

Securing livelihoods in Toliara, Madagascar

Rural livelihoods in Madagascar – in particular the south-west – are highly insecure, in part due to a scarce resource base. ESAPP and project partner DERAD designed an approach towards rural development that starts by assessing the resource base and its use by local communities. Recommendations included the design of a more resource-efficient herding technique for small ruminants.

Sustainable development challenge

Rural livelihoods in Madagascar have remained highly insecure for several reasons. First, off-farm income opportunities are limited, making it difficult to diversify risks. Second, unsteady household incomes and low livelihood resilience are exacerbated by poor infrastructure development, unstable and unpredictable markets for agricultural products, and unreliable yields caused by climate variability. Third, insecure land tenure systems and an unstable political situation inhibit the willingness to invest in land conservation measures and more efficient production systems. All this culminates in an unreliable context leaving little room for households to experiment with innovations. This explains to a large extent why only few rural households adopt interventions that might help improve livelihood security and resilience.

Communities in south-western Madagascar are particularly vulnerable, as their livelihood options are constrained by a scarce resource base and a variable semi-arid climate. When using the limited resources, they have little choice but to accept trade-offs between food production, energy supply, and securing water reserves. There is a desperate need for integrated approaches towards more efficient natural resource management.

ESAPP's response

Aware that communities in many arid and semi-arid areas in Eastern Africa are struggling with a limited resource base, ESAPP recognized the need to integrate the management of competing claims into approaches towards sustainable natural resource management. This means that solutions recommended to rural advisory services should not focus only on food production: they should also include the search for alternative and more efficient ways of using natural resources. In addition, potential solutions should maximize the market value of exportable resources and optimize the management of trade-offs between different uses of the same resource.

In south-western Madagascar, ESAPP's long-term partner institution DERAD (Diagnostic environnemental et recherches appliquées pour le développement en milieu rural) designed an approach towards rural development that started off with a comprehensive assessment of the resource base and its use by local communities. The nexus between food, water, and energy security (Hoff 2011; SGEA 2012) was at the conceptual core of this assessment and guided DERAD's subsequent recommendations and implementation activities. DERAD identified and implemented priority activities such as the search for alternative income opportunities to reduce charcoal production from the surrounding dry deciduous forests, as well as the design of a more resource-efficient herding technique for small ruminants.



Main messages

- Sustainable rural development strategies must be based on a participatory baseline study. Interventions that start with a careful research component have higher chances of succeeding than projects that start with immediate implementation.
- Projects aiming to improve livelihood security must consider the nexus between food, water, and energy security. These three aspects are closely interlinked, making it necessary to carefully weigh up trade-offs and complementarities.
- Decentralized government agencies increasingly require relevant, context-specific knowledge that helps them design strategies to improve local communities' livelihood security. Close collaboration between researchers and government agencies is needed to produce this knowledge.



The dry deciduous forests are an important source of firewood for local households. Some spiny trees are also used to make charcoal, which is usually sold in the town of Toliara. Charcoal production was identified as one of the main causes of deforestation in the region. Woody vegetation is also an essential source of fodder for small ruminants. These two competing uses lead to massive pressure on and continued degradation of the natural vegetation. (Photo: Rabeniala Radobarimanjaka)



Top: Access to water is a major livelihood concern for local households in Soalara, an arid area on the littoral of south-western Madagascar. Degradation of the surrounding dry deciduous forests through charcoal production and extensive goat herding has led to a lowering of the groundwater table. Finding alternative income opportunities to charcoal production and reducing the ecological footprint of small ruminant herding are therefore important pathways towards more sustainable livelihoods. (Photo: Albrecht Ehrensperger)

Bottom: Goat herding is the main economic activity for households in Soalara. Current extensive herding puts significant pressure on the natural vegetation, but reproductive efficiency is low. To raise reproductive efficiency, the project advised herders to split herds according to age and to use Christ's thorn jujube (*Ziziphus spina-christi*) as a fodder supplement. This plant can help synchronize oestrus in female animals by providing critical energy during the dry season, when other fodder is scarce. (Photo: Albrecht Ehrensperger)

The project story

DERAD has over seven years of experience conducting research and implementation projects in the semi-arid south-western part of Madagascar, which is characterized in many places by highly insecure rural livelihoods. One of DERAD's project sites is located south of the town of Toliara, along the coast. In this area, DERAD identified a number of development threats and priorities of the local community. The degradation of dry deciduous forests and grazing land due to unsustainable goat herding practices and widespread charcoal burning was identified as a major threat to the natural resource base, including ground water, and thus to the community's livelihood security. A comprehensive survey was conducted to assess the exact causes, extent, and trends of vegetation degradation processes. Forest areas were analysed spatially using Landsat images, and vegetation samples were taken to assess forest health as well as species diversity. Based on the results of this research, DERAD embarked on three major activity lines:

