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Integrating CBM into MRV activities of projects financed by the Alliance in the Early Action Areas of REDD+ in Mexico Report

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Executive Summary.

This document presents a basic approach to community based monitoring (CBM) in the Mexican setting of REDD+. The objective is to present firstly, a brief description of the projects being implemented in the early action areas (EAA) financed by the Alliance Mexico REDD+ (Alliance), secondly a proposal for the integration of CBM into the projects' activities and finally a discussion of the potential linkages to the MRV system. The Alliance is providing resources for the implementation of REDD+ activities in 13 projects located within the EAA of Chihuahua, Yucatan Peninsula, Chiapas, Cutzamala Basin and Oaxaca. These projects are implementing different activities to mitigate climate change including a wide variety of actors, strategies and scopes. The creation of a comparable and consistent system to monitor, report and verify the outcomes of implementation will allow the Alliance to evaluate the potential contribution of the projects to reduce carbon emissions and increase carbon removals in the EAA as part of REDD+; moreover the information to be produced can be compatible with national MRV systems and be integrated later into the monitoring systems for REDD+.

The potential for integration of CBM departs from two assumptions. Firstly, it is assumed that one of the objectives of the Alliance is to create local capacities for MRV in the EAA, by building up programs and activities that can endure and be sustainable over time. And secondly, prospects for sustainable schemes including CBM will increase when there is a higher engagement of local actors, know-how and infrastructure are successfully transferred to local communities and activities implemented and monitored produce tangible and predictable local benefits[1].

In order to analyse the type of information that could be produced through CBM, the activities to be implemented are described in terms of the data that might be generated as part of the normal operation of the projects. Three cases are identified: the first case corresponds to activities that would only produce geographical data of the activities to be implemented (A); the second case will be those activities that additionally would produce information of some carbon reservoirs, but not all (B); and thirdly, those activities which might produce information of all carbon reservoirs (C). Table 1 in the document presents a list of the different and heterogeneous activities that have been proposed by the projects. There are remarkable cases of activities to be implemented by different projects that can be considered as benchmarks. For instance the use of local land use plans as instruments to analyse local carbon balance for different management scenarios that can help to set local baselines; the description of fire management plans (i.e. fire breakers, black lines, prescribed fires, equipment and training for brigades, fire management in agricultural practices and construction of vigilance towers); or the description of management practices and methods for monitoring carbon, water and biodiversity services.

In absolute terms projects will intervene only a small fraction area of the EAA. The five EAA account for around 5.7 million ha, and the influence area of the 13 projects represents 13.9% of it. However direct implementation of activities where quantifiable carbon results can be expected in the short term will target only 2.9% of the projects' influence area (this is 0.4% of EAA). Most of these activities with quantifiable effect on carbon stocks,

[1] The *White Paper* (Balderas Torres, 2013), accompanying this document as part of the consultancy contract presents a literature review on this topic (e.g. Danielsen *et al.* 2009).

emissions and removals correspond to the establishment of pilot parcels and demonstrative practices. Other activities to be implemented as part of the projects might have a diffuse effect on forest management or this might only be perceived in the long term, making it hard to predict the impact on carbon stocks; moreover they may not include initially the implementation of carbon monitoring practices or targets to reduce emissions. Examples of such activities are the formulation of local land-use plans, general training on best agroforestry practices (without setting a target area) and the definition of best management practices (which have not been specified yet). After these activities are developed and specific management practices are defined as part of projects' outcomes it will be possible to define better the potential for implementation of quantifiable actions for climate change mitigation in the EAA. Meanwhile it is possible to prepare a MRV system including CBM to be integrated into the projects' plans and EAA.

After the description of the projects and identification of mitigation activities, this work presents a methodology to set a plan to include CBM considering the diversity of approaches proposed by the projects. The methodology enumerates the steps for different stages: Planning and Training; Implementation Data Gathering and Registering; Data Processing and Validation; and Reporting, Communication and Verification. The first stage is of critical importance since it could be possible to define objectives and assign resources for the monitoring of activities at the earlier stages of the projects. At this stage is important to define the characteristics of the SIG/PGIS systems to be created, the objectives for land use planning, and the techniques and protocols for carbon accounting. The creation of local land use plans incorporating carbon accounting can be used to analyse alternative management scenarios and establish a local baseline. Once the authorised activities are integrated into land use plans it is necessary to define management objectives and indicators at project and parcel level for the monitoring of carbon. Protocols are required for: carbon accounting in land use plans; implementing safeguards; preparing statistical sampling; establishing local baselines; carbon accounting using gain and loss and stock difference methods for different carbon reservoirs and measurement techniques (see *White Paper*); geographical and carbon data gathering and processing; for ensuring quality of data; updating of the information; collecting indicators at parcel level; validating and verifying data; sending samples for external analysis; registering information electronically; and for storing and updating of information. The protocols should describe the methods and frequencies for data collection. It is possible to define different plans for the information that should be gathered yearly (e.g. gain and loss method) and on a periodic basis (e.g. every 5 years using stock difference method). When statistical sampling is used to obtain carbon figures, it is necessary to clearly identify the associated correlates to obtain the estimates over the area of interest (e.g. stratum of vegetation or area under management, number of households or communities). It is necessary to perform a gap analysis of local capacities and resources to undertake these activities and set capacity building plans accordingly. Moreover it is important to define the roles of the communities, external experts and other actors for data gathering, data keeping, analysis, storage, interpretation, validation, communication and reporting.

In the implementation stage, data should be gathered and registered according to the protocols established. Software and electronic files should be periodically updated, equipment should be calibrated and it must be ensured that providers of external services (e.g. laboratories) have the appropriate certifications for the analyses required. Data must be kept in good conditions for periods up to 20 years or more for instance when participation in carbon markets is considered. Analysis of information will be

easier if it is done in electronic format. It is possible to prepare pre-determined formats, programs, tool-kits databases or spreadsheets for this purpose; appropriate training will be required. It is recommended to create an online system for the management of information and authorised/updated versions of the formats, protocols and tool-kits. After data is analysed it will be a good practice to validate it by performing a quality check. Once data has been validated it can be communicated to different stakeholders. Depending of the specific objectives of the monitoring schemes, audiences will range from the members of the community, to the project coordinators, the Alliance, the EAA, state/national level authorities, or international organisations (e.g. UNFCCC, buyers of carbon credits). Appropriate protocols for preparing and approving the reports will be required. If the information is to be integrated into MRV systems for REDD+, information could be centralised at the EAA level where it can be integrated into a multi-scale system and it can be verified and compared with local baselines. It will be important that the information is available at the community or ejido level for the planning of future activities and to help in local decision-making. It is important to identify drivers of emissions and evaluate how well the activities to be implemented will address them. Community based actions will be complementary to law enforcement, however local governance schemes can set 'informal' rules that can be locally enforced. There is potential to integrate geographical data and information of carbon stocks and stock changes produced locally into national MRV systems and the NFMS; this potential is explored in more detail in the *White Paper* that is also part of this consultancy.

As mentioned above, it can be expected that when local actors are more involved in the project and receive direct benefits from the management of natural resources, that overcome the costs of participation, then management and monitoring activities might be more sustainable over time. Most projects include the participation of local actors as part of the local alliance for implementation (communities, ejidos or union of ejidos or producers); in fact there are four projects that were directly proposed by local actors (projects Ejido Chinatu, Ejido Trinidad, NUKUCH KA AX and UZACHI). Conversely there are two projects were local actors are not included as members of the alliance, but as collaborators of the projects (projects ALTERNARE and AMBIENTARE). All projects include the participation of external experts such as members of academia, consultants and/or NGOs; these actors can provide equipment and know-how for technical activities (data gathering, analysis, interpretation). However not all projects have included MRV activities and CBM into their design. Since in general the role of communities is envisioned as data gatherers it is not clear how additional skills and infrastructure will be transferred to promote the establishment of more permanent monitoring schemes. At a first moment it is necessary to evaluate if such transfer and resources and know-how is possible under prevailing circumstances in each project. Furthermore, it is also necessary to evaluate what would be the optimal level of deployment of infrastructure and responsibilities/activities for MRV at the project level since the equipment required might be expensive and might not be used very often. For this, it will be necessary to set agreements for sharing equipment and information within the EAA.

As described in the *White Paper*, there are different activities that can be implemented depending on the motivation originating them. Monitoring activities can be implemented solely for the purpose of increasing sample size of national and state level inventories as part of public programs (CBM-1); they can be originated by the interest of the communities to improve forest management and obtain direct benefits from the forests and enhance other environmental services (CBM-2); they can also be associated to the participation in

carbon markets and other certification schemes (CBM-3); and finally they can be originated by the actions associated to the implementation of safeguards (CBM-4). The first and third cases will be associated to activities that respond to external incentives, while the second and fourth will rely more strongly on internal motivations. When external resources are available it will be possible to hire experts outside the communities to provide specialized services and most of these activities could be implemented. However if it were not clear how such external incentives could be provided in a predictable way in the mid and long terms, thus the best option would be to focus on the implementation of activities that will produce local direct benefits and will promote the local development of skills and appropriation of monitoring schemes without external incentives (see the Project LAIF in the *White Paper*).

There are two requisites that need to be reconciled in the monitoring scheme to be created: on one side, this process, ideally should include an active participation of local actors from a bottom-up approach that may enhance the prospects for sustainable monitoring schemes; on the other hand the Alliance in agreement with CONAFOR would be interested in establishing a set of protocols and a minimum of standards to ensure that the information to be generated at the local level could be integrated into the MRV system and NFMS (top-down). Summing up, the challenge for the Alliance is to create a unified comparable scheme within the different projects, and compatible with national systems. Such scheme, should engage communities more actively into monitoring, analysis, interpretation and use of information. The system to be created should also consider the future roles of inter-municipal associations in the implementation of the ENAREDD+.

Based on the recommendations presented here and in the *White Paper* it is possible to prepare a diagnosis of how MRV has been included in the projects, and set a plan to harmonize methods and protocols. The Alliance could provide a common platform to create the required systems for the representation of lands using local GIS/PGIS and local land use plans, and also to create the system to monitor carbon stocks and stock changes at project and parcel levels. This will enable the Alliance to evaluate and monitor the implementation of the projects in a comparable way. Ideally projects members should identify specific strategies for the transfer of technical skills and to develop local capacities and also to evaluate the prospects for sustained implementation of mitigation activities and monitoring in the mid and long terms.

Introduction and Background

1.1 Objective

This document presents a basic generic approach to community based monitoring (CBM) in the Mexican setting of REDD+. The objective of this document is to present firstly, a brief description of the projects being implemented in the early action areas (EAA) financed by the Alliance Mexico REDD+ (Alliance), secondly a proposal for the integration of CBM into the projects' activities and finally a discussion of the potential linkages to the MRV system. The Alliance is providing resources for the implementation of REDD+ activities in 13 specific projects located within the EAA of Chihuahua, Yucatan Peninsula, Chiapas, Cutzamala Basin and Oaxaca. Figure 1 below presents the location of the EAA in Mexico. The potential for integration of CBM departs from two assumptions. Firstly, it is assumed that one of the objectives of the Alliance is to create local capacities for MRV in the EAA, by building up programs and activities that can endure and be sustainable over time. And secondly, prospects for sustainable schemes including CBM will increase when there is a higher engagement of local actors, know-how and infrastructure are successfully transferred to local communities and activities implemented and monitored produce tangible and predictable local benefits. First the general social and environmental context of each project is described. The general interventions of each project are listed to identify the expected impact on carbon emissions and removals in the projects' area. Based on the different actions described in the projects a typology of strategies is proposed to integrate the common elements related to CBM and MRV. Considering the scale of the expected impacts over the carbon balance and the expected information that could be produced a proposal for the integration of CBM is made. The steps for setting up CBM schemes are presented, as part of this process it would be possible to define what variables should be monitored, by whom, how, and with what frequency, also taking into consideration how the data may be made compatible with national monitoring systems. Specific methods and equipment for data collection have been described in the *White Paper: Opportunities and challenges for integrating CBM into MRV systems for REDD+ in Mexico* (Balderas Torres, 2013), which is also part of this consultancy. The information of the projects is based on the description as stated in the Project Proposals made by the project leaders and selected as part of Alliance, the answers to a questionnaire sent to project leaders (Appendix 1) and interviews with projects leaders and coordinators.

Figure 1. Early action areas. ***Alianza Mexico REDD+ (image provided by TNC).***

1.2 Projects

This section presents the general background and description of the projects being implemented in the different EAA in México. In this first stage the Alliance is funding specific projects for a period of three years starting in 2013. Each project will be identified by the name of the leading organisation as described in the project proposal. The information is based on the proposals submitted to the Alliance and the information gathered from interviews and a questionnaire sent to project leaders in summer 2013.

1.2.1 Sierra Tarahumara, Chihuahua

1.2.1.1 Addressing Deforestation and Forest Degradation in the Turuachi River Basin (Ejido Chinatú)(Project: Ejido Chinatu)[2].

The objective of the project proposed by the ejido Chinatu is to restore the Turuachi river basin located in the state of Chihuahua; for this, the project will implement natural resource preservation practices, including sustainable forest management and the implementation of community planning instruments. The part of the basin to be restored is located in the ejido Chinatu, in the municipality of Guadalupe y Calvo that hosts nine indigenous communities; the project is developed in the Tarahumara region. The ejido has an area of 113,736 ha (12% of the municipality's area), from which 95,137 ha are forest (15% of the total municipality's forest land); out of this land, 42,609 ha are the exploitable woods pine and oak. The project will be developed in an area with forest-land use vocation of 86,090 ha specifically in the 5,000 ha of the Turuachi river basin where there are 9 communities all part of the ejido Chinatu.

The ejido Chinatu has a forest management plans that include timber extraction and the use of deadwood. The management plans in the state of Chihuahua are under revision, the objective is to increase forest productivity; one of the changes will be the harvest of trees of smaller diameter (from a previous limit of 25 cm down to 10 cm DBH). External technical consultants will be hired to develop a local forest dasometric inventory targeting

[2] Based on the proposal submitted by Ejido Chinatu (2012): *Cuenca Rio Turuachi con Atencion a Areas Criticas de Deforestacion y Degradacion Forestal.*

living biomass and dead organic matter and litter. The information of the inventory will be processed in a GIS by the consultants. There is local information on the potential for forest growth. For reforestation practices (*Pinus engelmani*), initial densities will be 1,800 to 2,200 trees per hectare; DBH between 5-10 cm are expected after years, and 30 cm after 35 years with a final density of 300 trees per ha.

The main activities of the project are focused on the prevention of forest fires, the implementation of improved forest and agroforestry management and soil restoration based on local planning. The project will benefit 200 landowners in the ejido. Two fire brigades and two soil conservation brigades will be organized and trained: 108 inhabitants will be organized to prevent and combat wildfires, restore soils, build fire-breakers, make black lines along highways, and install filtrating dams to conserve soil and favor infiltration. Specific activities include the creation of 20 km of gap fire-breakers, controlled fires over 100 ha, and 10 km of black lines. Deadwood will be arranged to prevent erosion in six springs to preserve them (5,000 m), and 10 m^3 of filtrating dams will be installed per spring; 10 ha will be reforested. The project will also include capacity building to increase the awareness of the communities, to communicate the needs of implementing the safeguards, and to plan and develop sustainable management practices (e.g. agroforestry, sustainable ranching, organic agriculture and permaculture).

