

Evaluation of remediation recommendations: Stakeholder Workshop 3

Cointzio, Mexico

1. Introduction

The Cointzio basin is important as a catchment supplying drinking water to the regional capital, Morelia. Land degradation (principally soil erosion) and flooding result from its unique combination of land uses (some mechanized farming, mainly rainfed agriculture with free grazing cattle, forest, recent avocado plantations), climate (temperate semi-humid with a 6 month rainy season), and soils and geomorphology (Luvisol on plain, Acrisol on piedmont, Cambisol and Andisol upper part) (Figure 1).

The DESIRE project in this study site has helped understand the origin and processes of soil erosion, and test different alternatives to reduce it. The approach taken tackles both the effects of land degradation (e.g. gullies) and the causes of the soil erosion (rain aggressivity, combined with soil properties and cattle grazing). Two main trials have taken place at two different scales:

- Plot scale trials with farmers to test agronomic options (2004-2008); and
- Watershed scale testing and evaluation of land use management (2007-2011)

These tests are organised according to the soil type (Andosol–Cambisol, Acrisol), land use (agriculture, forestry, pasture) and focused on small farmers, with low to moderate mechanization, with usually no irrigation, low incomes and low school level.



Figure 1: Soil erosion in Cointzio watershed : a) Basin of El Calabozo-Potrerrillos ; and b) Huertitas basin
(Photos : C. Prat, IRD)

2. Priority Remediation Strategies

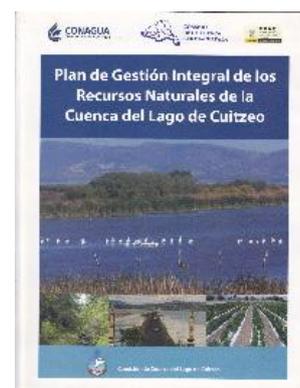
Three remediation technologies were defined and discussed during the first workshop (WB3) with stakeholders. During field trials, a new technology was proposed (agave forestry) and so was included for evaluation in the final workshop. Table 1 shows how technologies were ranked in the initial (WB3) workshop, compared to the rank after field trials and model results were presented at the final workshop (ranks are in declining order of importance).

Table 1: Remediation strategies ranked by participants in WB3 workshop versus final workshop.

Initial rank	End rank	Remediation Strategy
-	1	Agave forestry sustainable plantations with native plants (agave, tree, annual herbaceous)
1	2	Agronomical strategies (let fallow using cereals during this year and corn the other one, incorporation of harvest residues to cover at least a 1/3 part of the field)
2	1	Wood saver rural oven
3	3	Control run-off on existing gullies

3. How can we enable priority remediation options to be adopted?

The DESIRE project has worked with local institutions from the outset (and project members had existing long-standing relationships with these institutions). For this reason, the DESIRE project became part of a series of workshops run by SEMARNAT-CONAGUA with stakeholders of the Cuitzeo watershed. The objective was to identify problems, propose solutions and define the conditions (money, responsibilities, time-lines) to ensure proposed solutions would be effective. The document “Integral management plan of natural resources of Cuitzeo watershed” resulting from this workshop was signed by the Michoacan state governor at the beginning of 2009. Within this document, the management plan for the Lerma-Chapala catchment (where Cuitzeo and so, Cointzio, is located) included a number of recommendations arising from research undertaken as part of the DESIRE project. Although this process took some time, the result is clear: there are no major obstacles for adopting the priority remediation options locally or regionally, and a number are already being promoted by regional Government and being adopted by local stakeholders. The following sub-sections summarise more detailed comments from workshop participants about challenges and opportunities for promoting each of the proposed remediation strategies.



Technology 1: Agricultural practices

Despite considerable interest during workshops, few farmers were using the proposed agronomical practices. The main reason is not due to a lack of confidence of the results (farmers could visit the practices for instance) or a lack of money to implement this techniques (SEMARNAT funds are used for this); it is mainly a lack of time to implement the practices. Between 10-20% of annual farmer incomes come from the sale of agricultural products; the rest is typically derived off-farm. As such, the additional time needed to implement new agronomic practices can be associated with significant opportunity costs for the generation of off-farm income.



Figure 2a: Plots on Acrisol (Photo : C. Prat, IRD)



Figure 2a: Plots on Andosol (Photo : C. Prat, IRD)

Technology 2: Gully control

Although farmers want to control the formation of gullies on their land, and stone dams were initially suggested, workshop participants were sceptical about the efficiency of this technique. This scepticism was backed up by results from field trials that confirmed most dams were not very effective. After discussion during the workshop, participants concluded that stone dams were only likely to be effective in certain locations and that topographic surveys should be carried out prior to siting future dams.



