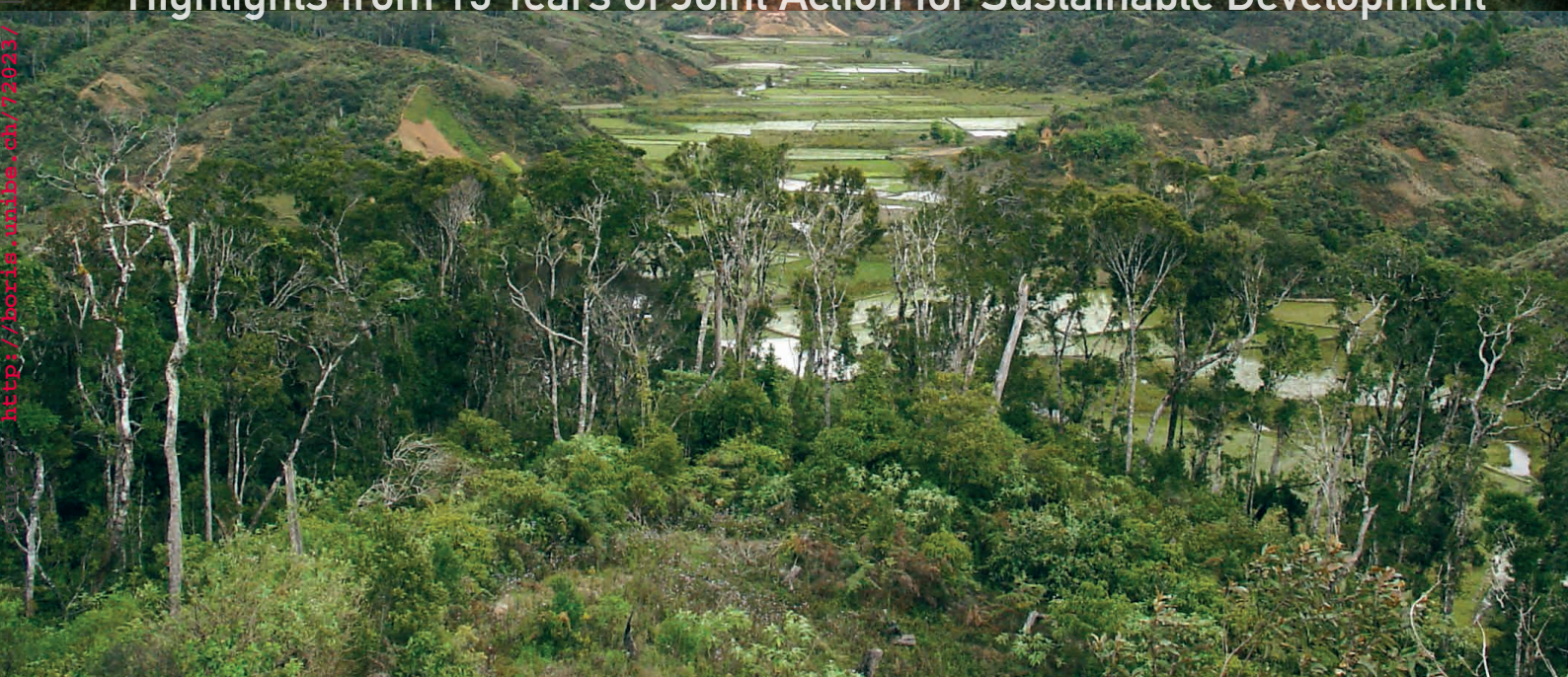




# Eastern and Southern Africa Partnership Programme



Highlights from 15 Years of Joint Action for Sustainable Development



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# **Eastern and Southern Africa Partnership Programme**

**Highlights from 15 Years of Joint Action for Sustainable Development**

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# Foreword

Africa has been undergoing rapid growth since the start of the 21<sup>st</sup> century. In Eastern and Southern Africa, for example, an abundance of natural resources is fuelling economic gains. Nevertheless, many countries on the continent continue to lag in terms of social development: one-third of the world's poorest people live in sub-Saharan Africa; seventy per cent of them live in rural areas and depend on subsistence agriculture for food and livelihood. Human-induced degradation of natural resources in Eastern and Southern Africa is progressing and is intimately linked to the continuing impoverishment of large swathes of the rural population. Many development programmes addressing these problems are still mainly oriented towards sectoral approaches. Little effort is devoted to understanding or addressing complex degradation processes and other development challenges, even though this represents a precondition for comprehensive mitigation strategies.

In the 1980s and 90s, the Swiss Agency for Development and Cooperation (SDC) and the University of Bern's Centre for Development and Environment (CDE) collaborated to meet this challenge: CDE carried out three major SDC mandates in Ethiopia, Kenya, and Madagascar, focusing on partnership-based research and transfer of research findings into reality. In the process, CDE obtained significant expertise in sustainable land management and sustainable regional development, built a large information base, and set up reliable institutional networks. This capital laid the foundation for the Eastern and Southern Africa Partnership Programme (ESAPP), a programme SDC commissioned from CDE in 1999. One of the main lessons learned from the three mandates was the need to combine requirement-driven conceptual reflections with local demand-driven development initiatives to find sustainable solutions. This insight directly shaped ESAPP's resulting structure and approach.

ESAPP pursued a dual approach combining a concept-driven basic mandate with demand-driven priority action projects. The former defines the programme's strategy and ensures that projects fit in a regional development landscape populated by pre-existing initiatives. The latter flexibly responds to development requests from partners and stakeholders, often bringing together proven approaches and experimental designs. Thanks to this approach, ESAPP rapidly evolved into an efficient and focused programme. Out of a broad range of partnerships between CDE and partners in six countries in Eastern and Southern Africa (Eritrea, Ethiopia, Kenya, Tanzania, Mozambique, and Madagascar), more than 300 sub-projects emerged.

Research communities are often accused of occupying ivory towers. This never applied to ESAPP; moving results from the "laboratory" to the farm was a constant preoccupation. Project ideas were developed bottom-up, translated into relevant research questions geared towards identification and evaluation of potential solutions, and operationalized as practice-oriented actions. Project elaboration took place in research partnerships between institutions in the South and the North. The partnerships mutually enhanced the cooperating institutions' capacities, helping provide innovative answers to core challenges facing Eastern and Southern Africa.

The present publication consists of five sections:

- 1. Sustainable land management:** This section addresses locally developed solutions and technologies and their transfer into practice in the areas of soil protection, water, and biodiversity. Among the highlights presented, “Saving Ethiopia’s soils” focuses on a key problem in Eastern Africa: soil degradation. It reduces the capacity of ecosystems to regenerate and sustain human needs; it also harms local communities’ food security and resilience against short- and long-term climatic variability. ESAPP’s integrative approach helped to improve uptake of soil conservation measures by local communities. Another highlight, “The *ngolo* farming technology”, shows how a traditional conservation farming technology, which was used successfully in southern Tanzania but remained unknown elsewhere, was effectively transferred to other affected regions in Tanzania and Kenya.
- 2. Sustainable regional development:** Traditional and indigenous knowledge is neglected all too often, and national legislation often fails to address regulation of resource use at the local level; these gaps are leading to unfavourable conditions for local producers, especially in marginalized areas. ESAPP helped improve the reliability of legal frameworks and value chains for local products by supporting the formulation of clear acts, laws, and certification as well as by facilitating consultation with local communities and stakeholders during these processes. The highlight “Policies and value chains for local products” portrays a series of ESAPP projects that succeeded in improving market access and reliability on behalf of gum arabic, frankincense, and camel milk.
- 3. Knowledge:** When adapting to and exploiting new opportunities, people’s knowledge and social capital are decisive. Rural populations – especially in remote areas – and low-income urban groups are often marginalized due to lack of access to timely and reliable information. As a result, they remain in a weak position in critical negotiations, for example, over infrastructure development. The highlight “Nakuru local urban observatory” describes a project in which community members and local authorities collaborated to identify the most urgent needs for information on urban development issues. The project eventually established a spatial database and a public information tool to address local needs. A methodology combining modern information and communication technologies, satellite imagery, and participatory mapping processes was developed, serving as a model for many other decentralization processes taking place in Eastern African countries.
- 4. Approach:** Development interventions often struggle to achieve results because of inadequate or wholly lacking basic knowledge on contexts. Similarly, conceptual and theoretical reflections on development issues at the policy or academic level often lack sufficient grounding. ESAPP’s dual-approach structure fostered coherence between sustainability implications and demand-driven implementations. The highlight “Promoting stakeholder exchange in Madagascar” illustrates the potential of this approach to integrate scientific knowledge at the regional level with specific, targeted interventions at the local level.
- 5. Foundations:** Learning for Sustainability (L4S) is one of the promising tools developed by CDE and its partners to promote sustainable land management by enhancing social learning processes between those responsible for managing natural resources. L4S was introduced in northern Mozambique through several ESAPP projects. The highlight “L4S: multi-stakeholder cooperation” illustrates the usefulness of L4S for capacity building in natural resource management, but also as a tool for knowledge co-production in equity-based research partnerships for sustainable development.



As enshrined in Swiss law, SDC's mandate is to support partner countries in improving the livelihoods of their people, and to enable them to develop by relying on their own resources. SDC is keenly aware of the importance of research to fulfil this mandate. Research as well as technical, social, and political innovation play an essential role in reducing poverty and global risks. Science contributes to solving development problems and helps to cope with future challenges. International scientific cooperation has a long tradition in SDC, especially regarding global challenges such as poverty, hunger, inequality, resource scarcity, and environmental change in developing regions. Accordingly, SDC is collaborating with universities and other research institutes in Switzerland and around the world, including Africa.

But SDC is also aware of its responsibility to promote exchange between science and practice, as research alone cannot ensure uptake of sustainable development solutions. This explains why SDC and CDE conceived of ESAPP as a research and implementation programme, in which activities such as the installation of a biogas plant, promotion of a new crop variety, or amendment of a legal act are considered no less important than related research activities.

Finally, one of ESAPP's major objectives was to facilitate research partnerships in Eastern and Southern Africa, since strategies established in the global North can seldom solve challenges in the global South on their own. Researchers must have a thorough understanding of the local context to offer promising solutions to the challenges faced by developing countries. Thus, building up local expertise in sustainable development research in the South is one of the most efficient ways to foster endogenous development. This requires participatory approaches in research and the development of research networks. ESAPP fulfilled these requirements to the utmost.



A handwritten signature in blue ink, appearing to read 'G. Siegfried', written in a cursive style.

Gerhard Siegfried  
Head, East and Southern Africa Division  
Swiss Agency for Development Cooperation





# Acknowledgements

ESAPP's journey lasted over fifteen years. In that time, countless participants in Switzerland as well as Eastern and Southern Africa made crucial contributions to this exciting programme. We, the editors of this publication, would like to extend our warmest thanks to all of them with the release of this final printed product of ESAPP. First and foremost, we wish to thank all the authors who contributed to this publication; the wealth of knowledge collected in these pages reflects their broad expertise and in-depth experience in Eastern and Southern Africa. While we regretfully cannot name everyone who contributed to ESAPP between 1999 and 2015, we would like to acknowledge the following institutions and individuals:

## At the Swiss Agency for Development and Cooperation (SDC)

**The chairpersons of the ESAPP advisory board:** Thomas Zeller, Andreas Gerrits, Giorgio Bianchi, Philippe Monteil, and Yves Guinand. One after the other, they skilfully guided the ESAPP coordination team in carrying out its tasks, ensured that SDC's priorities were taken on board, and acted as dedicated ambassadors for ESAPP within SDC.

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**The directors of the East and Southern Africa Division:** Armon Hartmann, Adrian Schläpfer, François Binder, Paul Peter, Chrystel Ferret, Maya Tissafi, and Gerhard Siegfried. They placed their trust in the ESAPP coordination team and the programme as a whole over an exceptionally long period by today's standards of international cooperation. In doing so, they repeatedly expressed support for a long-term initiative that doubtless competed with others seeking their approval. This was a strong statement in favour of long-term partnership-based programmes!

## At the University of Bern's Centre for Development and Environment (CDE)

**The ESAPP co-director:** Hans Hurni. He was an integral part of ESAPP from the very beginning, making essential conceptual and practical contributions to the programme all the way to the end of Phase IV. His vast experience in the region, especially in the Horn of Africa, was invaluable in steering ESAPP in the direction of meaningful, tangible, realistic approaches and activities.

**The ESAPP coordinators during Phases I and II:** Peter Messerli, Lukas Frey, and Sarah-Lan Mathez-Stiefel. They crafted the coordination tools and workflows that governed implementation of ESAPP Phases III and IV. They also helped to build trust between CDE and the partner institutions in the region, which was fundamental to everything achieved.

**The ESAPP coordination assistant:** Maria Paulsson. From 2007 to the programme's completion in 2015 she accompanied, supported, and advised the ESAPP partner institutions to help them comply with the administrative and formal requirements of the programme. Keeping track of dozens of projects implemented by dozens of partners was not an easy task, but Maria always handled it with aplomb.

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**External evaluators:** Joseph Guntern (Phase I); Elisabeth Katz, George C. Kajembe, and Moses W. O. Makunda (Phase II); Gete Zeleke Eshetu (Phase III); Monika Egger Kissling and George O. Krhoda (Phases III and IV). Their often critical but always highly constructive reviews of each ESAPP phase served as guiding lights along the way, allowing us to reflect on and make useful adjustments to our programme activities and concepts.

#### ESAPP partners

**ESAPP focal points:** Woldeselassie Ogbazgi (Eritrea), Berhanu Debele (Ethiopia), Boniface Kiteme (Kenya), Seif Madoffe (Tanzania), Yussuf Adam (Mozambique), and Gabrielle Rajoelison (Madagascar). They acted as essential links between the ESAPP coordination team and the entire Eastern and Southern African region, its stakeholders, decision-makers, and the programme partners. It is through them that the issues, opportunities, and challenges present in the region were shared with other ESAPP partners and used to steer the programme to success.

**All other ESAPP partners:** Last but certainly not least, we would like to thank all the individuals and institutions that have been active members of the ESAPP community over the years, some for focused efforts and others over long periods. They are far too numerous to list individually. More than 80 institutions were involved in one or more ESAPP projects over the course of the entire programme. Their enthusiasm and commitment to advancing sustainable land management and sustainable regional development in Eastern and Southern Africa has been truly inspiring. Our special thanks go to the many governmental institutions we worked with in the region, which were highly supportive throughout all four phases of ESAPP.

The editors:

Albrecht Ehrensperger, ESAPP coordinator 2006–2015  
Urs Wiesmann, ESAPP co-director  
Cordula Ott, conceptual advisor

# Introduction

## Why this publication?

In this publication, we present highlights from 15 years of work on behalf of sustainable development in Eastern and Southern Africa. The work was done through local and regional initiatives within the framework of the aptly named Eastern and Southern Africa Partnership Programme (ESAPP). ESAPP was a unique programme in terms of its structure, chosen topics, and working procedures. It sought to address certain fundamental challenges of collaborative North–South work for sustainable development, such as ensuring local uptake and ownership. This publication shows how ESAPP overcame these challenges by emphasizing equal partnership, co-production of knowledge, and scientific rigour. The result was concrete progress towards sustainable development in six countries throughout the region. Finally, this publication outlines some of the key principles and lessons learned in the course of the programme, which we believe will be of use in subsequent efforts to link knowledge generation and development action.

## ESAPP in brief

ESAPP was a research implementation programme that sought to advance sustainable development through joint action and co-production of knowledge in the context of local and regional initiatives. It promoted sustainable land management and equity-oriented sustainable regional development in Eastern and Southern Africa, particularly Eritrea, Ethiopia, Kenya, Tanzania, Mozambique, and Madagascar (see map on page 13). It was funded by the Swiss Agency for Development and Cooperation (SDC), coordinated by the University of Bern's Centre for Development and Environment (CDE), and implemented by CDE and a network of partner institutions in Eastern and Southern Africa. Launched in 1999, the programme concluded in 2015. More than 300 demand-driven small-grant projects were carried out in that time, with careful efforts to systematically integrate, link, and build on the results of every project. Independent experts evaluated the programme on four occasions, highlighting the success of the approach each time.

## ESAPP's origins

ESAPP grew out of three prior research implementation projects carried out by CDE and its partners in Ethiopia, Kenya, and Madagascar with support from SDC. All three projects applied an integrative approach to sustainable development and focused on acute problems present in the project areas, namely: soil degradation and loss in the densely populated highlands of Ethiopia, water conflicts in adjacent highland and lowland areas in Kenya, and biodiversity loss in Madagascar.

These initial projects produced a wealth of data and information on the project areas; gave participants extensive experience in applying integrative concepts, tools, and approaches; and helped solidify collaborative networks and partnerships with organizations in the region. But the projects also faced challenges typical of relatively isolated interventions not linked to a larger programme. On the one hand, their typical “log frame” approach, with predefined goals and outcomes, hampered recursive interactions at the science–society interface. This hindered both knowledge co-production and the participatory development of aims and targets in social and political learning processes. On the other, strict allocation of the projects to separate host institutions – such as individual ministries or government departments – limited the dissemination of results to individually approved channels, diminishing the overall impact of the knowledge created. For this reason, SDC and CDE conceived and launched ESAPP in hopes of further developing and better disseminating the results of the initial projects. The programme was designed to maximize synergies, enable better exchange, and ultimately achieve greater impacts on behalf of sustainable development.

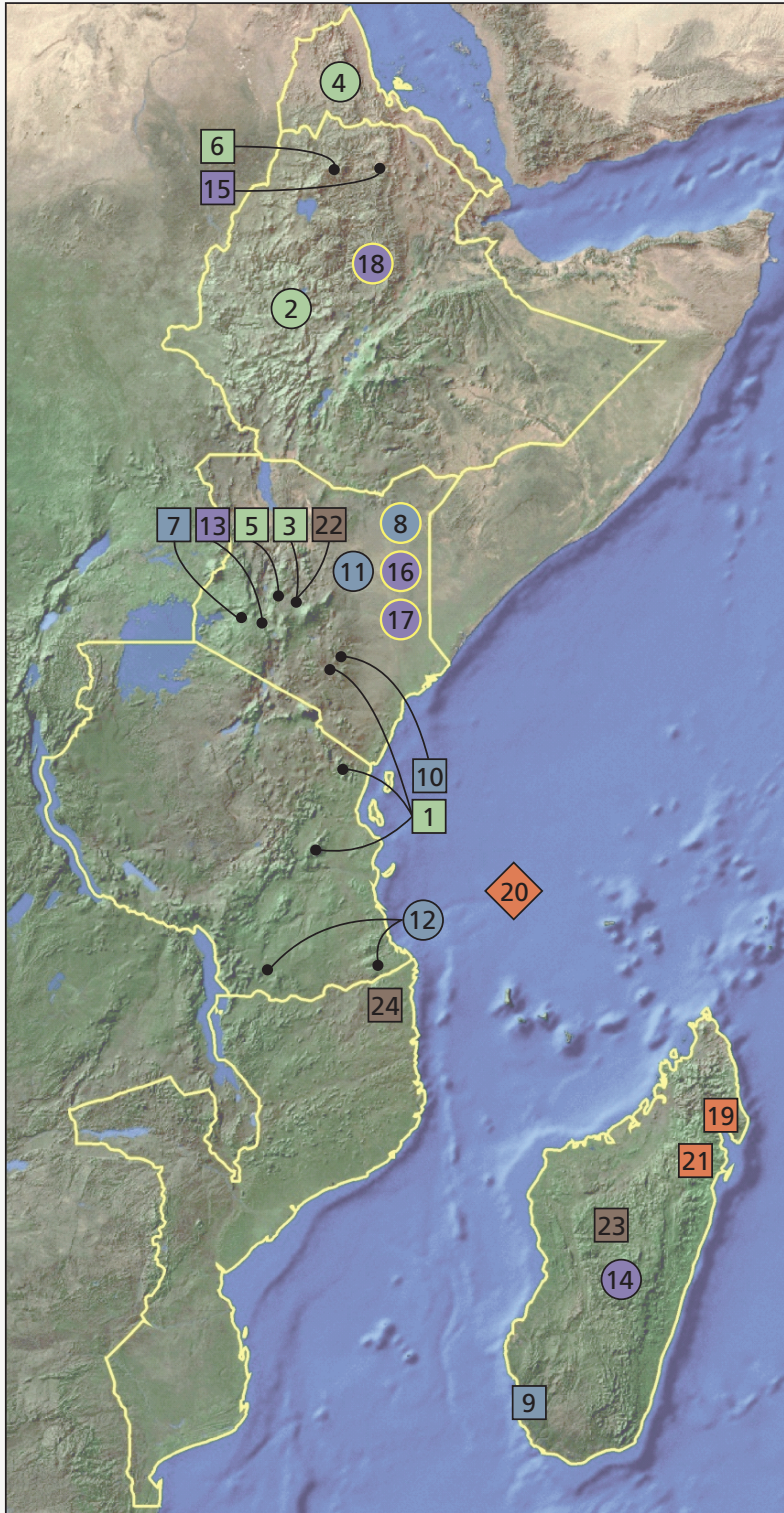
### **ESAPP’s emphases**

ESAPP emphasized a broad range of topics in the fields of sustainable land management and sustainable regional development, with special attention given to poverty and multi-dimensional disparities. Programme activities reflected an overarching aim: to support promising local and regional initiatives on behalf of sustainable development and sustainable use of natural resources. The decision to opt for a relatively broad programme focus was guided by the following considerations:

1. Sustainable development is a concept that aims at harmonizing economic, social, and ecological developments with an equity perspective. Consequently, it is normative by nature. This means that the societies concerned must have a voice in defining the meaning, values, goals, and priorities of development. Predefining these priorities according to a narrow sectoral approach is not legitimate.
2. Sustainable development initiatives are always embedded in a context. Typically, a wide range of sector-specific interventions are in place in a given development context, with each intervention pursuing a predefined agenda according to predefined problems. ESAPP’s openness to address various topics provided the flexibility needed to identify local needs and design synergetic and complementary interventions jointly with the populations involved.
3. Research for sustainable development must be inter- and transdisciplinary: that is, it must draw on different scientific disciplines and on non-academic knowledge. It must also incorporate all three dimensions of sustainable development – ecology, society, and the economy. Further, it must produce knowledge that helps us understand current development issues, define desired outcomes, and find ways to achieve them.
4. Finally, knowledge for sustainable development must be anchored in society to prevent or counterbalance its narrow sectoral purposes. For this reason, its creation must include knowledge co-production at the interface between science and society.