It is expected that the activities will contribute to reduce emissions from deforestation and forest degradation in the ejido and the river basin; although there are no local reference emission levels the main processes driving emissions are associated to forest fires, land use change and illegal logging which also affect the provision of other environmental services (e.g. biodiversity and water infiltration). Even though 80% of the locals' economy depends on forestry, forests and other natural resources keep degrading, according to the project description due to the lack of awareness of the locals. Nearly 25% of the population does not have access to electricity and rely in some extent on timber related products for lighting (i.e. *ocote*). One of the benefits expected is the generation of local, temporal, employment for the implementation of the activities (forest management and soil restoration practices). As part of the project there will be two follow up meetings planned per month. Although there are not specific activities included for the creation of a local MRV committee or a community-monitoring brigade it could be considered for the second and third years of the project.

1.2.1.2 REDD+ preparedness for the ejidos of the municipality of Guadalupe y Calvo, Chihuahua. (Project: Ejido Trinidad)[3].

The project's main objective is to achieve the sustainable and integral development of three ejidos from the Guadalupe y Calvo municipality in Chihuahua. It aims to contribute to a development model that should be economically competitive, socially and culturally equitable, ecologically sustainable and regionally balanced. The municipality has a total population of 53,499 and an area of 9629.05 km^2 from which 65.2% is covered by forestland (pine-oak forests). Other main land uses are agriculture and grasslands for grazing, the main crops harvested in the municipality are maize, oatmeal and bean.

[3] Based on the proposal submitted by Ejido La Trinidad (2012): *Proyecto Integral Ambiental para La Preparación de REDD+ en ejidos del municipio de Guadalupe y Calvo, Chihuahua.*

The ejidos that will be involved in the project are La Trinidad (48,013 ha), El Nopal (4,417 ha), and Catedral (35,600 ha) involving 11 communities overall. Land is communally owned and is used mainly in forestry. The project is proposed by Ejido La Trinidad in collaboration with other actors (i.e. a consultancy firm, a civil association and a local university). The ejidos have forest management plans for timber extraction; La Trinidad has been certified under the FSC. The ejidos have experience with reforestation practices, PES programs (i.e. hydrological services, 5076.06 ha in La Trinidad, 462.01 ha in El Nopal), soil conservation and restoration practices and wildlife management.

The project is based on three general strategies: the creation of local planning instruments for REDD+ (local land use plans), capacity building and communication of REDD+ and the implementation of strategies for fire prevention and natural resource management. The first year a survey will be prepared and applied to produce the local baseline of the project areas. The land use plans will identify areas for conservation, restoration, exploitation of natural resources and provision of environmental services. Local maps for land use plans will be elaborated by external consultants. The communication campaign will include the design of poster and other materials to disseminate the information of the activities to reduce emissions from deforestation and forest degradation. Fire brigades will be created trained and equipped by initiative of each ejido. Other activities to be implemented areas the restoration of degraded areas and implementation of pilot parcels for improved maize production, organic agriculture, agroforestry practices and biological pest control. At the end the impact of the project will be evaluated in the three ejidos.

The project is located at the Sierra Tarahumara, the most important natural reserve of Northern Mexico, which has been affected by deforestation, wildfires, overgrazing, water pollution, overexploited water reserves, among others. Currently, communities are not aware of good practices for forest and natural resources management, and have no access to technology for environmentally friendly agriculture. It is expected that the project will generate benefits for the local population in the economic, environmental and social contexts. The aims are to increase alimentary self-sufficiency and increase income; conserve forest cover and improve forest management, reduce emissions from deforestation and degradation, conserve soils and restore ecosystems, and increase quality of life, reduce migration and increase social capital.

1.2.2 Chiapas

1.2.2.1 Implementation of natural resources management strategies and activities in Villaflores municipality, Chiapas, for the adaptation and mitigation of climate change effects. (Project: BIOMASA)[4].

The project was proposed by Biodiversidad, Medio Ambiente, Suelo y Agua, A.C. Its main objective is to boost pilot models of productive and environmental alternatives to the use fire in four microbasins in the Villaflores municipality, located in the Sierra Madre de Chiapas. This will be achieved by implementing sustainable forest management strategies

[4] Based on the proposal submitted by BIOMASA (2012): *Implementación de estrategias y actividades de manejo de recursos naturales en el municipio de Villaflores, Chiapas, para la adaptación y mitigación de los efectos del cambio climático.*

and environmental safeguards, and by strengthening local abilities to contribute to the communities' REDD+ preparation. The project will be located in the limit and buffer zones of the "La Sepultura" biosphere reserve and the natural resources protection area "La Frailescana". Villaflores has a 1232.2 km² area, from which 50,000 ha are pine, oak, and evergreen forests. The four microbasins of the El Tablón river, where the project will take place, are Champerico, Nuevo Horizonte, Villahermosa, and Nueva Palestina. These hold 11 ejidos, a 20,000 ha surface (from which 15 000 are commonly owned), and 2,950 inhabitants.

The zone has undergone an increase of human activities including the use of fire, which has disturbed natural processes ecosystems, causing soil losses, resulting in an increment of agricultural areas. In order to decrease deforestation and degradation, restore affected areas, and increase tree cover to increment carbon stocks, the project will work on three aspects: The productive aspect includes commercialization of organic coffee and *camedor* palm, and boosting sustainable livestock through pastureland management systems (demonstration modules for the development of pastureland management systems as an alternative to livestock will be installed). Equipment for organic coffee production and transformation will be purchased and a communal model for *camedor* palm production will be executed in order to develop productive activities. The environmental aspect involves reducing wildfire risks and bringing working alternatives to communities by valorising existent resources. Fire prevention activities will be implemented (i.e. installing firebrakes, prescribed burning, black lines). The social aspect regards implementing organizing and planning schemes for communities developed by locals in a participative way. Field School (Escuela de Campo) models will be generated for sustainable livestock and fire management. Community promoters will transmit this knowledge to their fellow community inhabitants.

Through these activities, the following results will be obtained. Producers from the 4 microbasins will develop alternative productive activities that promote employment creation, resource use, and economical income as part of sustainable rural development. They will also strengthen local abilities in sustainable productive and environmental topics as an alternative to using fire in their lands. Communities will develop a community organization and land-use planning model that will assist institutional coordination of fire management. Environmental alternatives to prepare for MREDD+ will be adopted such as the creation of an evaluation model for environmental services generated in the community and a model for measuring stocked carbon.

1.2.2.2 Integrated strategy for low emission rural development in La Frailescana, Chiapas Mexico (Project: AMBIO)[5].

The project presented by Cooperativa AMBIO S.C. de R.L. intends to create a low emission rural development strategy in the area by leading productive activities toward sustainable practices and participative planning processes in order to improve the legal framework to favor social participation. Located at the Sierra Madre de Chiapas, the Natural Resources Protection Area (APRN) La Frailescana is an important biological corridor that provides

[5] Based on the proposal submitted by AMBIO (2012): *Estrategia Integral de desarrollo rural de bajas emisiones en La Frailescana, Chiapas México.*

several environmental services. It is located in four municipalities of Chiapas (La Concordia, Ángel Albino Corso, Jiquipilas, and Villaflores); 25.5% of these municipalities' area is forestland, 26.4% is agricultural, and 14.9% is grassland. The most important agricultural products are bean, maize, and sorghum. Existing vegetation in APRN La Frailescana includes low and high evergreen forest, low and high deciduous forest, and oak and pine forests, however these are decreasing. The most abundant covers are secondary vegetation, grasslands and seasonal agricultural lands. The project will benefit 16 communities, accounting for more than a thousand families distributed in more than 30,000 ha.

The current Management Plan is in review and the APRN has few resources assigned to it. The deforestation ratio has been increasing. Previous works on community forest management have been implemented in the area with positive effects. However, several programs to preserve carbon pools have existed and failed because coordination between institutions and local stakeholders has been difficult.

The project aims to protect, conserve and manage forest ecosystems sustainably, increase carbon pools and reduce wildfire frequency. Technical and organizational advice will be provided to communities and private owners. Workshops will take place to elaborate development plans for low emission forest integral management and implement pilot activities on the matter. Practices such as effective usage of fertilizers and biofertilizers, conservation tillage, sustainable livestock, soil erosion reduction and organic matter increasing practices, and installation of "protein banks" will be implemented. Land use management guidelines will be elaborated and updated. Meetings and programs for communities to participate, generate proposals, form alliances between communities, and plan a communication spreading strategy will be organized. All the information obtained in foru and from experiences will be documented and disseminated.

APRN La Frailescana communities will participate in building instruments to improve their land use management in order to regulate resource use and access and to develop and strengthen management abilities and capacities. Planning processes will be enhanced by communal land use planning in order to obtain social, economic and environmental benefits encouraging participation from ejidos' commissioners in meetings. Management activities will be performed by communities to implement activities identified with high priority. A participatory discussion forum will be organized to analyse and discuss on the internal regulations jurisdiction base in order to improve this framework. Low carbon emission agricultural activities and pilot activities on integrated forest management will be implemented and communities will learn from each other's experiences to employ good agricultural practices. Community members will frequently participate in the region's councils.

1.2.2.3 ocial cohesion and land use management: bases for the construction of MREDD+ in Chiapas (Project: IDESMAC)[6].

The project's objective is to implement a strategy for territorial development at different levels to reduce emissions from degradation and deforestation in eight agricultural sites from Reserva de la Biósfera El Triunfo (REBITRI). The project was proposed by Instituto para el Desarrollo Sustentable en Mesoamérica, A.C. REBITRI has a 119,177 ha surface with ten different types of vegetation: deciduous and evergreen forests, oak-pine forest and cloud forest. The reserve holds endemic and endangered species. It works as a rainwater catchment area to feed Mexico's most important hydroelectric system and nine rivers that work as a water source for different towns and irrigation systems. The agricultural sites are located in four municipalities from the state of Chiapas: Ángel Albino Corzo (Santa Rita and Querétaro), La Concordia (Plan de la Libertad and La Concordia), Montecristo de Guerrero (Toluca and Montecristo de Guerrero), and Siltepec (Ángel Díaz and Honduras) these cover 48,653 ha and hosts 3,018 people (total population of the four municipalities is 115 753). Main productive activities are agriculture, palm gathering, commerce, crafting and livestock.

Land use has changed quickly from cloud forest and rainforest to shade-grown coffee plantations, a process to implement organic coffee production started in the early 2000's. Due to male migration, women and youngsters are in charge of the land. People have little community life and lack social cohesion and land organization.

In order to achieve carbon balance oriented land use management plans, a committee will be created, workshops will be developed and the land's cartography will be elaborated. Training on GIS, MRV and safeguarding will be provided. Locals will negotiate stocks for the creation of savings funds to finance carbon emission reducing projects. Meetings will be held to operate a scheme for implementing forest management good practices and design a gender certification system for coffee organizations, establishing REDD+ policies and programs, including social and biodiversity benefits. Workshops will be held to diagnose and document gathered information to elaborate improvement plans and define strategies for monitoring safeguards regarding gender, generational perspective, governance and social cohesion.

As a result, communal territorial jurisdictions focused on carbon balance will be elaborated, which allow the generation of strategic development actions. An indicator system to build an improvement plan to acquire monitoring abilities in order to comply with gender, generational perspective, governance and social cohesion safeguarding will be created. Measurement, reporting and verifying by a participative monitoring and evaluating system for ecosystem services will be achieved. Communities will create a self-financing mechanism for productive projects focused on reducing carbon emissions chosen by them. A best practices scheme for forest management so activities based on environmental services can be profitable will be implemented.

[6] Based on the proposal submitted by IDESMAC (2012): *Cohesión social y ordenamiento territorial: bases para la construcción de MREDD+ en Chiapas.*

A multi-topic territorial Learning Community to monitor deforestation, degradation, safeguards and calculate emissions from productive systems will be created. This aims to link this community with other REDD+ regions.

1.2.3 Yucatan Peninsula

1.2.3.1 Alliance for the sustainable development of the Puuc and Chenes region, and the implementation of REDD+ objectives (Project: BIOASESORES)[7].

The objective is to design, plan, and develop a concept and pilot model of MREDD+ development in four pieces of land in the Puuc-Chenes region in the municipalities of Tekax and Oxkutzcab in Yucatán and Hopelchen in Campeche through low carbon emission activities, capacity building and communication development, and the implementation of safeguards and MRV system. The ejidos participating are: San Agustin (Tekax), Yaaxachen (Oxkutzcab), Bolochen and Yaxche (Hopelchen). The total influence area is 105,541 ha. The existent ecosystem is medium deciduous forest, however the conditions of resources vary from one community to another. The main crops grown in these municipalities are maize and pastures; however, the land is mainly forest, as an average 85% of the surface belongs to this category. BIOASESORES A.C. proposed the project.

The degradation of natural resources is caused by poorly planned policies with conflicting approaches without a long-term vision. These policies have also led to degradation of traditional social cohesion. Both chosen regions have Mayan cultural aspects and implement the traditional Mayan maize production system.

The purpose of the project is to implement better practices and encourage the preservation of traditional activities with a communal development approach. Project plan includes fire management practices, improved management of fallows, improved maize production, pastureland management and agroforestry plans. Strategic planning workshops to implement good practices to reduce GHG emissions will be offered. Three productive systems will be established in pilot pieces of land in each agricultural nucleus. To pursue an open dialogue between community participants, the formation of producer networks and forums will be boosted so learned experiences can be shared. Environmental education programs and training processes will be implemented covering technical and conceptual aspects. An initial diagnosis study will be made, as well as four participative ethnical-ecological studies to define the current socio-environmental conditions. Recovered information from forums, studies and implemented activities will be used to create an updated information platform that will assist in decision-making. A Local committee will be created to manage, monitor, and promote local projects.

Policies and programs linked to REDD+ will be developed through a committee in which representatives of the three governmental levels and resource users will participate. Better

[7] Based on the proposal submitted by BIOASESORES (2012): *Alianza para el desarrollo sustentable de la región Puuc y Chenes, y la implementación de los objetivos REDD+*.

practices will be adopted and new capacities will be acquired by implementing an intervention strategy built according to current socio-environmental conditions. Resource users will possess a good practice portfolio that will progressively be incorporated to their productive means and ways. These processes will allow the protection and conservation of local traditional knowledge and the integration of the population to the project area. Processes for strengthening, appropriating, and defending territory, culture, social structure, local economy, and gender complementarity will be generated. A scheme to monitor and evaluate the project will be designed and GHG emissions and carbon sequestration will be measured in each parcel.

1.2.3.2 Implementation of REDD+ early actions through a land management model and the construction of a local governance mechanism in the Holpelchén municipality, Campeche (Project: PRONATURA)[8].

The project was proposed by Pronatura Península de Yucatán, A.C. Its objective is to strengthen the technical and organizational capacities of the Puuc-Chenes corridor through the development of local and regional land management and governance mechanisms that will link rural development and sustainable management programs in Hopelchén. The project will be located in the Puuc-Chenes region in Hopelchén, Campeche, which total surface is 89% forest. Existing vegetation are forests, herbaceous and shrub secondary vegetation, grasslands, and seasonal agriculture. The region's importance resides in the fact that it is a corridor between two ecological reserves. Three ejidos were chosen for this project: Chun ek (15,700 ha, 124 inhabitants, 23 communal land owners), Ramón Corona (3,854 ha and 39 communal land owners), and Francisco J. Mújica (3,700 ha and 37 communal land owners). This covers 33% of Hopelchén's surface. Hopelchén's population is mainly indigenous (76%). It is estimated that the project will benefit 90 people directly and 200 indirectly.

The region has suffered from land use change to develop agricultural and livestock activities, establishing important commercial plantations. Lack of proper technology, infrastructure, policies, and dialogue space has contributed to land degradation. Government programs for the zone have different sector approaches that limit their application for land development as a whole. Projects that have been previously proposed by institutions lack planning and future projection, so they tend to disappear.

