IMPACTS OF WATERSHED MANAGEMENT PROJECTS IN MADAGASCAR

CASE OF TSIAZOMPANIRY AREA

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This is a summary of a study carried out in 2001-2002 by the author to assess the major effects of a pilot project on watershed conservation in Mantasoa and Tsiazompaniry region, in Madagascar. The author has contributed actively in different stages of the project as expert in social forestry from 1998 to 2001.

1.Background and general context

Unsound cultivation practices, deforestation, bushfire, population growth and poverty are the main factors of the watershed degradation in Mantasoa and Tsiazompaniry. As a result, the two reservoirs (lakes) which constitute the water -source for the national capital Antananarivo are now being affected by sedimentation.

Accordingly, from 1998 to 2000, the Ministry of Forests and water of Madagascar has been engaged in the execution of watershed management activities within the target area (40 000 hectares) with the support of the Japan International Cooperation Agency (JICA). Called itself Pilot Study, this phase included a six-month-survey (feasibility study) and approximately in total 20 months of implementation of relevant activities on watershed conservation within 4 pilot villages duly selected. The pilot study aimed at verifying the possibilities of the local communities through their effective participation to continue by themselves initiated technologies for a sustainable watershed conservation and management. In the near future, the result from this experience should be applied for the rest of surrounding villages located in the target area.

PRA (Participatory Rural Appraisal)- based approaches were adopted by the promoters for an effective involvment of the local communities in the implementation of the project. This represents also a warranty for its sustainability. Organize as stakeholders, local communities are to be considered as partners of the project.

2.Objectif of the study

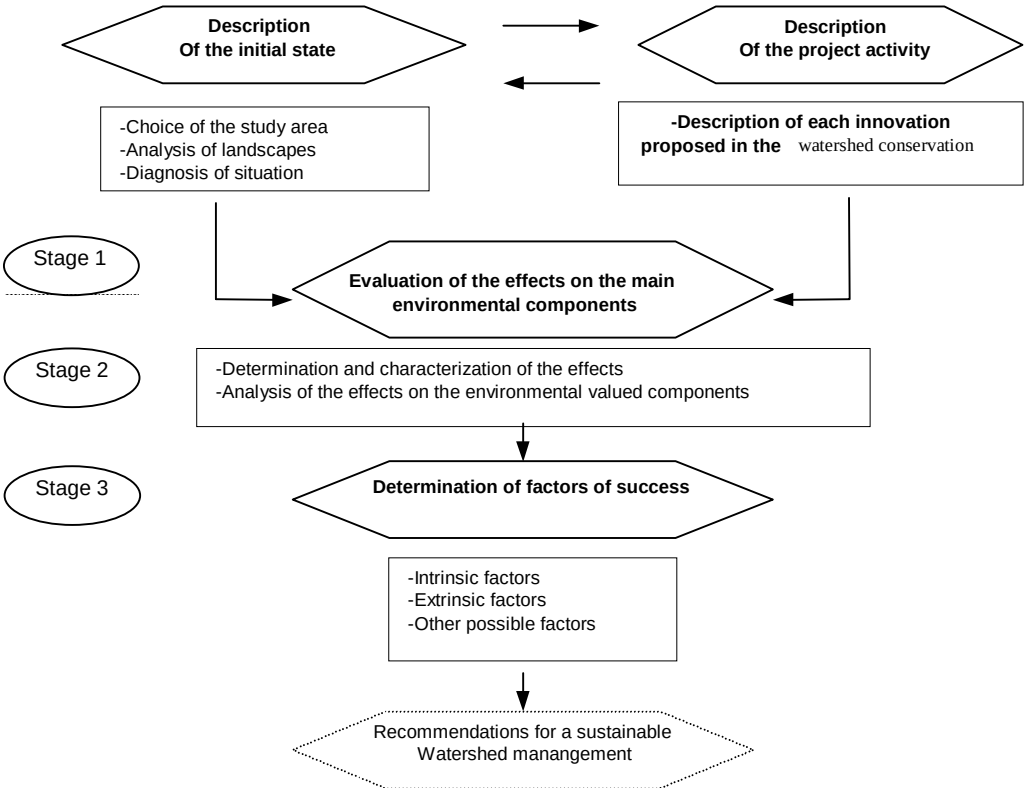
In consideration of a first hypothesis based on some preliminary results, this first experience of the project was a success. The study aims at evaluating the local impacts of the execution phase of the pilot project on the environment, after two years of implementation through the verification of this hypothesis. The second stage is to determine the different factors of the said successes.
The study is also an attempt to support the realization of the watershed management plan duly developed by the Ministry of Forests and Water of Madagascar, that will cover all the villages within the watershed area. Moreover, outcomes from this study may be helpful for similar projects.
Some questions were asked in the beginning of the study, such as :

-What kind of impacts can be locally expected after two years implementation of the project ?

-Can this first experience be effectively considered as a success ? If so what are the major factors ?

The study was focused on Analamihoatra, one of the four pilot villages which has shown good initiatives during the first two years.