Only an expansive sustainability-oriented research implementation programme can fulfil these requirements.





### ESAPP Highlights

- 1 The ngolo farming technology
- 2 Saving Ethiopia's soils
- 3 A grass-roots solution for water governance in Kenya
- 4 Upper Anseba's surface water potential
- 5 Biodiversity conservation and wildlife management
- 6 Supporting a World Heritage site in Ethiopia
- 7 Ogiek Peoples Ancestral Territories Atlas
- 8 Assessing equity and vulnerability in Kenya
- 9 Securing livelihoods in Toliara, Madagascar
- 10 Smallholder wheat production in Kenya's drylands
- 11 Policies and value chains for local products
- 12 Pastoralists and farmers: negotiating resources
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- 21 Carbon sequestration in Madagascar's forests
- 22 Integrative sustainable development in the Mount Kenya region
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- 24 L4S: multi-stakeholder cooperation

#### Focus of Highlights

- Sustainable Land Management
- Sustainable Regional Development
- Knowledge
- Approach
- Foundations

#### Geographic scope of Highlights

- Local scope (village to district)
- Sub-national scope (district to province)
- National scope (entire country)
- Entire ESAPP region



### **ESAPP's focus on local and regional contexts**

Based on its origins and programme partners' experiences, ESAPP concentrated its activities in six countries of Eastern and Southern Africa: Eritrea, Ethiopia, Kenya, Tanzania, Mozambique, and Madagascar. It focused on local and regional initiatives in each country, ensuring that its activities closely reflected the aims and needs of each context. ESAPP emphasized the local and regional scale for two primary reasons:

First, the programme's aim was to promote sustainable land management and sustainable regional development. Given that sustainable development is normative by nature, a substantial impact in these fields can only be achieved if activities concentrate on concrete local and regional contexts in which stakeholders and actors express their values, define development goals, and set priorities.

Second, many countries in Eastern and Southern Africa have been undergoing rapid economic and sociopolitical change, with progress and setbacks occurring simultaneously. This has led to a pronounced diversification of local and sub-regional contexts, and development patterns have become more complex and heterogeneous. For example, some regions may experience fast economic growth coupled with an accelerated transformation towards more intensive, larger-scale agriculture, while other regions are further marginalized. Blueprint approaches and solutions fail to address the diversity of situations. Creating and co-producing knowledge to support concrete sustainability initiatives requires contextualized approaches that account for specific conditions and development pathways.

### **ESAPP's demand-driven approach**

ESAPP supported local and regional initiatives for sustainable land management and sustainable regional development. It sought to build on local people's resources and priorities. Programme activities were developed in response to the demands of local communities, government authorities at different levels, and research and implementation agencies working in the area. A careful evaluation procedure guaranteed that demands were converted into project activities which were suitable and promising for addressing the given problem in the given situation, and which were in line with the principles of sustainable development. The procedure consisted of three steps:

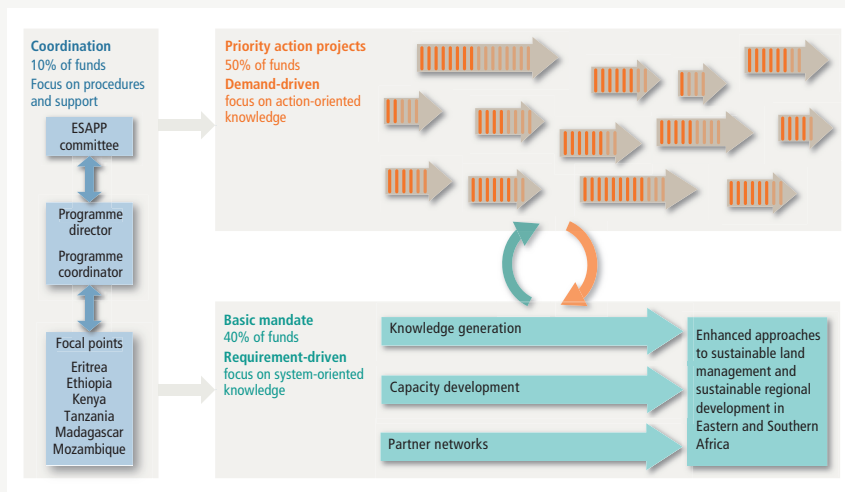
1. First, the ESAPP team assessed whether individual demands were socially anchored, equity-sensitive, and sustainability-oriented. This generally required negotiations among researchers and representatives from government, civil society, and the business community. These negotiations had to be led in a way that took account of power imbalances – a task that required profound context-specific experience and knowledge.
2. Next, the ESAPP team evaluated how research and knowledge could help meet given demands. Based on conceptual and contextual considerations, team members identified information and research gaps, training needs, and transfer and negotiation tools capable of ensuring uptake and application of generated knowledge.

3. Resulting ESAPP project proposals were carefully evaluated to assess their potential to make land management more sustainable and promote sustainable regional development. Their sensitivity to issues of poverty, gender, disparities, and power inequalities was also evaluated.

Experts with extensive knowledge of each context conducted the evaluations, with support from conceptual and methodological specialists. This three-step assessment procedure, a cornerstone of ESAPP's demand-driven approach, successfully converted local needs into concrete project activities.

### ESAPP's unique programme design

ESAPP's broad range of topics, its focus on local and regional contexts, and its demand-driven approach gave rise to a unique programme set-up. Two mandates were defined and each allocated a comparable overall budget subject to rolling-wave planning on a half-yearly basis (see figure below). One mandate consisted of developing and implementing so-called priority action projects based on ESAPP's demand-driven approach. These projects lasted up to one year each, with budgets limited to a maximum of CHF 50,000. The second mandate was referred to as the basic mandate. As the name suggests, its purpose was to provide a solid basis for the successful and effective implementation of the demand-driven priority action projects. This included the following: coordination at the overall programme level and at the national level in each country of the programme region; building up long-term databases of information relevant to sustainable land management and sustainable regional development; designing conceptual and methodological tools; providing platforms for exchange and communication; providing tailor-made human and institutional capacity development; facilitating mutual exchange within ESAPP's network of partners; as well as generalizing lessons learned from the broad range of context-specific priority action projects. The basic mandate was planned and budgeted for on an annual basis.



Four evaluations by independent experts (in 2001, 2006, 2010, and 2014) confirmed the strength of the programme design. They emphasized how the combination of priority action projects and a basic mandate enabled flexible, adaptive planning and effective support of the most promising local and regional initiatives. They also stated that the programme design rested on solid foundations in terms of concepts, research, data, information, and communication. Further, they noted how the rolling-wave planning approach enabled a governance and management structure that was both streamlined and participatory.

ESAPP was led and coordinated jointly by an overall programme coordinator stationed at CDE and by regional coordinators at so-called “focal points” in each of the six countries. Together, they were responsible for developing and implementing the two mandates. In particular, they had a crucial function in negotiating, developing, monitoring, and supporting priority action projects jointly with requesting agencies or communities and with implementing ESAPP partners on the ground. Decisions were taken by the ESAPP board, which comprised representatives from CDE, SDC, and institutions in the programme region. The board convened twice a year, received reports on all activities, and took decisions on proposed priority action projects and basic mandate activities that had been submitted and prioritized by the coordinators. On average, the ESAPP board approved about 30 to 40 per cent of the projects proposed. Project submission was thus a competitive exercise for partner institutions.

### **ESAPP’s partnership approach**

ESAPP’s unique planning approach was flexible and adaptive to local sociopolitical realities, yet consistent with a long-term perspective. Its implementation was demanding: it required a broad range of disciplinary expertise, interdisciplinary methodologies, transdisciplinary work at the science–society interface, and context-specific knowledge and experience. ESAPP’s partnership approach to research and implementation was designed to meet these needs. Its design was based on the assumptions that no single research institution can fulfil all these requirements, and that collaboration between multiple institutions can only achieve the required quality if it has a long-term perspective. Accordingly, ESAPP built on a broad network of partners comprising two types of collaborative settings. One or more institutions in each of the six countries – including the “focal points” – formed the core programme partners. These were institutions with a good track record in implementing research and development projects in the fields of sustainable land management and sustainable regional development. Together with CDE, they constituted a stable collaborative partnership network that implemented priority action projects, jointly managed and guided the programme’s long-term adaptive approach, and engaged in capacity development and mutual learning. While this first type of collaboration also accounted for interaction and exchange between the six ESAPP countries, the second type of collaboration involved different institutions within each country. This larger network included a greater number of collaborating institutions that contributed to the implementation of one or several priority action projects based on their specific expertise. Together, they formed growing national networks that pooled expertise to promote sustainable development.

ESAPP’s two-level partnership approach – featuring a core group of programme-level partners and many more project-level partners – fulfilled the demands of long-term mutual learning between science and society, context specificity, and local anchoring. It also enhanced participating countries’ institutional and human capacity to address complex sustainability issues in an effective, integrative way. Finally, it promoted South–South exchange on best practices and approaches. The significance of these capacity-enhancing effects cannot be overstated. They are crucial in countries where research capacity remains in short supply, institutional divisions often hamper knowledge sharing, and long-term context-specific data are frequently lacking.

## ESAPP as a model case

In many ways, ESAPP provides a model case of how to address key challenges of providing science-based and socially co-produced knowledge for sustainable development. ESAPP's broad focus on diverse topics of sustainable land management and sustainable regional development enabled it to respond to specific local and regional priorities and to develop inter- and transdisciplinary expertise. Its dual regional and local focus also made it possible to adapt sustainability negotiations to broader sociopolitical trends, while accounting for diverse, ever-changing conditions on the ground. ESAPP's demand-driven approach based on priority action projects with limited budgets and durations enabled efficient and effective support of local and regional initiatives. Where adequate, successions of priority action projects provided a flexible and adaptive form of longer-term support in complex sustainability issues. The programme's basic mandate ensured that activities expanded capacities and information bases, and that successive projects built on these growing assets. The set-up combining priority action projects with a basic mandate allowed for lean and adaptive management and governance structures. The partnership approach based on an international network of core partners and extended national networks of additional project partners was indispensable in supporting concrete local and regional sustainability initiatives. It also contributed to the much-needed growth of integrative and sustainability-oriented research and implementation capacities in the programme region.

The importance of programmes like ESAPP will only increase in the future. First of all, rapid economic and sociopolitical changes throughout the global South are producing increasingly diverse subnational contexts and increasingly complex sustainability challenges. Second, the growing importance of "knowledge societies", civil society participation, and communication networks in the global South will make information and socially anchored knowledge an increasingly important ingredient in planning and decision-making. Third, the ongoing transition from Millennium Development Goals to Sustainable Development Goals will increase countries' scope for finding adapted pathways to fulfilling these new internationally agreed obligations and targets. Against this background, programmes like ESAPP can and must play a greater role in future development cooperation.

## Content of this publication

This publication illustrates key outcomes and lessons learned from ESAPP, presented as 24 programme highlights. The highlights are organized into five sections. Sections one, two, and three contain six highlights each, covering the topics of sustainable land management, sustainable regional development, and the role of knowledge in promoting sustainable development. The last two sections contain three highlights each, covering ESAPP's approach and its conceptual foundations.

We hope that the highlights presented here successfully illustrate the advantages of ESAPP's unique programme design – its ability to address complex sustainability issues and achieve significant impacts in concrete settings. The highlights are also intended as a special thanks to SDC for having made ESAPP possible and for actively supporting it over the course of 15 years. To its credit, the Swiss agency stood by the programme even when it did not fit neatly into predefined project categories or country priorities. We hope that the example of ESAPP will inspire similar programmes in the future. We firmly believe that the knowledge, data, skills, and long-term partnership networks built up through ESAPP provide a solid foundation for future collaboration in Eastern and Southern Africa.





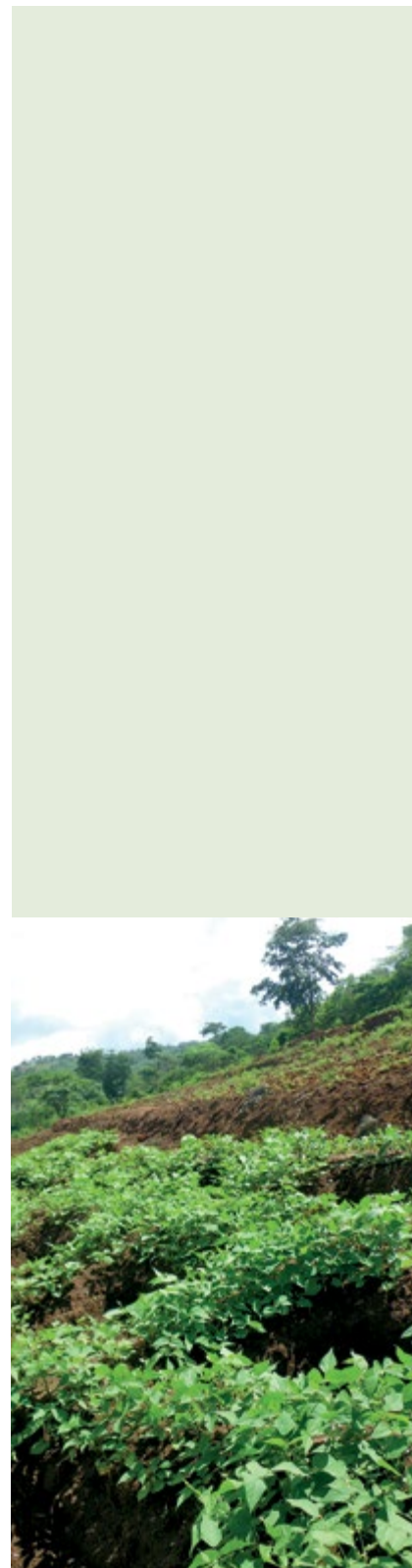
# Sustainable land management

Natural resources sustain all forms of life on earth, including human-kind. To ensure this role continues, the use of natural resources must remain within safe planetary boundaries (Rockström et al. 2009). However, increasing human demand – spurred by economic and demographic growth, and changing lifestyles – is fuelling competing claims and sometimes violent conflicts over natural resources. Those hardest hit when such conflicts arise are communities that strongly depend on ecosystem services and goods for their livelihoods.

In Eastern and Southern Africa, a vast majority of people are dependent on direct access to renewable natural resources to sustain their livelihoods, especially in rural areas. Competing claims at various scales, coupled with a dwindling resource base, represent a serious threat to these communities' well-being in general, and food security in particular. Ethiopia, for example, has reached its limits in terms of availability of land that is suitable for agriculture (Mitiku et al. 2006). But in spite of this insight, investment in agricultural land is still rising steeply.

ESAPP's engagement in sustainable land management focused on understanding human–environment systems, resource degradation processes in these systems, and options available to guide the systems onto sustainable pathways. Also, ESAPP interacted with resource users in concrete contexts to establish their needs in terms of ecosystem goods and services, and their visions of a sustainable future. Finally, ESAPP supported governance processes to define priorities and establish planning and policy frameworks suited to helping these visions materialize.

ESAPP focused on the following aspects of sustainable land management: production capacity of soils; management of water resources at community and regional levels; conservation of biodiversity through mitigation of human–wildlife conflicts; and management of protected areas.



## Soil

Rural livelihoods, agriculture, and soils are interdependent. Thus, safeguarding long-term productivity of soils is a fundamental prerequisite to securing multifunctional agriculture and resilient livelihoods of rural communities. Unfortunately, large swathes of agricultural land in Eastern and Southern Africa are affected by soil degradation and a severe loss of soil productivity. This threatens the livelihoods of concerned communities and leads to the gradual expansion of agricultural land into areas that were formerly less intensively used, putting additional pressure on natural ecosystems.

ESAPP operated on the premise that securing long-term productivity of agricultural soils could only be successful when based on complementary activities. Making appropriate recommendations to practitioners requires solid scientific evidence on degradation processes and impacts of conservation measures. Inventories of traditional conservation approaches and technologies are an invaluable tool for proposing soil conservation solutions that will meet with high acceptance by local communities. In-depth knowledge about the local context is required to fit soil conservation approaches into a wider sociocultural, economic, and ecological framework of operations. And finally, capacity development at community, academic, and vocational levels helps raise awareness about, as well as disseminate, promising soil conservation solutions.

ESAPP supported several soil conservation research projects in Ethiopia (Highlight 2). It also provided support to the Ethiopian component of the World Overview of Conservation Approaches and Technologies (WOCAT; [www.wocat.org](http://www.wocat.org)), an initiative working to establish a worldwide inventory of conservation methods. In addition, ESAPP helped popularize a traditional southern Tanzanian conservation technique in other parts of Tanzania as well as in Kenya (Highlight 1). ESAPP implemented conservation approaches at various scales, from single plots to entire watersheds. In doing so, it always took into account the socio-economic and ecological specificities of the local context. It pursued a long-term strategy to soil conservation, with partnerships and capacity development at the core.

## Water

River water is a mobile resource. It crosses administrative boundaries and thus creates dependency bonds between areas which may be far apart. It is also a highly dynamic resource, as its presence – or absence – is directly dependent on climatic variability and upstream use; this makes it challenging to manage. These factors lead to frequent conflicts over access to river water, especially in arid and semi-arid areas, where water is the limiting resource.

Where water is scarce, a first important step towards its sustainable management and, most importantly, towards conflict mitigation and negotiation support between different user groups, is to have good data and information on the availability and use of water in space and time. This is why ESAPP engaged in establishing water monitoring stations and inventories at various scales, from small watersheds to large river basins. Highlight 4, on the inventory of surface water resources in the Anseba basin in Eritrea, is a typical example of how to support decision-makers with suitable planning tools.

In Eastern Africa, centralized water governance through relevant government ministries has often failed at the local level, due to poor enforcement of water use regulations, conflicting priorities between sectors and scales, and lack of consideration for context-specific challenges. ESAPP responded with a strategy of setting up subsidiary structures at the level of local communities, to promote contextualized and locally driven governance of water as a common good of upstream and downstream communities. Highlight 3 shows how community-based river water user associations were established, supported, and trained in the Mount Kenya region, and later replicated in the Pangani Basin, Tanzania, as part of a long-term commitment of ESAPP partners in these two regions.

Through its initiatives, ESAPP was able to create bridges between the water resource management targets of government institutions at a regional scale, and the water resource access needs of local communities and farmers, whose interests are represented by local management structures such as river water user associations.

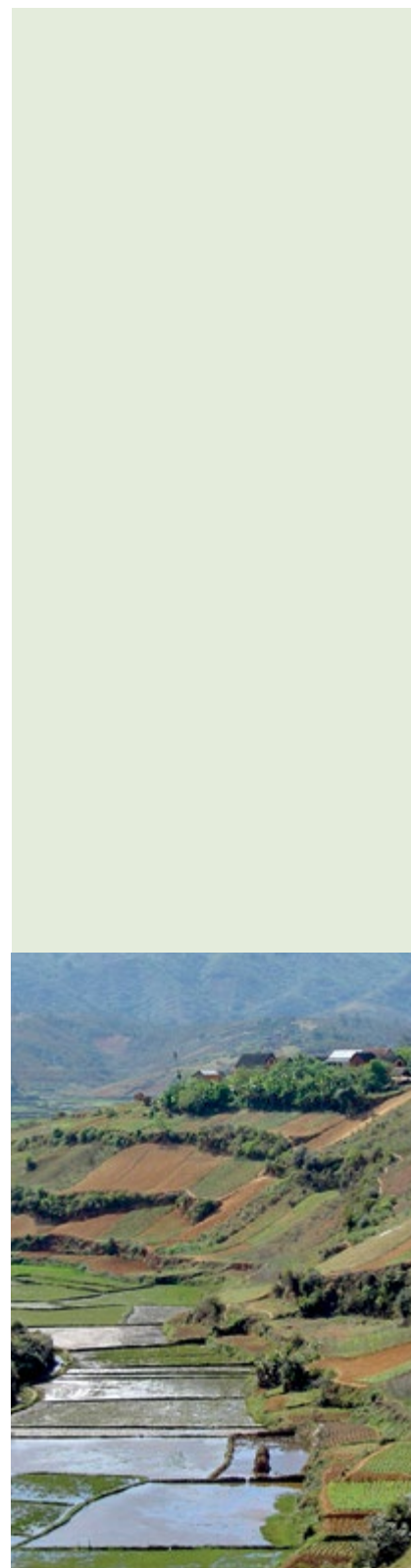
### Biodiversity

In many parts of the world, land use change and population pressure increasingly compete against biodiversity and nature. In many of these cases, win-win solutions are largely unattainable, leading to the inevitable outcome of trade-offs between different priorities. Sectoral approaches that focus either only on conservation targets or only on rural community development priorities are, by definition, partisan and therefore poorly equipped to tackle such trade-offs. In some cases, they have even contributed to the increase in conflicts between community development and conservation proponents.

To address such trade-offs, ESAPP supported initiatives investigating flexible ways and spaces of co-existence between humans and wildlife. Highlight 5 on the mitigation of human–elephant conflicts in Laikipia, Kenya, is probably the most impressive example of ESAPP's long-term support to such initiatives, and of the potential that lies in innovative approaches towards wildlife conservation. A major conclusion of ESAPP's implementing partner in this series of projects is that the most promising headway towards reconciling rural development and biodiversity conservation is land use planning that integrates rural development priorities and biodiversity conservation targets. ESAPP supported several such planning exercises, for example around protected areas in north-eastern Madagascar, and in the Simen Mountains World Heritage site in Ethiopia (Highlight 6). In these projects, ESAPP's priority was to establish negotiation platforms between local communities and management authorities of protected areas, and to raise the awareness of concerned stakeholders.

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# The *ngolo* farming technology

In Eastern Africa, soil degradation is a major problem in the densely populated hilly regions cultivated by subsistence farmers. A farming technology known as *ngolo* promises to enhance soil fertility, reduce crop erosion, and increase crop yields. ESAPP and its Tanzanian project partner, the Mikocheni Agricultural Research Institute, worked to introduce the *ngolo* technology to more communities.