The Hopelchén Alliance (Alianza Hopelchén), which covers federal, state, municipal and ejido's entities, will be created. This alliance will support local processes and elaborate a proposal to integrate the implementation of REDD+ activities and a local governance mechanism to the Municipal Development Plan. The alliance members will be qualified to generate low emission productive models; a guiding document and a technical and administrative operation agreement will be elaborated.

A pilot region to implement a low emission development model will be chosen according to a communication, coordination and social participation strategy between producers.

[8] Based on the proposal submitted by PRONATURA (2012): *Implementación de acciones tempranas REDD+ a través de un modelo de gestión territorial y la construcción de un mecanismo de gobernanza local en el municipio de Hopelchén, Campeche.*

Ecotourism development in Chun ek will be considered and gender equity will be promoted. Support from the government to develop these activities will be sought. The Municipal Council for Rural Sustainable Development will work as an interaction space between social organizations and government.

The Hopelchén municipality will provide the basis to establish a local organism as an instrument of land management and governance. The alliance will acquire a common agenda and the technical and administrative abilities to establish a local development agency. A pilot region for the development of a low emission development model for apiarian and forestry activities will be defined. The alliance will produce a monitoring system to quantify GHG emissions, carbon sequestration, and deforestation and degradation processes in the region. This system will lead to the development of community monitoring and protocol testing schemes. Performed actions will strengthen local capacities to increase innovation and interaction between involved sectors, providing suitable training.

1.2.3.3 Governance strengthening and productive activities reconversion in the UMAFOR 3106 to reduce deforestation and degradation (Project: NUKUCH KA AX)[9].

The project aims to develop and implement pilot parcels in five ejidos of the Forest Management Unit (UMAFOR) 3106 by developing capacities and transforming productive activities through intensive pastureland management systems, improved maize field, and organic agriculture. It was proposed by Asocioación Regional de Agrosilvicultores del Sur de Yucatán Nukuch Ka ax A.C. The chosen ejidos and the municipality in which they are located are described as follows: Tekax has 87% to forest and 10% to agriculture; San Juan Tekax and Becanchpen (10,069 ha and 298 communal land owners, 36% of surface is covered by secondary vegetation, 18.2% by dry forest, and 45.5% by agricultural land); Tzucacab, 74% of the territory is occupied by forest and 21% by agriculture; San Isidro (2,031.5 ha and 25 communal land owners) and Ekbalam. From Oxkutzcab, whose land is occupied 78% by forest-land and 21% by agriculture; Xul (will be partly reforested to diversify activities).

The UMAFOR 3106 suffers deforestation, mostly from local populations. However, according to the Regional Forest Study (Estudio Regional Forestal), forestland is increasing. Nevertheless, secondary vegetation surpasses natural vegetation (low and medium dry forest) and is intercalated with agricultural systems. Ejidos decided and manifested their interest to implement these projects. San Juan Tekax is highly organized and interested in improving livestock activities, pastureland management systems are included in its land use development framework, but have not been implemented yet. San Isidro is highly organized and technified, improved maize fields and pastureland management systems will be implemented as a regional program for environmental services for carbon management showed its viability. Ekbalam is interested to be reforested for carbon sequestration and to improve livestock.

Interested producers will be identified so they can attend workshops on Intensive pastureland management systems, seed gathering, improved maize fields, organic

[9] Based on the proposal submitted by NUKUCH KA AX (2012): *Fortalecimiento de la goberanza y reonversión de actividades productivas en la UMAFOR 3106 para reducir la deforestación y degradación.*

agriculture, and bio-fertilizers and bio-fungicides elaboration. Land to establish pilot parcels for intensive pastureland management systems will be selected and provided with means, tools and equipment. Actions to observe, monitor, verify and recover information will be performed. Strategies include training on business plans, a work schedule, workshops, and bonding with companies that consume the generated products and services will be developed to commercialize the obtained products.

The intensive pastureland management system will be applied in five pilot parcels (2 ha each), improved maize fields will be applied in three (1 ha each), and organic agriculture in one (1 ha), meaning that 10 pilot parcels will be settled in a 15 ha area. Producers will be qualified in REDD+ topics and low carbon emission activities. Ejidos will develop, implement, use, and monitor pilot parcels with any of the chosen activities. Handbooks and informative posters will be printed out and published with technical information gathered from technical field visits and executed activities. Learned lessons and experiences will be socially shared through forums and results will be documented. Ejidos will learn and implement commercialization strategies for the products obtained from implemented pilot parcels. It is expected for these projects to become an employment source, and that a larger portion of the communities' population to learn about and identify the benefits that can be obtained from REDD+ strategies and volunteer carbon sequestration projects.

1.2.4 Cutzamala Basin

1.2.4.1 Construction of an integrated model to implement REDD+ in the Oriental basins of the Cutzamala System (Project: ALTERNARE)[10].

The Project aims to generate an integrated model to implement MREDD+ projects according to current national reality. It will be placed in the San Juan River basin, which belongs to the Sierra Chincua Reserva de la Biósfera Mariposa Monarca, and is located in the Zitácuaro municipality, in Michoacán. A 13,700 ha are (80% of municipal forestland) will be influenced by the project, impacting 13,500 people (9% of the municipal population) that currently live with high marginalization rates. The target audience is the local ejidos and communities, as well as public officials and civil organizations. The institution that will be in charge of developing the project is Aliaza Alternare-UNAM, whose members already have experience implementing similar projects.

The area has the potential of sequestrating between 64 and 265 tC ha^{-1}, making it an important carbon reservoir. Previous efforts have been made to protect the forestland in the area, like declaring Natural Protected Areas and establishing PES programs. However, forests keep degrading. The project intends to identify the reason why these efforts have not been successful, and strengthen the target audience's capacities to implement this kind of projects.

A handbook to implement REDD+ projects and MRV activities will be built by identifying possible policies, programs, and incentives to be applied considering current

[10] Based on the proposal submitted by ALTERNARE (2012): *Construcción de un modelo integral para la implementación de REDD+ en las cuencas Orientales del Sistema Cutzamala.*

socioeconomic conditions and ecosystems, and acknowledging possible errors in current programs. Further on, the project will be reviewed, evaluated and amended. Communities will develop internal teachers to transmit knowledge to their fellow members in order to preserve the project. Documents will be created to inform about objectives and MRV activities for REDD+ projects. One directed to land owners to develop abilities, and the other one aimed to public officials and civil organizations to promote and facilitate these activities in order to guarantee the projects' effectiveness. The purpose of these documents is to apply the acquired knowledge in two projects created by the communities. Eventually, a model to evaluate the effectiveness of MRV projects will be created.

A systematic model for the target audience to guide and develop capabilities to apply REDD+ projects will be created. Strategic links with other organizations will be developed to learn from their experiences, aiming for communities to learn from one another. For the ejidos and communities from Rio San Juan, a document will be elaborated to explain possible low carbon emission, sustainable forest management, and ecosystem preservation activities that can be implemented. On the other hand, for public officials and civil organizations, the document will develop abilities to promote, facilitate, and implement REDD+ projects. These documents will let people involved know the policies, programs, and projects related to REDD+ implementation according to local conditions. These results will generate confidence for decision makers about available possibilities for different circumstances. Communities and ejidos will benefit and take possession of the MREDD+ productive projects, and be able to implement projects themselves.

1.2.4.2 REDD+ Pilot project in Amanalco (Project: CCMSS)[11].

The project proposed by Consejo Civil Mexicano para la Silvicultura Sostenible, A.C (CCMSS). aims to build a management model for the Amanalco-Valle de Bravo basin in order to contribute with REDD+ through facilitating agreements between local stakeholders and establishing communitarian pilot experiences. The basin (61,593 ha) provides wooded and non-wooded products, environmental services (water catchment, carbon sequestration, scenic beauty), it is the water source of inhabitants from Mexico City and State of Mexico. Ecosystems found in the area are 35444 ha of forestland (fir, pine, pine-oak, dry forest), 18,000 ha of agriculture land, 5,300 ha of grassland, and 1,770 ha of water bodies. It is located mainly in the municipalities of Amanalco and Valle de Bravo. 50% of Amanalco's surface is forestland, and 40% is agriculture, for Valle de Bravo these land uses occupy 18% and 46% of the municipality's surface, respectively. The project is focused on the Ejidos' Union (15647 ha), composed of the ejidos: San Juan, San Jerónimo, San Lucas, Amanalco, Agua Bendita, El Capulín, El Potrero, San Bartolo, Corral de Piedra, Rincón de Guadalupe, and San Miguel Tenextepec. Overall, the project will train 120 people and 1,800 ejido holders will benefit from it.

Rural economies and local institutions in the basin have weakened. Additionally, demand for land (for urbanization), water, and other resources has grown. Current ejidos are in charge of forest use, protection, and conservation as well as wood industrialization however, public policies elaborated for the region ignore basin management, deforestation and degradation of forests and soils.

[11] Based on the proposal submitted by CCMSS (2012): *Proyecto piloto de REDD+ en Amanalco.*

CCMSS has been working with forest communities for 16 years, has been working in the zone for six years and has participated in several REDD+ projects.

Technical and institutional capabilities will be increased to pursue basin level integration and coordination of public policies, as well as integrated management of landscapes, basins, and territories, including better practices for resource and productive systems management. Local communities will participate in planning, analysing and executing projects, and will improve them by sharing their experiences, planning tools, and better management practices. Local governance capacities will be strengthened to focus on sustainable land and rural development and fostering land planning instruments. The Union will assist delegates and organize a participative process and a control and vigilance committee. Workshops and technical assistance will be provided to develop REDD+ plans that the union will generate and present to decision-makers.

Four ejidos (5,000 ha) from the Ejidos Union will elaborate a community REDD+ pilot plan each. Communities will be capable of planning, implementing and monitoring REDD+ projects, as well as of employing better land management practices. The plans will attend degradation causes, and restore damaged areas. The union will strengthen forest management capacities in order to reach sustainability, efficiency and transparency, and increase acquired benefits. The whole basin will benefit from developed policies and programs seeking integrated management of the land, and designed mechanisms for finance and benefit distribution (a PES scheme will be established). Other benefits will be the established collaboration bonds among institutions to analyse methodologies and impacts for projects applied to the basin, learning from one another by exchanging experiences.

1.2.5 Oaxaca

1.2.5.1 Integrated plan for the conservation and continuity of the biological corridor in the Rincón de Ixtlán zone, Oaxaca, a contribution to carbon emission reduction (Project: MESOFILO)[12].

The project proposed by Grupo Mesófilo A.C. aims to implement in a participative way actions that may fortify the conservation of natural resources and incentive procedures to assure the continuity of ecosystems in the Rincón de Ixtlán zone, Sierra Norte de Oaxaca, as a contribution to carbon emission reduction. The project covers an area of 25,371 ha (35% of the municipality's surface) of communally owned land and is located in Sierra Norte. Chinantla, in Ixtlán de Juárez, Oaxaca. Involved localities are: San Miguel Tiltepec (9,769.82 ha), San Juan Yagila (1,576.61 ha), Santa Cruz Yagavila (1,469.03 ha), Santa María Zoogochí (687.21 ha). The project intends to benefit 250 people directly and 1,800 people indirectly (27% of the municipality's total population). Marginalization in the area is high.

The leading economic activity in the zone is agriculture, mainly maize. Lands used for this purpose have high erosion rates and nutrient loss. Even when locals have extensive

[12] Based on the proposal submitted by MESOFILO (2013): *Plan integral para la conservación y continuidad del corredor biológico en la zona del Rincón de Ixtlán, Oaxaca, una contribución a la reducción de emisiones de carbono.*

experience in farming, good practice knowledge is being lost. Regulations for wood extraction exist in current land use management plans. The community of San Juan Yagila currently has a forest management program, however it is irregularly followed. However, most landowners are more interested in agricultural activated than forestry.

Communal landowner will be trained on soil conservation and restoration, biodiversity monitoring, sustainable forest management, and fire control. Characterization and diagnostic studies of agroecosystems will be performed. Firewood saving stoves will be installed and their performance, emission reductions, and environmental and socio-economical impact will be evaluated. Committees will be formed to monitor biodiversity, preserve forests, and prevent fires.

The following results are expected. Diversified agroecosystems management will be accomplished; the implementation of fallow systems that include species with market value is proposed in order to preserve forestlands allowing its sustainable use. Fuelwood will be sustainably used and emission reduction from the reduction of fuelwood consumption will be monitored. Social structure will be consolidated to manage biodiversity sustainably. Provided training will give locals the ability to monitor forests and generate proposals and projects to benefit conservation and their communities. A fire prevention program will be established, and fire brigades will be formed.

1.2.5.2 Microregional model to reduce degradation and increment forest cover (juniper and oak) in the Alta Mixteca Oaxaqueña in the Mexico REDD+ strategy framework (Project: AMBIENTARE)[13].

The main objective of the project is to develop land and forest resource management instruments and to strengthen capacities related to different REDD+ components to avoid degradation and lead to better management practices in three communities and two ejidos in Santa Catarina Zapoquila, San Juan Suchitepec, and San Francisco Teopan in Oaxaca. The zone holds a population of 1,259 people, distributed in 16 rural communities living with high poverty and marginalization conditions. The project will benefit 75 people directly and 831 people indirectly. The ecosystems found in the area are coniferous and hardwood forests. Around 22,223 ha (75% of the municipalities' total area) have no management plan and 4,845 ha are productive and settlement areas. From the total area, 59% is secondary vegetation, 22% is grassland and 19% is forest-land. The project was proposed by AMBIENTARE, A.C.

Currently, there is no forest management plan or compensatory activities to use timber/forests that allow the expansion of forest cover and enhancement of carbon pools. The current land use regulations were neither created nor approved by the land holders. SEMARNAT and CONAFOR have established soil conservation projects and ditches to be reforested, however there are no seedlings of local species to do this.

The forest area will be visited to gather information in order to prepare an initial diagnosis. It will include the description of the forest's condition, structure, size, recovery,

[13] Based on the proposal submitted by AMBIENTARE (2013): *Modelo microregional para evitar la degradación e incrementar la cobertura de los bosques de táscate(+) y encino(+) de la alta mixteca oaxaqueña en el marco de la estrategia REDD+-México.*

available forestry options, and actions to prevent wildfires and plagues. A nursery to produce saplings of local species will be established. Locals will be trained to develop tasks such as seed collection, seed treatment, soil, land conditioning, and planting. A follow-up committee for each agrarian community, participative workshops, and geospatial data recollection training will be implemented in order to establish land use management plans. Community technicians will be trained on REDD+ strategy, forest management and monitoring based on carbon sequestration, and map reading and making. A communication committee will be created to implement mechanisms to disseminate information about the project

A Forest Resource Diagnosis with strategic actions to manage the juniper forest will be prepared. A local 200 m^2 nursery will be established and community inhabitants will reproduce forest species. Workshops will be provided to generate technical knowledge or elements to measure and validate carbon sequestration and activities for forest management, protection, and recovery according to REDD+. A community approved land use management framework for each of the ejidos will be elaborated, as well as a Regional land use management framework for the Mixteca Alta. These will follow the agrarian law with strategic guidelines, actions, and projects to respond for productive, conservation, management, and human settlement areas. The community technicians will elaborate a newsletter to disseminate information about the project and its benefits.

1.2.5.3 MRV Protocol development for the structure, biomass, carbon sequestration and environmental in the Unión de Comunidades Productoras Forestales Zapotecos-Chinantecos de la Sierra Juárez de R.I. (UZACHI) and Anexes (Project: UZACHI)[14].

