Land Rehabilitation through reforestation – The power of property rights

An innovative approach from the Republic of Madagascar
Bioresources: From exploitation to controlled, sustainable supplies

Like many other countries struggling against receding forest cover and progressing desertification Madagascar is locked in an impasse of unsustainable, uncontrolled extraction of firewood for satisfying growing household energy demands. Action is needed to avoid degradation of soils with disastrous effects on water resources, subsistence farming and biodiversity hotspots. Poverty reduction is imperative with a high proportion of landless among the rural population living on less than $1 a day.

With 20 years of experience in household energy matters in tropical and subtropical economies ECO Consult was called to advise the „GREEN Mad“ component („Decentral management of natural resources“) of the German-Malagasy environmental programme (PGM-E), in 2004. The programme is implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ). The lead executing agency is the Republic of Madagascar’s Ministry of Environment and Forests (MEF). The approach developed in the consecutive ten years has won international recognition. Reason is that it was able to address a typical bundle of obstacles, comprehensively. And thus it succeeded in curbing deforestation and securing decentral sustainable energy supplies.

This paper is to sketch the pilot measures in the region of Diana, with a focus on the individual community afforestation scheme (RVI). It mentions some quintessential findings transferable to other contexts and shows points of entry for scaling up.

Madagascar: A country losing ground

Progressive deforestation at an annual rate of -0.4 % (57,000 ha) throughout the last two decades and subsequent erosion have already stripped Madagascar of many of its fertile soils. This directly affects the country’s 20 million populace, especially in rural areas. Small and subsistence farmers suffering from decreased soil productivity increasingly turn to charcoal production to make a living. Primary forests, secondary forests and savannah are used, often illegally, as a freely accessible resource.

Charcoal production is attractive as it furnishes a comparably rapid income. 85% of all Madagascan households depend on fuelwood or charcoal for their cooking energy needs. The demand is expected to rise dramatically in the coming decades, as will the prices for charcoal, facing the economic crisis. However, even if revenues from urban sales rise, these will rarely reach the rural producers but commercial traders who dominate the business. Charcoalers react by intensified logging, further proceeding into fragile ecosystems like mangroves and dry forests, which harbor the country’s unique biodiversity and fulfill other major ecological functions.

Inefficiency of both traditional kiln technology and domestic combustion techniques (cooking stoves) add to the excessive amounts of wood and charcoal consumed (Diana: 430,000 m³/a), much beyond the natural regenerative capacity.

The resulting accelerated deforestation and degradation affects water resources, increases vulnerability to natural disasters, deteriorates the charcoal producers’ production basis and is expected to contribute to global climate change.

Individual community afforestation: The power of property rights

The project’s objective is to contribute to the sustainable woodfuel supply of Antsiranana, the capital of the Diana region in northern Madagascar. Individual community afforestation (RVI) places local people at the centre of planning and implementation of woodfuel plantation management. The approach is based on voluntary participation of communities eager to rehabilitate degraded lands by means of voluntary individual reforestation. A village based participatory approval process allocates individual woodlots to interested households, along with defined use-rights and obligations. Each plot is demarcated, mapped, and documented with the communities’ approval. Technical assistance is provided by specially trained NGOs through a three-stage approach, with a total implementation period of 21 months. To date, 34% of the poorest and landless people got involved. 22% of women are enrolled as woodlot holders.
What energy policies should attempt

Adjustments in the national energy policy are necessary to make RVI effective in the long run. What is true for Madagascar is also more or less relevant in other countries with a comparable outset. Energy policies should:

- transform countries’ mostly informal wood energy sectors into regulated, legally formalized regional economies;
- devote administrative attention and financing to formal local biomass energy markets;
- establish national energy wood reserves and sustainable production of wood for household energy purposes – best combined with such participatory approaches as RVI;
- integrate woodfuel as an important pillar in the country’s energy mix (image change).