## Sustainable development challenge

Soil degradation is a major problem in Eastern Africa. It reduces the capacity of ecosystems to regenerate and sustain human use, and impacts negatively on local communities' food security and resilience against short- and long-term climatic variability. Soil conservation measures proposed by development projects and rural advisory services are often not, or insufficiently, taken up by local communities. Thus, a broad effect of these technologies is only rarely achieved.

In Eastern Africa, these problems mostly occur in the densely populated mountainous and hilly regions. Facing rapid land cover change, decreasing land productivity, and ever smaller land parcels, subsistence farmers in these regions cultivate steep slopes using farming practices that are poorly adapted to the rugged terrain. Areas such as the Uluguru and Usambara mountains in Tanzania and the heavily degraded hills of Mutonguni and Nzauni villages in Kitui County, Kenya, have become so unproductive that the affected communities have but two options. Either they shift to lower, flatter, relatively fertile areas – resulting in serious conflicts among the farmers – or they resign themselves to becoming perpetual food-relief recipients.

## ESAPP's response

Maintaining the productive capacity of land in the long run was one of ESAPP's major concerns, and consequently a focus of its research and implementation activities. ESAPP adopted an integrative approach towards achieving this goal, the last step of this approach being dedicated to the dissemination of successful sustainable land management practices. Particular emphasis was put on the participatory dissemination of traditional or locally developed innovative technologies and practices in the regions concerned.

*Ngolo* is a traditional farming technology that was known to scientists and extension officers for its ability to enhance soil fertility, reduce soil erosion, and increase crop yields. The purpose of the *ngolo* project was to scale out this technology, selected because of its good performance in its area of origin and because it was unknown to farming communities in other parts of the country. Awareness creation, test plots, exchange visits, and information material thus became the main tools for the project partner, the Mikocheni Agricultural Research Institute (MARI), Tanzania, to enhance the visibility of *ngolo* and to make it attractive to other farming communities.



## Main messages

- Smallholder communities in Eastern Africa have developed a number of local solutions for the conservation of land resources. These solutions can be scaled out to other communities within and outside the region, provided they are adapted to the context into which they are being transferred.
- Exchanges between farmers, even across country boundaries, have a high awareness creation impact. They greatly encourage the visiting community to replicate, back home, the practices learned; they also help to enhance self-confidence of the host community and its willingness to maintain the practice in question.
- Successful scaling-out of local innovations requires consistent mid- to long-term intervention by visionary scientists and extension officers who have the resources and experience to design and facilitate the implementation of a participatory technology transfer and exit strategy.



Having returned from Tanzania, Kenyan farmers pass on their knowledge on how to prepare *ngolo* fields. The project's success hinged on farmer-to-farmer learning, with only limited external facilitation and guidance. This strongly enhanced credibility of the technique to farmers for whom it was still new. (Photo: CETRAD photo gallery)





### The project story

The *ngolo* farming technology combines erosion control and soil fertility maintenance using pits and ridges on steep slopes. It has been practised by the Matengo community in southern Tanzania for more than a century, but was never disseminated to other parts of the country, despite its confirmed ability – when correctly implemented – to control erosion, maintain soil fertility, and increase productivity. Under the *ngolo* system, farm residues from the previous cropping season are arranged into square grids of around 1.5 metres edge length and subsequently covered with soil dug up from the pits in the centre of the grids. The residues increase soil fertility while the pits retain rain water, thus considerably increasing soil moisture.

In 2003, project partner MARI, of the Tanzanian Ministry of Agriculture and Food Security, proposed to scale out the *ngolo* farming technology to heavily degraded agricultural areas in the Uluguru and Usambara mountains. MARI created a capacity development and dissemination concept that involved building awareness, devising training modules, producing posters and leaflets, establishing demonstration plots, and organizing farmer field days and exchange visits. The successful dissemination of the *ngolo* technology in the Uluguru and Usambara mountains from 2003 to 2005 encouraged the MARI team to extend it to other affected regions of Tanzania. Two equally successful additional transfer phases took place: one in 2005, in selected north-eastern and coastal areas of Tanzania, and the other in 2012, in the Uмба river basin in the East Usambara Mountains.

Eventually, the *ngolo* success story was carried across the border to the heavily degraded hillsides of Mutonguni and Nzauni in Kitui, Kenya. Nanyuki-based CETRAD (Centre for Training and Integrated Research in ASAL Development) developed a cross-border collaborative concept to facilitate technology migration. A team of researchers and extension officers from MARI and CETRAD designed an implementation strategy, identified suitable sites in the selected areas, and effected a first cycle of two seasons. Meanwhile, CETRAD organized an exchange visit of Kenyan farmers to southern Tanzania to facilitate farmer-to-farmer interaction, promote social learning, and allow Kenyan farmers to convince themselves of the benefits *ngolo* has to offer. The CETRAD team included extension workers from the Department of Agriculture in Kitui, to whom the project was eventually handed over to ensure long-term and widespread adoption.



**Top:** Kenyan farmers walking towards *ngolo* fields in southern Tanzania, where this farming technique has been used for several generations. (Photo: CETRAD photo gallery)

**Bottom:** Beans and other crops, such as maize and wheat, can be planted using the *ngolo* technique. (Photo: CETRAD photo gallery)



## Innovation and relevance

The series of projects on the dissemination of the *ngolo* farming system was based on an approach revolving around the transfer and adaptation of knowledge and experience from one community or region to another. With this approach, farmers learn from other farmers who speak the same language and share the same pre-occupations and needs. The researchers from MARI and CETRAD purposely limited their role to facilitating and guiding the dissemination and awareness creation processes along the different stages of the project. This facilitation and guidance was done using the tools mentioned above (e.g. exchange visits, leaflets, farmer field days, demonstration plots).

Between 2010 and 2012, the *ngolo* dissemination projects were upgraded to a transnational South–South exchange between Tanzania and Kenya. According to the implementing institutions, the Tanzanian farmers' self-confidence was greatly strengthened by the fact that farmers from another country came to learn about their farming practices. Inversely, Kenyan farmers who visited Tanzania became highly motivated ambassadors of the *ngolo* farming system back in their own communities, which substantially helped to enhance ownership of the targeted dissemination process.

The *ngolo* projects are of great relevance in terms of food security, both in the short and in the long term. In the short term, the *ngolo* farming technology can substantially improve the quantity and stability of yields, even in areas with climate variability. In the long term, the improvement of soil fertility leads to an overall improvement of the project regions' carrying capacity and ability to withstand high farming pressure. As food security and land degradation are two major problems in Eastern Africa, the experiences gained in the *ngolo* projects are also highly relevant at the regional scale.



**Top:** A Tanzanian farmer shows his Kenyan counterparts how to prepare *ngolo* fields. The interaction between farmers of both countries was crucial to successfully scaling out the *ngolo* farming technique. It instilled a sense of pride in Tanzanian farmers, and reassured Kenyan farmers that the technology is already in use and has yielded good results. (Photo: CETRAD photo gallery)

**Bottom:** A farmer in Kitui demonstrates how crop residues from the previous season are arranged on the ground and then covered with soil around a central pit. Integrating these residues enhances the soil's fertility and water permeability. These are crucial advantages in an ecologically marginal farming area such as Kitui, where rainfall is erratic and soils are often poor in nutrients. (Photo: CETRAD photo gallery)



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### Highlight profile

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

**Implemented during:**  
 2006–2014

**Total funds contributed by ESAPP:**  
 CHF 141,000

**Implemented by:**  
 Mikochei Agricultural Research Institute (MARI), Dar es Salaam, Tanzania

**In collaboration with:**  
 Centre for Training and Integrated Research in ASAL Development (CETRAD), Nanyuki, Kenya

**Main beneficiaries:**  
 Farming communities in the Uluguru and Usambara mountains in Tanzania, as well as in Makueni County in Kenya

### This highlight

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Funded by



### 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](http://www.cde.unibe.ch) (keyword search: "ESAPP").

# Saving Ethiopia's soils

About one-third of all agricultural land worldwide is degraded, presenting a significant threat to current and future food security. The picture is worse in Ethiopia: there, two-thirds of the population is affected by soil degradation, which usually starts when forests are converted into agricultural land. To remedy this situation, ESAPP's main focus in Ethiopia was on developing integrative approaches to sustainable soil and water management.

## Sustainable development challenge

Worldwide, nearly 2 billion hectares of land are affected by human-induced soil degradation, putting the livelihoods of nearly 1.5 billion people at risk (UNCCD 2012). Reduced production capacity of the land is a major cause of food insecurity in many parts of Eastern Africa; in Ethiopia, about two-thirds of the population is directly affected by soil degradation, an age-old phenomenon which started with the spread of agriculture millennia ago, but was greatly accelerated in the past century.

According to a recent study by Hurni et al. (2015), the overall rain-fed agricultural area of Ethiopia covers 600,000 square kilometres, or 54 per cent of the country. In this predominantly highland and mountain area, yearly net erosion (i.e. soil erosion minus soil deposition) is estimated at about 940 million tonnes, or an average of 18 tonnes per hectare. On cropland, which covers more than one-third of the rain-fed agricultural area, both erosion and deposition rates can be much higher than average. Since the 1970s, much effort has been invested in soil and water conservation, not only on cropland but also in reforestation and area closure. To date, about 18 per cent of the cropland can be considered as treated, while another 23 per cent requires no treatment. Over the next five to ten years, sustainable land management measures must be taken on the remaining 59 per cent of cropland.

## ESAPP's response

ESAPP took an integrative approach towards soil and water management, combining a number of strategies. First, researchers together with other stakeholders worked to generate relevant knowledge on sustainable land management issues. Next, they made this knowledge accessible through various channels and tools, and helped develop human and institutional capacity to maximize its use. Finally, they tested innovative solutions and made them available at a larger scale.

ESAPP worked in Ethiopia for 15 years, always focusing on sustainable soil and water management. During this period (1999–2014), over 25 interrelated projects were carried out. A first set of projects emphasized knowledge generation, supporting monitoring activities in research catchments varying in size from one to ten square kilometres, as well as in larger watersheds. A second set of projects focused on enhancing and developing the knowledge base for sustainable soil management. Here, work focused on further analysing databases established by a prior project, and establishing information and knowledge systems. In a third set of projects, key needs in capacity development were identified at the level of universities and ministries, and addressed through training courses and course material development at the universities. Finally, a fourth set of projects focused on implementing pilot projects for testing innovation and best practices.



## Main messages

- In Ethiopia achievements in soil and water management since the 1970s are impressive. However, there is still a need to scale up projects to achieve broader coverage, to regions as a whole and to all croplands showing signs of soil degradation.
- Long-term observatories collecting all relevant socioecological and biophysical parameters have proved essential for the success of activities and programmes in sustainable land management. Whenever possible, such observatories should take advantage of and build on the experience of previous projects, while supporting new activities.
- Knowledge and capacity development at all levels remains a key requirement for sustainable land management, but must be based on local experience and joint generation of new knowledge on technologies and approaches.



Farmers in Anjeni, Gojam, built these conservation structures in 1985 and have maintained them well ever since. They retained traditional measures, such as drainage ditches across the terraces. (Photo: Hans Hurni)



## The project story

**Knowledge generation:** The University of Bern conducted research work from 1981 to 1998 under the Soil Conservation Research Programme (SCRP), funded by the Swiss Agency for Development and Cooperation. Results from this programme provided the basis for later research and implementation in ESAPP projects from 1999 to 2014. ESAPP partners assessed the impact of sustainable soil and water management on reducing soil erosion and maintaining agricultural productivity, and they developed indicators for improving, scaling up, and phasing out various management approaches (see Gete 2011). The benefit of having long-term rural observatories became clear, as on-farm data and impact assessments of past activities and experiences are vital to current projects.

**Knowledge base:** A number of ESAPP projects focused on building up databases on climate, soil erosion, sedimentation, and agricultural production in research catchments before and after conservation (e.g. Amare et al. 2011). In addition to these local-level knowledge platforms, ESAPP supported EthioCAT, a knowledge and information base that serves to test applicability of local solutions in wider areas of Ethiopia. Other ESAPP projects supported EthioGIS, a geoinformation system that brings together national layers of information into a common and open-access information source (see Highlight 18). A major follow-up programme to the SCRP and these ESAPP projects is now the Water and Land Resource Centre in Addis Abeba, which makes all previous and current information available via its interactive website.

**Capacity development:** ESAPP strongly emphasized the training of trainers in view of achieving a wider educational impact. One strategy was to support university-level courses for Master’s students through curriculum development and training of lecturers (see Highlight 15). The other approach taken was to help local academics develop locally relevant textbooks on soil and water conservation and on indigenous technologies in soil and water management.

**Testing innovation:** Finally, ESAPP supported pilot implementation projects in sustainable land management at four different sites in Ethiopia. Innovative aspects of these pilot projects included the way in which local communities were integrated in project activities, methods used for identifying degradation processes, design of the measures developed to reduce land degradation, and implementation and monitoring procedures of the projects.



**Top and middle:** A research assistant monitors suspended sediment yields in Anjeni, a Soil Conservation Research Programme (SCRP) study site in Gojam. Regular sediment sampling and processing throughout the rainy season makes it possible to assess total sediment loss from the catchment. (Photos: Hans Hurni)

**Bottom:** Traditional ploughing for *teff*, a major cash crop, but also for subsistence extends well into the rainy season. For this reason, traditional *teff* farming is a major contributor to soil erosion on cultivated land. (Photo: Hans Hurni)





## Innovation and relevance

ESAPP's main support to Ethiopia was on sustainable soil and water management. Two main innovations were (a) the multi-scale approaches, and (b) enhancing process-based understanding of land degradation and rehabilitation.

**Multi-scale approaches:** This first innovation started with on-farm testing, in cooperation with farmers, of concrete solutions against excessive overland flow, soil erosion, soil accumulation, and gullying. At that scale, participants monitored the effectiveness of measures and their impacts on reducing problems and enhancing agricultural productivity. They also studied, documented, and made available to stakeholders the potential of maintaining ecosystem services. At an intermediate scale, projects addressed soil and water conservation issues in small catchments or larger watersheds, by monitoring the interactions between plots of land, particularly overland flow, soil movement or gullying, and the reactions of farmers in these catchments' communities. At a macro scale, overviews were developed for district and regional staff and up to the country level, again with a focus on river flow, sedimentation, or agricultural productivity, thus contributing to policymaking for sustainable soil and water management.

**Enhancing process-based understanding of rural systems:** This second innovation contributes to a comprehensive understanding of larger systems. It was carried out by carefully monitoring climatic, hydrologic, sedimentological, and agricultural parameters at selected sites, usually small to medium catchments, and by using models for extrapolation to wider areas. The innovation involves combining process-based knowledge with information layers of biophysical resources, socio-economic settings, and land use systems, enabling analyses such as the Economics of Land Degradation (ELD) case study on Ethiopia (Hurni et al. 2015).

At a regional scale, in Eastern Africa, sustainable soil and water management is a core problem and key focus of national governments. Here, ESAPP furthered South–South exchange through meetings on methodology and approach.



**Top:** Even very steep slopes are cultivated in about one-third of Ethiopia's highlands. These farming activities in very steep terrain threaten the country's soil resources more than anything else. (Photo: Hans Hurni)

**Bottom:** Farmers today are convinced that sustainable land management is a major component of their on-farm activities. Their willingness to invest time is apparent almost throughout the highlands. Here, farmers in the area of Abagerima, south Gonder, are working to conserve their soil and water resources. (Photo: Hans Hurni)



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## Highlight profile

This highlight is based on the achievements of 25 ESAPP priority action projects.

**Implemented during:**  
1999–2015

**Total funds contributed by ESAPP:**  
CHF 825,000

**Implemented by:**  
Sustainable Land Use Forum (SLUF), Addis Abeba, Ethiopia; Southern Agricultural Research Institute (SARI), Hawassa, Ethiopia; Oromia Agricultural Research Institute (OARI), Addis Abeba, Ethiopia; Water and Land Resource Centre (WLRC), Addis Abeba, Ethiopia

**In collaboration with:**  
ESAPP Horn of Africa Coordination Office, Addis Abeba, Ethiopia

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

**Main beneficiaries:**  
Staff of regional agricultural research institutes, as well as farming communities in the Ethiopian Highlands

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Hurni H, Berhanu D, Gete Z. 2015. Saving Ethiopia's soils. 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. 27–30. <http://doi.org/10.7892/boris.72023>.

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## What is ESAPP?

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Funded by



# A grass-roots solution for water governance in Kenya

Population growth, changes in land use, and competition over resources have aggravated water scarcity in parts of Kenya over the last three decades. Water Resource Users Associations (WRUAs) have emerged as an effective community-based way of managing scarcity and conflict. To maximize their potential in one Kenyan river basin, ESAPP established a long-term capacity-building programme and a basin-wide platform for collaboration and exchange.

## Sustainable development challenge

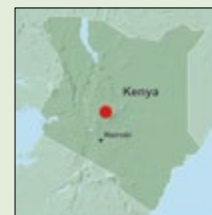
Water scarcity remains a major challenge in sub-Saharan Africa. Global efforts to address it have mainly focused on hotspots involving transnational basins and high-level institutional management structures. Far less attention has been given to intra-national conflicts over river water. These conflicts and their socio-economic triggers require institutions and approaches that are firmly rooted in local communities. They also require policy support and effective coordination at the regional level. Water Resource Users Associations (WRUAs) have been promoted as a possible grass-roots institutional solution. But they have often faced serious capacity issues and lack of political support, hampering realization of their full potential.

In the Ewaso Ng'iro basin, north-west of Mount Kenya, water scarcity has worsened over the last 30 years due to rapid population increases, land use changes, and competing resource claims. Water conflicts have intensified, including violent confrontations and loss of life, with some groups in the basin forced to go without water during extended dry spells. WRUAs that were formed to help resolve such conflicts often lacked sufficient knowledge, resources, and political support to execute their difficult mandate.

## ESAPP's response

Under the banner of sustainable integrated water management and governance, ESAPP sought to promote institutional arrangements fostering multi-stakeholder participation at different levels and different scales.

Kenya's WRUAs were established to enable participatory management and governance of water resources, in addition to resolving water conflicts. Having grown out of reforms in Kenya's water sector, WRUAs faced many capacity-related challenges that limited their effectiveness. To address this, ESAPP supported a WRUA capacity-building initiative with four objectives. Its first aim was to design a long-term training programme based on a WRUA-specific assessment of training and information needs. Second, it sought to consolidate a user-friendly information and documentation resource to guide further operation of the WRUAs. Third, it aimed to facilitate face-to-face meetings between different WRUAs, fostering an exchange of valuable ideas and experiences. Finally, it worked to mobilize upstream and downstream WRUAs towards formation of a basin-wide forum that would support vertical and horizontal integration within the basin.



## Main messages

- Growing numbers of Water Resource Users Associations (WRUAs), their success in resolving water conflicts, and their ability to raise funds attest to their strength. They are capable of improving water resource management and governance, especially in rapidly changing environments such as the Ewaso Ng'iro north basin.
- Forming WRUAs at the sub-catchment level is a necessary step towards inclusive management and governance of water resources. But it is not enough. Establishing a basin-wide forum is also crucial in order to foster integration among and between upstream and downstream WRUAs.
- To create an effective capacity building programme for grass-roots institutions, it is best to begin by conducting a participatory assessment of each institution's training needs. WRUAs should be disaggregated and supported according to their stage of development. A long-term commitment is necessary to ensure sustainability.



Motorized water pumps have become widely available, enabling farmers to practise irrigation agriculture and seeing them through dry spells, but also posing a risk of overuse.

(Photo: CETRAD photo gallery)





**Top and middle:** River gauging stations (RGSs) are used to monitor the availability and temporal fluctuation of river water. They provide key information for the enforcement of abstraction regulations and by-laws, and are crucial to any early warning system informing farmers of anticipated water shortages. Most old, manually operated RGSs (top) are currently being replaced with automatic RGSs (middle) for live data transmission and interfacing with the Water Resource Users Associations. (Photos: CETRAD photo gallery)

**Bottom:** Water is not only used for irrigation agriculture, domestic purposes, and in urban areas; animals also depend on it. Conflicts can erupt when pastoral communities migrate their herds upstream, through farmland, in search of water – or, similarly, when wild animals' search for water leads them to invade farms or destroy crops and property. (Photo: CETRAD photo gallery)

## The project story

Water Resource Users Associations (WRUAs) were officially created by the 2002 Kenya Water Act. In the Ewaso Ng'iro river basin, however, WRUAs arose as far back as 1997 in connection with a three-year water awareness campaign led by CETRAD (Centre for Training and Integrated Research in ASAL Development). With the support of ESAPP, WRUAs grew to 13 in number by 2003 and 32 in number by 2007. Today, there are over 80 WRUAs across the basin.

Formed at the sub-catchment level, WRUAs promote participatory governance of water resources and help solve water conflicts in their areas of jurisdiction. From the outset, WRUAs showed great potential and efficiency in tackling an increasing number of conflicts among water users. Out of 52 water-related conflicts recorded between 1997 and 2003, 48 were successfully resolved by WRUAs; only four were referred to the courts. Yet WRUAs also confronted serious capacity constraints, in particular lack of technical, management, policy, and legislative knowledge. This hampered their efforts. In addition, they lacked a platform for knowledge exchange and negotiation between upstream smallholders and downstream pastoralist WRUAs. Crucially, related government institutions also did not have the capacity to backstop the WRUAs.

To address these gaps, a long-term capacity-building initiative was designed by CETRAD in collaboration with Kenya's Water Resource Management Authority (WRMA). Launched in 2008, the initiative targeted specific WRUAs representing different upstream and downstream user groups, as well as technical staff at the WRMA itself. A participatory needs assessment was conducted to ensure targeted, effective training. For this, the WRUAs were grouped by stage of development into three clusters: fledgling, young, or mature. From 2009 to 2014, over 300 management committee members were trained from 30 WRUAs.

An independent WRUA Forum was also founded and given a defined mandate and functions. Several inter-catchment exchange visits and a basin-wide tour were held under the Forum's auspices, bringing people together and alleviating tensions and mistrust between upstream and downstream WRUAs. In one case, upstream smallholders ceased irrigating for two weeks, increasing water supplies to downstream pastoral communities struggling with scarcity.