The Project was suggested by the UZACHI (union of local producers). Its main objective is to develop a participative community monitoring scheme that allows the measurement of the carbon reserves increment based on data from de National Forest Inventory and measurement units, as well as measurement of emission levels linked to better practices on natural resources management and considering monitoring of water and biodiversity environmental co-benefits. The project will reside in the following communities: La Trinidad, Capulálpam de Méndez, Santiago Xiacuí, Santa María Jaltianguis, San Juan Evangelista Analco (all of these located in the Sierra Norte), San Juan Ozolotepec, and Santa María Lachixonace (located in the Sierra Sur). It covers an area of 57,464.894 ha.

UZACHI is located in an area known as “Northern Oaxaca Mountain System”, where two mountain systems from the Gulf of Mexico and from the coast of the Pacific Ocean converge. This convergence results in a complex physiography that makes the region susceptible to climate change effects. The problem resides in the difficulty for the communities to access regulatory and voluntary carbon markets, as well as benefits form forest management good practices, biodiversity preservation, and PES.

[14] Based on the proposal submitted by UZACHI (2013): *Desarrollo de protocolos para el MRV de la estructura, biomasa, captura de carbono, y co-beneficios ambientales en la Unión de Comunidades Productoras Forestales Zapotecos-Chinantecos de la Sierra Juárez de R. I. (UZACHI) y Anexas.*

IPCCC's Good Practice Guidance for Land Use, Land-Use Change and Forestry will be followed in order to measure and monitor the increment in carbon pools, as well as on reduced emissions linked to better forestry practices. Remote sensors, (satellite images, digital orthophotos) and direct field measurement methods will be used to detect changes in vegetation. Databases containing descriptive and spatial information will be designed and developed. These will allow capturing, classifying, and verifying basic information from the national forest inventory and geographic attributes from the study area according to their qualitative and quantitative characteristics. Good management and conservation practices of forest resources, water and biodiversity will be performed. Community land management guidelines will be formulated.

The project will benefit 54 people directly and 2041 communal landowners indirectly. It ill include the monitoring of changes in forest land cover and evaluation of carbon pools changes and co-benefits from water and biodiversity. Social safeguards will be implemented. Reports of results on the MRV system and GHG emissions will be elaborated and information will be publicly available and constantly updated.

1.2.6 Jalisco[15]

The Junta Intermunicipal de Medio Ambiente para la Gestión Integral de la Cuenca Baja de Río Ayuquila (JIRA) is an association uniting 10 municipalities within the area with a view to coordinating improved environmental management. It is recognized as an innovative institution that has a grassroots basis that could possibly be a model for subnational implementation of REDD+. The costs of the organization are paid partly by subscription from the municipalities, but in addition it receives funds from CONAFOR and through various externally funded projects. The work on REDD+ as a CONAFOR Early Action Area that has been carried out for CONAFOR for example is funded by AFD (Agence France de Developement) via CONAFOR. The area has also been included by the Alianza in their programme as an early action area although no specific projects have been funded yet.

The area of the area under JIRA is in the central part of the basin of the Rio Ayuquila, in western Jalisco state and includes part of the Manatlan Biosphere reserve. It is just over 400,000 ha in total area and currently nearly 29% of its surface is covered with dry forest (selva baja), 12.5% with pine-oak forest, and 8% oak. Much smaller areas carry other forest types (mixed pine-oak, cloud forest, firs, etc). It is an area that has in the past been subject to quite high rates of deforestation, particularly in the selva bajas, and most of the forest is quite degraded; the selva baja is mostly used in a shifting cultivation system which means that, depending on the length of the fallow, which can be anything from 5 to 20 years, much of it is recuperating as secondary forest. JIRA was one for the first areas to be selected as a pilot project area for REDD+ by CONAFOR owing to its earlier environmental work at the community level and the good relations the organization has with communities and with universities in the area (U of Guadalajara, Autlan campus).

[15] The information for this section was provided by Dr. Margaret Skutsch who is leading the project, 'Estudio para determinar el estado de degradación y potencial derestauración en ecosistemas forestales bajo manejo de la Cuenca Baja del Río Ayuquila – Parte I' in Jalisco.

REDD+ activities up to now have centred on MRV. In 2010 JIRA set up a contact with CIGA-UNAM and the University of Guadalajara to carry out studies to help develop a REDD+ baseline and MRV system for the area. The report on the first phase, which dealt with deforestation (¨Análisis de cambio de cobertura y uso del suelo, escenario de referencia de carbono y diseño preliminar del mecanismo de Monitoreo, Reporte y Verificación en los diez municipios de la Junta Intermunicipal del Río Ayuquila, Jalisco¨) was delivered on 10 may 2012 and is available on the website http://redd.ciga.unam.mx. The second phase of the Project focuses on degradation; a final report has been prepared but is not yet in the public domain. As yet there have been no implementation projects carried out, as JIRA works in a highly participatory way and such projects are still under discussion at community level.

The analysis of deforestation was done for 1995-2003 and 2003 to 2010, using a variety of remote sensing images including Landsat, SPOT 5 and aerial photos. An important finding was that when the analysis is done at a scale of 1:40,000 (using SPOT5) the level of deforestation, much greater levels of forest loss were observed than when the analysis was carried out at 1:250,000 (more than double, in fact), owing to the fact that smaller patches could be observed. This raises more general concerns about the scale at which the sub-national analysis for MRV should be carried out. The analysis showed that there had been an annual loss of 0.72% in the area of forests and 0.66% in the area of selvas bajas, in the period 1995 to 2003. In the second period, 2003-2010, the losses were 1.39% and 2.39% per year respectively (both using the more detailed scale of analysis.) During these periods there is a large increase in area devoted to pastures, and a moderate increase in shrubland (matorrales). There was a loss of area under non-irrigated agriculture. A detailed analysis of drivers indicates although the clearances have been heavier in the northern part of the zone, the losses are characteristically scattered, and do not represent a ´frontier´ of clearance. It is evident that changes in agricultural practices, particularly an increase in cattle ownership and grazing are fundamental to the changes. Although fire events occur, fire usually results not in deforestation but rather in degradation (temporary loss of carbon stocks). Applying statistics on typical carbon content of these types of forest derived from the State of Jalisco´s own forest inventory, the estimate of total loss of carbon in the JIRA area over these two period as a result of the loss of forests and selva baja was -402,875 tCO_2e (1995-2003) and -312,696 tCO_2e (2003-2010).

The report continues by proposing and costing a possible system for MRV for deforestation within the JIRA area. The second report utilizes the statistics on loss of forest area to propose a baseline for deforestation and deals with the problem of degradation, first making the point that degradation processes are very different in nature and causes from those that promote deforestation. Identifying degradation, which for REDD+ purposes means the decrease of stocks in forests that remain forests, is impossible using the kinds of remote sensing that were utilized in the first study as losses in stock cannot be quantified in this way. The report provides data on the biomass measurements that were made in around 200 sample plots, largely in selva baja, in an attempt to improve the estimates of stocks within forests. It proposes use of a 5 level scale of degradation from relatively intact to highly degraded.

Proposal for CBM in the Projects funded by the Alliance

1.3 Activities to be Implemented

As described in the previous Section, there are many different mitigation activities to be implemented as part of the projects financed by the Alliance. These activities might affect carbon emissions or removals in forests in many different ways. This section proposes a systematic approach to include CBM into the different mitigation strategies depending on the type of impacts expected and basic information that may already be available as part of normal implementation. Projects include different mitigation activities. Considering the geographical scope, strategies can be classified as those to be developed directly in forestland (i.e. sustainable management of forest), those that take place off-forest (i.e. improved agricultural practices, reforestation) and those referring to a group of regional policies (i.e. community land-use plans; environmental law enforcement). The challenge is how to identify the impact on carbon emissions and removals of each of these heterogeneous activities, how to measure them through CBM and how to integrate local information into the MRV system and NFMS for REDD+. In order to offer a systemic approach for the design of local CBM schemes, the activities proposed in the projects financed by the Alliance are classified into three groups depending on the type information that could be generated.

1.3.1 Case A: Activities with Geographical Data

Some activities might have a diffuse effect on forest management, making it hard to predict the impact on carbon stocks; moreover they may not include *initially* the implementation of carbon monitoring practices or targets to reduce emissions. Examples of such activities are the formulation of local land-use plans, general training on best agroforestry practices or the exclusion of cattle in forested areas. Local actors can produce activity data and integrate it into a PGIS as part of project's design and follow-up. Information could refer for instance to the areas of forest that have a local land-use plan, or the ejidos, communities and municipalities that have received training or the polygons where certain activities are being implemented.

Local geographical information could be integrated into the NFMS as an extra stratum for analysis (*White Paper*). There would be three options to evaluate the impact of these activities on carbon. If there are measurement plots of the national forest inventory within these areas and the sample is large enough, it could be possible to compare the values of carbon stocks and stock changes in the areas implementing the policy of interest (new polygons), with those from comparable areas (i.e. with the same type of vegetation and ownership regime), but not implementing the policy. In the cases where there were not enough measurement plots from existing forest inventories, a second option would be to perform analyses based on satellite imagery by comparing proxy variables such as canopy cover or NDVI in a GIS. The third option would be to create a time-series to analyse the performance after the policy is implemented and compare it against its own baseline or the scenario at time zero. It would be important to determine the date of adoption of the different practices and the date when the data from the national inventory was collected

(and of the satellite image used for analysis), since implementation of some activities on the ground will take some time to produce detectable changes.

1.3.2 Case B. Activities with Geographical Data and Partial Carbon Monitoring

A second case would be the activities which in addition to geographical data could provide information on certain carbon stocks, gains or losses; although these may have not be included still as a comprehensive local forest inventory. Examples of these activities could be the installation of improved cook stoves or the restoration of degraded forests by tree planting. It is necessary to identify the specific information to be produced as part of the implementation of these activities to identify the suitable methods to estimate carbon stocks, emissions or removals. Still, as shown in the *White Paper* (Section 2.2) the information of individual reservoirs can be included into national monitoring systems

1.3.3 Case C. Activities with Data Complete Local Information (Geographical & Carbon)

The third case will be when actions include the implementation of a local forest inventory including all the relevant carbon reservoirs. This could be the case of areas with commercial forest management plans or areas participating in carbon sequestration markets. Information could be used in addition to information from national inventories, or to produce local information for all the reservoirs. Usually these practices will follow standardised protocols and verification processes required for the different schemes.

1.4 Summary of Activities

Table 1 presents a list of the different mitigation activities mentioned in the projects financed by the Alliance as part of their work plans. Most of these activities take place over relatively small management units and national inventories cannot measure the effect of specific practices (e.g. activities take place outside the plots; national inventories do not monitor relevant reservoirs; satellite images do not detect changes below the canopy). Information produced through CBM could complement information of the NFMS. Specific carbon reservoirs and processes (levels, gains and losses) can be monitored to evaluate the impact of activities implemented. The potential direct impact on carbon stocks would be higher, in the short term, for activities of types C and B. Some activities of type A, particularly those associated to the creation of governance systems (CBM 4), when implemented successfully could help reducing emissions and increase carbon removals in the mid a long terms.

Table 1. General Actions that reduce emissions/increase removals as described in the projects of the Alliance.

Activity/Intervention	Location of Activity	Expected Information to be Gathered			Type of Activity (Case)	Projects Mentioning the Activity/Intervention													Potential Monitoring Scheme (*White Paper*)			
		Activity Data	Some Carbon Reservoirs	All Carbon Reservoirs		Ejido	Ejido Trinidad	BIOMASA	AMBIO	IDESMAC	BIOASESORES	PRO-NATURA	NUKUCHKA AX	ALTERNARE	CCMSS	MESOFILO	AMBIEN-TARE	UZACHI	CBM 1	CBM 2	CMB 3	CMB 4
Improved Forest Management	Forest	X	X	X	C	X	X		X	X			X			X	X	X	X	X		
Forest Management Certification Schemes	Forest	X	X	X	C		X			X					X					X	X	
Forest Conservation	Forest	X	X		B									X				X	X	X	X	X*
Restoration Critical Areas	Forest/Off-forest	X	X		B										X				X	X	X	
Fire Management Practices	Forest	X	X		B	X	X	X			X	X				X	X		X	X		X*
Soil Conservation Practices	Forest/Off-forest	X	X**		B	X		X								X	X		X	X		
Improved Coffee	Forest/Off-forest	X	X**		B			X		X						X				X	X	
Beekeeping (reforestation/ restoration for…)	Forest/Off-forest	X	X		B					X		X								X	X	
Camedor Palm Production	Forest/Off-forest	X	X**		B			X		X										X	X	
Ecotourism	Forest/Off-forest	X			A							X								X	X	X*
PES	Forest	X	X		B										X			X	X			X*
Reforestation/Afforestation	Off-forest***	X	X		B	X							X	X			X		X	X	X	
Improved Grazing/ Ranching	Off-forest	X	X		B	X		X	X		X	X	X		X	X				X	X	
Improved Fallow	Off-forest	X	X		B						X					X				X	X	
Agroforestry	Off-forest	X	X		B		X				X				X					X	X	
Organic Agriculture	Off-forest	X	X		B		X						X							X	X	
Improved Corn Production	Off-forest	X			A		X		X		X		X			X				X		
Biological Pest Control	Off-forest	X			A		X						X							X		
Protein Banks	Off-forest	X			A				X											X	X	
Productive Activities Low Carbon Development	Off-forest	X	X		B				X	X		X	X	X						X		X
Food Production at home	Off-forest	X			A	X								X						X		
Eco Techniques	Off-forest/ forest	X	X		B									X		X			X	X	X	
Tree Nurseries	Off-forest	X			A				X		X			X			X		X	X	X	
Land use Plans	Governance/ Capacities	X			A		X	X	X	X		X				X	X	X	X	X		X
Governance, Coord. Plann.	Governance/ Capacities	X			A	X	X	X	X		X	X		X	X	X			X	X		X
Financing Benef. Shar.	Governance/ Capacities	X			A					X					X				X		X	X
Market Access	Governance/ Capacities	X			A			X	X				X					X			X	X
Best Practices	Governance/ Capacities	X	X**		B					X	X			X	X			X		X		
Pilot Activities	Governance/ Capacities	X	X**		B				X		X	X	X	X	X					X		
Training, Cap. Building	Governance/ Capacities	X	X**		B	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Safeguards	REDD+	X			A					X						X		X				X
Evaluation Protocols	Monitoring	X	X		B		X	X	X		X	X						X	X	X		
Wildlife Inv.	Monitoring	X			A		X									X		X	X	X	X	
Forest Inventory	Monitoring	X	X	X	B/C	X	X	X									X	X	X	X	X	
Carbon Accounting	Monitoring	X			A			X	X	X						X	X	X	X		X	
Monitoring Water and Env. Serv.	Monitoring	X			A			X						X				X	X	X	X	X

Activity/Intervention	Location of Activity	Expected Information to be Gathered			Type of Activity (Case)	Projects Mentioning the Activity/Intervention												Potential Monitoring Scheme (*White Paper*)			
		Activity Data	Some Carbon Reservoirs	All Carbon Reservoirs		Ejido	Ejido Trinidad	BIOMASA	AMBIO	IDESMAC	BIOASESORES	PRO-NATURA	NUKUCH KA AX	ALTERNARE	CCMSS	MESOFILO	AMBIEN-TARE	UZACHI	CBM 1	CBM 2	CMB 3	CMB 4
Identification of Drivers	REDD+	X			A										X				X	X	X	X
Carbon Markets	Off-forest/Forest	X	X	X	B/C													X			X	
Development of Allometric Equations	Monitoring	X	X		B													X	X	X	X	
Online Repository of Information	Monitoring				NA													X	X	X	X	X
Community Mapping	Monitoring	X			A												X		X	X	X	X
GPS use	Monitoring	X			A												X		X	X	X	X

*These activities can help showing directly the compliance with environmental safeguards on conservation/protection of natural forests.
** It is not clear how/if carbon accounting will be incorporated into these practices.
***Reforestation/Afforestation practices take place in non-forest land, however if the projects are successful after 20 years areas can be reclassified as forests.
NA. Not Applicable.

