



XII Congrès forestier mondial XII World Forestry Congress XII Congreso Forestal Mundial

This is the original, unedited version of a paper submitted to the XII World Forestry Congress, 2003, Québec City, Canada.

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0102-C1

THE IMPACT OF MANAGING A RESEARCH AND EDUCATION FOREST IN INDONESIA

Untung Iskandar^[1]

ABSTRACT

The paper describes the management of the Wanagama I, the Research and Education Forest managed by the Gadjah Mada University, Yogyakarta. The main objective of managing the R&E Forest is to rehabilitate degraded and critical areas. In order to do so, the management involved the local community at the earliest stage. Rehabilitation was started by planting *Acacia auriculiformis*, *Acacia villosa*, and *Glerecidia maculata*. Later the farmers that live around the R&E Forest were involved in many of the silvicultural activities, and they became proficient and skilled in the techniques. They used their skills to establish tree communities in their home and field gardens. The R&E Forest Management provided seeds for them to plant. They were able to improve their incomes and living conditions by planting many of the commercial trees, notably teak, mahogany, *Parkia* and *Gnetum gnemon*. The R&E Forest also conducted training and field practice for rehabilitation of the degraded and critical lands. The outcome of the training was the development of a large-scale private forest in Gunung Kidul Regency.

Introduction

The paper will describe the impact of management Research and Education Forest (R&E Forest) by the Faculty of Forestry of the Gadjah Mada University. The management was started in 1966, over a forest area of 79.9 hectares. The forest area is located in the regency of Gunung Kidul, some 35 kilometers from the campus. The Provincial Forest Service of Yogyakarta granted the forest area to Gadjah Mada University. The start of the efforts was at the height of long drought that resulted in soil and forest degradation. At that time the social condition was worse than ever, caused by simultaneous famine and crop failure. Within the period of 16 years, the management concentrated on improving the livelihood of the community, first by improving the soil fertility and second by providing job to them. As the first effort to improve soil fertility, the management planted *Acacia villosa*, *Glerecidia maculata* and *Acacia auriculiformis*. The management also distributed the seedlings of these species to the workers, for them to plant in their field gardens.

At the later stage, the management planted all dryland species available nationally. Among others,

a high demand timber (such as teak) was selected. Very recently *Santalum album* was introduced and the community could participate in planting them. Scientific experiments were carried out to select the best species for low soil fertility. Currently the management is doing species and provenance tests to select the most suitable one for commercial plantation in degraded and *Imperata* infested lands.

Sixteen years later, in 1982, the R&E forest area was expanded to 599.9 hectares by integrating adjacent forest areas. The area became unified, integrated with the community and reached an economic size of a sustainable management unit area. By then, the R&E forest is called the Wanagama I.

The objective of the management is to provide for infrastructure for education and research especially in the rehabilitation of degraded and critical lands. Later, the management added the activities by providing training for extension officers in land rehabilitation and development of community and private forests for east Indonesia. The education and research are also concentrating on rehabilitation of critical land areas. Research activities are dominated by species trials and provenance tests. In addition, the research also introduces species, which are almost extinct in their endemic environment to the area. Socio-economic analysis was nearly absent from the research and education.

The workforce to carry out the effort was recruited from the adjacent villages and hamlets. In the dialog with these persons, it was apparent that they benefited most by working in the field. Formerly they did not believe that soil conditions could be improved and trees can grow on such poor soil. Before in the inception of R&D Forest, they tried once and it failed. They did not know that the researchers have added mycorrhiza to the soil, as a way to improve survival-ability of the plants in such a harsh condition.

They were also provided with seeds of all trees planted in the field, to be planted in their field gardens. Because they have first-hand experience in plant preparation from nursery to the planting field and tending of the juvenile trees, they could plant and tend better in their field gardens. Later the R&E Forest Manager distributed all kinds of seeds to these forest farmers. The R&E Forest received seeds from donations and from the result of exploration of the scientists in the management. Thus, their field gardens were planted with all kinds of available plants and soon it resembled forest. Thus the persistence of the researchers and the field workers contribute to the success of the land and forest rehabilitation.