Further, a comprehensive Water Management Information Platform was developed based on long-term socioecological monitoring in the Upper Ewaso Ng'iro Basin. It served as a useful tool for planning and resource mobilization. The WRUAs have strengthened over the years, their activities expanding to include environmental education and awareness raising, catchment protection, water conservation, and more.



## Innovation and relevance

Building on awareness-raising campaigns led by CETRAD, ESAPP successfully designed an innovative, multi-level, multi-stakeholder approach to long-term capacity building in water governance. In so doing, it went well beyond the one-time, two- to three-day workshop-based training approaches common to programmes of this nature in the global South. ESAPP's approach, based on successive cycles of intervention, gradually introduced different activities. These included participatory needs assessment, compilation of targeted training materials, and development of an information platform facilitating strategy development and effective implementation. The platform made it possible to hold legitimate, structured discussions between concerned WRUAs over how to share water and schedule its distribution during periods of scarcity.

The basin-wide WRUA Forum enabled effective institutional integration and coordination of action – a major achievement for a catchment as big as Ewaso Ng'iro (over 200,000 square kilometres). The catchment features high cultural diversity, socio-economic disparities, and spatially varied levels of resource endowment and user arrangements. The forum proved effective at fostering inclusive decision-making and consensus-building during periods of water scarcity and related conflict. It promoted cooperation between communities, represented by WRUAs, whose relations were previously marked by recurrent conflicts. Government policymakers were inspired to replicate the forum in other catchments throughout Kenya. The success of the WRUAs led to a cross-border transfer of knowledge to the Pangani Basin in neighbouring Tanzania.

Nevertheless, while the WRUAs are legitimate and recognized by the state, they are not permitted to enforce agreements. As such, their primary function is to facilitate negotiations and build consensus.



**Top:** A self-regulating weir in one of the 21 sub-catchments of the Upper Ewaso Ng'iro Basin. The weir is designed to allow abstraction of only the permitted amount of water; the rest of the flow is left for users and the ecosystem downstream. Knowledge of the number of water abstractions and permitted abstraction levels is decisive for steering negotiations and scheduling water abstractions towards an equitable and sustainable use of water resources in the basin. This information is contained in the upper basin's sub-catchment directory, part of the Water Management Information Platform. (Photo: CETRAD photo gallery)

**Bottom:** Large-scale horticultural enterprises and local farmers alike vie for the use of water for irrigation. Regulating the abstraction of water from rivers is therefore one of the key responsibilities of Water Resource Users Associations. (Photo: CETRAD photo gallery)





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### Highlight profile

This highlight is based on the achievements of 8 ESAPP priority action projects.

#### Implemented during:

1999–2010; in 2011, ESAPP's activities were taken over by the Water and Land Resource Centre (WLRC) project at CETRAD within SDC's Global Water Initiative

#### Total funds contributed by ESAPP:

CHF 310,000

#### Implemented by:

Centre for Training and Integrated Research in ASAL Development (CETRAD), Nanyuki, Kenya

#### In collaboration with:

Centre for Development and Environment (CDE), University of Bern, Switzerland

#### Main beneficiaries:

Water user associations in the greater Mount Kenya area

#### This highlight

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 Design: Simone Kummer (CDE)  
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#### Funded by



# Upper Anseba's surface water potential

Water shortages severely affect the densely populated Upper Anseba region in Eritrea, a country whose dry season lasts nine months of the year. As reservoirs are the most important source of surface water, knowing about their capacity and how the water is used is crucial to informed decision-making. This project explored the potentials of geographic information system technology and satellite imagery to generate that knowledge.

## Sustainable development challenge

Around the world, river water is shared by communities upstream and downstream, often over long distances, for different uses such as farming, drinking water supply, industry, and crafts. This can trigger conflict, especially where water is in short supply. Attempts to mitigate conflicts over water often require involvement of several levels of governance – from local to national, and sometimes transnational. But a lack of sound data on water availability – especially in water-scarce regions – often hampers mitigation efforts.

Water scarcity is a major development challenge in Eritrea, a Sahelian mountain country with a semi-arid climate. As the country has no perennial rivers, reservoirs provide an effective coping mechanism for ensuring water supply during the nine-month-long dry season (Tadesse and Bissrat 2005). Reservoirs are particularly important in the central highlands, where the rocky underground does not hold large bodies of water. Water stored in reservoirs is used for irrigation of agriculture, and ensures a constant supply for domestic use, industry, and services. However, there is a lack of updated information on the volume of water stored in these reservoirs (Abraham et al. 2009). In addition, water is often wasted, especially in small-scale irrigation.

## ESAPP's response

Sustainable water management requires an integrated approach that takes into account land use planning and agricultural production. In semi-arid contexts adapted cropping techniques such as conservation agriculture, suitable crops, and rain water harvesting can help reduce the pressure on water resources. A sound assessment of how much water is available and when, is crucial for planning and management. ESAPP supported projects that inventory resources and prepare the necessary baseline information for sustainable water management.

With a view to promoting good practices, ESAPP partners engaged in a project to provide an inventory of reservoirs, assess the potential for further surface water storage development, and document current water management approaches. This project focus was chosen to help bridge the information gaps faced by the Government of Eritrea in its efforts to overcome seasonal water shortages by building more reservoirs. The project was conducted in one of Eritrea's major watersheds: the Upper Anseba catchment, in the country's central highlands.



## Main messages

- Creating awareness of the increasing gap between water supply and water demand is important in many development contexts. An inventory of reservoirs is crucial for realistic planning and proper management.
- Alleviation of future water shortages requires concrete measures. As irrigated farming often accounts for a major share of water use, more efficient irrigation practices are key to sustainable water management. More crops per drop can be achieved through improved irrigation scheduling, lined conveyance systems, and extensive training of farmers – especially those who are new to irrigated farming.
- Water is indispensable for development. Accordingly, plans for regional development, based on negotiated outcomes, should define future water allocations for all major user groups.



The Mekerka reservoir near Serejeka, north of Asmara. The survey inventoried all 49 dams in the Upper Anseba catchment. Seventy per cent of the available rainwater is already channelled into these reservoirs, so the potential for building new ones is low. Motorized pumps such as the one shown on the picture are often used by farmers to irrigate fields. (Photo: Ministry of Agriculture, Maekel Region Branch, Eritrea)



## The project story

Upper Anseba is Eritrea's hotspot in terms of sustainable water management challenges. Located at 2,000 to 2,500 metres above sea level and extending over 633 square kilometres, it is the most densely populated area in Eritrea. It comprises small-scale farming villages as well as by far the largest urban area in the country: the capital city Asmara with its expanding suburbs (Gurtner et al. 2006). Demand for water – already high – is increasing, fuelled by a growing urban population, industry, and services. Demand is also rising for agricultural products such as horticultural crops, a sector in which numerous villages with access to reservoir water now participate. Reservoir water enables off-season production by irrigation, fetching higher prices but also increasing water demand when water is most scarce. Gold mining, a recent development, will further exacerbate pressure on water resources.

This was the background against which ESAPP and its partners carried out their assessment of the catchment's surface water potential. Given the diversity of actors with a stake in water use, the project was set up as a transdisciplinary undertaking. It involved scientists, experts from the Ministry of Agriculture and the Ministry of Land, Water and Environment, as well as villagers and local administrators. The main aim of the project was to provide decision-makers and planners with an overview of the water resources currently available, and the potential for their development to satisfy growing regional water demands. The project focused on reservoirs, the most important source of water.

The first step was to create a spatial database. A geographic information system (GIS) and satellite imagery were used to locate reservoirs, resulting in an inventory of 49 reservoirs in Upper Anseba. These reservoirs store 70 per cent of the estimated annual run-off from rainfall, which shows that the potential for increasing storage is reaching its natural limits. A survey of nine reservoirs revealed annual storage capacity losses of 0.5 to 2 per cent due to siltation, pointing to the need for more sustainable land management upstream. Workshops in villages showed that farmers maximize rather than optimize water input, a waste untenable in a semi-arid environment: with efficient use, the irrigated area could be increased by almost 40 per cent. The reason for this poor practice is that small-scale farmers in Eritrea are mostly new to irrigation. While the main output of the project was the spatial database with the reservoir inventory, important additional outputs consisted in providing farming communities and extension workers with an updated irrigation schedule for key crops, and improving existing water by-laws.

**Top:** Eritrean project partners conducting a bathymetric survey of one of the reservoirs in the Upper Anseba catchment. Such surveys are used to measure the depth and volume of a waterbody. When carried out at intervals, bathymetric surveys also provide information on sedimentation rate. (Photo: Ministry of Agriculture, Maekel Region Branch, Eritrea)

**Bottom:** These farmers in the project area are taking part in a participatory rural appraisal exercise organized by the Maekel Region Branch of the Ministry of Agriculture. (Photo: Ministry of Agriculture, Maekel Region Branch, Eritrea)

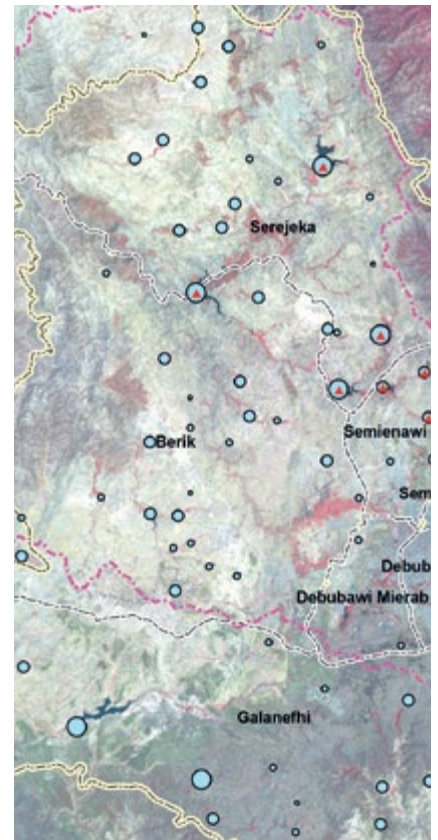




## Innovation and relevance

The project included a number of elements that were innovative in the Eritrean context. One was the project's transdisciplinary set-up involving different levels from the national to the local – importantly, local farming communities and key water users. Another was the combination of various tools and technical approaches (GIS and satellite imagery interpretation) alongside local workshops as well as water use and irrigation assessments with local farmers. Yet another innovative element was the preparation of different outputs tailored to the stakeholders' needs: (1) a book was prepared in English as a baseline reference for decision-makers in policy and administration; (2) a series of three leaflets was produced in the local language Tigrigna to disseminate important findings to village extension workers, village development committees, and interested farmers; and (3) the study team was invited to present and discuss their results at fairs and exhibitions in Asmara in order to sensitize the wider public to the challenge of water supply and the need for proper management of this scarce resource.

The project was highly relevant. First and foremost, it made it clear that the potential for additional storage is more limited than planners expected, and that it is constrained above all by low amounts of rainfall. The project also revealed considerable storage loss due to reservoir siltation, and a massive waste of water due to inefficient irrigation practices. As an additional – unplanned – output, it provided simple tools to improve water use efficiency (model irrigation schedules, improved water by-laws). It also highlighted the need for a regional water master plan that focuses less on supply and more on demand management and allocates negotiated shares of water to the different actor groups. Not least, the project demonstrated the usefulness of spatially explicit information, including maps, in locating issues and providing an agenda for negotiation. The project also led to various GIS training courses and establishment of a GIS infrastructure for mapping exercises at ministerial level.



**Top:** Excerpt from map showing the design capacity of reservoirs in the Upper Anseba catchment (and the rest of Maekel Region, or Zoba Maekel in Tigrinya). Large blue dots indicate reservoirs with a capacity of above 1 million cubic metres. The smallest blue dots represent the smallest reservoirs inventoried, with capacities of below 50,000 cubic metres. Reservoirs in the Upper Anseba catchment that are marked with a red triangle in addition to the blue dot are used for urban water supply.

**Bottom:** Most farmers in the Upper Anseba catchment are new to irrigation practices. As a result, they often use irrigation methods that are not appropriate to a semi-arid climate with severe water constraints. Furrow irrigation, pictured, has a very high evaporation rate. (Photo: Ministry of Agriculture, Maekel Region Branch, Eritrea)





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## Highlight profile

This highlight is based on the achievements of 1 ESAPP priority action project.

**Implemented during:**  
2007–2008

**Total funds contributed by ESAPP:**  
CHF 29,500

**Implemented by:**  
Ministry of Agriculture, Maekel Region  
Branch, Asmara, Eritrea

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

**Main beneficiaries:**  
Ministry of Agriculture and Ministry of Land,  
Water and Environment, as well as the pop-  
ulation of the Upper Anseba catchment and  
Zoba Maekel (Maekel Region) in the central  
highlands of Eritrea

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## This highlight

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# Biodiversity conservation and wildlife management

Growing populations mean that human use is expanding into wildlife habitats, potentially sparking conflict. Human–elephant conflict is a particular problem in Laikipia, Kenya. Using an approach linking development and conservation, ESAPP helped create a highly innovative wildlife management tool.

## Sustainable development challenge

Biodiversity conservation efforts clash with rural development goals in many parts of the world, and it is still rare for decision-makers to consider and harmonize the concerns of both sides in an integrated land use planning process. Conflicts of interest are largely due to increasing pressure on natural resources. Growing populations in high-potential areas mean that new, previously marginal areas are being targeted for human use. Often, these are natural habitats home to wildlife, setting the scene for potential human–wildlife conflict.

Conflicts between humans and elephants are a major problem for small-scale farmers and wildlife authorities in Laikipia County, Kenya. Elephants raid fields and destroy crops, undermining the affected communities' food security and causing resentment among smallholder farmers. This leads to the retaliatory killing of elephants, political tension with conservation actors, and the disruption of large-scale programmes for biodiversity conservation and rural development. Despite these tensions, local and regional decision-makers have been unable, for several reasons, to integrate biodiversity conservation into regional land use planning.

## ESAPP's response

ESAPP's experiences in Eastern Africa show that nature conservation is most likely to succeed when linked to socio-economic development, involving multiple stakeholders, and applying participatory approaches. According to Wiesmann et al. (2005), this requires extending the reach of negotiations beyond the area of conservation and developing both a regional perspective and a focus on sustainable regional development. A key instrument of such a strategy is land use planning that takes into consideration the needs of both nature conservation and the development of rural communities living in and around conservation areas.

In Laikipia, ESAPP supported the non-governmental organization Space for Giants through a series of projects that started with a comprehensive scientific analysis of spatial patterns of human–wildlife conflicts (Graham 2007). Based on this work, later project activities focused on elaborating a sophisticated wildlife management system, creating awareness among local communities and a wider public, and devising and disseminating concrete conflict mitigation measures (Graham and Ochieng 2008). Among these, integrative land use planning was identified as a key measure.



## Main messages

- Long-term and high-quality applied research can inform and influence local, national, and international policymaking with regard to the management of major natural resources and associated conflicts, provided it is appropriately linked to local institutions and partners.
- Appropriate investment and capacity building on the ground can reduce human–elephant conflicts through a range of interventions from simple farm-based tools to more expensive high-cost barriers, such as electrified fences. An even better option is to prevent human–elephant conflict through appropriate land use planning.
- Mobile-phone-based technology provides a key tool in rural Africa for monitoring the status of natural resources and associated conflicts, and can help mobilize resources for its management in space and time.



An elephant bull breaking through a strong electrified fence. With financial support from the Laikipia Wildlife Forum, Space for Giants worked with local landowners to develop a more appropriate fence design and fence management protocol. It also trained fencers in skills needed to maintain the 163-kilometre West Laikipia Fence. (Photo: Max Graham)



## The project story

The main goal of the collaboration in Laikipia between the Centre for Development and Environment (CDE), the Centre for Training and Integrated Research in ASAL Development (CETRAD), and Space for Giants was to understand and mitigate human–elephant conflicts and to provide information, knowledge, and tools to advance the conservation and management of Kenya’s second-largest elephant population.

The project capitalized on the results of a PhD study funded by the University of Cambridge, UK (Graham 2007), and a Master’s study written within the Swiss National Centre of Competence in Research (NCCR) North-South programme. First, researchers analysed the spatial patterns and dynamics of human–elephant conflicts. Next, communities affected by elephant raids were trained in monitoring and reporting incidents to the relevant wildlife management authorities. These initial steps helped to create awareness, strengthen links between communities and authorities, and identify main predictor variables for human–elephant conflicts, in order to better target further interventions.

Later, an educational film was created to sensitize Eastern African wildlife managers and policymakers, and to familiarize them with tools to minimize conflict and promote peaceful coexistence. Farm-based deterrent strategies for communities living with elephants in Laikipia were collected and made available in a comic book, helping the communities to protect themselves. Fences smeared with chilli paste, watch towers, torch lights, and “banger sticks” imitating the noise of guns have shown encouraging results, especially when used in combination.

A follow-up intervention provided local people with tools to participate still more effectively in human–elephant conflict management and conservation planning: community scouts were trained in using a mobile-phone-based system for reporting incidents, as well as a web-based mapping platform that enables real-time viewing of this information and the movement of radio-collared elephants. Through the systematic monitoring of fence breaking and crop raiding across Laikipia, this system was eventually used to provide early warning and conflict prevention services.

Most recently, the project used the results of the spatial analysis of elephant movements and human–elephant conflict to drive policy on land use planning across the region. The integrated conflict mitigation approach (from providing simple real-time monitoring tools to developing conflict mitigation interventions) has since been adopted in other sites across Eastern Africa, including the Amboseli ecosystem.

**Top and middle:** Chilli paste is a natural way of keeping elephants at bay. Farmers mix the paste from crushed chilli peppers and used motor oil, applying it to pieces of cloth attached to rope fences surrounding their farmland. Elephants are very sensitive to the burning sensation produced by chilli, causing them to leave and possibly even avoid the route in future. (Photo: Max Graham)

**Bottom:** Elephants not only raid farmland and destroy crops; sometimes they damage infrastructure and injure or kill people. The level of resentment among local farmers is high, as they feel they are not compensated adequately after such incidents. For this reason, the project also worked towards improving collaboration between wildlife authorities and local communities. (Photo: Max Graham)

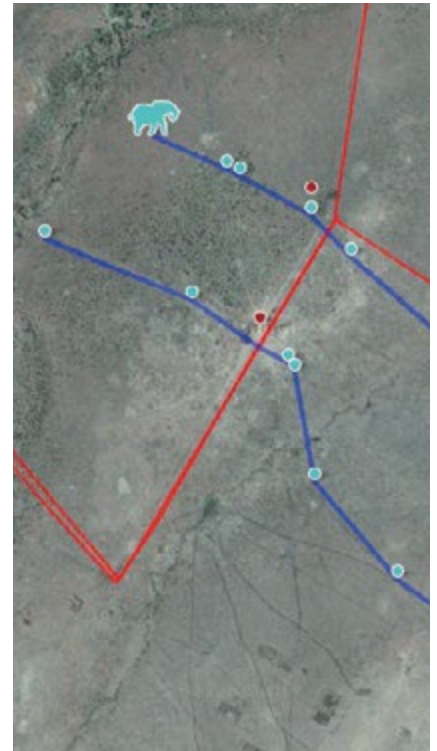




## Innovation and relevance

The project combines the functionalities of several technologies to come up with a highly innovative wildlife management tool: Global Positioning System (GPS) receivers are used to record elephant locations; the mobile phone network helps to transfer locational data into a geographic information system (GIS), where they are spatially analysed and combined with other geographic information. Finally, the combined data are made available to wildlife authorities and community scouts via a smartphone application. This tool is invaluable to help record and analyse movements of elephants across a human landscape, and to understand their behaviour in relation to risks and opportunities. It also enables systematic monitoring of fence breaking and crop raiding across the area for a better understanding of the spatial and temporal extent of this problem, and to help inform management action and assess underlying causes.

Conflicting goals between nature conservation and the development of rural communities are a widespread challenge in Eastern Africa and elsewhere in the world. Win-win situations between both priorities are rare; more often, trade-offs have to be dealt with in the best possible way. For example, if local communities' access to protected areas is restricted, reducing their resource base, these communities have to be compensated with a share of profits from tourism in and around the protected areas. The widespread occurrence of such trade-offs makes the experiences gained in this project highly relevant at a regional and even continental scale. Accordingly, as of 2014, ideas are being exchanged and collaboration is being initiated with the wildlife authorities in Ethiopia and Tanzania. It is especially the comprehensive and coherent approach towards wildlife management and conflict mitigation – combining a technical tool with capacity development, awareness creation, and the setting-up of efficient conflict management procedures – that has a high potential for transfer to other protected areas.



**Top:** A smartphone application was designed to enable local scouts in Laikipia to enter important conservation information – such as the location of a fence break or a crop raid – and to monitor the location of the elephant herds. The information is displayed in real time on the smartphone, as well as on the Space for Giants website. The purpose of the application is to increase the timeliness of reporting and intervention.

**Bottom:** The ESAPP-supported human–elephant conflict project implemented by Space for Giants attracted the interest of scientists, development practitioners, and the broader public at a science fair of the Swiss Agency for Development and Cooperation (SDC), and at the annual sustainability day of the University of Bern. (Photo: Corina Lardelli)





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### Highlight profile

This highlight is based on the achievements of 5 ESAPP priority action projects.

**Implemented during:**  
2003–2014

**Total funds contributed by ESAPP:**  
CHF 187,500

**Implemented by:**  
Space for Giants, Nanyuki, Kenya; Centre for Training and Integrated Research in ASAL Development (CETRAD), Nanyuki, Kenya

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

**Main beneficiaries:**  
Farming communities in Laikipia County, Kenya’s wildlife authorities, and elephants living in the area

### This highlight

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

### Citation

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Funded by



### 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](http://www.cde.unibe.ch) (keyword search: “ESAPP”).

# Supporting a World Heritage site in Ethiopia

When nature parks exist in populated areas, reconciling biodiversity conservation and local livelihoods can be a challenge – one that cannot be met without input from people living in and near the park. At a struggling park in the rugged Simen Mountains, ESAPP supported participatory research, suggested farmer-friendly redrawing of park boundaries, and enabled new high-altitude environmental monitoring stations.