In Table 1 the expected information to be gathered refers to that information that might be generated as part of the normal implementation of the projects. Then a first task would be to harmonise the protocols for data gathering, processing and reporting among the 13 projects for the different carbon reservoirs possible exploring different approaches. In some cases it would be necessary to design and create *ad hoc* monitoring schemes for the relevant carbon reservoirs (i.e. the activity may not have carbon monitoring as an initial objective). Once the data is produced and processed it could be possible to determine the resulting reduction of emissions or carbon removals in terms of tCO_2e/ha-yr. The mean values and associated standard deviation and percentage uncertainties could be reported for the polygon of interest under specific management. The local data produced through CBM (Tier 3) could replace Tier 1/Tier 2 data values or could complement missing data. Provided that a system is in place local data could be integrated into regional or national MRV systems. The *White Paper* (Sections 2, 3 and 4), explores different approaches for integrating information at local and national level.

1.5 Best Practices Across Projects

Projects are being developed in many diverse environments with different social actors and have proposed different strategies. Some of the strategies are common to various projects, however each project has its own approach and strengths that could be shared as internal benchmarks within the Alliance. Below, it is presented a brief description of a few outstanding cases that could enrich the implementation process of the projects.

1.5.1.1 Local Land Use Plans

Most of the projects propose the development or review of community/participatory land use plans. This is a necessary first step to participate in federal programs (CONAFOR) and to prepare a local strategy. The description of this process as made by IDESMAC project is quite interesting since it portrays the preparation of community land use plans in a way that could be included as an input for the baseline analysis for REDD+. Before preparing the final land use plan, the current situation (land use/land cover) will be evaluated to know what is the current status of carbon stocks, emissions and removals. Then it is proposed to make a carbon accounting for alternative land use scenarios in the region to identify the implications that each alternative would have in terms of carbon stocks, removals and emissions. Then the 'carbon dimension' can be integrated into local land use planning. The consideration of the local conditions and interests is a necessary condition for setting up baselines for REDD+ and to guarantee the implementation of safeguards. The input provided by local land use plans can help to create nested baselines bottom-up in the EAA.

In order to produce the initial carbon estimates it is necessary to have access to geographical data, ideally in a GIS: information would include at least, a recent satellite image and the land use classification according to NFMS (INEGI); it could also include historical information on land use change, information of soil types, topography, climatology, etc. The first estimates for carbon stocks can be made by using Tier 1 level default data or Tier 2 information from INFyS. The availability of local information on carbon stocks for different ecosystems would help to improve the first estimates but it

would be too costly to include an initial inventory for the purposes of preparing a land use plan alone. For the analysis of future scenarios it is necessary to consider at least the emissions from forested areas converted to other land uses; removals in areas converted from grasslands/cropland or degraded areas to forests; the carbon removals from agroforestry/re-vegetation practices; removals from forest remaining as forests, if they have not reached maturity and a natural balance (in which case these areas could be eligible for the conservation of carbon stocks); and the carbon stock in timber to be harvested as part of forest management plans. For these processes, the differences between initial and final carbon contents can be used to provide scenarios in the long-term; for carbon removals estimates produced will be better if they are based on yearly growth rates of forests or trees planted (reforestation). It is unlikely that there is knowledge of current trends of degradation and the areas involved, but if these are available they can help to plan local activities. Geographical information on the different management units can be drawn on paper, included directly into GIS or be gathered on the field (GPS) (see Section 3.1.3 in *White Paper* for considerations for the preparation of cartography based on CBM).

Once final land use plans are available, this geographical information can be used to update the system for the representation of lands in the NFMS.

Whereas the analysis of land use changes in a GIS provides the a view on carbon dynamics in the past, including the analysis of different land use options can provide a perspective of the baseline focused on future alternative scenarios. It is important that the analysis of scenarios is made within realistic scenarios and in compliance with local regulations; this will help to not overestimate carbon benefits.

AMBIO project also provides an interesting insight to the preparation of land use plans, it describes that in order to promote the use and appropriation of the plans they should be adopted formally at the ejido assemblies within their internal codes and regulations. This process should not be overlooked. Ideally the process to prepare local land use plans and baselines should take place at the beginning of the project (first year). These should be revised accordingly to local rules and the frequency established for the different 'commitment' periods for REDD+ to update the baselines (4 or 5 years). It is expected that local communities and landowners become the leaders of this process.

1.5.1.2Fires

Practices to prevent and combat fires are mentioned by various projects. The most frequent activities relate to the preparation of fire-breakers, black lines, prescribed fires and equipment and training of local brigades. MESOFILO project adds also activities for fire management (or elimination) as part of agricultural practices and the construction of vigilance towers. Ideally local CBM plan should include training, equipment and protocols for fires brigades to assess and register damages made by fires (and other disturbances) that will help to estimate CO_2 and non-CO_2 GHG emissions.

1.5.1.3 Monitoring of Carbon and Co-Benefits

The UZACHI project provides a detailed description of how carbon, water and biodiversity services will be monitored in Oaxaca including references to quantitative methods and specific analysis that will be done through a GIS. The BIOMASA project also describes activities to create protocols for local monitoring of carbon and other environmental services.

1.5.1.4 Description of Management Practice

Most of the projects describe the implementation of specific management practices and the training and preparation of manuals for best practices. These include activities in crop, pasture and forestland and the implementation of eco-techniques. The MESOFILO Project offers a detailed description of how management practices will be implemented in fallow-land, describing the species that will be used in the different management practices. Another example is from the projects in Chihuahua, where there is information available on allometric equations and expected growth rates in pines that are used for forest management plans and reforestation practices. The MESOFILO project also provides specific references to quantitative methods for carbon accounting and to measure the impact of a program of improved cook-stoves. There are other innovative and interesting proposals in all the projects; it will be an interesting exercise to share these plans in a cross-project workshop.

Many of the deliverables of the projects consist in the selection of the activities to be implemented, either as the result of local planning and design of governance schemes or as a direct result of the financed project (e.g. description of best practices). Considering this situation, this work describes in the following sections the steps that can be followed to integrate CBM into the activities of the projects. Hence the intention is that the guidelines presented here are used into the projects and processes already in development to ensure that specific aspects are included for CBM and MRV; depending on the level of detail of the works expected in each case, each project could identify if a specific step has already been included/covered or not. The spirit of the methodology proposed intends to reconcile on one part the need to create sustainable monitoring systems (locally driven) with the necessity of producing reliable information for MRV/NFMS for REDD+.

1.6 Scale of Implementation

The projects described in Section 1.2 will implement activities with different geographical scope within the EAA. As mentioned above some might have impacts over specific areas in the short term, however for many preparation activities which might strength local governance their effect over carbon stocks would be noted only in the mid and long terms. In many cases the activities presented in Table 1 are mentioned as part of the projects' plans as the activities that will be promoted, but there are no specific references for implementation as part of the project's goals. When activities are described quantitatively the extent of implementation would be over a small area since in most cases these refer to pilot parcels. In order to visualise the impact that projects may have in the EAA Table 2 presents the areas of influence and areas where direct management activities will be developed.

It can be seen in Table 2 that direct implementation of foreseeable activities will take place over a very small portion of the projects' influence areas and of the EAA. Nevertheless it is expected that as part of other deliverables of the projects, there will be a growing number of practical activities to be replicated and implemented in the mid and long terms in the areas of influence of the projects, though they have not been defined yet. Hence, it is possible to plan and design a MRV system for the different projects and EAA at this early stage of implementation in such a way that it could incorporate the local monitoring of activities to be implemented in the future.

Table 2. Projects' influence area and area for direct implementation in the different EAA

EAA (ha)*	Project	Project Influence Area (Ha) (% EAA)	Direct Implementation (Area; % EAA; % Project Influence Area)
Chihuahua (1,883,895 ha)	Ejido Chinatu	113,736 (6.0%)	Fire protection 5,000 ha, prescribed fire 100 ha, 20 km fire breakers, 1000 ha for conservation (water), 10 km black lines, 30 km dead organic matter soil conservation practices; 10 ha reforestation (5,000 ha; 0.27%; 4.4%).
	Ejido Trinidad	88,030 (4.7%)	-
	Sub-Total EAA	*201,766 (10.7%)*	
Chiapas (1'059,157 ha)	BIOMASA	123,200 (11.6%) (Villaflores Municipality)	80 ha prescribed fires, 20 km black lines, 70 km fire breakers (80 ha; 0.01%; 0.1%).
	AMBIO	30,000 (2.8%)	Pilot parcels in 3 communities (pastureland and cropland management) (30 ha; 0.003%, 0.1%).
	IDESMAC	119,177 (8.6%)	10,000 ha with improved coffee management (10,000 ha; 0.94%; 8.4%).
	Sub-Total EAA	*272,377 (25.7%)*	
Peninsula (1'381,924 ha)	BIOASESORES	105,541 (10%)	12 pilot parcels (12 ha; 0.001%; 0.01%).
	PRONATURA	22,984 (1.7%)	Study over 250,000 ha.
	NUKUCH KA AX	12,101 (0.9%)	15 pilot parcels (15 ha; 0.001%; 0.1%).
	Sub-Total EAA	*140,626 (10.2%)*	
Cutzamala (267,768 ha)	ALTERNARE	13,700 (5.1%)	3 proposals of viable projects in communities.
	CCMSS	61,593 (23%, Basin) *15,647 (5.8%, Union) 5,000 (1.9%, ejidos)*	Pilot community REDD+ plan over 5,000 ha.
	Sub-Total EAA	*75,293 (28.1%)*	
Oaxaca (1'154,839 ha)	MESOFILO	25,371 (2.2%)	40 ha of enriched fallows, 4% households reduce 50% fuelwood consumption (Approximately 20 households) (40 ha; 0.003%; 0.2%).
	AMBIENTARE	22,223 (1.9%)	200 m^2 nursery with capacity for 25,000 plants.
	UZACHI	59,225 (5.1%)	Reduction of land use change in about 3,000 ha, working with 54 community members directly (3,000 ha; 0.3%; 5.1%).
	Sub-Total EAA	*106,820 (9.2%)*	

*Areas of the EAA obtained from (Alianza, 2013) (For Oaxaca, information provided by Canto-Vergara pers. com.).

1.7 Infrastructure and capacities for MRV.

The questionnaire sent to project leaders included questions regarding the specific inclusion or the creation of a MRV system within the project, the different roles expected from the different actors and capacities and infrastructure available. Table 3 presents a summary of the responses obtained to these questions.

As presented in Table 3 it can be seen that not all the projects have included MRV into their design and in some cases there is reference only to the monitoring or reporting of information. In general, all the projects have access to computers, internet connection,

basic equipment for forestry inventories and GIS software. However most of these resources are not part of the assets of the communities but of consultants, NGOs and academia. Thus it will correspond to external experts the analysis and reporting of information. Capacities for the local analysis of information have not been developed consistently and homogenously across communities participating in the projects. In most cases it is necessary to develop capacities for MRV in the communities and also for some external experts (i.e. regarding specific particularities of MRV and REDD+). The prominent role envisioned for communities as part of CBM will be that of data gathering. This is a necessary initial step, but as discussed in the *White Paper*, the risk of confining the role of communities only to data gathering might jeopardize the sustainability of monitoring schemes in the long term. Furthermore, when communities do not adopt fully the monitoring schemes, external incentives and know how might be permanently required, and there may be little use of information for local decision-making.

Table 3. Roles and infrastructure for MRV for the projects financed by the Alliance.

Project	MRV formally Included	Responsible of Analysis and	Infrastructure	Role/capacities of Communities	Role/capacities External Experts
Ejido Chinatu	No	Project information to be reported by external consultants	Consultants provide equipment including GIS software.	Capacities for MRV are needed	Forest management, Capacities for MRV are needed
Ejido Trinidad	No	Forest technicians elaborate reports according to forest management plans	Computer, internet, brigades and GIS software available.		Forest management
BIOMASA	No	Consultants	Field equipment to estimate fuels, computer and GIS software	-	-
AMBIO	Yes	-	Brigade, computers and GIS software	Data gathering	Analysis
IDESMAC	-	-	-	-	-
BIOASESORES	Yes	Consultants	-	Capacities for MRV are needed	Measurement and monitoring, some capacities are required
PRONATURA	Yes (M only)	Consultants	Brigade, computers and GIS software	Capacities required for data gathering	Capacities for MRV are needed
NUKUCH KA AX	Yes	Experts and communities	Brigade, computers and GIS software	Capacities for MRV are needed	Capacities for MRV are needed
ALTERNARE	Yes (M only)	-	Brigade, computers and GIS software (CIGA-UNAM)		
CCMSS	Yes (M only)	-	Brigade, computers and GIS software (CIGA-UNAM)	It is necessary to align local knowledge to MRV	SIG, carbon accounting.
MESOFILO	Yes (MR only)	Experts and academia	Computer and brigade equipment, not mentioned GIS software	Capacities for MRV are needed	SIG and Project management, capacities for MRV needed
AMBIENTARE	Yes	-	Brigade, computers and GIS software	Need to build capacities for monitoring, PGIS and inventories.	SIG, inventories, and reporting.
UZACHI	Yes	Analysis Academia, Report, UZACHI	Brigade, computers and GIS software*	There is a high degree of social organization	Information management and methodology

IDESMAC project did not provide the answered questionnaire.

1.8 Inclusion of CBM in proposed monitoring activities

In order to visualise the scope of the monitoring activities included in the projects financed by the Alliance, project leaders were asked about the specific information that would be generated; they were also asked if CBM had been considered as part of these monitoring activities. Table 4 presents the responses obtained. The answers shown as 'Yes' correspond to the cases where the project will produce information or methods to estimate the specific information and it would consider CBM. As mentioned above, the prominent role of communities would be as data gatherers. For the cases of 'No' it indicates that the information will produce methods or information related to the specific types of information but it would not include CBM. Finally 'NS' indicates the cases when projects will not consider the generation of information or methods associated to the specific type of information. The cases where a star is presented (*) correspond to those when the organisations provided a general description of the methodologies to be used. Although in some cases projects did not include specific provisions for setting a MRV system, the activities to be implemented will generate information that could possibly be integrated into it; however it will be necessary to standardise monitoring, reporting and verification practices since there are large variations across EAA and even among projects in the same regions. This would allow harmonising the information of the different projects, enable the comparability of the actions and will help to create a compatible MRV system that could be linked at a later stage to the systems to be created by CONAFOR. It is important that the personnel of the Alliance maintain contact with CONAFOR to create a harmonised and compatible system.

Table 4. Information to be generated by the projects. Is CBM considered for the generation of the following information?