3.Diagram of Methodology



4.Results

41. Brief description of the initial situation

Socio-economy	Forestry	Agriculture
Low incomes Low organization capacity	-Low coverage -Only few tree planters exists -Shortage of young seedlings -Shortage of fuel wood -Techniques of seedlings production unknown	-Low productivity -Low yield -Lack of manure -Shortage of biomass to be used as green manure -Soil loss -low fertility

42.Proposed innovations related to watershed conservation

Forestry	This activity is promoted to provide opportunities to local farmers to plant trees in the available lands (private lands and governement lands). Seedlings production techniques are transfered to the participants through trainings as well as relevant activities. The main species (exotic) for afforestation are : -*Eucalyptus robusta* -*Eucalyptus grandis* -*Pinus patula* A low quantity of indigenous species were promoted in some areas : -*Podocarpus madagascariensis* -*Terminalia mantaly* -*Phyllarthron madagascariensis*
Agroforestry	Relevant activities were promoted for soil and water conservation and to improve soil conditions : -live hedgerow on contour lines -improved fallow Main species : -*Tephrosia vogelii* -*Leucaena spp* As incentive for the farmers, fruit tree production was also launched within the village.
Biomass production	Adequate biomass were produced at the same time to produce compost locally. This is to solve fertility issue and shortage of local manure. In the future this can be a substitute of NPK fertilizers which are now out of reach of farmers. Main species : -*Tephrosia vogelii* -*Tephrosia candida* -*Crotalaria grahamiana*
Microhydroelectric station	A small scale hydraulic power generation was installed to encourage the population to preserve the watershed. This machine, working by using falling water is for electrifying the church in the village This is the symbol of the interaction between the natural ressource and life comfort. Through this achievement the project expects the population to protect more the environment and thus participate into the watershed conservation activities

View on Analamihoatrabe (hamlet level)
The capital of Analamihoatra village.
Major sources of income are potatoes and rice cultures

Photo by the author

Seedlings production :

This is the main promoted activity for watershed conservation. The average capacity of each nursery is approximately 10 000 seedlings

Compost making :

Produced first with local available biomass This compost serves as demonstration to villagers. This is to be disseminated within the area

Photo by the author

Agroforestry

Hedgerow establishment (sowing of *Tephrosia vogelii)*

Photo by the author

43.Effects in the environment

431. spatial effects

Table 1 : Evolution of afforested superficies

Species	1998		season 1999-2000		season 2000-2001		Together	
	Surface (ha)	Coverage rate (%)	Surface (ha)	Coverage rate (%)	Surface (ha)	Coverage rate (%)	Afforested superficies (ha)	Coverage rate (%)
Pinus	17,20	**1,00**	24,81	1,32	110,31	6,00	**241,90**	**12,48**
Eucalyptus	80,70	**4.32**						

Superficie of Analamihoatra village (ha)	1867.1 ha

Table 2 : Realizations in agroforestry

themes	1999-2000	2000-2001
Live hedge (linear metres)	13 650	29 500
Fruit tree (seedling)	356	483

Housholders, men and women engage in planting trees in their lands.

Photo by the author

The change in the ladscape is significant.
2-year *Eucalyptus robusta* grow in the slopes normally

Photo by the author

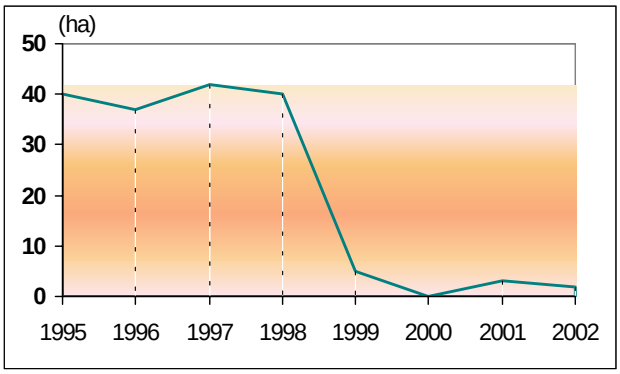
The hamlet of Analakely is an example of a general adoption of agroforestry practices.
But some improvement is still needed

Photo by the author

Closer view of one parcel in Analakely.
Tephrosia vogelii appeared to be the most adaptable species for hedgerow

Photo by the author

432. decadence of bushfire practices



432. Effects on the Socio-economy

Direct and indirect positive effects could be noticed within the local communities. Especially in terms of savings. So from using compost, each household could save 115 USD per hercare while it spent annually 2000 USD or more.

For five years Eucalyptus, 135 USD of benefits would come to the planters for 1 hectare plantation. Of course, benefits are much more higher in case of older plantations.

By the initiatives of the population, about 20 of localmade generators based on the design of the small scale hydraulic generator (installed by the project) exist now in different places of the village where small streams are available. As a result, instead of purchasing dry batteries to listen to radio, housholders can make economy through the use of such devices.

Fruit of the communities'initiatives, this localmade generator are diffused in many places in Analamihoatra village

Photo by the author

5.Was really the project a success ?

According to the results of the study the project generates some satisfactory effects in the target area for the first two years. So the hypothesis seems to be verified.

6. Some major factors of the success (only a few ones are given here)

61. Effective participation

>the participation rate has jumped from 30% to 96% in two years

62. Involvment of the local population

>The PRA approach showed good result in social mobilization and consider the local communities as real partners of the project.

6.3 Land allotment system

>The Ministry of Forests and Water developed a strategy to encourage tree planting activity by allowing the local farmers to afforest the government land and become owners after 5 years .

6.4 Mutual confidence

Confidence between the project actors (NGO, Officers…) and the local community is very important in the conducting of activities. Naturally, the project should fail if the relationship between the project and the beneficiaries is unsatisfactory.

7. Some recommendations for a sustainable watershed management.

- to invest more efforts on local capability strengthenning
- to favorize communication between the stakeholders and the project team and also between the stakeholders themselves
- to integrate some development activities as incetive for the project beneficiaries
- to consider the viability of each proposed technologie (social viability, technical viability, economical viability)
- to involve women in each stage of activity