## Sustainable development challenge

It is often difficult to balance biodiversity conservation and rural development. Conservation agencies understand the importance of considering the needs of local communities – but the benefits of biodiversity conservation are seldom seen immediately, while livelihood needs are often pressing. The Simen Mountains World Heritage site is a case in point.

The Simen Mountains reach 4,540 metres and include the highest peaks in Ethiopia. The land, often compared to the Grand Canyon in the United States, has been farmed for more than 2,000 years and is seriously degraded. Until recently, some of the steepest and coldest parts of these mountains saw limited human use and thus maintained a highly diverse fauna and flora, including endemic wildlife such as the Walya ibex and the Simen wolf. For their protection, a national park was established in 1969; it became one of the first UNESCO World Heritage natural sites in 1978. Ever since, the park administration has struggled to reconcile the park's needs with those of the many villages and farm fields inside the park and on its border. In 1996, the park was listed as a World Heritage site in danger.

## ESAPP's response

Knowing that the trade-offs between biodiversity conservation and rural development are highly diverse, ESAPP partners concluded that attempts to reconcile them must be context-specific and build on multi-stakeholder negotiations. Potential solutions in the Simen Mountains included various levels of protection and of coexistence between humans and wildlife, participation of local populations in the benefits of conservation, and awareness raising.

In 1999, ESAPP co-funded the finalization of a participatory baseline study of land inside and around the national park, the fieldwork for which was done in 1994. The study, *Reconciling Conservation with Sustainable Development* (Hurni and Ludi 2000), strongly recommended participation by land users in negotiations.

In the decade after 2000, park boundaries were redefined, with the help of land users in nearby villages, to exclude farmed areas. ESAPP contributed to a donor conference in 2012, developed a geo-referenced information system, and most importantly, established a high-altitude observatory in 2013 for monitoring climate, land use, and water- and sediment-related changes in a critical valley inside the park.



## Main messages

- In Simen, steps to conserve nature were successfully negotiated in processes involving local land users, park administrators, and international institutions, informed by the results of a transdisciplinary baseline study conducted in 1994.
- The geo-referenced documentation of socioecological systems in the villages in and near the national park, combined with spatial information on nature protection and development, greatly facilitated management planning, including for development in the buffer zone.
- The high-altitude observatory in the Simen Mountains has enabled close monitoring of changes in climate, land use, hydrology, and sedimentation in a unique highland setting, thus serving as a learning tool for real-world impact assessment.



Protecting the Walya ibex was one of the main reasons for creating the Simen Mountains National Park in 1969 and the World Heritage site in 1978. (Photo: Raphy Favre)



### The project story

ESAPP built on information produced during earlier work in the Simen Mountains, such as the management plan initiated in 1983 (Hurni 1986). One crucial issue in that plan was Gich village, in the centre of the park, which had existed for at least 500 years but was threatened by extreme soil degradation. As early as the 1970s, international experts and authorities said the village needed to be relocated, which contributed to conflicts between the park administration, land users, and political forces and led to an insecure situation throughout the 1980s. The village is situated in a part of the 30-square-kilometre-large Jinbar River catchment, in which there is a particularly valuable biome with Ericaceous forests and afro-alpine grasslands. This biome is extremely rare in the Ethiopian Highlands, which are otherwise almost completely used for agriculture.

The Ethiopian Government is negotiating with Gich village to leave the upper Jinbar Valley and resettle near the town of Debarq, about 50 kilometres away. The government is willing to compensate villagers for their loss of housing and land and to help them develop housing in town. In view of the potential opportunity to monitor the consequences of changes in land use, hydrology, and sedimentation in the upper Jinbar Valley, ESAPP established two hydrometric and five climatic stations in the area in 2013. It is hoped that, in a follow-up project of the Water and Land Resource Centre, researchers at these stations will be able to observe the progression towards secondary vegetation should the area be abandoned and left to nature. The 2014 data confirmed what had been observed in 1975 and 1976 in the same locations: the forest and alpine grasslands have regular runoff and produce almost no sedimentation during the rainy season, while the agricultural areas have high peak runoff with substantial sediment losses and reduced baseline flows in the dry seasons.

ESAPP also contributed to a donor conference in October 2012 in Addis Abeba, attended by representatives of tourism organizations, donors, universities, and private businesses. ESAPP provided key insights into the human–environment system of the Simen Mountains, related to biophysical, socio-economic, and land use issues as well as issues of park management and zoning, including in the upper Jinbar Valley.

**Top:** The protected area has been well guarded particularly over the past 20 years. This has led to a significant increase in wildlife numbers and contributed to political stability in this remote area. (Photo: Kaspar Hurni)

**Bottom:** People in the upper Jinbar Valley in the centre of the protected area have recently agreed to be relocated to the nearby town of Debarq. They are thus helping to preserve a unique highland biome that is severely degraded in its lower, cultivated reaches. (Photo: Hans Hurni)





### Innovation and relevance

ESAPP's support for participatory mapping of natural resources and socio-economic systems in 30 villages empowered local residents to assess their current situation and the changes that were occurring in areas such as demography, natural resource degradation, and development. They were invited to express their needs, identify opportunities and constraints, and develop a vision of their future in the vicinity of the park.

Another ESAPP innovation was the documentation of study findings in a spatially explicit geographic information system (GIS) database and layers representing topography, soils, land use, infrastructure, population, and development. The detailed mapping that this produced helped the park administration extend the park's boundaries without further disturbing farmed areas (FZS 2009). It also helped residents of the 30 villages document their resources and socio-economic systems and establish their own ideas for development.

A third innovation was the unique setting of a high-altitude observatory for the park in the upper Jinbar Valley, where fundamental changes are taking place towards regeneration of nature. The observatory enables researchers to monitor, document, and compare these changes to conditions 40 years ago.

The Simen Mountains World Heritage site is probably one of the best-documented conservation areas in Africa, not just in terms of its fauna and flora, but equally in terms of its human population, their land use systems, the interactions between farming and natural resources, soil erosion and surface runoff, climate observations, and monitoring of current change processes.

ESAPP also promoted tourism by providing regular updates of a trekking map of this unique area. The map was first published in 1981 and has a new edition in preparation for 2016.



**Top:** Repeating high-altitude observations after 40 years: detailed monitoring of biophysical and socioecological processes resumed in 2013. (Photo: Hans Hurni)

**Bottom:** Participatory negotiations on the needs of local populations and requirements of protected area management are a means to finding common solutions to complex interactions between human land use and biodiversity conservation. (Photo: Kaspar Hurni)





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## Highlight profile

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

**Implemented during:**  
1999–2002; 2011–2015

**Total funds contributed by ESAPP:**  
CHF 187,000

**Implemented by:**  
Simen Mountains National Park, Debark, Ethiopia; Ethiopian Wildlife Conservation Authority (EWCA), Addis Abeba, Ethiopia

**In collaboration with:**  
ESAPP Horn of Africa Coordination Office, Addis Abeba, Ethiopia; Water and Land Resource Centre (WLRC), Addis Abeba, Ethiopia

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

**Main beneficiaries:**  
Staff of government partner institutions

### This highlight

Language editing: Amanda A. Morgan ([www.aamorgan.com](http://www.aamorgan.com)); Tina Hirschbuehl, Marlène Thibault (CDE)  
Design: Simone Kummer (CDE)  
Proofreading: Stefan Zach (z.a.ch GmbH)

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# Sustainable regional development

Sustainable land management can only be achieved if human activity remains within safe planetary boundaries: this is what we wrote in the introduction to the previous section. But there is also a lower threshold of human activity, referred to as the “social foundation” (Raworth 2012), below which human deprivation occurs. Deprivation can take the form of poverty, hunger, lack of access to health and education, loss of self-determination, or exclusion from political processes – and it can lead to severe social tensions and conflicts. Sustainable regional development should therefore work towards ensuring that livelihoods of all human beings within a region do not make them fall below that lower threshold. Instead, livelihoods should enable people to rise to a higher economic and social level.

However, improving human livelihoods without overstepping planetary boundaries necessitates equity within and between communities, societies, and at the global scale. If access to natural resources and benefits of economic development remain grossly inequitable, planetary boundaries might be overstepped while large parts of human society still face severe deprivation. Further, equity cannot be achieved if it is not explicitly addressed and enforced through governance frameworks at the local, regional, national, and global scales. And for such frameworks to be put in place, spaces and platforms must exist to enable negotiation processes between stakeholder groups.

ESAPP built its sustainable regional development strategy around three cornerstones. These are: equity, secure livelihoods in economic and social terms, and favourable governance frameworks. Using this approach, ESAPP addressed issues of economic, social, and political disparities at various scales, by supporting negotiation platforms, advocacy initiatives, and policymaking processes – but also by finding ways of enhancing livelihood resilience in marginalized communities.



## Equity

Most emerging economies are characterized by widening economic disparities between the upper and lower segments of their societies. As rural transformation accelerates under the influence of new and powerful investments, marginalized communities are often pushed below the social foundation threshold, where they experience various types of deprivation. Meanwhile, others are able to seize the opportunities that accompany this transformation to consolidate their economic, social, and political advantages.

This growing inequity is widespread in Eastern and Southern Africa, where multi-dimensional disparities follow social divides and multiple centre–periphery gradients. Making these patterns visible and explaining the occurrence of poverty and marginality by relating them with other development variables is an important basis for information and decision-making. It can strongly enhance the capacity and readiness to act in rural advisory and support systems and it can help shape policy frameworks towards explicitly addressing equity issues. This is what ESAPP aimed at, by supporting the process of establishing a socio-economic atlas for Kenya (Highlight 8) based on national census data.

But equity also needs to be improved in concrete local contexts. Marginalized communities often depend on external advocacy to generate the information needed to make their concerns visible, and to initiate negotiation processes in which these concerns will be addressed. To play a significant role in such processes, the information generated through advocacy initiatives has to be as accurate and explicit as possible. ESAPP contributed by creating an atlas of the ancestral territories of the Ogiek ethnic minority, which assisted in making their territorial claims visible during litigation processes with the national government (Highlight 7).

## Livelihoods

Rural households in Eastern and Southern Africa often struggle with low levels of resilience. This means that external stress factors such as price fluctuations on the agricultural commodity markets, climatic variability, or changes in the governance framework can easily threaten livelihood security. In other words, the unreliability and unpredictability of rapidly changing sociopolitical contexts undermine rural development potentials.

As a consequence, one of the most important aspects of improving the livelihood security of marginalized rural communities is to promote the setting-up of viable production strategies, dependable market mechanisms, and just and reliable legal frameworks. All of these are a prerequisite for investments, increased production, and innovation in agro-ecosystems, yet can be effective only in a wider national governance framework that guarantees security, reliability, and continuity in a rapidly changing environment.

As a first step towards identifying secure livelihoods for rural communities, ESAPP operated several projects in which it assessed economic alternatives given the available resource base. In south-western Madagascar, for example, ESAPP partners investigated alternative income opportunity strategies to charcoal production,

and ways of enhancing livestock production among poor agro-pastoral communities (Highlight 9). In arid and semi-arid areas, ESAPP sought ways of reducing the vulnerability of rural communities towards climatic variability, especially erratic rainfall. The promotion of traditional and modern drought-resistant crops was one way of addressing this issue. In the arid and semi-arid areas of eastern Kenya, ESAPP partners helped farming communities diversify their crops by introducing drought-resistant wheat varieties and building up seed-bulking facilities to ensure continued use of that crop (Highlight 10).

### Governance

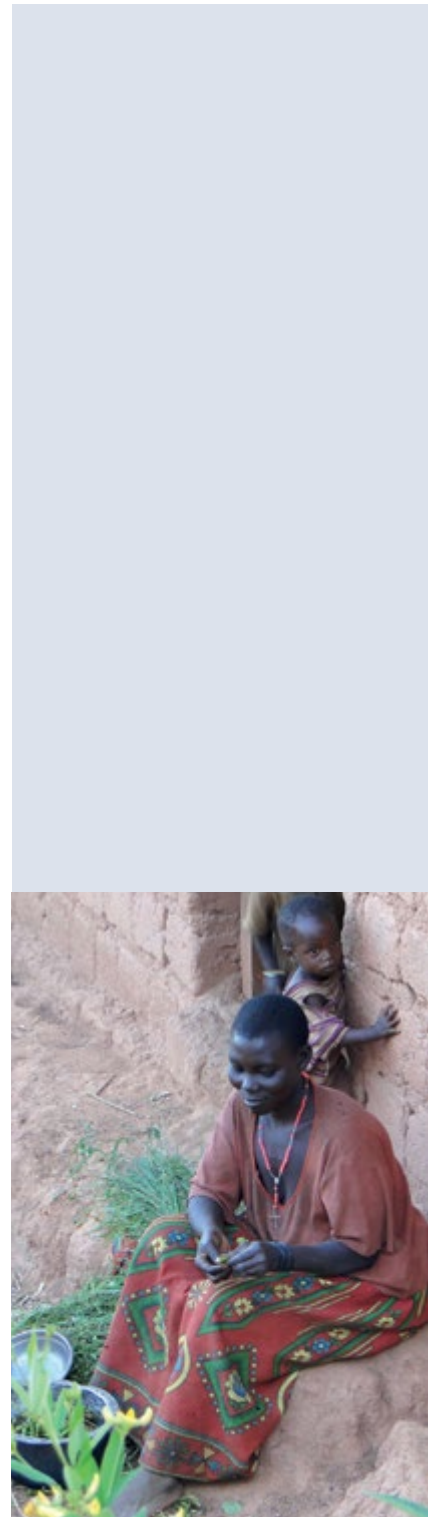
Local land use dynamics and conflicts are often triggered by stakes and powers beyond the control of the local context. For example, international trade can lead to increased resource competition in areas where tradable commodities are found, or national governance systems can favour one type of land use system over another, creating winners and losers among rural communities.

Identifying these dynamics as well as the actor groups and decision-making powers behind them, provides the necessary information to address mismatches between underlying customary, formal, and informal governance frameworks. This is a necessary first step towards the development of a just and reliable land governance system. Further steps include helping resource users preserve their livelihood basis by establishing their own resource governance systems at the local level, such as harvesting protocols and by-laws. They also include the setting-up of negotiation platforms to help rival stakeholder groups and communities mitigate conflicts and to establish memorandums of understanding as mutual guidance for conflict-free future cohabitation.

Highlight 11 illustrates how ESAPP's partners in Kenya worked with local communities to establish local by-laws and harvesting protocols for frankincense and gum arabic, thus helping to secure the future of this economically important resource and to achieve better prices on the international market. Highlight 12 shows the importance of establishing exchange platforms between farming and pastoral communities in southern Tanzania, as an efficient tool for solving land use conflicts in areas of pastoral resettlement.

### Reference

Raworth K. 2012. *A Safe and Just Space for Humanity: Can We Live within the Doughnut?* Oxfam Discussion Paper. Oxford, UK: Oxfam. <http://policy-practice.oxfam.org.uk/publications/a-safe-and-just-space-for-humanity-can-we-live-within-the-doughnut-210490>; accessed on 1 September 2015.







# Ogiek Peoples Ancestral Territories Atlas

Indigenous knowledge is often absent from sustainable development debates, partly because those who possess it are unable to assert their needs and rights in negotiation and decision-making processes. ERMIS Africa, ESAPP, and CDE helped to provide such a platform by mapping the ancestral territories and recording the history of the Ogiek community in the Eastern Mau forest of Kenya.

## Sustainable development challenge

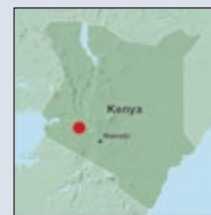
Most land use planning and decision-making processes in Eastern Africa are steered by actors at multiple scales and levels, often with little regard for indigenous knowledge. Indigenous knowledge is based on different sets of values and linguistic typologies, but is often absent from sustainable development debates (Corbett et al. 2006). This is partly because it is not well documented, but also because those who possess it are rarely in a position to participate or assert their needs and rights in decision-making processes. Lacking the necessary foundations, networks, and platforms to make their voices heard, the concerned communities become further marginalized.

The Ogiek people are among the last remaining forest-based hunter-gatherer communities in Kenya and northern Tanzania. Ogiek communities are struggling to safeguard their ancestral territories, natural resources, livelihoods, and political rights. Since 1997, the Ogiek have been engaged in several litigation cases against the Kenyan Government, to oppose their eviction from the Eastern Mau forest and the resettlement into this area of farmers from other parts of the country. However, the lack of clear and up-to-date spatial data and information regarding their territorial claims has made it difficult for the Ogiek to assert their rights during these litigation processes.

## ESAPP's response

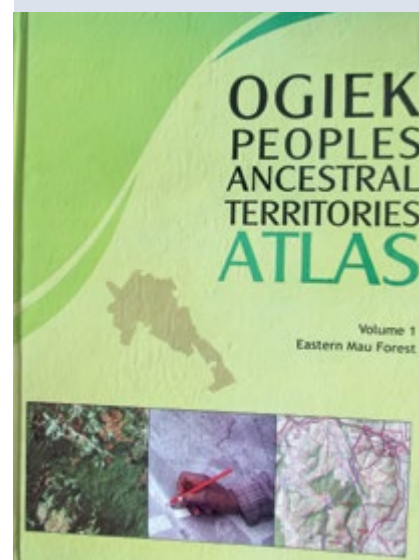
Information is a key resource for equitable and sustainable development and should be available and accessible to all. This is particularly important in the context of enforcement of resource-relevant policies, which can have far-reaching consequences for resource users (Ehrensperger et al. 2011). Indigenous knowledge should be acknowledged in decision-making processes, to make local realities visible and enable local communities to assert their claims. As this knowledge is often tacit and therefore difficult to transfer to another person in writing, innovative tools must be found to facilitate the communication process.

The Ogiek Peoples Ancestral Territories (OPAT) project aimed to map the ancestral territories and record the histories of 25 Ogiek clans in the Eastern Mau forest of Kenya, to help them negotiate their ancestry claims with the Kenyan Government. Interactions with community elders over several months were combined with a Geographic Information System (GIS) using participatory learning approaches; the resulting maps and narratives were bound together as an atlas (Muchemi and Ehrensperger 2011). Published after community-wide consultations, the OPAT Atlas is an instrument for the Ogiek community to make its territorial claims visible during litigation processes with the national government and during negotiation processes with other stakeholders and development partners.



## Main messages

- Participatory systematic mapping and comprehensive documentation of indigenous knowledge and assets promote all-inclusive negotiation processes on resource allocation and access equity.
- Such an approach further helps to secure indigenous people's participation in land use planning and has the potential to help minimize conflicts and enhance sustainability in the concerned communities and beyond.
- Appropriate participatory tools combined with approaches or methods that effectively integrate modern innovative techniques with local knowledge can enable even the most marginalized community to make useful and relevant contributions to complex decision-making and planning processes. This potential remains largely untapped to date.



The Ogiek Peoples Ancestral Territories Atlas was printed in A3 format in Kenya and made available to Ogiek communities and to a wider public. A digital version is available on the ISSUU digital publishing platform (<http://issuu.com/>; enter "Ogiek" in the search field to find the atlas).

## The project story

In 2005, elders of several Ogiek clans of the Eastern Mau forest approached ERMIS Africa – a non-governmental organization based in Nakuru, Kenya – for support in mapping their ancestral territories. With the help of ESAPP and the Centre for Development and Environment (CDE), ERMIS Africa launched a project to map the ancestral territories and record the history, family trees, and cultural practices of 25 Ogiek clans in the Eastern Mau forest.

First, a pilot mapping event was organized with one Ogiek clan in the location of Nes-suit. Community representatives used enlarged and mosaicked aerial photographs and Global Positioning System (GPS) receivers to delineate their clan territory. The drawings done by the community were then processed and mapped in a Geographic Information System (GIS). Experiences from the pilot event were used to design the workflows for the other participatory mapping events. The workflows had to take into account aspects such as the preprocessing of aerial photographs, selection of mapping software, and identification and categorization of information to be mapped and included in the narratives. But the part that needed the most careful preparation was community mobilization, especially because of the political dimension of the project and the stakes of the participating communities.

The subsequent participatory mapping events were prepared, implemented, and moderated by ERMIS Africa over several years; in several cases, more than one attempt was necessary. Mapping teams were formed, each comprising representatives of the clan whose territory was to be mapped as well as its neighbouring clans. The Ogiek communities grew increasingly interested and demanding as to the information to be included in the atlas, making it necessary to gradually expand its scope. A complete second round of visits had to be organized in order for each ancestral territory map to be verified and signed by the elders of the clans concerned.

Production, editing, and layout of the atlas were done at CDE. A professional cartographer took care of the map design and verification. Graphical representations of Ogiek clan family trees were added to the clans' narratives. Finally, the atlas was printed in Kenya in A3 format and later also made available on the Internet ([http://issuu.com/cde.unibe.ch/docs/fullversion\\_atlas\\_opat\\_2011\\_cde](http://issuu.com/cde.unibe.ch/docs/fullversion_atlas_opat_2011_cde)).