Small ruminants: A series of projects were implemented in order to help local goat herders improve pasture management as well as animal nutritional and reproductive health. One of the main goals of this activity line was to design a system with new herding techniques. Aimed at preserving the natural vegetation and groundwater levels in the region, the system focused on sustainable production of sufficient fodder and reduction of pressure on dry deciduous forests (Andrianarisoa and Raoliarivelo 2013).

Farming: Solutions were sought to improve agricultural production in this semi-arid environment, mainly as a complement to goat herding and fishing. DERAD identified the rehabilitation of irrigation infrastructure (channels and water reservoirs), as well as capacity development of farmers, especially in agricultural pest control, as important priorities in the agricultural sector. Accordingly, recommendations were made to the local extension services to focus on these aspects.

Energy supply: In parallel, research was conducted on the potential of *Jatropha mahafalensis*, an endemic variety of the *jatropha* genus, to substitute charcoal as a fuel for cooking and lighting (Sonnleitner et al. 2013). The study focused on whether to replace the numerous agave and cactus hedges, used for the corralling of goats, with *Jatropha mahafalensis* hedges. However, DERAD found that these hedges would not produce sufficient amounts of oil to replace current cooking and lighting fuels, and therefore recommends a multi-fuel strategy (Andrianarisoa et al. 2014; Ehrensperger et al. 2015).



Innovation and relevance

DERAD's approach in south-western Madagascar was a combination of careful and comprehensive scientific assessments of the main development challenges, priorities, and trends, with the targeted implementation of activities selected and designed on the basis of these research findings. ESAPP and its local partner decided to take a multi-strategy approach to rural development in the project area. To achieve long-term livelihood security of rural households, such an approach must take into consideration the nexus between food, energy, and water security. DERAD's projects addressed the components of this nexus by improving livestock and agricultural production (food), exploring alternative and affordable fuels for cooking and lighting (energy), and mitigating pressure on the natural vegetation to help preserve the groundwater table (water).

Semi-arid areas with a limited resource base and highly variable climatic conditions are quite common in many parts of Eastern Africa. In all these areas, local communities face similar livelihood security challenges. DERAD's experiences in south-western Madagascar are therefore of great relevance for the entire region. To foster South–South experience sharing, ESAPP organized exchange visits of DERAD staff members to other partners' projects in semi-arid areas of eastern Kenya that are facing similar challenges. Such events helped strengthen collaborative links between ESAPP partner institutions and consolidate the approaches used.

DERAD's experiences also provided helpful insights into how to support local authorities and their development partners. This was important because rural advisory services have been scaled down or discontinued in many countries, due to structural adjustment programmes in the region. Local authorities have had to take on part of the task of securing their communities' livelihoods. These local authorities are therefore increasingly in need of best-practice examples, as well as support in assessing development needs and designing sustainable development implementation strategies.



Top: Various hedge replacement scenarios were calculated to assess the potential for *Jatropha mahafalensis* oil production in the village territory. Results showed that, even if 80 per cent of the traditional hedges were replaced with *Jatropha mahafalensis* hedges, oil production would be insufficient to substitute traditional fuels for cooking. (Photo: Albrecht Ehrensperger)



Bottom: Hedges and live fences play a crucial role in the local land use system. They are commonly used by livestock herders to corral animals or to keep them off the crop fields. Sometimes, they are also used to isolate sick or pregnant animals needing special fodder or protection from the rest of the herd. Using handheld GPS receivers, DERAD measured all existing hedges within 3 kilometres of the village. A total of 93 kilometres of hedges and 110 hedge plants, found in 60 sample locations, were identified. Cactus (*Opuntia stricta*) and agave (Agave sp.) – both pictured – are by far the most frequently used species for live fences. (Photo: Masezamana Haja Nirina)



Josoa R. Randriamalala, PhD
Ecologist, Research Scientist
Diagnostic environnemental et
recherches appliquées pour le
développement en milieu rural
(DERAD)
Antananarivo, Madagascar



Léa I.B. Raoliarivelo, MA
Geographer
Diagnostic environnemental et
recherches appliquées pour le
développement en milieu rural
(DERAD)
Antananarivo, Madagascar