Materials and Methods

The analysis will examine whether intensive tree planting improves the prosperity of the community adjacent to the R&E Forest relative with that of 20 years ago. The analysis will focus on the community adjacent to the area. To identify the impact, an unstructured interview with the members of the community took place on July 2002, twenty years after the forest area was expanded. Altogether 14 hamlet chiefs and four village chiefs were interviewed. They gave permission to the interviewers to examine the factual situation in the field, to verify their description. The interviewers could not go to the farmers because of cultural setting that allow only their chiefs explain to strangers. The scope of the dialog was to seek first-hand information regarding the direct benefits they accrued from their participation or their observation of the activities within the R&E forest area.

In the past the community was regarded as an impoverished one because the area produced only cassava. The land was originally infertile and classified as critical. Because of an extensive utilization compounded by sparsely applied fertilization, the soil became poorer. Rice and corn were grown only in short rainy season, along the riverbed to take advantage of the available water. Especially in the high dry season, the people in the area consumed dried cassava as the staple food.

The community around the R&E Forest consists of four villages (*desa*) and each village consists of several hamlets (*dusun*). The total area of the four villages surrounding the R&E forest is 3998.4 hectares with the total population of 13.474 people. In all of the four villages, the area of field gardens (1730.4 hectares) exceeds that of rain fed rice fields (77 hectares). The presence of

much larger field gardens indicated that the community could develop private forest.

The soil of the area classified as grumusols and mediterranean in which permeability is very poor and thus soil are strongly water retaining. Chemically the soil is very poor and calcerous. Annual rainfall of the area was about 1500-2500 mm with dry months 4 to 6 months (Tolboom, 1991).

In all villages there are big number of cattle and goats that support their livelihood. Further, cattle and livestock signifies the importance of multiple purposes tree species that can supply timber, fruits and more importantly, fodder. The cattle and livestock may be a factor for conflicts with the management of the R&E Forest, because the community may resort to secure their fodder by encroaching the forestland.

Results of Interviews

1. Those farmers who were recruited to become forest farmers stated that they benefited by joining the project because of their understanding of the techniques of planting to rehabilitate degraded soils. The skills were generated by field practices as well as compliance to the instructions of the project officers.
2. Formerly they were skeptical that planting the trees in the degraded land can rehabilitate the soil. Only after seeing the results of their hard work, they were convinced that trees do improve soil conditions.
3. They understand that the soil was improved by *Acacia villosa*, *Acacia auriculiformis* and *Gliricidia maculata*. They planted the *auriculiformis* and the *gliricidia* in their field gardens since both could provide for fuel wood and for fodder.
4. They were convinced that they could improve their incomes by intercropping of grass underneath the trees, without harming them. Later they practiced intercropping in their field gardens, by planting bananas and medicinal herbs underneath the trees. Indirectly, the management introduced agro forestry, without stating it.
5. After mastering the techniques and benefited from planting all kinds of trees in their field gardens, the farmers then selected the more economical ones, namely *Parkia speciosa* and *Gnetum gnemon* (for high priced fruits) and *Tectona grandis* (teak, for high priced timber). To a lesser extent they also planted *Swietenia mahogany*.
6. For those who did not join the rehabilitation planting, they were attracted to plant trees in their field garden, after observing that planting trees could change the areas from critical land to a better soil and land conditions. They follow those who work in the project, planting teak and also practice intercropping system. Almost all practice similar techniques that were developed in the R&E Forest.
7. The interviewees stated that their prosperity is improved, they do not sleep hungry, they can send their children to high schools, and they can repair and rebuild their houses. All of those by using the timber they grow. Some of them have the other opportunity to explore other profession, such as to become timber traders and sawmillers.
8. The hamlet and village chiefs also decided that teak should be planted along roads and on the boundaries between villages and hamlets. The chiefs also stated that any available open space should be planted with teak and other useful trees to further improve the prosperity of the community.

Discussion

The effort to rehabilitate soil and to improve land was made by planting *Acacia villosa*, *Acacia auriculiformis* and *Gliricidia maculata*. Formerly the farmers were skeptical that planting the trees in the degraded land can rehabilitate the soil. Only after seeing the results of their hard work, they were convinced that trees do improve soil conditions. Those trees generated benefits for fuel wood and fodder. *Acacia auriculiformis* and *Gliricidia* enjoyed popularity by the community

because of their fuel value and in case of *Gliricidia* its fodder value as its additional benefit.