Variable	Ejido Chinatu	Ejido Catedral	BIOMASA	AMBIO	BIOASESORES	PRONATURA	NUKUCH KA AX	CUTZAMALA	MESOFILO	AMBIENTARE	UZACHI
Carbon Reservoirs (Stocks and Changes)											
Biomass (Above and below ground, trees, shrubs and herbs)	Yes	Yes*	Yes	No*	Yes	Yes*	NS	Yes	Yes*	Yes	Yes
Soil (Organic, Mineral)	No	Yes*	No	No*	Yes	No	NS	Yes	NS	NS	Yes
Dead Organic Matter and Litter	Yes	Yes*	Yes	No*	Yes	No	NS	Yes	Yes*	NS	Yes
Emissions from disturbances (fire, pests, meteorological)	No	No	No	No	Yes	Yes*	NS	Yes	NS	NS	Yes
Storage in Harvested Wood Products (Timber, other)	NS	No	Yes	No	Yes	Yes*	NS	NS	NS	NS	No
Illegal Logging (reports)	No	No	No	NS	Yes	Yes*	NS	Yes	NS	NS	No
Information on Representation of Lands											
Representation of Lands (Stratification, vegetation type, areas with different management practices)	Yes	Yes	Yes	No*	Yes	Yes*	NS	NS	NS	Si*	Yes
Mapping the area of each stratum	Yes	Yes	No	No*	Yes	Yes	NS	NS	NS	Si*	Yes
Monitoring land use change of forest areas.	Yes	Yes	No	No*	Yes	Yes*	NS	Yes	NS	Si*	Yes
Monitoring changes in canopy cover.	Yes	Yes*	No	NS	No	No	NS	NS	NS	NS	Yes
Leakage											
Displacement of extractive activities (timber, fuel-wood, soil).	Yes	Yes	Yes	NS	Yes	Yes*	Yes	No*	*	Si*	Yes

Displacement of grazing activities.	Yes	Yes	Yes	NS	Yes	Yes*	Yes	No	NS	Si*	Yes
Displacement of agricultural practices.	Yes	Yes	Yes	NS	Yes	Yes*	Yes	No	NS	Si*	Yes

*Project leaders provide a brief description of the methods.
N.S. Not specified, not included.

1.9 Practical steps to set up a CBM Plan for MRV at the project level.

This section presents a series of steps and criteria for establishing MRV systems that can provide a common ground to harmonise these activities in the projects financed by the Alliance. The practical guidelines for setting up CBM schemes presented here are inspired partly on the recommendations of IPCC (2003) for mitigation projects in the LULUCF sector (see Section 2.3 in *White Paper*) and the different elements of collaborative on-line monitoring schemes (Figure 1, *White Paper*). The general steps described below are the following: planning of activities and training; implementation, data gathering and registering; data processing and validation; and reporting, communication and verification. The proposal differentiates two roles, one for the manager implementing activities at the level of projects or that of the EAA and another at the level of the implementation which can be taken down to the parcel and management unit levels; this approach reflects the stance of the recommendations at project and parcel level based on IPCC (2003). It is assumed that the intention is to integrate project level data at a later stage into national systems for REDD+ and NGHGI (approach 2, IPCC, 2003).

1.9.1 Planning and Training

The initial planning stage is critical for the design of appropriate monitoring schemes, if monitoring priorities are identified at early stages of a project it will be easier to allocate the time and resources needed.

Initially it is necessary to identify the activities to be implemented locally and identify the type of monitoring that could be included depending on the resources that could be obtained for these activities and the interests that might drive the collection and use of information; ideally these activities should also be aligned to local needs and interests. For instance, some activities could be financed externally as part of public programs and could produce information to be integrated into the MRV system (e.g. PES, community forest management, conservation, soil restoration, grassland management) (Potential for CBM 1, See Section 2 in *White Paper*). Other activities will respond primarily to local needs and will have the potential for CBM 2 schemes that could be more flexible and with lower costs. In the cases when it is planned to access carbon markets or other certification schemes (e.g. organic, fair-trade, FSC…), these can offer specific activities to finance initial planning and monitoring practices (CBM 3); however it is necessary to identify the requirements for participation and prospects for future financing (demand) (e.g. for carbon sequestration projects benefits from economies of scale for which minimum areas for implementation are required to break-even e.g. Balderas Torres *et al.* 2010). For the monitoring of safeguards (CBM 4) it is expected that the process will be led at a later stage by CONAFOR and the inter-municipal associations; however some activities can be related to the monitoring of environmental safeguards in the field (e.g. biodiversity). Finally, other activities could be advocated specifically to protect and conserve natural forests as part of specific public programs for conservation and standards for certification schemes focused on biodiversity. The documentation of all participatory actions undertaken can contribute to the future monitoring of social safeguards.

Another necessary activity is to create a local GIS and if possible a PGIS depending on the initial level of technical skills and infrastructure available. This will be the local system for the representation of lands. General information at the region (EAA) and project levels should be collected including if possible recent and with high geographical scale/resolution (i.e. 1 year old, with higher scales; ideally based on GPS measurement and satellite imagery –Landsat or SPOT-). Information for integrating a local GIS includes, land cover/land use topography/altimetry, hydrology, information on soil types, climatology, administrative limits, and ownership regimes, among other.

Based on the information of the GIS and local land information, the area can be stratified according to vegetation types, management regimes and other criteria that could be considered of local relevance (e.g. ownership regime, soil, climate). At this point, if historical satellite images are available, drivers of emissions and barriers for implementation of sustainable practices can also be identified geographically. For each project, and for each EAA, it is necessary to state the management objectives of the strategies and of the activities to be implemented.

The information of the potential activities to be implemented and information of the GIS can be used as valuable input in the process of local land use plans. As described above, local land use plans can help to identify different scenarios for defining the baselines; it will be necessary to harmonise the methods for the analysis of carbon changes for different land use scenarios could be made (Section 1.5.1.1). Then the next step will be to define the baseline and generate the local land use plans. Once the activities to be implemented and the GIS are in place it would be necessary to define technical specifications for specific management practices at the project and the management unit/parcel levels.

It is necessary to describe the activities and practices to be implemented in terms of the inputs required and expected outputs and impacts on carbon reservoirs. Thus the relevant reservoirs and GHG to be monitored can be identified. Section 2.4 in the *White Paper* can be used to identify specific relationships between CBM and the different activities of REDD+, and Section 3 also in the *White Paper* can help to identify the methodological implications associated to the monitoring of each carbon reservoir.

Implementation can be based on the definition of technical descriptions for specific management practices at the regional level, and definition of practices and monitoring indicators at parcel level (i.e. those practices mentioned in Table 1). Hence it is necessary to produce at the regional level (EAA), technical descriptions for the specific management activities and identify the specific parameters needed to evaluate performance and to establish local baselines at the management unit/parcel levels; this will help also to document the scenario at the start of activities in each area of intervention.

After identifying the carbon reservoirs of interest, the technical specifications of the activities and indicators of interest, the next step is to select the appropriate methods for carbon accounting, data gathering and equipment for the brigades (this could be an iterative process). This will be the local system to estimate carbon stocks and stock change factors. The formulation of the monitoring plan also requires preparing a sampling framework (census vs. statistical samples). When forest inventories are to be used, it is necessary to define the shape, size, location and number of measurement plots or the sample size required performing other analyses (e.g. produce allometric equations; use

visual/relascopic measurements of basal area; or those to evaluate the effectiveness of improved cook-stoves). It is necessary to ensure that when statistical samples are used, there are appropriate correlates to estimate results over an area of interest (e.g. area of forest within the same stratum; number of communities; total number of cook stoves installed, etc.). Depending on the type of activity to be implemented there are different information sources that can be consulted to select the most suitable accounting methodology (Table 5).

Table 5. Methodologies available for different practices

Type of Activity	Comments
CBM 1	INFYS and other operative rules of public programs (potentially IPCC guidelines). Most of these methods should be compatible with NFMS.
CBM 2	Ad-hoc, locally developed methods and protocols; these could make use of any standards, methods, manuals or techniques suitable for the use of local communities. However methods should provide solid basis to show the links between implementation activities and the intended impacts. If the objective is to integrate local information to NFMS, protocols should be harmonised.
CBM 3	Market standards and certification schemes (e.g. from CDM and voluntary markets, these are inspired on IPCC guidelines); these methods would be compatible with NFMS, however specific guidelines and considerations for setting-up nested baselines starting at activity-project level will be required.
CBM 4	For monitoring environmental safeguards, there are specific techniques to monitor biodiversity, in some cases these are also included in specific standards for carbon projects e.g. CCBA; it will be possible to monitor specific areas advocated for conservation/protection of natural forests (e.g. PES, NPA). For social safeguards, process, policy and outcome indicators still needs to be defined. The system for monitoring safeguards may be based on REDD+SES; in some cases information could be gathered from interviews, focus group and other techniques based on social sciences approaches to obtain the required data (e.g. income, equity, participation).

Based on the activities implemented and natural processes, it is necessary to define the frequency for gathering the data. It is necessary to consider the cycles of public programs and reporting requirements of market-based or certification schemes, to define the frequency for monitoring, analysis and reporting. At this point it will be possible to formulate standard protocols for data gathering and sampling, for processing and for quality assurance and control.

The selection of the methods for monitoring carbon should also define the role that information gathered through Stock-Difference Methods (SDM) (successive inventories) and the Gain-and-Loss Methods (GLM) (yearly changes) will play. The recommendation is to consider the use of GLM when management activities focus on few carbon reservoirs, or for specific activities aiming to reduce degradation or to increase rates of carbon enhancement. One advantage of approaches based on GLM is that they can provide more frequent information that will help in decision-making than the SDM (See Section 2.2.4 in *White Paper*); this will be critical to provide prompt and appropriate feedback for implementation of activities since evaluations based solely on SDM might take >5 yrs to produce results for a specific management area. However, in order to reduce the risk of strategic behaviour and incomplete information when GLM are used, the recommendation is to set up an appropriate verification scheme including SDM including permanent and temporal measurement plots; this could be part of a local verification scheme. In the broader sense, information gathered through GLM can provide information of monitoring indicators of implementation, which could be confirmed by performance indicators of the results of activities (produced by SD).

Once the monitoring plan has been defined it is necessary to assess local capacities and needs for training (e.g. Section 3 in *White Paper*). It is recommended to make use of cross-project training so members of other communities participating in similar projects can provide part of the technical and field-based material.

1.9.2 Implementation, Data Gathering and Registering (Storage)

As part of the implementation of projects it will be necessary to gather and document specific information for the different management activities (Table 1). In practice this will imply registering the geographical data of activities implemented (polygons and specific locations) and information of specific carbon stocks and stock changes. It will be necessary to establish protocols for updating the information of both the GIS and for carbon monitoring of each activity at project level and/or for the EAA. It is recommended to create an information management system inspired on quality/assurance standards to be able to identify the official and updated/corrected sources of information (e.g. ISO, Environmental Management Systems).

At the parcel/management unit level it will be necessary to measure the variables and indicators selected and measure the indicators to define the baselines. It will be necessary to verify if the results lie within the ranges given in the technical descriptions and if not, set a corrective plan. The data could be gathered in paper and then transferred into electronic devices (computers) or be collected electronically in the field. In both cases it is necessary to guarantee that the information is stored safely and when participating in schemes such as market mechanisms, the information should be conserved for relatively long periods of time (20 or 30 years). Electronic information, files and software should be updated periodically. It will be also necessary to generate adequate protocols for data management (for information in paper and electronic).

Some field equipment would need to be calibrated and even replaced periodically. When external services are required (e.g. analytical laboratories) it is necessary to verify that they have the necessary certifications for the analytical works solicited. Electronic information could be stored in online repositories, at the regional offices of projects or EAA or at the local level (i.e. ejido) depending on the specific arrangements agreed for information sharing and infrastructure available.

1.9.3 Data Processing and Validation

After the data has been collected and appropriately stored in electronic format it will be easier to perform the necessary analysis for the estimation of carbon stocks, emissions or removals. These can be made in pre-determined formats, programs, tool-kits databases or spreadsheets. It is necessary that the personnel in charge of these analyses are properly trained and skilled. It may be necessary to update periodically the methods and toolkits for analysis. Some of the processes can be automatized in which case data processing might require only capturing the information collected in the field. It will be necessary to develop

the adequate skills to interpret the information produced according to the use that is to be given to the information. Data collected through CBM can be used for local management of natural resources without strict validation processes, as these processes might be locally driven (i.e. CBM 2). However for its integration into externally driven programs (NFMS or

carbon markets) it is necessary that a third party validates the information produced. This process can be done internally within the projects in each EAA as part of MRV or require certified validation if it is to be linked to benefit sharing processes. In the case of projects participating in carbon markets, certified parties audit the information.

1.9.4 Reporting, Communication and Verification

Information gathered through CBM will be integrated into activity reports that would be presented at local, regional, national and even international levels depending on the scope of implementation. At the local level, information can be communicated at the ejido meetings and other local forums (e.g. meetings to revise forest management plans). In order to report local information to CONAFOR as part of the MRV systems, it will be necessary to establish the appropriate reporting protocols (e.g. formats, dates/period for reporting, form of reporting, person allowed to report…). There is potential to create on-line systems to upload, update, process and report the information. In order to facilitate data management and its use for local decision-making it is recommended that the reports are available at the local level (ejido, project). For this, the information can be centralised at the regional level (EAA) or sub-national projects (State Level). From this level it will be possible to evaluate performance of implementation against the local nested baselines and undertake appropriate actions for up-dating plans and for benefit sharing. For accessing international finance for results-based actions it will be necessary that the information remains available for verification by authorised auditors. It is expected that this process will be coordinated centrally by CONAFOR. Once the information is reported it should be considered to make any adjustments for the planning of the next period. Table 6 presents a summary of the different steps described in this section.

Table 6. Summary of practical steps for setting CBM schemes in the areas financed by the Alliance.

Activities	**Actors***	**Methods**
Planning and Training.		
Identify local needs and interests.	Communities and external facilitators (Project Coordinators)	Participatory approaches.
Identify mitigation activities for implementation.	Communities/ External Experts	Participatory approaches, IPCC guidelines for specific activities (e.g. reforestation, afforestation, forest management, revegetation…)
Classify Activities Related to Public Programs (Potential for CBM 1)	External Experts	Those of relevant public programs.
Classify Activities Possibly Driven by Local Interests (Potential for CBM 2)	External Experts	Review methods available for benefits of interest (e.g. forestry, water management, wildlife…)
Classify Activities Oriented to Carbon Markets/Certification Schemes (Potential for CBM 3)	External Experts	Review approved methodologies in carbon markets and certification standards of interest.
Classify Activities related to Biodiversity Management and Social Safeguards (Participatory Approaches and Governance) (Potential for CBM 4)	External Experts	Review outcomes of pilot project and REDD+SES. Review techniques to collect socioeconomic data.
Integrate local GIS/PGIS	External Experts/ Communities depending on local capacities and infrastructure	GIS.
Identify Areas Suitable for Implementation of mitigation activities in the Local Land Use Plans	Community	GIS, field visits data gathering GPS.
Define Strata in GIS for vegetation types and management practices.	Community, External Experts	GIS.
Identify drivers of emissions and barriers for sustainable management	Community, External Experts	Participatory approaches, statistics, GIS.
Define objective of management practices.	Community	Review methods of relevant activities (e.g. public, those