Albrecht Ehrensperger, PhD
Head of Innovations Cluster
Centre for Development and
Environment (CDE)
University of Bern, Switzerland

References and further reading

- Andrianarisoa JH, Rabeniala R, Raoliarivelo LIB, Randriamalala JR. 2014. *Identification et analyse d'activités alternatives à la fabrication de charbon de bois dans le District de Toliara II: Développement de l'élevage de petits ruminants*. Project report. Bern, Switzerland: Eastern and Southern Africa Partnership Programme.
- Andrianarisoa JH, Raoliarivelo LIB. 2013. *Contribution à la professionnalisation des éleveurs de petits ruminants dans la commune de Soalara: Promotion de la conduite d'élevage en bande*. Project report. Bern, Switzerland: Eastern and Southern Africa Partnership Programme.
- Ehrensperger A, Randriamalala JR, Raoliarivelo LIB, Husi JM. 2015. *Jatropha mahafalensis* for rural energy supply in south-western Madagascar? *Energy for Sustainable Development* 28:60–67.
- Hoff H. 2011. *Understanding the Nexus: Background Paper for the Bonn 2011 Conference*. Stockholm, Sweden: Stockholm Environment Institute.
- SGEA (Secretary-General's High-Level Group on Sustainable Energy for All). 2012. *Sustainable Energy for All: A Global Action Agenda*. <http://www.se4all.org/>; accessed on 19 June 2015.
- Sonnleitner A, Rathbauer J, Randriamalala RJ, Raoliarivelo LI, Andrianarisoa JH, Radobarimanjaka R, Ehrensperger A. 2013. *Jatropha mahafalensis* oil from Madagascar: Properties and suitability as liquid biofuel. *Energy for Sustainable Development* 17(4):326–330.

Highlight profile

This highlight is based on the achievements of 4 ESAPP priority action projects.

Implemented during:
2008–2014

Total funds contributed by ESAPP:
CHF 195,000

Implemented by:
Diagnostic environnemental et recherches appliquées pour le développement en milieu rural (DERAD), Antananarivo, Madagascar

With support from:
Centre for Development and Environment (CDE), University of Bern, Switzerland

Main beneficiaries:
Inhabitants of Soalara village, south of the town of Toliara, in south-western Madagascar

This highlight

Language editing: Tina Hirschbuehl, Marlène Thibault (CDE)
Design: Simone Kummer (CDE)
Proofreading: Stefan Zach (z.a.ch GmbH)

Citation

Randriamalala JR, Raoliarivelo LIB, Ehrensperger A. 2015. Securing livelihoods in Toliara, Madagascar. In: Ehrensperger A, Ott C, Wiesmann U, editors. *Eastern and Southern Africa Partnership Programme: Highlights from 15 Years of Joint Action for Sustainable Development*. Bern, Switzerland: Centre for Development and Environment (CDE), University of Bern, with Bern Open Publishing (BOP), pp. 59–62. <http://doi.org/10.7892/boris.72023>.

© 2015, the Authors and CDE

This work is licensed under a CC BY-NC 4.0 licence (<http://creativecommons.org/licenses/by-nc/4.0/>).

u^b

**UNIVERSITÄT
BERN**
CDE
CENTRE FOR DEVELOPMENT
AND ENVIRONMENT

Derad diagnostic environnemental et
recherches appliquées pour le
développement en milieu rural

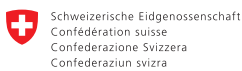
What is ESAPP?

The Eastern and Southern Africa Partnership Programme (ESAPP) is a research implementation programme funded by the Swiss Agency for Development and Cooperation (SDC), coordinated by the Centre for Development and Environment (CDE) of the University of Bern, Switzerland, and implemented jointly by CDE and a network of partner institutions in Eastern and Southern Africa. Launched in 1999 and completed in 2015, ESAPP implemented over 300 priority action projects in the programme region, which included Eritrea, Ethiopia, Kenya, Tanzania, Mozambique, and Madagascar.

What are ESAPP Highlights?

ESAPP Highlights are a series of 24 project descriptions providing insights into ESAPP's research and implementation partnerships. Each Highlight describes a succession of demand-driven priority action projects addressing local and regional sustainability issues. The 24 Highlights are collected in a publication that includes additional background information on ESAPP (see citation above). The individual Highlights and the entire publication are also available for download on CDE's website: www.cde.unibe.ch (keyword search: "ESAPP").

Funded by



Swiss Agency for Development
and Cooperation SDC