**Top:** Prior to mapping their territory, clan members arrange enlarged aerial photographs on the ground and consult each other to gradually learn how to read the images and to orient themselves. Giving sufficient time to this orientation and learning process allowed the actual mapping to be done more precisely and faster. (Photo: Albrecht Ehrensperger)

**Bottom:** Once all had agreed, the boundaries of the ancestral territory as well as important landmarks such as clearings were drawn in different colours directly onto the aerial photographs. Later, these drawings were manually digitized on-screen upon the background of a digital and geo-referenced copy of the aerial photograph. The resulting vector files were saved in a GIS-compatible format and used for final map making. (Photo: Albrecht Ehrensperger)



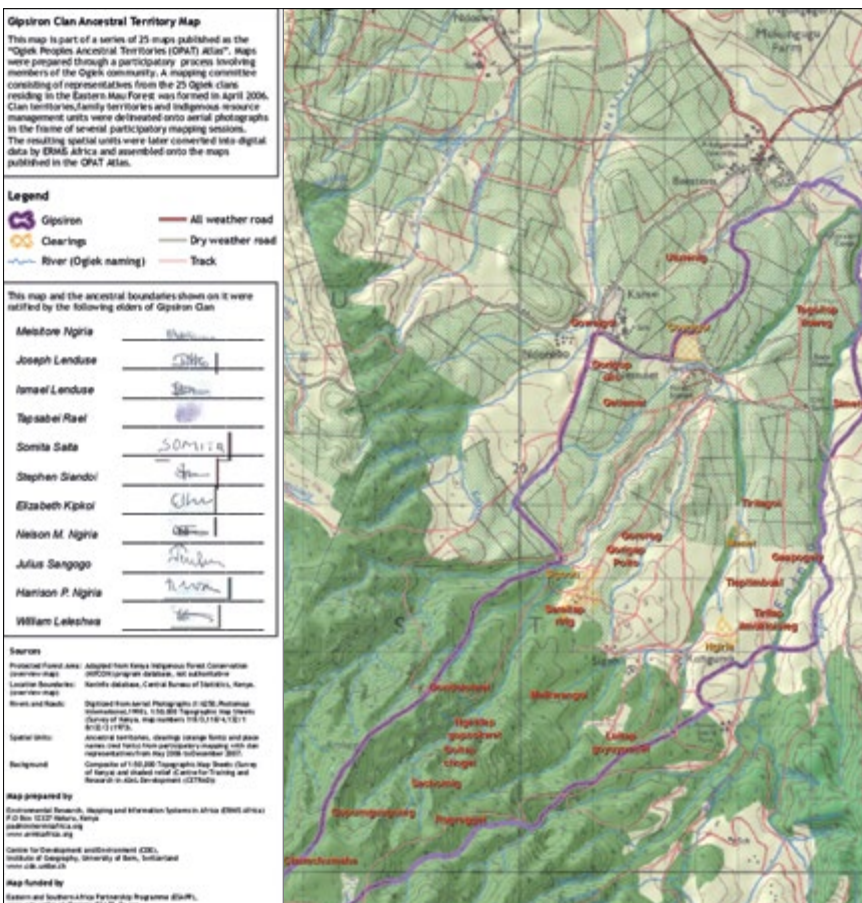


## Innovation and relevance

The participatory GIS approach used to create the OPAT Atlas combines advanced spatial technologies such as aerial photography, GPS survey, and GIS with an intensive process of community involvement as well as patient ethnographic recording and inventorying of clan narratives. This combination of approaches is innovative and enabled the project team to achieve a unique and highly valuable output.

The maps included in the atlas provide an accurate delineation of ancestral territories, certified by the elders of each clan and its respective neighbouring clans. As such, the atlas goes beyond sketch mapping, which is usually carried out by development practitioners with local communities, but offers less spatial precision and is hence less authoritative. The atlas is of high local relevance as it contributes to the self-determination of the Ogiek by visualizing their ancestral territories and the associated territorial claims, and by telling the stories of their settlement in this region, their cultural heritage, and their livelihood strategies. The use of enlarged aerial photographs and participatory three-dimensional modelling (Rambaldi et al. 2007) improved participation tremendously: spatial features such as houses, rivers, and footpaths were easily recognizable on the photographs, allowing literate and illiterate community members to participate equally in the process (Gabathuler et al. 2012).

The selected approach brought together tacit indigenous knowledge and high-tech information technology within one product, making indigenous realities and claims more visible and explicit. Such tacit knowledge and local realities are found all over Eastern Africa but are rarely considered in negotiations over the enforcement of resource-relevant policies. The experience gained in this project is therefore of high importance at a regional scale and could be used to provide a better basis for negotiation for a number of marginalized communities in the region.



**Top:** The mapping was an intensive and demanding process. Participants assessed each element on the images in order to sharpen their own mental map and to agree on the location of as many spatial features as possible. In some areas the images were outdated and thus orientation became more difficult. This was the case especially where fast development of settlements had taken place. When in doubt, participants complemented the mapping on the images by a GPS survey in the field. (Photo: Albrecht Ehrensperger)

**Bottom:** Each clan map in the OPAT Atlas features a topographic map underlain by a shaded relief, rivers, roads and footpaths. The clan's ancestral territory is surrounded by a purple line. Important Ogiek landmarks are included inside the territory. Each map is signed by the clan's elders.





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## Highlight profile

This highlight is based on the achievements of 2 ESAPP priority action projects.

**Implemented during:**  
2003–2005; 2011–2014

**Total funds contributed by ESAPP:**  
CHF 57,000

**Implemented by:**  
ERMIS Africa, Nairobi, Kenya

**With support from:**  
Centre for Development and Environment (CDE), University of Bern, Switzerland;  
Centre for Training and Integrated Research in ASAL Development (CETRAD), Nanyuki, Kenya

**Main beneficiaries:**  
Ogiek communities on the Eastern Mau Escarpment, Nakuru County, Kenya

### This highlight

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Proofreading: Stefan Zach (z.a.ch GmbH)

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Funded by



## 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](http://www.cde.unibe.ch) (keyword search: "ESAPP").

# Assessing equity and vulnerability in Kenya

Many African countries are experiencing substantial economic growth and sociopolitical transformation. Kenya is no exception. The country is on the rise economically and poverty has declined at the national level. But the gains are not felt the same everywhere and by every population group. Disaggregated data and high spatial-resolution maps can help policymakers better understand and address newly emerging distributional patterns of wealth, poverty, and disparities.

## Sustainable development challenge

Achieving equitable societies with low or no poverty incidences remains a key challenge of sustainable development. This is equally true in countries experiencing considerable economic growth and undergoing fast economic and sociopolitical transition, as seen in many African states. In such cases, non-equitable distribution of welfare may become more pronounced, and poverty may appear more complex than before economic growth began. In many African countries, high poverty rates were previously a typical and widespread phenomenon in rural settings and in informal settlements near urban areas. Nowadays, these once-distinct patterns have become more complex, displaying increasing differences between various rural settings and more pronounced disparities along centre-periphery gradients.

Kenya is one such African state that is experiencing rapid economic and sociopolitical transition, and is thus contending with new distribution patterns of poverty and disparities. These emerging patterns mean that approaches and interventions aiming at greater equity encounter new challenges in targeting and addressing poverty and disparities. Contextualized information representing these emerging patterns is needed to reorient poverty-reduction strategies and approaches appropriately.

## ESAPP's response

In recent decades, the availability of information on equity and poverty has improved considerably in many countries of the global South. However, in most cases, this crucial information remains highly aggregated contextually. For example, poverty rates are usually only available at district or provincial levels. Against this background, ESAPP partners, in particular the Centre for Development and Environment (CDE), have sought to develop approaches and methods to disaggregate information on poverty and disparities. Higher spatial resolution is needed to establish links between issues of equity and environmental and socio-economic dimensions in concrete settings. This, in turn, makes it possible to target poverty more effectively and appropriately.

Thanks to long-term collaborative links with the Kenyan National Bureau of Statistics (KNBS), the opportunity arose to obtain disaggregated data from Kenya's National Population Census and national household surveys. This made it possible to take tools and methods developed by CDE in Southeast Asia and modify and apply them in Kenya, resulting in high-resolution maps on poverty and disparities. The Volkswagen Foundation and the University of Bern oversaw and funded the scientific activities, while ESAPP supervised corresponding capacity development and knowledge-transfer activities.



## Main messages

- Though poverty has declined in many countries of the global South, poverty and inequality remain persistent sustainability challenges. Further, the distribution patterns of poverty and disparities have become more complex, requiring poverty-reduction strategies that are more differentiated and context-specific.
- High spatial-resolution data and maps on poverty and disparities are key tools for effective and adequate contextual targeting of inequality. They make it possible to identify and address vulnerable regions as well as vulnerable populations in less vulnerable contexts.
- Maps that show socio-economic data in granular detail (e.g. communities) are capable of triggering broad-based development debates at all levels of decision-making. They can promote more integrative, inclusive development policies and approaches.



Kenya is experiencing rapid economic and sociopolitical transformation. But not all segments of the population profit equally from these developments, and disparities are growing. (Photo: Urs Wiesmann)



**Top and middle:** In some rural settings – particularly in areas with high ecological potential – poverty rates are decreasing as a result of rapid agricultural transformation and the development of infrastructure and services (top). But in other, more remote rural areas, poverty rates and livelihood insecurity remain high (middle). Poverty reduction in these settings requires integrated regional development approaches. (Photos: Urs Wiesmann)

**Bottom:** Forty-five per cent of Kenya’s 38 million people are poor. However, poverty incidences are distributed very unequally among the country’s 7,149 sub-locations. The most decisive factor correlating with the percentage of people living below the national poverty line is the urban–rural gradient. All sub-locations with incidences of less than ten per cent are urban, whereas almost all sub-locations with very high poverty incidences are found in the rural periphery. (Source: Wiesmann et al. 2014)

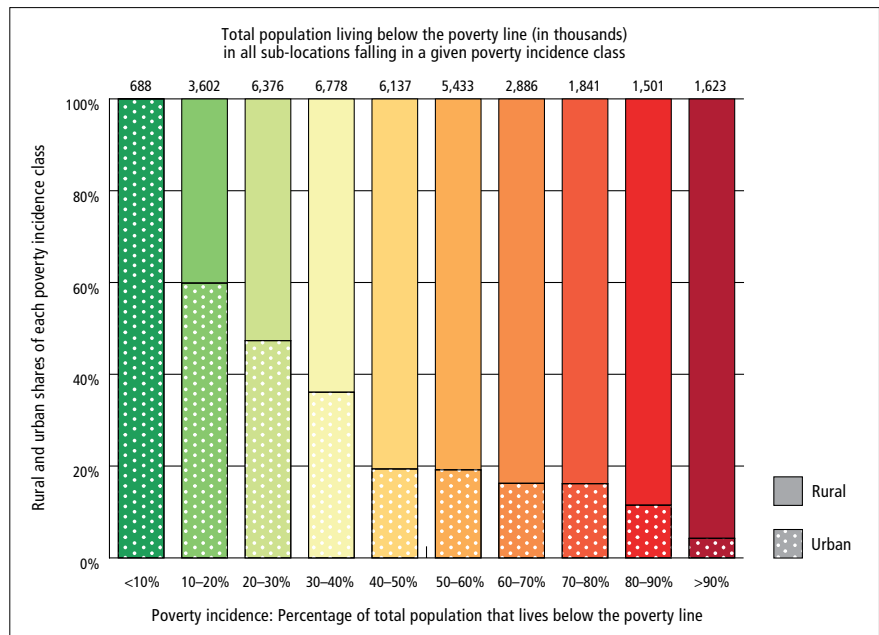
### The project story

The initiative to produce high-resolution geographic information on poverty and disparities in Kenya was neither explicitly demand-driven nor commissioned. Rather, it emerged organically from within the ESAPP partner network. An important trigger was Kenya’s new constitution, which devolves power from the national level to 47 newly founded counties. These counties urgently require more detailed information with which to design and streamline their policies (see also Highlight 17). The Kenya National Bureau of Statistics (KNBS) and related authorities were enthusiastic about the initiative, in particular because the distribution of poverty rates partly determines the national allocation of finances to different counties.

The concept of representing selected equity indicators was jointly developed by KNBS, the Centre for Training and Integrated Research in ASAL Development (CETRAD), and the Centre for Development and Environment (CDE) during an intensive training and planning phase. The three institutions decided to use Kenya’s sub-locations (over 7,000) as key spatial reference points, since they represent the smallest administrative units available. In addition, it was decided to present results at various scales in order to adequately represent not only rural areas, but also individual neighbourhoods in urban centres such as Nairobi. Finally, members of the team were trained in aspects of spatial representation and mapping, especially small area estimation, a method used to derive high-resolution poverty and disparity maps.

By applying these tools and methods and combining census and survey data, the team produced a high-resolution monthly expenditure map. This map provided the basis for deriving other maps on the relative and absolute incidence of poverty, on the poverty gap and depth, as well as on the Gini coefficient. These maps revealed that Kenya’s overall poverty rate has dropped to 42 per cent, but that the patterns of poverty have changed, resulting in more pronounced regional differences and important centre–periphery gradients.

The initial high-resolution poverty maps proved highly relevant for policymaking and planning. But the team went even further by analysing the wealth of the non-poor in all sub-locations and calculating the so-called wealth gap: a measure of how far above the poverty line the non-poor are on average. These calculations revealed a small wealth gap in many regions of Kenya. In such areas, economic “shocks” such as drought or fluctuating food prices could push large numbers of formerly non-poor into poverty. In this way, calculation of the wealth gap made it possible to identify not only poor regions, but also economically vulnerable regions in Kenya. This provided an important basis for discussion in many counties (see Highlight 17).



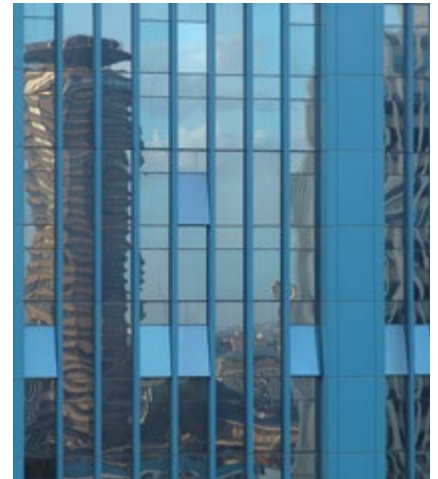
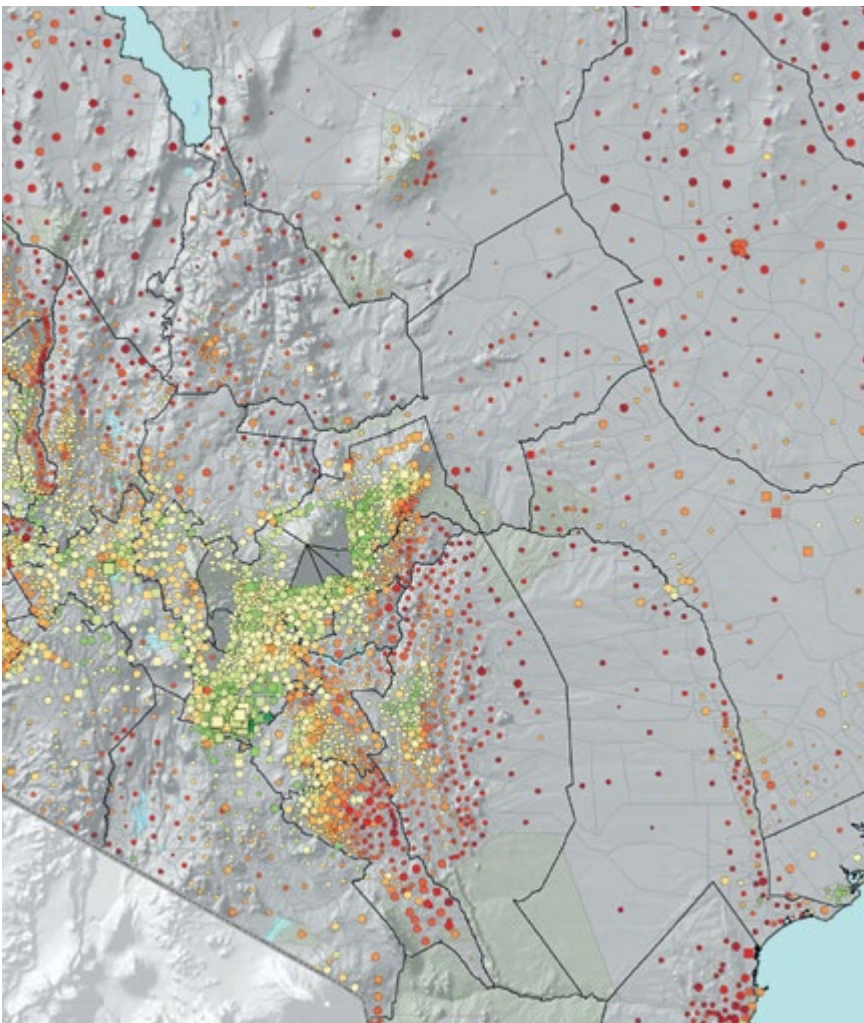


## Innovation and relevance

To the best of our knowledge, this project is the first in Africa to produce such high-resolution maps of poverty and inequality, which graphically represent population figures in symbols instead of conventional map area shades. This enables users to compare, on an equal basis, the situation in high population-density areas, such as towns, and in low population-density areas, such as Kenya's vast semi-arid and arid regions. In addition, our wealth gap analyses made it possible to identify two types of areas requiring different poverty-reduction strategies: first, areas with high poverty rates and high vulnerability, where regional development strategies are needed; second, areas with lower poverty rates but high absolute numbers of poor, where targeted social and economic programmes are needed for specific population segments.

In addition, the information tool developed expands people's perspective of economic poverty, enabling a modern multi-dimensional understanding of poverty and equity. For example, the high-resolution poverty maps created may be compared with and linked to other important indicators such as housing conditions, access to safe water, school enrolment and education levels, and gender disparities.

In 2015, the ESAPP team led intensive sub-national workshops using the maps with relevant authorities from all 47 Kenyan counties. These confirmed the potential of high-resolution poverty and disparity information to promote knowledge-based planning and decision-making in a wide range of policy fields. Further, the workshops revealed that such data and maps can trigger broad-based discourses and debates at all levels – local to national – enabling more integrated, inclusive development policies and approaches.



**Top and middle:** Large and medium urban centres are the hotspots of economic growth and development in Kenya. They offer a dynamic labour market with a wide range of formal employment opportunities and a vibrant informal sector (top). Although poverty rates are comparatively low in these urban centres, a large number of urban dwellers are nonetheless poor (middle). Poverty-reduction strategies in these settings must therefore specifically target poor population segments. (Photos: Urs Wiesmann)

**Bottom:** The so-called wealth gap measures how far above the poverty line the non-poor population is living. The wealth gap was assessed for all sub-locations and displayed in a map. It is big in sub-locations marked in greenish colours, and small in sub-locations marked in reddish colours. Reddish colours mean that the non-poor population is living just slightly above the poverty line. Those regions of Kenya where reddish colours dominate are highly vulnerable, as shocks such as droughts can easily push the non-poor back into poverty. (Source: Wiesmann et al. 2014)



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## Highlight profile

ESAPP contributed to this highlight with one priority action project.

**Implemented during:**  
2013–2014

**Total funds contributed by ESAPP:**  
CHF 50,000

**Implemented by:**  
Kenya National Bureau of Statistics (KNBS), Nairobi, Kenya; Centre for Training and Integrated Research in ASAL Development (CETRAD), Nanyuki, Kenya; Centre for Development and Environment (CDE), University of Bern, Switzerland

**Main beneficiaries:**  
Decision-makers in Kenya at national and county levels

### This highlight

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# 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)





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## 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

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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>.

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**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.

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Funded by





# Smallholder wheat production in Kenya's drylands

Drought-resistant crop varieties can diversify livelihoods and improve food security, provided seed supply is adequate and farming practices are appropriate. ESAPP worked to promote the farming of two new wheat varieties in arid and semi-arid areas in eastern Kenya, training farmers as well as technical and extension staff and supporting community-based seed bulking.

## Sustainable development challenge

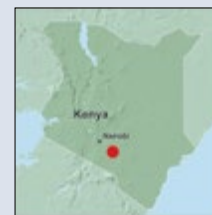
Introducing new drought-resistant crop varieties can be a strategy to diversify livelihoods and improve food security in marginalized rural areas. However, efforts to do so in arid and semi-arid regions of Eastern Africa have largely failed to achieve the desired impact. One of the main reasons is that these efforts lack the necessary support to produce enough seed for widespread use in areas where new varieties have been accepted. Other reasons include inappropriate farming practices, over-reliance on non-performing crops, and ineffective government-supported extension service systems that are near collapse.

Over the years, agro-pastoral communities in the semi-arid areas of Makueni and Machakos in eastern Kenya abandoned agro-climatically suitable crops in favour of crops that fulfil both subsistence and commercial functions. This practice continued despite poor performance of such crops and persistent crop failure. To address the problem, the Kenya Agricultural Research Institute (KARI) – now the Kenya Agricultural and Livestock Research Organization (KALRO) – developed two new wheat varieties, Duma and Njoro1. While smallholder farmers were willing to shift to the new varieties, uptake was severely hampered by the lack of affordable seed to satisfy the huge demand.

## ESAPP's response

ESAPP developed, tested, and implemented integrated approaches for promoting sustainable livelihood strategies in different socioecological environments of Eastern Africa. The approaches are based on inclusive community mobilization and institutional capacity development, and are adapted and implemented in different ESAPP regions.

To promote wheat farming in the semi-arid areas of Makueni and Machakos, ESAPP supported KARI's Seed Research Centre, the non-governmental organization Benevolent Institute of Development Initiatives (BIDI), and existing self-help groups. A community-based seed bulking and distribution initiative was designed to address the problem of seed availability and promote widespread distribution and use. Appropriate training materials were prepared, and farmers from selected project areas, together with staff from BIDI and line ministries at the county level, were trained in the basics of wheat farming in drylands environments. This included harvesting, primary processing, packaging, and use of wheat and wheat products.



## Main messages

- There is untapped potential to successfully diversify crop-based rural livelihoods. This requires identifying and implementing appropriate approaches to promote inclusive community mobilization, participation, and extension support.
- Adequate provisioning for seed bulking and multiplication is decisive for successful introduction and rapid uptake of new seed varieties, especially in dry environments where most farmers live below the poverty line.
- Poverty limits farmers' ability to afford commercially produced seed, which is usually very expensive. Interventions should include measures to protect the seed from being used as food if the communities involved face successive seasons of crop failure.



The new wheat varieties Duma and Njoro1 are specially developed for early maturing and drought resistance. They offer an interesting alternative to the commonly planted maize, which requires more moisture and takes longer to mature, often resulting in crop failure. (Photo: Samuel Makali)





### The project story

A study conducted within ESAPP-associated projects (Ifejika Speranza et al. 2007) revealed that despite persistent crop failure resulting from unfavourable weather conditions, communities in Makueni and Machakos continued to depend almost exclusively on maize as their main crop. In this region, maize doubles as a subsistence as well as commercial crop. This practice was found to limit crop diversification, reducing the options for broadening livelihood systems and causing communities in the affected areas to face perpetual food insecurity. Other studies (Hager 2012) showed that despite availability of alternative crops, uptake was hindered by a lack of seed to supply farmers. This was even the case with new wheat varieties such as Duma and Njoro1, which were recommended for smallholder production in dry environments. Based on these findings, ESAPP supported the “Smallholder Wheat Production in Arid and Semi-arid Lands” project, which promotes wheat farming in semi-arid areas of Kenya. The project’s main approach is to facilitate community-based seed bulking and distribution in selected areas of Makueni and Machakos counties.

