understood however is that in many of these forest villages, the number of non-*ejidatarios* is very large (Shepherd and Ludlow Paz, 2015). REDD+ interventions to improve management and save carbon (which could range from capacity building of all kinds to measures to reduce losses when logs are towed and more efficient sawmills generating less waste) are likely to benefit the *ejidatarios* who are the official owners of the forest, some of whom may be quite well off already (at least relatively). If the poor are to receive any benefit at all, specific measures would have to be built in to the REDD+ intervention strategy.

The most obvious means would be to require *ejidos* receiving investments for improvement of timber management to employ non-*ejidatarios* in forest related activities, rather than handing these paid jobs only to the *ejidatarios*

as frequently happens at present. It is unlikely that the *avecindados* would have any rights to profits from the industry, however, as this would require major changes in the ejidal constitution (Carrillo, 2015). Nevertheless, it is important to point out that due to problems of developing efficient and productive organisations within *ejido* based forest enterprises, in many cases the timber is sold to private external buyers while it is still standing in the forest. Thus most of the benefits are kept by the intermediaries (see Balderas Torres, Skutsch and de los Ríos Ibarra (2016) for a detailed description of this).

Many of the timber villages have protected areas set aside for conservation, some of these with PES funds. Typically PES areas are small in comparison to areas for harvesting (CONAFOR allows a maximum of 5,000 ha of PES per *ejido*, while forest areas may be up to 50,000 ha in total) and that they tended to be in remote areas where the opportunity costs are lower. *Ejidos* vary in how they use the PES funds. Some fund forest management activities out of this money, others distribute at least part of it as income to the *ejidatarios* individually. If REDD+ uses the PES model on a large scale to protect forest within *ejidos*, a decision will have to be made as to whether to follow the same pattern (under which non-*ejidatarios* receive nothing) or to develop new rules for distribution. In many of the forest *ejidos* there are strong objections to sharing forest benefits with *avecindados*, who are seen as newcomers and outsiders.

No evidence of unsustainable management or loss of carbon stocks relating to *chicle* production was found. Indeed it has been argued that *chicle* is a force for protection

of forests, although it is known that *chicle* trees are also used as a source of poles for construction of 'rustic' pavilions (*palapas*) in tourist areas and this could compromise the long term sustainability.

Firewood gathering for domestic purposes in rural areas rarely results in degradation and certainly not in deforestation. However, in many areas in the Peninsula, particularly around the larger cities, there is a strong trade in firewood, much of it supplied by micro dealers who are generally either older, landless or poorer *ejidatarios*, typically using a bicycle with trailer. Some firewood comes from plots cleared for *milpa*, which would otherwise be burned on site, but much more comes from the *acahuales* and there is evidence that this is in a few places leading to degradation, particularly in areas which have become open access as a result of land speculation and absentee landlordism. Any REDD+ interventions aimed at curtailing this trade would hit hard at a vulnerable group that is engaged in this activity essentially for survival, and this is therefore not to be recommended, particularly as it represents relatively small losses of carbon.

Charcoal production on the other hand is probably responsible for more emissions. It is officially illegal to transport or sell charcoal without a permit, or to make it on a large scale without a management plan, which is complicated to obtain and which only a few *ejidos* have. However both production and trade continue because of the high demand in urban centres and in coastal resorts. This is also an activity mainly of poorer people. Some charcoal is made from wood when the *milpa* is first cleared (many *carboneros* claim that they are producing it here 'for domestic

purposes', which is generally permitted, or the law turns a blind eye), but it is also produced with wood from areas that are rented for this purpose or from areas which for one reason or another are seen as open access. In the village of San Antonio Chuc, for example, *carboneros* have been using wood supplies from a neighbouring private property which was seen as abandoned, for five or six years.

There is much that could be done in the charcoal sector to improve efficiency and thus save carbon, but the first essential step would be to decriminalise it, not least because this would free the poor producers from middlemen who make large profits out of the current shady situation. While the production of charcoal is typically very individualistic (it is in all countries so), a cooperative marketing system would benefit many poor people and offer at the same time a platform for gradual improvements in harvesting for charcoal and in production methods. Whether this should be financed out of REDD+ or out of a small tax on charcoal sales is open to question.