Activities	Actors*	Methods
		related to internal objectives and from external markets and certification schemes).
Prepare Local Land Use Plans include carbon accounting for different feasible land-use scenarios.	Communities	Official available protocols (CONAFOR); harmonised protocols for carbon accounting are needed.
Define the Baseline* (Validated with CONAFOR to be discussed at regional level)	Community, External Experts.	Harmonised official methods needed (CONAFOR). Consider legitimate activities.
Prepare technical specifications for the different management activities	External Experts, Community	Same as above.
Identify indicators and parameters to evaluate performance and establish local baselines	External Experts, Community	Official protocols are needed to harmonise information, particularly for safeguards.
Select methods for carbon accounting, for data gathering and equipment (consider Gain-and-Loss, and Stock-Difference Methods)	External Experts, Community	Official protocols are needed to harmonise information.
Define sampling strategy.	External Experts, Community	Official protocols are needed to harmonise information.
Define frequency for measurements.	Experts, Community	Local conditions, Protocols, External Requirements, Limits of Methods.
Prepare protocols for data gathering, sampling and for processing and ensure quality of the data.	Community, External Experts	Protocols
Identify areas to set control sites.	External Experts, CONAFOR, Community	Official protocols are needed to harmonise information.
Identify the local gap in capacities/skills in relation to the proposed system for CBM.	Community, External Experts	Participatory practical approaches.
Prepare and provide training.	Cross-Community, External Experts, CONAFOR	Participatory practical approaches.
Implementation, Data Gathering and Registering (Storage).		It is assumed that appropriate mechanisms to finance activities and for benefit sharing are in place.
Gather geographical data.	Community	Following protocols prepared in previous stage.
Update PGIS	Community/ External Experts	
Measure variables and monitor indicators at parcel level (performance and baselines).	Community	
When appropriate collect information of control plots.	Community/ External Experts for Quality Assurance and Verification (GLM vs. SDM).	
Verify if the values are within the expected ranges. If necessary report the need for corrective actions.	Community/ External Experts for Validation Purposes	
Send samples to external analysis (when required)	Community	
Receive results from external services (e.g. laboratories)	Community/ External Experts (for interpretation)	
Register information in electronic format	Community/ External Experts	
Store and update the data (electronic format, and hard copy backups).	Community and Externally	
Data Processing and Validation.		
Provide training on data analysis.	Cross-Community, External Experts, CONAFOR	Participatory practical approaches.
Analyse the data (quality control/assurance). These include analyses of information of Areas, Area Changes, Carbon Stocks, Stock Changes, Growth/Accumulation, Losses, Disturbances, Emissions, Removals, Performance Against Baseline, Permanence, Leakage, Safeguards… according to scope and methodologies adopted.	External Experts, Community	Following protocols prepared in initial stage. Official protocol for harmonising information, and official toolkits.
Validate the results (if necessary review the analyses).	External Experts (third party)	Official Protocols are needed.
Reporting, Communication and Verification.		
Prepare reports.	Depending of scope Communities for local reports. External Experts at project/EAA level for internal national reports. CONAFOR for national report	Following protocols prepared in initial stage. Official protocol for harmonising information, and official toolkits.
Present reports to appropriate stakeholders.	Same as previous	In person, distance.
Integrate information into MRV system.	External Experts at Project/EAA Level. Communities, if a participatory on-line system is in place.	Following protocols prepared in initial stage. Official protocol for harmonising information, and official toolkits.
Maintain information available for national/international verification.	External Experts at Project/EAA Level, CONAFOR.	Following protocols prepared in initial stage.
Compare the information produced against corresponding baselines	External Experts at Project/EAA Level, CONAFOR.	
Consider information produced for the planning of next year.	Communities, External Experts at Project/EAA Level and CONAFOR depending on the scope of the each	

Activities	Actors*	Methods
	activity.	

*The second column specifies the actors that should primarily involved in each step. When local capacities have not been developed it is necessary to evaluate if these can be created, if not activities can be overtaken by other actors, however the risk is that once the participation of the external experts ends the process would also stop.

The official protocols required mentioned in Table 6 can be defined initially at the project level where the Alliance is working and then scaled up to the EAA; if additionally these protocols are consistent across EAA this will allow the cross-comparison and evaluation of results. When local inter-municipal associations or other umbrella organisations are created in the EAA they can uptake these and other activities. Activities can be implemented still without preparing official or harmonised protocols. Certainly activities could then be implemented differently for each EAA, project, ejido or parcel, but in this case a bottom-up integration into the MRV system will be more difficult or impossible if minimum standards are not met. In this case, verification of impacts of implementation will have to be made from a top-down perspective using external data (satellite imagery), without considering the particularities of specific management practices. This could compromise the transparency of benefits distribution systems in REDD+.

Time and resources required to address comprehensively all the aspects for the creation of CBM schemes as presented in Table 6 will be different for each project depending on the activities to be implemented in each case. Variations are also expected considering that some projects have already included some of these monitoring activities in their design and budgets. The share of these costs will be higher for areas focusing in smaller geographical areas (smaller projects). As mentioned earlier the ideal scenario is to prepare these activities in the early stages of the projects before starting actual implementation. As mentioned in the previous paragraph, each project can implement REDD+ activities and monitor them, however if the intention is to harmonise this information to integrate into MRV/NFMS the ideal is to lead this harmonisation process at the regional level.

1.10 Expected Effectiveness of Implementation (Drivers)

In order to assess whether activities to be implemented would be effective or not, it is possible to analyse how well they will address the different drivers for deforestation and forest degradation. Based on the information received from the different projects and early actions areas different drivers for deforestation and degradation were identified (Table 7). In Table 7 drivers are grouped for the different projects in the same region. Although the tender made by the Alliance did not ask for a detailed identification of drivers of carbon emissions, it is important that these factors have been already identified in the different regions. In order to perform a more accurate assessment it will be necessary to make specific studies on drivers of emissions and barriers for the implementation of sustainable practices in the different EAA.

Table 7. Drivers of carbon emissions identified in each region.

Drivers	Chihuahua	Chiapas	Ycuatan Peninsula	Cutzamala	Oaxaca	Examples of Mitigation Actions	Main Effect on:
Land Use Change	X	X		X	X	Land Use Plan, Enforcement…	Deforestation
Fires	X	X		X	X	Brigades…	Degradation
Plagues				X		Monitoring Brigades, Treatment…	Degradation
Unsustainable Fuel-Wood Gathering		X		X	X	Improved Cook-stoves, Forest Management, Reforestation, Restoration…	Degradation
Unsustainable Wood Extraction		X		X	X	Forest Management, Land Use Plan, Reforestation, Restoration…	Degradation
Unsustainable Soil Extraction and Erosion				X		Soil conservation practices.	Degradation
Poor Forestry Practices		X		X		Forest Management, Certification…	Degradation
Grazing		X	X	X	X	Pastureland Management, Agroforestry…	Both
Agriculture		X	X		X	Cropland Management, Agroforestry…	Both
Illegal Logging	X					Land Use Plan, Enforcement, Brigades…	Both
Commercial Plantations			X			Land Use Plan, Enforcement…	Both
Low Social Capital		X	X			Governance, Capacity Building…	Both
Awareness/Capacities	X		X			Capacity Building/Training/Environmental Education…	Both
Poor Definition Land Rights		X				Governance, Land Use Plan…	Both
Infrastructure		X				Regional Development and Land Use Plan…	Both
Lack of Resources		X				Links to Markets, Public Programs…	Both
Climate Change (draughts)	X					Selection of appropriate species (adaptation)	Both

The main effect on deforestation, degradation or both is presented in Table 7 only for indicative purposes. The dynamics of deforestation and forest degradation is complex, hence specific activities identified as drivers might have different effects in different regions. For instance forest fires might degrade the level of carbon in forests assuming those are not intentional, however if they are very severe they could prevent the recovery of the ecosystem and if an assessment is made over 20 years, and may result in deforestation specially if they are intentional with the objective to promote land use change. Another example is that of commercial plantations, the establishment could follow an initial deforestation followed by tree planting; although some carbon stocks and the canopy cover might recover it would be considered as a degraded forest in comparison to natural ecosystems. This is one of the processes that the implementation of safeguards should prevent. The activities to address each driver are also provided only as an example, depending on local dynamics some drivers could be addressed differently through particular mitigation actions.

For the 'plus' activities (i.e. carbon enhancement, conservation of carbon stocks and sustainable management of forests) drivers can be interpreted as initial barriers for implementation. There are of course additional specific barriers present on each area preventing the implementation of these activities. However in general there would be a large overlap with the drivers of emissions; for instance lack of capacities or awareness, non-sustainable forestry practices, low social capital could also be important root causes preventing the adoption of sustainable practices.

Table 7 can be used as guidance for the projects to review if a given factor driving emissions could be present in the areas where they are working and to evaluate if

appropriate mitigation actions proposed have been included in their work-plan. The list provided in the table is not exhaustive and additional drivers or causes can, and possibly should, be identified.

In order to address certain drivers sometimes 'strong' actions that are not yet specified in the projects will be required (e.g. law enforcement, judicial processes, or changes in market structure and land use governance); however these can stem from the governance schemes to be implemented. While information on these actions can be gathered to assess its level of implementation and impacts (e.g. number of illegal loggers arrested), the implementation of these activities in general is beyond the roles envisioned here for CBM, since CBM is focused on the generation of local data for operative activities related to forest management whereas law enforcement is the monopoly of appropriate public agencies. From a more academic active-research point of view, it will be interesting to evaluate how effective are informal rules, enforced locally by communities, in addressing drivers of emissions.

1.11 Prospective Sustainability of CBM Schemes

One of the objectives of creating local capacities for CBM is to produce systems that could be sustained over time, preferably without the need of external incentives. In this context the prospect for creating a sustainable CBM scheme is defined as the potential to maintain REDD+ activities and their monitoring once the support from the Alliance ends Table 8 presents information of the different projects to assess the potential sustainability of activities to be implemented and monitored. This potential is described based on the type of actors leading and participating in the projects and the type of activities to be implemented. It can be expected that when local actors are more involved in the project and receive direct benefits from resource management that overcome the costs of participation then management and monitoring activities might be more sustainable. In this context, incentives for participation can come from external programmes (e.g. carbon markets) or be aligned to local interests (e.g. forest management plans; fuel-wood collection; water supply).

Table 8. Members of local alliances and potential CBM types to evaluate prospects for sustainability of monitoring schemes.

Project	Project Proponent (Type)	Other Members of Local Alliance				Number of Interventions Planned Classified by CBM type			
		Local Actors	NGO/ Consult.	Acad.	Gov.	CBM 1	CBM 2	CBM 3	CBM 4
Ejido Chinatu	Local Actors		*			7 (32%)	9 (41%)	4 (18%)	2 (9%)
Ejido Trinidad	Local Actors		X	X		8 (27%)	13 (43%)	6 (20%)	3 (10%)
BIOMASA	NGO	X	X	X		9 (28%)	11 (34%)	8 (25%)	5 (15%)
AMBIO	NGO	X	X	X		7 (24%)	11 (38%)	6 (21%)	5 (17%)
IDESMAC	NGO	X	X	X		6 (20%)	10 (33%)	8 (27%)	6 (20%)
BIOASESORES	NGO	X	X	X		5 (22%)	11 (48%)	5 (22%)	2 (9%)
PRONATURA	NGO	X	X			5 (22%)	10 (43%)	4 (17%)	4 (17%)
NUKUCH KA AX	Local Actors	X	X			3 (15%)	9 (45%)	5 (25%)	3 (15%)
ALTERNARE	NGO	*		X		7 (26%)	11 (41%)	6 (22%)	4 (14%)
CCMSS	NGO	X		X		6 (23%)	9 (35%)	7 (27%)	4 (15%)
MESOFILO	NGO	X				10 (28%)	13 (36%)	8 (22%)	5 (14%)
AMBIENTARE	NGO	*			X	12 (33%)	11 (31%)	8 (22%)	5 (14%)

Project	Project Proponent (Type)	Other Members of Local Alliance				Number of Interventions Planned Classified by CBM type			
		Local Actors	NGO/ Consult.	Acad.	Gov.	CBM 1	CBM 2	CBM 3	CBM 4
UZACHI	Local Actors			X		13 (31%)	12 (29%)	11 (26%)	7 (16%)

*Actors are not specified formally as members of the local alliance for the implementation of the project.
Consult.: Consultants; Acad.: Academia; Gov.: Government. CBM types refer to the classification presented in Table 2 in the *White Paper*.

1.11.1 Actors

There are different actors participating in the projects: Local Actors (ejidos or producers' unions), NGOs or Consultants, Academia and Public Offices. The implementation projects were proposed officially by an individual actor to the Alliance, and each proposal mentions who are the other official members of the project (local alliance). There are four projects that were proposed directly by local actors (Communities or productive unions) these are the ejidos Chinatu and Trinidad in Chihuahua and the unions of Nukuch Ka Ax in the Yucatan Peninsula and UZACHI in Oaxaca. In fact in the proposal of ejido Chinatu, the ejido appears as the only participant in the original project proposal; when a deeper view is taken at this project it can be seen that they collaborate (hire) an external consultant to perform some specific activities to support the project (e.g. GIS analysis) but the project is entirely led by the ejido. Locally-led projects might indicate that these local actors have developed interest, capacities and initiative to engage into REDD+ related activities and thus might have good chances to continue efforts in the mid and long terms. These cases would correspond to type 3 projects based on the typology proposed by Danielsen *et al.* (2009) (collaborative locally driven with external interpretation, see Table 1 in *White Paper*) and it could be relatively easy to move towards type 4 projects (with local data interpretation) to implement activities in a more autonomous fashion. However it is important to recall that technical capacities for MRV are still required as discussed previously.

Most of the projects were proposed by non-governmental organisations many of them with longstanding experience in collaborating with local actors in local management of natural resources (e.g. CCMSS, AMBIO, PRONATURA). When these organisations have predictable and sufficient sources of funding to cover their overheads this might help to run the projects and create local capacities for the implementation of REDD+ activities in the longer term. This offers a period of opportunity to initiate processes to build local capacities and mechanisms for the adoption of locally driven sustainable management practices and local governance schemes. Strictly, these are type 3 projects, since are externally driven (both by the Alliance and the NGOs), however most of them involve local actors as part of the project partnerships, this indicates a higher level of collaboration (not only data gathering). Many of the projects proposed by NGOs would be in between type 2 and 3 based on the typology presented in the *White Paper*. There are critical tasks that would be done by the external experts (e.g. starting from the proposal writing, project planning, data management and GIS analysis), it would be important to identify how communities could start to adopt and lead these activities if the objective is to transit to type 4 projects.

There are two projects in which local actors are not officially members of the partnerships in the projects' description document; these are ALTERNARE and AMBIENTARE projects.

In the case of the ALTERNARE project, it is mentioned that the project proponents (NGO and academia) will collaborate with the members of CCMSS and Emiliano Zapata Ejidos' Union (EZEU) in the Cutzamala Basin, but the EZEU is not listed formally as a project member. CCMSS and the EZEU are the members of the second project funded by Alliance in the region (CCMSS project). The second case is the project AMBIENTARE in Oaxaca proposed by an NGO in collaboration with environmental governmental offices (CONANP/SEMARNAT); the document mentions that the project will be implemented in three communities and two ejidos from three different municipalities however they are not mentioned at the level of project members. These two projects would be starting from a type 2 class of scheme, externally driven with external management and interpretation of data. In the case of the ALTERNARE project the effort and know-how of the partners can add up to implementation of the EZEU in addition to the CCMSS project. In the case of the AMBIENTARE project, the assistance provided by the project could be critical to start local appropriation projects to transit to locally driven processes, however activities might have to start from earlier stages of development in comparison to the other projects.

1.11.1.1 Know-how

In terms of specific abilities and capacities for data management and processing, all the projects include either NGO/consultants and/or academic institutions. These actors should have the capacities and infrastructure to process and store the information, however if the objective is to transfer these capacities and facilities to local communities some specific activities need to be implemented.

It is necessary to asses what would be the optimal level for the deployment of infrastructure and specific responsibilities/activities at all project sites (e.g. per ejido or per community) since the equipment required might be expensive and might not be used very often (e.g. plotters, or expensive equipment for data gathering, see Table 15 in *White Paper*). For the implementation of specific monitoring schemes it is necessary to make an internal gap analysis on the abilities, equipment and human resources available that could be allocated for these tasks. This activity should be preceded by the definition of a common strategy to include CBM in the projects led by the Alliance compatible with the actions in each EAA.