Interventions all along the value chain

Smallholder afforestation is at the heart of the project and has proven highly successful. Nevertheless, the project’s interventions go far beyond it, addressing all stakeholders of the charcoal chain in an adapted manner.

ECO’s approach is based on an understanding of the whole sequence from fuelwood provision across several phases of transformation and marketing down to household consumption as a value chain. Modernization and formalization must pertain to all steps in parallel. This is important to outbalance hardships e.g. after an introduction of energy efficient stoves (high investment cost for the consumer/ drop in sales for the charcoal producer).

The measures along the value chain (sketched in keywords in the illustration on the right) are explained in more detail on the following pages.

Wood fuel production
- Devolution of secure, long-term tenure to rural communities
- Optimization of plantation and natural forest management techniques
- Equitable access and benefit sharing
- Community organization and participatory management schemes

Transformation
- Technical and organisational support to charcoal producers
- Introduction and testing of innovative kiln technologies
- Piloting of new credit schemes
- Valorisation of residues
- Introduction of alternative wood energy products

Commercialisation
- Establishment of formalized local energy markets
- Standardized, traceable products (proof of origin)
- Support to economic policy measures and enhanced enforcement
- Piloting of public-private partnerships

Consumption
- Dissemination of improved stoves
- Research and development for more efficient, cleaner and safer technologies
- Testing of alternative energy sources
- Information and advice to retailers and consumers
Afforestation

Large-area planting of fast growing trees is coupled with training of personnel for managing nurseries and forest management according to fixed quality standards. The choice of areas eligible for afforestation and transfer of individual property rights is deliberately on degraded areas without any agricultural potential. This is to prevent later competition and use conflicts in the long term.

The choice of tree species was based on: short rotation cycles, resistance against climatic fluctuation, suitability of the cultures for machine processing, especially on slopes, and their potential to contribute to erosion control, particularly of the widespread erosion basins. Energy woodlots were successfully planted as buffer zones around protected areas and mangroves: Local residents now extract their wood supplies from the plantations. Further important sites for planting are watercourses and corridors on the routes of migrating fauna.

Transfer to local user groups

Currently, 2,600 individuals from about 70 villages are enrolled in the participatory management schemes of *Reboisement Villageois Individuel, RV*I. Smallholders form voluntary user groups and apply to their local forest authorities for land title transfers, subject to the joint selection of afforestation sites on state-owned lands. Forest authorities register the transfer of use rights for an indefinite period, including equal access and benefit sharing for the participants.

User groups are self-governed and operate self-reliantly, with training and organisational support (charters, administration, formation of committees, databases) provided by the project, NGOs and other local partners. Direct monetary support is not being provided. User group committees also address the more day-to-day aspects of village development. The legal title to land is individual. One smallholder household owns on average 3 ha of energy forest with a rotation period of 4-7 years. This enables the smallholder to produce 2.6 tons of charcoal annually for about 27 years, without any need for further investments.

The number of bush fires in the afforestation zones decreased as the owners of the forest plots have an interest in protecting their property. Logging and carbonisation are tied to respective licenses which secure quality and sustainability in all production phases. Incomes have increased by about 40% as compared to the average income in rural areas. For the landless third of rural farming households the increase is significantly higher. Landless poor and women are privileged in the distribution of plots. Many women have succeeded in strengthening their economic position in society through participation in the project.
Greening the charcoal chain: measures

Optimisation of kiln technologies

Instead of prior traditional kilns that operate on a rate of effectiveness of 10-12% and waste large portions of bio-resources, charcoal burners in the project area use improved kilns with effectiveness rates of up to 36%. This means a tripled output on the basis of equal raw material. New climate-friendly kilns with methane recycling cut the carbonisation time from 7 days to 72 hours. The project provides micro credit services and demonstrates the use of alternative fuels such as chips, briquets and pellets.