Finally, hurricanes and subsequent damage caused by fires (due to accumulation of deadwood) and vine growth (which impedes regeneration) is observable in many areas in the Peninsula. Hurricanes are not anthropogenic and no REDD+ activities are likely to reduce them, but it can be argued that in part the subsequent damage is and could be prevented. The seriousness of hurricanes as a cause of loss of carbon stock is illustrated by the maps above. Removal of deadwood (and conversion e.g. to charcoal) after a hurricane event, together with replantation if necessary, would reduce the problem considerably and might generate employment for poorer people.

## 5. Conclusions

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The findings of this study indicate that a strategy of pro-poor interventions under REDD+ should take into account the following points:

- ◆ Poorer groups within the population are not generally engaged in deforestation but are more likely to carry out activities which can cause degradation. A pro-poor REDD+ approach would therefore make tackling degradation a higher priority than tackling deforestation. For this it is important to develop mechanisms to incentivise such interventions since the REL, the IRE and the forest carbon market include reduced degradation.
- ◆ However, many of the uses that poorer people make of the forest (firewood collection, chewing gum extraction, honey gathering) do little damage to carbon stocks. Incomes from these activities could be raised through technical improvements (increasing productivity, increasing access to credit and to markets, among others), yet this would not have much impact on carbon stocks per hectare in either a positive or a negative sense. Nevertheless, if these processes take place over very large areas it is possible that the sum of the emissions reductions and removals could be significant.
- ◆ Shifting cultivation tends to be carried out in poorer communities. Reduced cycle length in shifting cultivation may or may not be causing increased degradation and therefore increased emissions: it is not clear at the moment. Before any interventions are planned, this needs to be investigated more thoroughly, system wide. Since shifting cultivation is the mainstay of livelihoods of the poorer sections of the population especially in the state of Yucatan, great care is needed before recommendations for any changes are made. Permanent agriculture is not necessarily superior in terms of carbon savings and is in any case not suited to much of the terrain, particularly in the northern part of the Yucatan Peninsula. Yet it is clear that poor *milperos* are not able to accumulate sufficient wealth through this production system alone to allow them to get out of poverty.
- ◆ Increasing productivity in traditional agriculture through use of best practices may not have enormous impacts on carbon stocks although it may reduce the dependence of poor families on forest for other products, apart from increasing their agricultural incomes.
- ◆ Provision of microcredit is identified as one of the best ways to get people out of poverty, and if this is applied to support family

level enterprises it can reduce pressure on natural resources and save carbon in the long run. One important recommendation is to identify the role that the family as an institution can play in terms of sustainable rural development in the context of REDD+ particularly for pro-poor interventions.

- ◆ There are opportunities to expand and develop home gardens (*solares*) both to increase the incomes of landless people and to increase carbon stocks.
- ◆ Charcoal production is often carried out by poorer people within communities. A policy which legalises and decriminalises charcoal trade and cuts out the middleman would go a long way to increasing the earning power of charcoalers and would also make it possible to plan more sustainable production and investment. There are opportunities for REDD+ in rationalising and improving charcoal production and trade. Nevertheless, care needs to be taken that poor people are not pushed out of the trade if REDD+ intervenes to support it.
- ◆ Firewood gathering for sale is an economic safety net of the poor. It causes very few emissions, and where this does occur it is usually because of underlying conditions such as lack of clear ownership of land. Stopping firewood trading from villages to the city should not be a priority area for intervention by REDD+.
- ◆ There are opportunities for REDD+ in timber production villages, since efficiency is very low at present and there is high level of waste including losses of carbon at various stages in production. Nonetheless, in most of these villages the majority of the population does not have rights to the forest or to profits from forest activities. Interventions are thus likely to benefit only

official rights holders and not the poorer people within the communities, unless norms are promulgated which at least ensure that non-*ejidatarios* are given opportunities for paid labour positions. It is important to develop a local chain to add value to forest based products, at least some of which could be produced by recruiting the landless and unemployed.