Figure 3: Gully control in El Calabozo-Potrerrillos bassin (Photo : C. Prat, IRD)

Technology 3: Agaveforestry

Agave forestry was proposed after the first workshop, and so does not appear in the first ranking. This proposal took time to propose because it was first necessary to consider other experiences with the technology, evaluate their results and difficulties, improve and adapt the technology to the local context, find funds, and ensure the production and sale of spirits derived from the plant would be legal (for marketing purposes, it was essential to obtain the “mescal” denomination, reserved for specific regions of Mexico).

Workshop participants deemed this to be a particularly innovative and effective technology. The team planted a number of agaves on 5 ha in 2010 to see how the plants would grow, and what work, costs and time would be required to make the technology work successfully. After one year, more than 90% of the plants were still alive and growing well. Stakeholders attending the final workshop were positive about this technology and already organized to find good planting stock, treat the seeds, to find and arrange space for the building of greenhouses etc.



Figure 4: Plantation of agave in El Calabozo-Potreriillos basin and what it should be in 7 years for the best (Photo : C. Prat, IRD)

Technology 4: Wood saver rural oven

The wood saver oven was initially proposed by the Mexican Government's Secretariat of the Environment and Natural Resources (SEMARNAT). Deforestation is one of the main drivers of environmental degradation in the region, and workshop participants felt that the use of the wood saver oven was an excellent way of reducing this problem. In addition, SEMARNAT provides the materials and technical help to build the ovens, so costs for local stakeholders are extremely low. So, despite sluggish initial demand, after one year, the demand exploded. It is very easy from one family to see the oven working for a neighbouring family, and share experiences with one another. Given the almost unanimous positive feedback about stoves, demand grew rapidly during the field trial period. It should however be noted that although the use of ovens has the potential to reduce wood consumption by between 30-50%, where wood burners replace gas burners, the popularity of the wood stoves may be counter-productive, and workshop participants pointed out that adoption of the wood burning stove by gas burning families could cancel out the reduction in demand for wood. Hence, it was suggested by participants that there may be a need to plant fast growing plantation forestry to meet future demand for wood. As such, workshop findings need to be analysed in future with reference to data on the quantity of wood consumed by a communities using the stoves.



Figure 5: Wood saver rural oven (« patsari » model) (Photo: E. Rios, SEMARNAT)

4. Feedback from participants

All workshop participants were very positive about the DESIRE project and methodology used, especially with the workshops. For land users, workshops helped them to identify and connect with the institutions and the people who are working with them. For them, it was also a good place to get news, make balance of some actions, and prepare the future. As workshops were open to anyone, the workshops helped to give more transparency to the actions and decisions that arose from the process. Participants particularly liked the different “games” that were used to animate the workshops, as these kept their interest and helped them to identify problems, solutions and their own priorities.

The only real problem was the difficulty of including some other institutions other than those that typically attended workshops as part of the DESIRE process. Although the project team interacted with these other organisations, it would have been better to have them present more often during the land-user workshops.

The results of the DESIRE project have been important for a number of programs and actions linked to SEMARNAT, and for the people living in the Cointzio watershed. A number of proposals have already been accepted, while others are still under development.



Figure 6: Workshops for the elaboration of the management plan of Cuitzeo lake catchment (Photos C. Prat, IRD) in 2008



Figure 7: The last workshop, august 2011 in San Andres Coapa (photos E. Rios, SEMARNAT; C. Prat, IRD)

5. Next steps

The following actions have been agreed:

- SEMARNAT has agreed to fund the development of agave forestry with local stakeholders as well as the monitoring of test areas for the next few years. It is hoped that in a few years, people earning enough money with the agaveforestry, will reduce the number of the cattle and will control their grazing area in a better way than they presently do. The other consequence may be that children will remain on the land, rather than migrating to the city, and will be interested in improving the sustainability of land management, following recommendations from the DESIRE project
- SEMARNAT will spatially target the construction of stone dams to control gullies in future, in collaboration with the DESIRE team and others institutions (e.g. municipalities, CONAFOR etc.)
- In response to DESIRE research findings, the National Water Commission, CONAGUA, used the Cointzio watershed as a pilot basin to test a new way of using hydrological water taxes for forest protection
- The DESIRE methodology will continued to be followed in future years (workshops, involvement with authorities, stakeholders, etc...), making an effort to continue coordinating between different parts of the Government administration and trying to get more than those who are already coming, during the land-user workshops
- Dissemination of results to the stakeholders, especially through the commission and the technical committee of Cuitzeo catchment will follow
- August 2012: Forum of Cuitzeo watershed (where Cointzio is located) with national, regional and local authorities, scientifics, administrations, stakeholders, people. Objective: to design and implement special land and water management programs for the Cuitzeo watershed, with a focus on the Cointzio basin
- May 2013: National Watershed Management Congress (scientific meeting) - one session will be dedicated to research and results obtained in the Cuitzeo/Cointzio basin, including those from the DESIRE project