The participation of academia can also provide a permanent access to specialized know-how and trained personnel as long as researchers and students have funding and authorisation to allocate their time to the projects. In this case it will be necessary to prevent potential conflicts related to data ownership, management and publication. Sometimes part of the technical information collected and analysed by researchers is withheld until it has been published in academic journals.

1.11.2 Potential Benefits.

The second element for evaluating the sustainability of monitoring schemes relates to the potential benefits that the activities to be implemented could generate locally. Based on the matrix of activities to be implemented (Table 1), Table 8 presents the frequency or number of interventions considering the type of monitoring that could be implemented (i.e. CBM 1, 2, 3, 4).

The activities linked to CBM 1 indicate that these strategies could be more aligned with external programs (e.g. CONAFOR's specific programs), and could produce external incentives for implementation of activities and monitoring (i.e. subsidies for soil conservation, reforestation, or community forest management; PES for forest conservation). It could be possible that CONAFOR includes in the future specific protocols compatible with INFyS and NGHGNI to monitor these activities; another possibility would be to hire communities to establish forest inventory plots and increase the density for the national system or to include data collection of this data as part of other public programs in which case the incentive would be the wages received.

Activities that could develop a CBM of type 2 are those which implementation might result in direct benefits to local communities (e.g. timber from improved forest management, increased output of agriculture/livestock under improved systems, water services, healthier forests without pests). This group of activities is on-line with the work pursued by the LAIF project (*White Paper*, Section 4.1.5). If communities identify the local benefits associated to improved management and value them highly enough, both, the practices and at least some monitoring could be adopted and be continued in the mid and long terms. When this information is used only for local internal interests, it could occur that protocols for measurement, evaluation and storage of data would not be as stringent as those for externally driven projects; but it may not require the characteristics for external use. It will be important that project coordinators identify and communicate effectively the local benefits that can be derived from the implementation of REDD+ activities. If there were interest to integrate the information formally to the NFMS and MRV system then some measures would need to be agreed to harmonise and share this information.

There are also some activities that could be eligible to participate in private incentive based mechanisms (e.g. voluntary carbon markets, decentralised PES programs, and other certification schemes –organic, fair trade, timber, biodiversity-); these correspond to the activities identified under CBM 3. In many cases the principal barriers to access to these specific markets and niches relate to high transaction costs and large economies of scale (project area) required to make a project viable, albeit in some cases there are weak stimuli from the demand side (e.g. compliance carbon markets). The implementation of projects under the Alliance can offer however an important advantage: the projects are to be of regional scope within the EAA, thus there could be potential to implement activities over a relatively large area (to produce economies of scale) though compact region (which could reduce some monitoring costs). Moreover the creation of standardised protocols for the planning, monitoring and management of activities and for setting baselines can help to reduce the transaction costs of enrolling into these schemes. This can create an important part of the required information for many projects rather than doing it on a project-by-project basis (e.g. it will resemble more a Program of Activities rather than individual projects in the Clean Development Mechanism of Kyoto Protocol). Since the objective of the pilot and demonstrative activities is to replicate successful experiences (which might help creating the necessary scale for participating in these schemes), the potential for joining these incentive-based schemes should not be overlooked. Additionally the development of this type of activities would promote the generation of monitoring data complying with externally verified standards. In any case CONAFOR should need to set criteria for the harmonisation of information of projects participating in the in carbon markets and that of the NFMS.

Finally activities related to CBM 4 are those related to the implementation of safeguards and in a broader perspective to activities related to the creation of adequate governance systems for REDD+. All projects include some activities in this category. As more information of local safeguards is communicated at the local level, this will increase the awareness of communities, which then might become more active in the definition of REDD+ activities. This is part of the objectives of creating transparent and participatory governance schemes. Local land use plans will be of particular importance in this context as governance tools that could help to achieve the objectives of REDD+ at the local level if they reflect legitimate local interests.

It is important to remark that there is not a specific weight of the relative importance of activities under the different types of monitoring. A general conclusion is that monitoring of activities of type CBM 1 and 3, might endure as long as external incentives exist (if there are no other relevant local benefits). The design of the projects reflects the different levels of local capacities for the different regions; for instance in regions with stronger previous governance systems the proposal might have not include as many activities of CBM 4 as in the cases where the process needs to start from zero. Totals are included only as reference to draw attention to the different activities proposed which can be tracked down to Table1.

Potential Integration of CBM into MREDD+ and National Programmes

1.12 Integration of CBM into the activities financed by the Alliance

One of the objectives of the Alliance is to create local capacities for MRV in the EAA, however this support will be temporal. Then it is necessary to build programs and institutions that can endure and be sustainable over time. It is also considered that as projects will come to an end, the presence of certain members of the local partnerships (e.g. NGOs, consultants, academia) will also diminish overtime. Pilot and preparation projects will be successful if activities are adopted and maintained by local actors within the permanent programs and existing institutional frameworks and those that are to be created as part of REDD+.

Activities financed by the Alliance will be implemented at project level and appropriate monitoring protocols can be included into project management. The integration of a harmonised CBM into existing projects it is not minor, it will be necessary to create a specific work plan for the design and creation of local monitoring systems in each EAA and in each project. The *White Paper* and Section 2 of this document provide general guidelines and suggestions on how this process can be established. The Alliance can adopt some specific roles specified in Table 6 for External Experts or CONAFOR; it will be critical to define clearly these roles and responsibilities. There are two requisites that need to be reconciled in this context, on one side, this process, ideally should include an active participation of local actors from a bottom-up approach that may enhance the prospects for sustainable monitoring schemes; on the other hand the Alliance in agreement with CONAFOR needs to establish a set of protocols and a minimum of standards to ensure that the information to be generated at the local level could be integrated into the MRV system and NFMS (top-down).

1.13 Alignment with National MRV

The ENAREDD+ and Vision on REDD+ include CBM as an important element of the MRV system in Mexico. However, there are no protocols or specifications yet for CBM and it is not clear how local information could be integrated into national systems; the *White Paper* and this document explore different options how these issues could be addressed.

As described in Section 0, it is required both the collaboration of communities/ejidos/projects at local level and a regional coordinator to design appropriate monitoring systems. Some of the local-level activities can be undertaken by project managers in the different projects financed by the Alliance in the EAA, but still it will be necessary to define who will coordinate these activities in the long term at the regional level; this could mark the transitions between the first two phases of REDD+ (i.e. preparedness and implementation).

It is important to point out that in general, the activities of the Alliance only target a small fraction of the areas of the EAA. The proposal made in the ENAREDD+ states clearly that although local implementation will start at the ejido and municipality levels, the inter-municipal associations play play the key role in linking local and state/national scales. It appears as if the Alliance is adopting, on a temporal basis, this role to link local initiatives to the national strategy and is providing to the projects some of the services that in the future will correspond to the local associations. However specific arrangements should be made with CONAFOR to coordinate these efforts. In this context, it is necessary to stress that while some activities can be undertaken at the project level to set up CBM schemes, it is necessary to define and create the intermediate interphases to merge local information into the national MRV system for REDD+.

1.14 Conclusions and way forward

The projects financed by the Alliance are implementing different activities to mitigate climate change including a wide variety of actors, strategies and scopes. In this context creating a comparable and consistent system to monitor, report and verify the outcomes of implementation will allow the Alliance to evaluate the potential contribution of the projects to reduce emissions and increase removals in the EAA as part of REDD+. It will also be important that the information to be generated by the projects is compatible with the MRV system to be created at national level.

When communities are more active in the implementation of activities and the monitoring, analysing and interpreting of information generated it will be easier to develop sustainable schemes where information is used for local decision-making, as long as practices provide local benefits to the communities. In this context, it is not clear how or if the projects will include the transference of know-how and resources not only for data gathering but also for analysis and interpretation at the local level, or if this is even possible (e.g. protocols, computers, software, equipment for forest inventories). It is a good sign that in all projects and EAA there are capacities and infrastructure to perform the required analytical works, since these services can contribute greatly to produce the required information for the implementation of REDD+. However in the absence of clear and predictable external incentives or mechanisms to share benefits from implementation of REDD+ activities, there is the risk that the deployment of REDD+ interventions will be limited. Considering the gap in local capacities for monitoring and analysis there is a risk that communities might not use the information for local decision-making. After the mechanisms for benefit sharing and for financing REDD+ implementation become clearer, then it will be possible to evaluate the potential for implementing activities where the role of external exports is more prevailing for data gathering, analysis, interpretation and reporting since there will be a predictable source of resources to hire them. Meanwhile, the best options for promoting implementation and monitoring of activities will be those producing local direct benefits to communities in addition to climate change mitigation. Other activities could be implemented as long as resources for their development are granted for the mid and long terms.

In this context in order to consolidate a MRV system including CBM for the projects financed by the Alliance, it is recommended to prepare a diagnosis to evaluate the comparability and gaps among the different projects following the steps proposed in Table 6. It will be necessary to define further the quantifiable outcomes of the projects, for instance what management practices will be defined (e.g. pastureland management, agroforestry practices). Particularly, the Alliance can consider the standardisation of a system for the representation of lands via GIS/PGIS and software used. The second element corresponds to the harmonisation of formats and protocols for data gathering for monitoring the different carbon stocks and activities to be implemented, and the associated toolkits for analysis of information. It will be critical to coordinate with CONAFOR and the inter-municipal associations to be created in the EAA. The objective would be to create a system that enables the comparison between the different projects and EAA (and even for REDD+ projects financed by TNC in other countries) and that is also compatible with future national MRV systems. For this it could be possible to organise a workshop to be focused on CBM and MRV to share experiences and set a common ground for the different projects.

It will be also important to identify what strategies can be included in the projects to promote the transference of key infrastructure and know-how associated to the planning and management of activities, and the planning of monitoring schemes, data gathering, analysis and interpretation. As mentioned above it is recommended that projects identify and focus first in those activities that mitigate climate change and also deliver local benefits to communities; these benefits should be clearly identified locally and be valued highly enough to ensure that the costs associated to its monitoring and reporting are covered. It will be necessary that the Alliance sets also appropriate mechanisms to verify the information included into MRV systems and the implementation of the projects' activities.

It is also recommended that project coordinators, together with local communities identify clearly the potential for sustained implementation of activities and the associated monitoring in the mid and long terms once the support from the Alliance ends and how efforts could be replicated in the EAA and integrated into the MRV system (e.g. mid term 5 years after implementation, long term 10 to 20 years or more). Prospects for sustainable schemes will increase when there is a higher engagement of local actors, know-how and infrastructure are successfully developed and activities produce tangible and predictable local benefits.

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Appendices

1.15 Questionnaire (Spanish)

Necesidades de información proyectos MREDD+.

Nombre **Proyecto**
Fecha **Rol en el Proyecto:**

Por favor conteste las siguientes pregunta, o indique el documento donde dicha información pueda ser consultada.

Antecedentes Generales

1. ¿Cuál es la historia del proyecto? ¿Por qué se eligió ésta área?

2. ¿Cuál es el contexto natural y social? (tipos de vegetación, áreas forestales, actividades productivas y grupos sociales).

3. ¿Cuál es el objetivo del proyecto y los resultados esperados?

4. ¿Cuál es el plan general y calendario del proyecto? ¿Cuál es el horizonte temporal de las actividades a implementar?

5. ¿Cuál ha sido la participación de las comunidades?

Contexto REDD+

6. ¿Cuáles son las emisiones por deforestación y degradación forestal en el área del proyecto? ¿Se han elaborado escenarios de referencia a nivel local? Si sí, ¿Cuáles son y qué información fue utilizada?

7. ¿Cuáles son las causas o fuerzas impulsoras de las emisiones por deforestación y degradación? ¿Qué indicadores indirectos (proxies) pueden identificarse en campo?

8. ¿Cuáles son las principales barreras locales para la implementación de prácticas sustentables de manejo forestal y de otras actividades dentro de REDD+?

9. ¿Cuáles actividades serán implementadas como parte del proyecto y en cuál actividad de REDD+ se enfocan? (Reducción de deforestación; Reducción de degradación; Conservación de Acervos de Carbono; Manejo Sustentable de Bosques y Selvas; Aumento de Acervos de Carbono)

Actividad a Desarrollar	**Actividad REDD+**	**Reservorio de Carbono Afectado por Actividad.**
Ejemplo. Manejo y plantación de árboles en sistemas silvopastoriles (bosques abiertos/degradados).	*Aumento de acervos de carbono.*	*Carbono en árboles*

10. ¿Cómo se evaluará el desempeño de éstas actividades?

MRV

11. ¿Cómo se ha incluido el Monitoreo Comunitario en el Proyecto?

12. ¿Cuál de la siguiente información será medida/monitoreada como parte del proyecto?

Variable	**¿Se incluye en MC? (Sí/No)**	**Por favor describa brevemente el método usado, equipos, la información clave a generar y frecuencia de medición**
Reservorios de Carbono (niveles y cambios)		
Biomasa (Aérea, Subterránea, Árboles, Arbustos, Hierba)		
Suelo (Orgánico, Mineral)		
Materia Orgánica Muerta y Hojarasca		
Emisiones por Perturbaciones (incendios, plagas, desastres naturales)		
Almacén en Productos Maderables Duraderos (Madera, leña, otro)		
Reporte de tala ilegal		
Información de las Áreas del Proyecto		
Sistema de Identificación (Estratificación, tipo de vegetación, áreas con diferentes práctica de manejo)		Por favor liste los estratos y prácticas de manejo.
Mapeo de área de cada estrato.		
Monitoreo de cambio de áreas forestales.		
Monitoreo del cambio en cobertura de copa.		
Fugas		
Desplazamiento de actividades de extracción de madera, suelo o leña.		
Desplazamiento de actividades de pastoreo		
Desplazamiento de actividades agrícolas		
Otro (agregue las filas necesarias)		

13. ¿Se monitoreará otro tipo de información/variables? ¿Cuáles?

14. ¿Cómo se hará el reporte y procesamiento de información? (¿Dónde, quién, frecuencia?)

15. ¿Cuál es la estructura e infraestructura para el manejo de información del proyecto? (equipo de cómputo, equipos de medición, acceso a internet, software especializado SIG…)

16. Por favor indique los grupos participantes en las actividades de MRV local y cómo se realizará.

	Actor Responsable	**Principales roles y actividades (frecuencia, información involucrada, proceso de comunicación)**
Monitoreo		
Reporte		
Verificación		

17. ¿Cuáles son las actividades existentes y por desarrollar para MC para MRV de REDD+ de diferentes participantes del proyecto y grupos locales?

Participante (Por favor especificar)	Capacidades existentes	Capacidades por desarrollar
Ejidos, comunidades indígenas		
Propietarios (pequeña propiedad)		
Asociaciones Civiles/Consultores		
Coordinador del Proyecto		
Técnicos Forestales en la Zona		
Academia a nivel local		
Gobiernos locales (municipio)		
Otros (por favor especificar)		

Salvaguardas, Distribución de Beneficios y Financiamiento

18. ¿Cómo se implementarán las salvaguardas sociales y ambientales?

19. ¿Cuáles son los beneficios esperados del proyecto y cuáles serán los medios para su distribución entre los diferentes participantes?

Beneficios Esperados	**Mecanismos de Distribución de Beneficios**

20. ¿Cuáles son las fuentes de financiamiento de los proyectos? (mercado/otra; pública/privada; si se considera la participación en mercados de carbono, ¿Quién sería el propietario del carbono?)

21. Los brigadistas participando en MC ¿Recibirán (o deberían recibir) un pago por ello? (Si la respuesta es No ¿Por qué no?… si es Sí ¿Cuáles serían las opciones para financiar/cubrir el costo?)

Comentarios.

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