- ◆ Making timber production more profitable while at the same time ensuring that extraction does not exceed sustainable rates requires both technical and organisational skills which are not present in many *ejidos* at present, and in general economies of scale play a large part in the feasibility sustainable management and e.g. certification schemes. Smaller and poorer *ejidos* (i.e. those with smaller forest endowments per capita) will have relatively higher costs and may be unable to achieve viable timber industries. REDD+ should recognize this explicitly when planning interventions. It is important to recall that different *ejidos* were created with different livelihood development strategies in mind. The *chiclero ejidos* are large enough to allow the population to make a living out of this activity, however agriculturally based *ejidos* are usually much smaller in area; trying to “fix” this situation by shifting agricultural based *ejidos* to other livelihood paths presents huge challenges.
- ◆ A strategy of hurricane preparedness and contingency planning including (micro) insurance would help to protect whole communities from destitution and could provide post-hurricane employment while creating more favourable conditions for forest recovery. It would thus constitute a good long term REDD+ strategy, particularly benefiting the poorest and most vulnerable groups.



- ◆ Off-farm employment generally reduces rates of deforestation and degradation and can be very important for poorer people; a pro-poor REDD+ strategy would actively seek to encourage this.
  - ◆ Although, reduced labour availability is also linked to a switch from shifting cultivation to induced or cultivated pastures, resulting in long run deforestation. The potential for a specially targeted subsidy for retaining land under *acuahuales* in this situation could be considered. The same measure might be applied to communities of immigrants in central Campeche and Quintana Roo, who do not have locally specific traditional knowledge of farming systems and may find development of pasture a more economic option.
  - ◆ The poor may benefit even from interventions which are primarily aimed at richer people, if they result in preservation of forests and other natural resources which poor people also use, such as communal forests which are everyone's source of firewood and NTFPs. Hence, although schemes such as PES limit land use change from forest to pasture in the short run and financial sense may be aimed at richer cattle-owning members of the community the landless could also benefit indirectly.
- they do not attend *asambleas* and are often not listed even as residents. Key informants in *ejidos* are always senior *ejidatarios* who may have an interest in minimising the visibility of these poorer groups.
- ◆ Most of the poor have no land or forest rights. A pro-poor approach would therefore have to explicitly deal with this, and with the fact that by law, the financial benefits of environmental services are supposed to flow to the forest owners. To reach the poor, either there have to be changes in the composition of *ejidos* to give landless people more rights in to REDD+ financial benefits, or the benefits have to be delivered not as profits for distribution among the owners but as investments in forest management and development activities. The proposal put forward by CONAFOR to use internationally sourced performance-based REDD+ premiums as investments in sustainable development, rather than as rewards or incentives, is a progressive position in this sense. There could however be legal difficulties associated with this, as the position could be challenged under the General Law for Sustainable Forest Development.
  - ◆ For example, if PES type payments are used under REDD+ to protect parts of the forest, whether in timber-producing or in other *ejidos*, the money is likely to flow only to rights holders (*ejidatarios*). To ensure that poor people receive some of the benefits of the investments, regulations will be needed under REDD+ to enshrine their rights at least to a share of the employment generated. The same holds for any investments which are designed to create alternative employment opportunities that reduce pressure on the forests.

Additionally, a pro-poor benefit distribution system should take into account the following aspects:

- ◆ Not all communities are equally poor, but there are significant poorer groups within most communities, who may be *posesionarios* or *avecindados* (they may form 30% to 50% of the population). They are usually overlooked by government agents and other people coming from outside because

- ◆ Clarification of the ownership situation and of the rights of *avecindados* under REDD+ should be a priority.
- ◆ Investments made in community facilities are more likely to benefit the poor than investments in production.

The implementation of REDD+ in Mexico has been framed as a means of promoting low-carbon rural sustainable development. As a result, the current approach involves reducing carbon emissions through encouragement of the sustainable management of the territory and efforts have focused on providing the enabling conditions for this model. Nonetheless, there is an urgent need to comply with legal commitments to halt the loss of ecosystems, as already expressed in the Mexican legislation (e.g. LGCC), and to reach emissions reduction goals as per internal and international agreements. It is not clear

to what extent the broad range of interventions being proposed at the moment would be effective in controlling deforestation and degradation and whether they will be sufficient to allow Mexico to access international results based finance. The posing of REDD+ in broader development terms, including framing it as a means of reducing rural poverty, may be beneficial for social and environmental development in the long run but may not necessarily achieve the original goals of REDD+. An alternative approach would be to address directly the drivers known to be linked to the major share of emissions (e.g. commercial agriculture and pastureland development), through command and control measures, even if this means that a large share of the benefit will not reach the most vulnerable groups.



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