Prior to seed bulking activities, selected farmers and BIDII staff were trained in the basics of wheat farming, harvesting, primary processing, and packaging, as well as the use of wheat and wheat products. To ensure sustainability of uptake, training was organized at two levels: for technical and extension staff at county level, and for farmers at village level. Over 160 farmers from 13 villages were trained, and participating community-based organizations were supplied with seed and basic farm inputs for initial multiplication. After the first season, the seed generated by the community-based organizations was distributed to 100 farmers for further multiplication. In the two subsequent seasons, supply reached over 600 farmers, increasing the initial area under production from about 2.6 hectares to over 243 hectares in 13 villages. This rapid increase in wheat-growing farmers ensured availability of affordable wheat seeds, which, in turn, boosted the process of scaling activities up beyond the initial test areas (Kiteme et al. 2010).

This intervention provided a feasible approach to crop diversification using suitable alternative crop varieties that meet farmers’ subsistence and commercial expectations and are adapted to ecological conditions in the test areas. It broadened smallholder farmers’ means of making a living, and reduced their vulnerability to weather-based crop failures.

**Top:** Farmers in Makueni visiting a test plot. Changing their farming systems strategy is coupled with substantial risks, which is why seeing the potential and advantages of a crop in their own context was a very important element in gaining farmers’ participation in the project. (Photo: Samuel Makali)

**Bottom:** Farmers in Makueni have long depended on maize as a subsistence as well as commercial crop. Switching to wheat required substantial persuasion and training, as farming techniques for this crop are quite different and its cultivation is challenging. The project included regular field-based courses, mainly involving seed research scientists of the Kenya Agricultural Research Institute and local farmers. (Photo: Samuel Makali)



## Innovation and relevance

This knowledge-based intervention was designed from research results that helped to understand the agronomic and socio-economic factors contributing to food insecurity in the semi-arid areas of Makueni and Machakos (Ifejika Speranza 2006; Ifejika Speranza et al. 2007). The research component ensured integration of socio-economic and agroecological dimensions to promote farming of crop varieties that meet farmers' expectations.

Furthermore, this is the first time in Kenya that socioecologically marginalized farmers were involved in seed bulking, multiplication, and distribution through the self-regulated systems of local community-based organizations. Use of institutions that are rooted in local communities' social structures guaranteed instant ownership of the process and provided a solid foundation for successful implementation and sustenance of uptake. The approach to precede seed bulking with relevant training for both farmers and county extension service providers was very important for guaranteeing sustainability beyond the project's duration. The ESAPP project transformed farmers' livelihoods for the better, strengthened their social capital through an expanded social network, and provided a new foundation for improved social interaction and cooperation – all crucial features for broad-based and secure rural livelihoods. Compared with maize, the two wheat varieties Duma and Njoro1 have higher yields, fetch better prices, require less moisture, and mature earlier.

The project provided some important lessons worth noting for similar interventions. First, even the most suitable crop variety for drylands cannot succeed without the minimum moisture required for growth to term; Duma and Njoro1 failed in one of the seasons that experienced total crop failure. Second, sustainable community-based seed bulking can fail if no arrangements are put into place to prevent farmers from using the seed for food in cases of serious food shortage and the total collapse of other alternative food sources. This happened in the seasons following the total crop failure, when some of the affected farmers were forced to consume their wheat seed and had to abandon wheat farming.



**Top:** Farmer field day in Kaiti, Makueni County. A county-level agricultural extension service provider displays different wheat seed varieties at the event, during which farmers learn about and discuss important aspects of wheat production and use. Consistent and reliable extension service support is crucial for successful transfer and adoption of new agricultural innovations. (Photo: CETRAD photo gallery)

**Bottom:** A healthy and fast-growing wheat crop in one of the successful seasons in Kathiani, Machakos County. Even the crop varieties most suited to the drylands cannot succeed without the minimum amount of moisture required for growth to term. (Photo: CETRAD photo gallery)





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## Highlight profile

This highlight is based on the achievements of 2 ESAPP priority action projects.

**Implemented during:**  
 2005–2006; 2013–2014

**Total funds contributed by ESAPP:**  
 CHF 90,000

**Implemented by:**  
 Centre for Training and Integrated Research in ASAL Development (CETRAD), Nanyuki, Kenya

**In collaboration with:**  
 Kenya Agricultural Research Institute (KARI), Nairobi, Kenya; Benevolent Institute of Development Initiatives (BIDI), Nairobi, Kenya

**Main beneficiaries:**  
 Farmers in Makueni and Machakos counties, Kenya

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# Policies and value chains for local products

A lack of effective local by-laws on resource use and national product standards frequently creates unfavourable conditions for small agricultural producers in marginalized areas of Eastern Africa. ESAPP helped to improve policy frameworks and value chains for small producers of frankincense and camel milk by supporting formulation of by-laws, facilitating consultation of local communities, and helping local producers establish value chains for their products.

## Sustainable development challenge

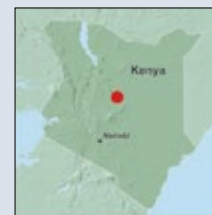
Adequate governance tools are needed at different decision-making levels to foster sustainable resource management and regional development. However, communities in Eastern Africa often lack effective by-laws regulating resource use at the local level, or they do not have the tools to enforce existing by-laws. At the national level, gaps in legislation tend to worsen conditions for local producers in marginalized areas who wish to supply goods to country-level or international markets.

In the arid and semi-arid lands (ASALs) of the Upper Ewaso Ng'iro Basin, north-west of Mount Kenya, natural resources are scarce and contested. Local communities frequently lack by-laws to regulate the harvesting of resources such as gum arabic and frankincense, tree resins that are exported via informal market routes to the Middle and Far East and represent significant sources of income. This leads to overuse, species and rangeland degradation, and low product quality. Pastoralists living in this region also depend heavily on camel milk as a source of food and income. Due to lack of official certification and quality standards, camel milk was considered illegal for commercial trading until recently and thus marketed informally far below its fair-market value. Effective governance with regard to natural resource management and market policies is necessary to prevent further degradation and to improve livelihoods.

## ESAPP's response

Here and in other project areas, ESAPP helped improve the reliability of policy frameworks and value chains for local products by (1) supporting the formulation of clear acts, laws, and certifications at various levels of governance; (2) facilitating consultation of local communities and stakeholders during these processes; and (3) helping local producers in establishing value chains for certified and processed products. At the local level, ESAPP helped to establish user-group governance bodies and regulations on access to natural resources.

In the Upper Ewaso Ng'iro Basin, context-specific harvesting and processing protocols regarding access to, and use of, gum arabic and frankincense were formulated together with concerned communities, tested, and introduced as a basis for negotiating binding agreements between these communities and regional and national institutions. In parallel, ESAPP facilitated a national policy negotiation process to help define quality standards for camel milk and its inclusion in national dairy policy and legislation. This was done to improve pastoralists' economic returns, enabling them to access premium markets, thus improving their livelihoods and food security.



## Main messages

- In order to improve livelihood security and resilience to environmental and economic changes, clear, supportive, and reliable policy frameworks must be established at various levels of governance in collaboration with local communities.
- Information and knowledge generation, policy support, and capacity development are an integral part of this process, as are identifying niche markets and developing appropriate and sustainable land management technologies.
- In arid and semi-arid lands, increasing the (sale) value of local resource-based goods is a good way of responding to resource scarcity; this can be achieved through better quality management, formal certification, and attractive branding.



Camels are a vital source of livelihood for the communities in the semi-arid and arid lowlands of northern Kenya. (Photo: Eliza Peter)



**Top:** Before ESAPP's intervention, there were no quality standards governing camel milk and its formal trade was forbidden. ESAPP organized a series of policy dialogue workshops with the aim of integrating it into the national dairy policy framework. In 2007, the policy was changed to enable commercial production, and camel milk became a tradeable commodity. Now, camel milk is even found in some of Kenya's main supermarkets. (Photo: Boniface Kiteme)

**Bottom:** Before ESAPP started its activities in the region, harvesting of gums and resins was done without regard to resource management, leading to overuse and degradation of the natural resource base. The establishment of community-based harvest protocols and by-laws has helped improve this situation. (Photo: CETRAD photo gallery)

## The project story

In 2005, ESAPP launched a series of projects in the arid and semi-arid lands (ASALs) of the Upper Ewaso Ng'iro Basin, north-west of Mount Kenya, seeking to improve the livelihoods of marginalized communities. Two main approaches were adopted: (1) improving people's income through better access to markets, and (2) establishing by-laws and protocols for the sustainable harvesting of natural resources. The projects focused on three key regional products: gum arabic, frankincense, and camel milk.

**Gum arabic:** The project aimed to create reliable market contacts, negotiate supplier agreements, establish collection centres and storage facilities, improve local institutional structures, and develop a marketing initiative to streamline the commercial gum trade. A significant result was the transfer of knowledge and skills to local producers. Gum-producing tree species are now more highly valued and their felling for charcoal burning has decreased. There is renewed incentive to tap gum for commercial purposes, and improved partnerships have attracted interest from stakeholders in the gum industry. Establishment of a central location for sales has enabled the community to fetch better prices, and has enabled buyers to collect gum more easily. Further, local and regional development authorities committed to open and sustain international market links for the local communities.

**Frankincense:** ESAPP aimed to improve market access for locally produced frankincense, enabling pastoralist communities to benefit from an alternative source of income that is not vulnerable to drought. To that end, potential markets were identified and organic and Fairwild certifications (<http://www.fairwild.org/>) were sought. In parallel, the project inventoried *Boswellia* trees, from which frankincense is harvested, in selected monitoring sites; this provided a basis for formulation of locally negotiated protocols for the sustainable harvesting of frankincense. Findings were presented to relevant government partners and new partnership networks were created, contributing to improved research and policy guidelines.

**Camel milk:** In 2005, the Centre for Training and Integrated Research in ASAL Development (CETRAD) hosted a high-level stakeholder workshop involving government agencies responsible for dairy-sector development and standards. It facilitated discussions between leading commercial dairy traders and research organizations on the topic of camel milk production and trade. The workshop recommendations were adopted, and camel milk production was mainstreamed into the national policy and legislative framework. The Kenya Bureau of Standards also developed criteria for raw whole camel milk, the production and marketing of which is now legalized and standardized. Enabling local communities to legally trade camel milk has opened access to new markets, resulting in better prices and improved livelihoods.

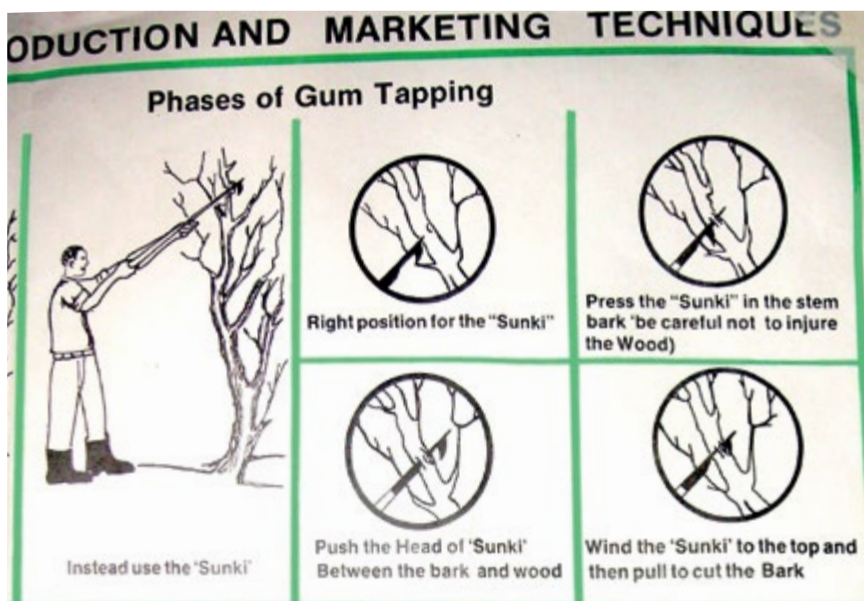




## Innovation and relevance

ESAPP partners used an innovative, integrated approach to help improve the livelihoods of local communities in the resource-poor ASALs of the Upper Ewaso Ng'iro Basin. The approach is two-pronged: On the one hand, it seeks to improve the income of local producers by enabling them to access premium formal markets. This is done by enhancing the value of local products, and establishing quality standards and facilitative policy frameworks at the national level. On the other, it seeks to secure the natural resource base from which these products are derived by helping local user and producer groups enforce a local governance framework centred on sustainability. This includes establishment of context-specific harvesting and processing protocols, which form the basis for negotiating binding agreements on access to and use of natural resources. It also includes capacity development of local producers in sustainable harvesting and processing practices.

Insecure livelihoods of rural communities in marginal and resource-scarce areas are a widespread problem in Eastern Africa. The ESAPP projects described here illustrate the use and potential of pursuing a combined strategy that includes: (1) sustainable local-level resource management and capacity development, in order to secure the production base of local commodities on their own land; (2) quality management and certification of these commodities in order to establish profitable value chains linking marginal rural areas and big national markets; and (3) creation of a beneficial regulatory framework through policy support and national-level negotiations to create more secure conditions for local communities in marginal areas. The experience gathered in Kenya's Upper Ewaso Ng'iro Basin is documented and could be transferred to other areas of Eastern Africa and applied to other commodities.



**Top:** Gum or resin exudate ready for harvesting. Harvesting gum and resin sustainably means protecting the trees and promoting their natural regeneration, planting gum- and resin-producing species, selecting mother trees and seed stands, properly scheduling harvesting cycles, tapping trees selectively, and creating awareness of fire risks and hazards. These and other important aspects of commercial gum production were the main focus of the training sessions facilitated by the projects. (Photo: Eliza Peter)

**Bottom:** Training offered by the project enabled gum and resin harvesters to improve yields while sustainably managing the resource base. (Photo: CETRAD photo gallery)





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### Highlight profile

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

**Implemented during:**  
 2005–2014

**Total funds contributed by ESAPP:**  
 CHF 119,900

**Implemented by:**  
 Centre for Training and Integrated Research in ASAL Development (CETRAD), Nanyuki, Kenya

**In collaboration with:**  
 Egerton University, Department of Dairy and Food Science and Technology, Egerton, Kenya; Mandate The Future (MTF), Isiolo, Kenya

**Main beneficiaries:**  
 Pastoralist communities in the lowlands north of Mount Kenya

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# Pastoralists and farmers: negotiating resources

New claims on land are increasing competition for resources between pastoralists and farmers in Eastern Africa. In Tanzania, ESAPP established participatory processes to map and assess land use conflicts. Project activities brought herding and farming communities together, fostering mutual understanding and enabling them to engage in joint participatory land use planning.

## Sustainable development challenge

Pastoral grazing lands in many Eastern African countries have become the target of large-scale land acquisitions. The surging competition for land and pastures among local, national, and international stakeholders threatens to deprive local communities of their control over resources (UCRT 2010). This development is of particular concern to pastoralists because they graze their animals across large areas based on traditional land access rights that are in conflict with modern land tenure concepts. Restricted access to grazing lands means restricted mobility of herds, which in turn leads to overgrazing, triggers conflicts with farming communities, and marginalizes a production system that is otherwise well adapted to the local environment.

In the 1970s, pastoralists in Tanzania began to use the Usangu wetlands for seasonal grazing. But towards the 1990s, water levels in the nearby reservoirs were found to decline. A scientific study claimed that this was due to livestock grazing (Kikula et al. 1996). Ten years later, other researchers attributed the decreasing water levels to intensive irrigated farming in the area (Walsh 2006). In spite of these new scientific insights, the Government of Tanzania forcibly evicted a large number of pastoralists from the wetlands in 2007 and relocated them to the south of the country. This has led to several, sometimes violent, conflicts between the evicted pastoralists and the resident farming communities.

## ESAPP's response

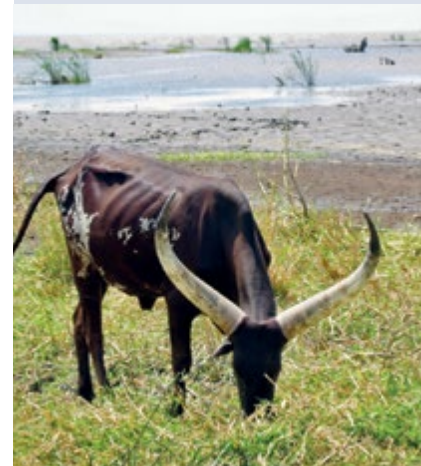
ESAPP addressed issues of large-scale investments in land from a sustainable development perspective, combining two complementary approaches. On the one hand, ESAPP created cartographic overviews and assessments of land transactions and competing claims on land and natural resources. These provided a basis for awareness creation, planning, and policymaking. On the other hand, ESAPP set up local exchange platforms and fostered the advocacy of marginalized communities as a basis for local conflict mitigation.

In southern Tanzania, ESAPP's main objective was to create a common exchange and negotiation platform for local stakeholders. These stakeholders included representatives of the conflicting parties – farmers and pastoralists – as well as government officials at national and subnational levels, and local non-governmental organizations. Participants met regularly to assess ongoing conflicts, identify stakeholder perceptions and competing claims on resources, and to make decisions about land use planning that are agreeable to both parties. Thus, ESAPP focused on fostering a participatory planning process in which all stakeholders agree on a common solution during each step of the process.



## Main messages

- Independent but participatory assessments of conflict situations must be the starting point for developing solutions to mitigate resource conflicts.
- Conflicts in the pastoralist sector are often viewed as conflicts between pastoralists and farmers. In fact, social conflicts between communities are a symptom of larger-scale conflicts between two key economic sectors. Discussions at the policy level tend to focus on these symptoms rather than addressing the causes.
- The agricultural sector receives better services than the pastoral sector and is therefore more flexible, better informed, and better organized. Projects need to address and overcome these inequalities in a participatory process before community-based development and conflict mitigation can become effective.



Livestock herding is a major economic activity in Tanzania. Pastoralist communities' livestock produces 90 per cent of the meat and 72 per cent of the milk traded in the country. But despite its economic significance, the pastoral livestock sector receives far less government support than the farming sector. (Photo: Udo Höggel)



## The project story

The pastoral and agro-pastoral livestock production systems are the dominant livestock production systems in Tanzania. Their ecological footprints are small and their integration into the ecosystem is almost perfect. Both production systems produce 90 per cent of the meat and 72 per cent of the milk consumed in the country with almost no external input of protein or fossil energy (Mwambene et al. 2010). Nevertheless, when other stakeholders lay claim to grazing lands, pastoralists are often evicted from their ancestral pastures and sent to other parts of the country, where they come into conflict with resident farming communities. These conflicts centre on access rights to pasture and water, and often develop into violence. Pastoralism has thus become a national political issue.

ESAPP's stakeholder platform project was initiated to address these tensions and to assess the consequences of forced livestock movements on pastoral and farming communities. The project focused on two areas where conflicts were severe: the Kilwa and Lindi districts in Lindi region and the Tunduru and Songea districts in Ruvuma region, both in southern Tanzania.

Coping with a considerable influx of livestock herds into farming areas was a new challenge for all stakeholders, and therefore largely undocumented. The ESAPP project broke new ground by supporting communities in managing this unusual and challenging situation. ESAPP researchers conducted assessments in the project areas by interviewing representatives of each community in cooperation with the relevant government offices. They found that a major reason for hostility between the communities was a lack of communication and information. To overcome this problem, the project convened exchange and negotiation platforms between conflicting communities. In addition, it offered information and practical help to support effective land use planning, as well as advice on how to obtain government livestock extension services, including access to marketing infrastructure and information and veterinary services.

The various project activities brought communities together and provided a platform for discussion. Pastoralists and farmers began to share their fears and expectations and work towards a common vision of the future. This enabled them to draft land use plans in a more participatory and hence more sustainable way. Based on this experience, they will be able to handle future conflicts in a more participatory and self-determined manner as well. Overall, the project helped to end an atmosphere of hostile silence between the communities.