Support to marketing

The charcoal trade is often dominated by tight networks of middlemen (transport businesses, wholesalers, retailers). They are able to control market prices and to forestall the trickling down of economic benefits. Promoting farm-gate sales redirects a greater share of revenues to communities. Incentives for farmers and charcoal burners to set up formalized small rural businesses strengthen their bargaining power and market shares. They also facilitate proving the sustainable origin of the coal produced.

Until use regulations and differentiated taxation take effect, charcoal sourced from sustainably managed plantations suffers a competitive disadvantage vis-à-vis charcoal from non-regulated and non-sustainable open-access use. The “Green Charcoal Chain” concept responds to this structural market distortion by guaranteeing producers (as members of local trade cooperatives) higher purchase prices for sustainably sourced charcoal. Specially established rural markets enable producers to exclusively sell woodfuel and charcoal with a proof of origin. The “Carbon Vert” label documents that labeled products have been certified against verifiable standards.

As long as consumers refuse to pay higher prices for sustainably sourced charcoal, the wood energy value chain may be tied, by virtue of its documented reduction of greenhouse gas emissions, to novel financing mechanisms of carbon markets. The direct cost of afforestation amounts to EUR 225/ha, of which farmers contribute about one third through their own labor. The remaining 65% are subsidised. Measures to formalize wood energy markets include penalty surcharges for illegally/non-sustainably sourced products, differentiated fees and charges (levied on transport, conversion and trade) as well as the further promotion of public-private partnerships.
Optimisation of combustion technologies

Decentral manufacturing and dissemination of more energy efficient cook stoves is supported. Further, research is continually devoted to the development and testing of even more efficient, cleaner and safer combustion technologies.

Creating conducive policies and laws

Policy advise aims to capacitate the Ministry to establish a substantiated and coherent legal basis and implement laws and regulations. To this end, a system of decentral supervision and control through local forest authorities and enforcement patrols in the villages is being set up. Awareness raising against illegal practices will further be needed. Public controls of transport routes to consumption hotspots and markets ensure that charcoal burners, transporters and retailers are motivated to use sustainably sourced wood.

Benefits for the present and future, added value for overall development

Thorough modernization of the wood energy value chain generates benefits for forest stewards, producers of improved stoves and end consumers alike, while suppressing non-regulated exploitation. End consumers reap the added benefits of reliable supply, lower fire and health hazards, and less indoor air pollution.

Thanks to the pilot project in Diana, 30,000 people in the regional capital of Antsiranana (this is almost every third citizen of the town) have now access to sustainable household energy. About 800 ha of the total afforested area can be logged per year. Capitalizing on efficient conversion technologies, a total amount of 3,500 tons of coal can thus be produced.

With support by the German-Malagasy environmental cooperation implemented by ECO Consult, the state has in comparably short time (i) created national biomass/wood energy reserves, (ii) recultivated degraded lands, (iii) generated rural employment and income, (iv) mainstreamed standards for sustainable forest management and community organization, and (v) generated co-benefits for biodiversity conservation and climate change mitigation.

Moreover, the pilot project has triggered many side effects for an overall integrated regional development – e.g. in terms of innovative community organization and empowerment (user group committees, management skills, promotion of good governance etc.).
Scaling up

The pilot project in the region of Diana is being advocated by the Programme’s commissioning body, the German Federal Ministry for Economic Cooperation and Development (BMZ), to be scaled up within the country and to other partner countries of German bilateral cooperation. Supplying households with energy from sustainable energy forests to a greater extent in other regions too, will be dependent on external financing for some time through bilateral or multilateral donors. The same holds true for an extension of the approach to other countries. In terms of concept development and knowledge management the project is closely aligned with other projects of German technical cooperation in the area of sustainable household fuel provision.
Further reading

Numerous publications have reported on the pilot project and its activities from various standpoints. A choice of recent publications is to be obtained via the Programme under the aegis of GIZ: PGM-E/ Alan Walsch: alan.walsch@giz.de.

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The perspective to live on plentiness one day instead of scarcity occupies people’s minds. Unsurprisingly, it figures also in their art work. This painting was dedicated to ECO by a local artist.