Later on, the farmers and the community practice intercropping in their field gardens, by planting bananas and medicinal herbs underneath the trees. Indirectly, the management introduced agro forestry, without stating it. Very recently, they planted *Santalum album* for its high priced timber for cosmetics and incenses and *Acacia mangium* for its versatility as construction timber as well as fuel wood. Later, they demand genetically improved teak. Some of them have already planted TEAK⁺ from Monsanto. They plant in their field gardens and some in their rain-fed rice field, with the density of 1 by 1 meter, to benefit from the thinning that will take place at the year 4. By the end of the rotation of 20 years, the stand distance will be 3 by 3 meters.

The practice is repeated elsewhere. Sallata *et.al.* (1999) reported that agroforestry, the practice of intercropping perennial trees with annual trees including industrial ones (such as coffee) increase land productivity and hence farmers' income. Intercropping with food crops and fodder took place up to the second year, due to crown closure of the dominant trees. Similar agroforestry practice of Gunung Kidul is also practiced in Lombok, which shows similar results, namely an increase in the income of the practicing farmers'. They acquired benefit from agroforestry practice on land conservation, reduction of soil erosion and therefore increase land productivity (Yudilastiantoro, 2001). He reported further that the practice of planting in critical land areas is reintroduced to the farmers'. Tolboom (*op.cit*) further reported that agroforestry system reduces crop failures and risks from adverse weather, especially when drought resistant are selected.

There are direct and indirect benefits that could be accrued from managing the R&E forest. The direct ones are the skills generated to rehabilitate soil by planting trees. The skills were from nursery, planting and tending until the trees reached maturity. The additional skills were on converting waste into compost and practicing intercropping in their field gardens.

The second benefits accrued for those that planted trees in their field gardens were from the fruits and timber from thinning and from final felling. They stated that they are now wealthier because of the incomes from fruits and timber from their home and field gardens. Some of them even expanded planting trees in their rain-fed fields, as they started to leave planting rice. They also intensify the intercropping system, to further enhance their prosperity. The majority relies on teak and to a lesser extent on *Acacia mangium* and *Gnetum gnemon*. They bring forest ecosystem into their villages.

They could not describe how much their prosperity was improved; yet they stated that they could send their children up to high school. Many of them stated that they can repair their houses or even built a new one by tearing down the old ones. These two indicators were very obvious. Schools are busy and the school children are well clothed. Their houses are relatively newly built and modeled to the recent trends. Some of the newly built houses consume large quantity of timber. Buying motorbikes for their children was not a dream anymore. Some families use electrical appliances, because they can afford to.

The officers of the extension-service from several provinces generated the indirect benefit. They were trained in the Wanagama on techniques of critical land rehabilitation and when they return to their original places, they establish community or private forestry as a means to improve the livelihood of the community. However, the results were not as spectacular as that of Gunung Kidul Regency.

The community in the Regency of Gunung Kidul went to a greater extent, by establishing 21.000 hectares of teak forest grown on private lands. Many of these have reached maturity. Aside from teak, there are several dominant species, such as *Swietenia mahogany*, *Parkia spp.* and *Gnetum gnemon*. Later the community will plant *Santalum album* and other high priced trees. The forest produces about 2.250 cubic meters of timber per year. All of them were sent for as construction, for furniture and for high priced carved furniture. The traders quickly become the affluent group within the community (Gunung Kidul Regency by Number, 1999).

Only after the community surrounding the forest enjoys a better life than before the R&E Forest Management starts to embark on research. Currently the research is focused in developing propagation techniques for *Dyospyros celebica*, another high priced timber originated from other

parts of Indonesia. The management also introduced neem (*Azadirachta indica*) for its medicinal contents.

Conclusion

The interviews indicated that:

- The planting of trees converted degraded and critical land areas into fertile lands.
- The management of R&E Forest in fact converted the community adjacent to the R&E Forest in particular and in general the people of Gunung Kidul Regency from poverty to prosperity.
- Their prosperity was generated by the products from the trees they planted namely fruits and timbers.
- The community started practicing agro forestry. They planted a variety of trees, with the main species is teak.
- The benefit of the Wanagama was conspicuous by the existence of teak forest grown on private lands, especially in Gunung Kidul, which produces sizeable amount of timber.

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^[1] Coordinator, ITTO Project PPD 47/02(F), Gedung Manggala Wanabakti block 4 9th floor, Jalan Gatot Subroto, Jakarta 10270, Indonesia. Email: u_iskandar@hotmail.com