**Top:** The ESAPP project initiated a participatory land use planning process in areas experiencing conflicts between farmers and pastoralists. This process was preceded by the preparation of detailed cartographic overviews and assessments and intensive coordination with the Government of Tanzania. The process included various stages of sketching and consensus building to create local ownership of the resulting land use plan. (Photo: Udo Höggel)

**Bottom:** A facilitator of the ESAPP project is talking with members of the pastoralist community in Lindi region. In situations of serious conflict, talks were first held separately with each community, before organizing encounters between the communities to try and sort out differences and eventually work towards a consensus based on commonly agreed land use modalities. (Photo: Udo Höggel)





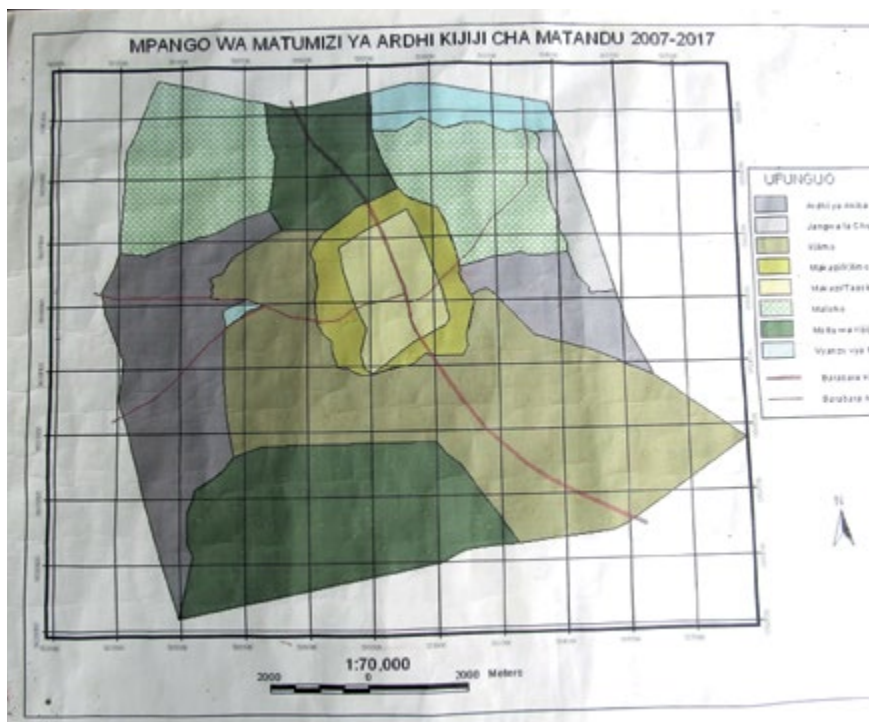
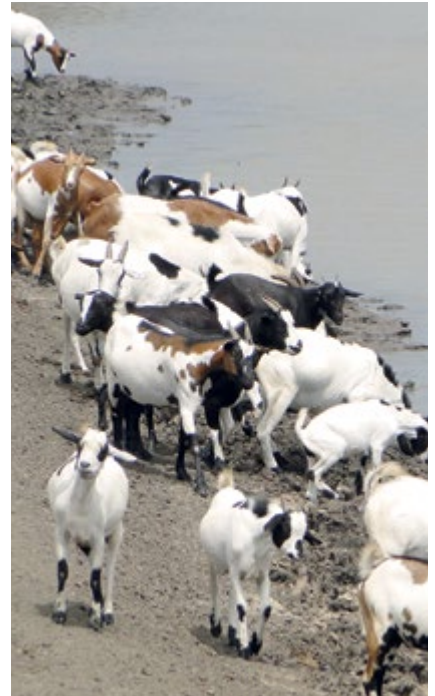
## Innovation and relevance

Fostering a participatory process in a situation of conflict was the most important innovation of this project. Participation in government-led land use planning processes in Tanzania is usually weak; research has shown that the overly interventionist nature of these processes can lead to various problems such as a very low level of stakeholder participation and, consequently, low acceptance of the land use plan (Walsh 2007).

The project also introduced the step of creating detailed cartographic overviews and assessments prior to actual land use planning. Given the highly politicized context of the pastoralism debate in many Eastern African countries, a lack of detailed and sound information about the situation on the ground can easily lead to a vicious circle of mutual blaming. Sound assessments in the field are therefore an important basis for participatory land use planning in accordance with existing government guidelines.

Pastoralism contributes significantly to food security in Tanzania. Nevertheless, it is neglected in terms of sector policies, services, and market development compared to the agricultural sector, which ranks high on the national development agenda. Furthermore, there is no concept for the integrated development of the two sectors. Amid these challenges, the project successfully addressed conflicts between these two important sectors of the Tanzanian economy. Lessons learned suggest that similar processes in other parts of Tanzania and other countries in Eastern Africa could address some of the most frequent causes of violent conflict while significantly improving local populations' food security.

Effective participatory approaches to land use planning in conflict situations, although frequently discussed, did not exist in the project area prior to the project interventions. ESAPP promoted such participatory approaches at a time when government-led land use planning processes were largely prescriptive and community members hardly had an opportunity to participate. In many villages, communication and exchange platforms promoted by the project grew into broader development platforms that were used for conflict mitigation and land use planning beyond the end of the project. This fact demonstrates the relevance of the project's approach.



**Top:** Competing claims on natural resources between farming and herding communities are not restricted to land. Access to government or private-sector services is an important issue as well, especially access to water for irrigation, domestic use, and watering of animals. Pastoralists frequently have to cross farmland to reach places where they can water their animals, thus creating disturbances to the farmers. (Photo: Udo Höggel)

**Bottom:** Land use planning at the level of villages in Tanzania is coordinated by the national land use planning commission. While guidelines prescribe community participation, the commission admits that the quality of planning is deficient in many instances, particularly with regard to participation. This land use plan, for example, does not include seasonal changes in resource availability and access to water – aspects that are crucial to pastoralist livestock management. (Photo: Udo Höggel)



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## Highlight profile

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

**Implemented during:**  
2007–2014

**Total funds contributed by ESAPP:**  
CHF 161,000

**Implemented by:**  
Southern Highlands Livestock Development Association (SHILDA), Iringa, Tanzania

**In collaboration with:**  
The Government of Tanzania, Regional Livestock Development Offices of Lindi and Mtwara Regions, Dar es Salaam, Tanzania; Tanzania Livestock Research Institute (TALIRI), Dar es Salaam, Tanzania; Sokoine University of Agriculture, Morogoro, Tanzania

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

**Main beneficiaries:**  
Farmers and pastoralists in the area around Lake Rukwa Basin in the Southern Highlands of Tanzania as well as in Lindi and Ruvuma regions, in southern Tanzania

Funded by



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### This highlight

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## 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](http://www.cde.unibe.ch) (keyword search: "ESAPP").

# Knowledge

Three types of knowledge are essential to any endeavour towards sustainable development. *Systems knowledge* is needed to understand the situation at hand, as well as the development challenges faced and their causes. *Target knowledge* is required to define what is meant by sustainability and to identify the desired future state. *Transformation knowledge* is necessary to identify and shape the best possible measures to reach the desired future state and to handle the trade-offs that are likely to arise on the way (Hirsch Hadorn et al. 2006; Pohl and Hirsch Hadorn 2007).

As the perception of what sustainable development is varies from one sociocultural context to the next, systems, target, and transformation knowledge must be developed in participatory and inclusive processes. This calls into question the traditional contribution – and (self-)conception – of scientists and researchers. While their task is still to generate scientific knowledge, they have to do so in agreement with societal actors, in joint knowledge production processes. This means that science has to give up its primacy in knowledge production, and embrace actors and knowledge systems that exist outside the scientific sphere. It also calls into question the dominance of Northern research institutions in the production of knowledge that is relevant for Southern regions.

ESAPP's strategic goal in addressing these challenges was to support the development of knowledge societies in which actors and institutions are capable of advocating their own vision of sustainable development. This goal – which is in line with the recommendations made by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2005 – cannot be achieved without massive investment into human and institutional capacity development at various levels, from academic training to rural advisory services. Numerous ESAPP projects focused on capacity development, relying on local data, information, and co-production of knowledge. Finally, the support of knowledge societies requires availability of accurate and up-to-date data and information bases, without which the monitoring of (and debates on) development trends are not evidence-based and are therefore left to those groups with power. ESAPP invested in a large number of projects to build up such databases.





## Knowledge societies

Social and economic disparities tend to increase along power gradients, which are, in turn, consolidated by unequal access to and control over information and knowledge. Consequently, sustainability-oriented initiatives need to help build knowledge societies in which people and institutions are capable of counterbalancing unequal power and decision-making structures. Only by democratizing generation of, and access to, knowledge in joint learning processes can self-determined development gradually replace unequal power and decision-making structures and thus help overcome socio-economic disparities.

Information and communication technology can play a decisive role in this knowledge democratization process. It can reach a large number of actors, thus contributing to the building of knowledge societies. In some cases it also enables target groups to participate in defining knowledge gaps and demands and in co-producing knowledge, for example through crowd-sourcing platforms. Eventually, such tools can help shorten knowledge diffusion and feedback loops, thus enhancing democratic control of socially relevant governance and decision-making processes.

ESAPP partners have recognized these potentials and experimented with different ways of putting information and communication technology at the service of knowledge democratization. In the Kenyan city of Nakuru, ESAPP partners developed an urban information platform in the form of maps and spatial information layers showing various indicators of urban development (Highlight 13). Other ESAPP partners have had a close look at the potential of radio to enhance the access of rural communities to relevant information, and to favour the exchange of information between them. In Madagascar, ESAPP made an in-depth evaluation of the potential of a community-based radio station, and in Kenya, ESAPP partners designed and broadcast rural advisory programmes with the active participation of farmers (Highlight 14).

## Capacity building

For a number of years, ESAPP partners in Eastern and Southern Africa criticized that research agendas and capacity development contents are still strongly dominated by Northern academic or non-governmental institutions. As a consequence, the regional perspective and agency remained weakly articulated and poorly integrated in academic and vocational training materials and concepts. The same partner institutions insisted on the fact that investments in developing institutional and human capacity in the region are indispensable and highly rewarding, as they help to build enduring partnerships and knowledge societies for sustainable development.

In response, ESAPP dedicated a substantial share of its interventions to different types of training and capacity development. This support was highly appreciated by target groups, as the region is still struggling to produce capacity development contents and set up learning platforms that fulfil the complex requirements of sustainable development research and implementation. In all these interventions, ESAPP consequently built on local data, case studies, and illustrations, and integrated local approaches and solutions into its capacity development modules. In Ethiopia, ESAPP collaborated with a local university to produce the first-ever learning manual on sustainable land management that builds entirely on local case studies. Collaboration continued, with the design of new curricula for the teaching of sustainable land management at academic level (Highlight 15). In Kenya, one ESAPP partner specialized in vocational training in support of government and NGO staff working in arid and semi-arid lands (Highlight 16). This training addressed major aspects of sustainable development such as integrated water management, environmental impact assessment, disaster risk management, and the use of spatial analysis tools.

## Knowledge base

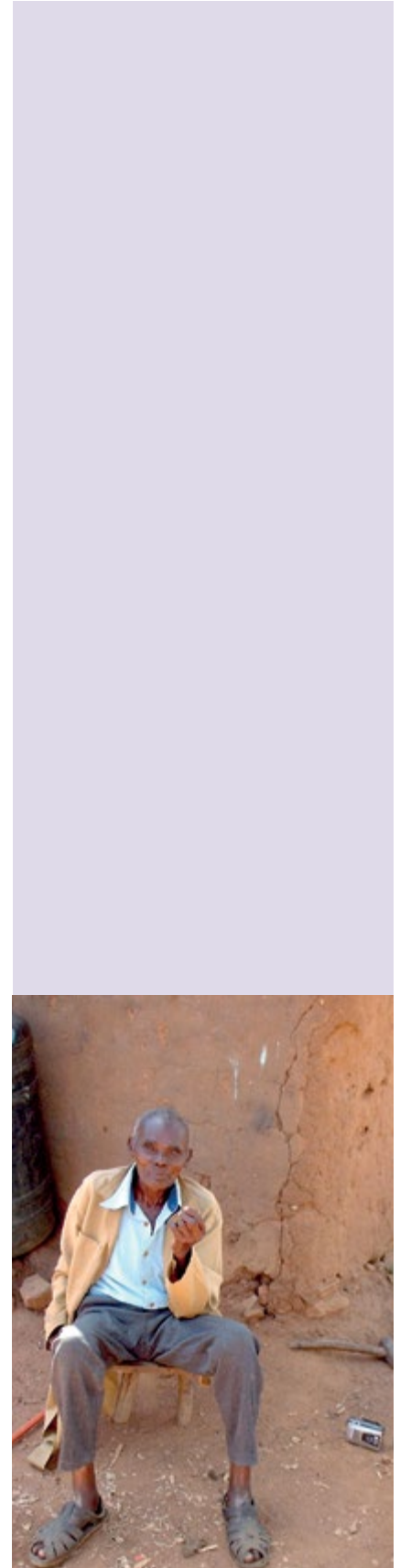
Comprehensive long-term regional data and information bases support evidence-based and locally driven rural development as well as innovative research and products. They can also complement existing environmental monitoring systems with contextualized information. However, in Eastern and Southern Africa, comprehensive, accurate, and reliable databases on sustainable development issues and indicators are difficult to find. Time series often contain gaps, because observatories and monitoring stations are discontinued or poorly maintained. Remotely sensed data, which are sometimes seen as a welcome alternative data source, cannot substitute ground-based data collection, especially in the case of socio-economic development issues.

As a consequence, it is sometimes simply impossible to monitor development indicators, which would be an important information basis for decision-makers. This makes it difficult to convince governance bodies to base their decision-making on evidence. Consequently, power-based decisions determined by lobbies and dominant stakeholder groups continue to prevail. Another challenge is that available good data are rarely used to their full potential before becoming outdated. Documentation, exchange, combination, and statistical or spatio-statistical analyses are rarely undertaken.

ESAPP partners have integrated databases from former projects and continuously updated them with new data and information they collected in the course of their activities. Systematizing these data, checking their quality, documenting them, and making them available to a wide range of beneficiaries was one of ESAPP's strategies towards enhancing the potential of existing spatial and statistical data in the region. In Ethiopia, for example, ESAPP meticulously collected spatial data and compiled them in a coherent national-scale data catalogue called EthioGIS (Highlight 18). In other cases, ESAPP focused mainly on upgrading existing data. In Kenya, raw data from the national population census were processed, combined, displayed, and interpreted, with a view to analysing a wide range of relevant socio-economic development indicators (Highlight 17).

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# Nakuru local urban observatory

Fast-growing cities and towns in developing countries are often characterized by poor infrastructure, inadequate provision of basic services, and degradation of local resources. When development efforts make their way across urban landscapes, some communities may benefit more than others. ESAPP sought to empower communities at risk of exclusion in Nakuru, Kenya, by enabling their participation in the creation of a spatial planning tool.

## Sustainable development challenge

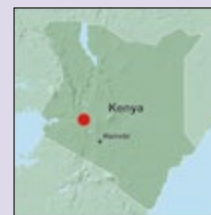
When it comes to exploiting new opportunities, people's knowledge and social capital are decisive. Often, when opportunities arise, a limited number of people succeed in strategically maximizing their existing power and strengthening their position, while others lose out. Access to knowledge and social capital must be democratized in order to combat growing inequality, to empower marginalized people, and to realize mutually beneficial opportunities of global change.

Nakuru, located 160 kilometres from Nairobi in the Great Rift Valley, is Kenya's fourth-largest city. It faces problems that are typical of rapidly growing cities in developing countries, such as inadequate infrastructure, poor basic services, and resource degradation. Because of lack of access to information, communities and their representatives are often unable to point to documented evidence to illustrate their needs. As a result, they frequently remain in a weak position in negotiations, for example about infrastructure development. This discourages public participation in urban development and planning, and leads to low levels of trust between citizens and local authorities. Building knowledge societies through more transparent exchange of information can help to transform the situation.

## ESAPP's response

ESAPP sought to identify and fill knowledge gaps, especially by facilitating access to, and dissemination of, existing knowledge. Based on a multilevel and multi-stakeholder approach, it worked to bring together a variety of social actors – bearing specific knowledge, perceptions, and norms – in order to jointly frame relevant development questions, desired outcomes, and strategies for development interventions.

The Nakuru Local Urban Observatory (LUO) project sought to provide local authorities with a user-friendly instrument for sustainable urban planning, while simultaneously enabling ordinary citizens to help shape urban planning and development via improved access to relevant information. Residents of Nakuru were expressly involved in planning and implementing the LUO project in order to ensure accommodation of their needs. They helped decide what information should be compiled and made available to interested users. Further, residents participated in generating a spatial database with the help of a participatory mapping approach. The collected information was then processed and made available to local authorities and community representatives by means of a web-based information platform.



### Main messages

- Communities urgently need better access to information in order to assert their needs for sustainable development.
- Information technology in general and Geographic Information Systems (GIS) in particular bear great potential for improving communities' access to relevant knowledge.
- However, these technologies also bear the risk of overemphasizing a few aspects of reality – in this case spatial aspects – at the expense of other crucial aspects and processes. To avoid this, a participatory approach is needed that emphasizes local perspectives and priorities.
- Finally, efforts to improve information access must be institutionally anchored to ensure long-term benefits. This sort of institutionalization can prove very challenging for technology-based projects, as they require openness to new technologies.



The Local Urban Observatory project set up an information centre in Nakuru town, where anyone interested could view the data on two computers and print out maps of selected data layers. Community groups were frequent users of the centre. Students from Egerton University (nearby), from Nairobi University, and even from abroad also visited the centre to access information for research purposes. (Photo: Albrecht Ehrensperger)



### The project story

The Local Urban Observatory (LUO) project began by bringing together municipal officials and development partners (community-based organizations, NGOs, businesses, universities, and international agencies) in order to identify the most pressing development and information needs. The main needs mentioned – in terms of both information and action – were economic development, basic infrastructure (especially water supply and sanitation), clarification of responsibilities among the various authorities, crime prevention and security, and social development. Next, urban development indicators were assessed in a spatially differentiated manner, for example at the level of town planning blocks or electoral wards. This provided a valuable tool for comparing the status of urban development in relation to planning units, and for monitoring the trends of important aspects such as shelter, economic development, environmental management, and social development.

The data inputted into the LUO information system were gathered in a participatory way at the neighbourhood level, and complemented with statistics from various sources. Community representatives used high-resolution satellite images to map spatial information layers. This type of data usually enjoys acceptance and stands a good chance of triggering debate at various levels, affording individuals an opportunity to air their views on various development issues. The data were later prepared by the project team for analysis with a Geographic Information System (GIS). Several training events in GIS technology were organized to reinforce the team's capacity and, with support from UN-Habitat, a licence grant was obtained from a large GIS company to equip the team with up-to-date tools.

Finally, a web-based information tool called NakInfo was developed. The tool features an interactive map and query function and integrates the data layers generated via participatory mapping. A "Nakuru Information Centre" was set up at the local town hall. It was donated by the local branch of the Lion's Club upon request from the project team. Interested users can now visit the centre, query the LUO database, and print out maps. In parallel, capacity development workshops were organized to train local authorities and community-based organizations in use of the NakInfo tool. In 2005, the project received an award for humanitarian contributions within computer science and informatics from the American Association for Computing Machinery (ACM).

**Top:** Representatives of local authorities and community groups were trained in the use of offline version 1 of the NakInfo mapping tool at a local Internet café. The training process also enabled the project team to identify software bugs and improve the tool's functionality. (Photo: Albrecht Ehrensperger)

**Bottom:** Before making the information available, each data layer was vetted by representatives from local authorities and local communities. The vetting process was challenging and required compromise with respect to certain data layers, especially those reflecting people's perceptions, such as the level of safety in various parts of town. (Photo: Albrecht Ehrensperger)





## Innovation and relevance

The LUO project emphasized use of newly released high-resolution satellite imagery in order to construct a coherent and comprehensive spatial database for the municipality of Nakuru. The project team successfully combined use of a high-tech spatial analysis and visualization tool with a participatory approach, bringing together local authorities and members of civil society. This resulted in a highly inclusive process: the combined use of visual tools and geo-referencing enabled even community members who could not read or write to fully participate in creating standardized and widely exchangeable knowledge for the LUO database. The LUO project also broke new ground by integrating qualitative data in the spatial database based on community members' perceptions, including areas considered insecure or particularly affected by poverty.

Various processes of decentralization are occurring in countries of Eastern Africa. In many cases, responsibilities that are highly relevant to sustainable development are being devolved to regional and local authorities. Often, such authorities are poorly prepared to assume these responsibilities and lack the data and information needed to make informed decisions. This is particularly true in contexts of dynamic change such as rapidly growing urban centres. In such contexts, improving the quality, availability, and visibility of data and information bases is highly beneficial. The LUO project illustrates how local authorities and civil society can work together with researchers to establish a better information basis for decision-making. While the approach and success of such projects highly depends on context-specific aspects, the LUO project could certainly be adapted and applied elsewhere.



**Top:** Participatory mapping of relevant spatial information was led by a local community representative in every town planning block and facilitated by Local Urban Observatory project members and field assistants. Participants liked the interactive character of the exercise and appreciated that everyone could participate regardless of their ability to read or write. (Photo: Albrecht Ehrensperger)

**Bottom:** The new online version of the NakInfo mapping tool includes 32 spatial data layers that can be individually selected and rendered on maps. Information can be queried for individual spatial objects. Maps may be saved as digital image files or printed out. This map extract shows water supply pipes (blue) and sewerage lines (pink) in the town centre. The tool can be viewed online at <http://nakinfo.unibe.ch/nakinfo.html>.





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### Further reading

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### Highlight profile

This highlight is based on the achievements of 5 ESAPP priority action projects.

**Implemented during:**  
2003–2014

**Total funds contributed by ESAPP:**  
CHF 186,000

**Implemented by:**  
Centre for Development and Environment (CDE), University of Bern, Switzerland

**In collaboration with:**  
Municipal Council of Nakuru, Kenya; Practical Action East Africa, Nairobi, Kenya; UN-Habitat, Nairobi, Kenya

**Main beneficiaries:**  
Local authorities of Nakuru municipality and community-based organizations in Nakuru town

### This highlight

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Proofreading: Stefan Zach (z.a.ch GmbH)

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Funded by



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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](http://www.cde.unibe.ch) (keyword search: "ESAPP").

# Radio for rural development

Use of mobile phones and similar technologies is growing across Africa, but radio remains a vital way of sharing news and communicating in many places – especially rural areas. Farming communities in remote parts of Eastern Africa risk increasing marginalization if they miss out on new opportunities such as emerging agricultural markets. ESAPP addressed this threat by supporting radio programming by and for farmers about sustainable land use and other timely topics of interest.

## Sustainable development challenge

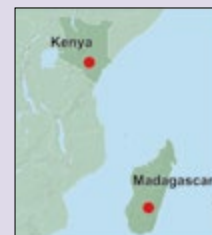
Rural populations in remote areas are often marginalized by their lack of access to timely and reliable information and means of communication. At the same time, government support for rural extension services is weakening. Rural extension and development staff increasingly fail to reach remote areas because of limited personnel, material, or financial resources in conjunction with poor road access. Thus, taking advantage of existing or emerging opportunities (e.g. markets) is a challenge for farmers because they miss out on relevant information, knowledge on new crops and varieties, or improved land use techniques. Further, rural people often lack the means and networks needed to make their interests and concerns heard, hampering their participation in societal processes.

In rural Madagascar and Kenya, as in other parts of Africa, radio remains the communication medium of choice and the sole source of supra-local information for many communities. Print media, television, and Internet are often inaccessible or unaffordable where they live (Myers 2011). The Kenya population and housing census of 2009 revealed that 74 per cent of all households own a radio set (Wiesmann et al. 2014). Thus, radio can play a crucial role in advancing rural development.

## ESAPP's response

ESAPP worked to empower rural people by enhancing their participation in societal, economic, and political processes. It sought to enhance rural development by enabling local stakeholders to access relevant information and knowledge on topics of sustainable development and sustainable land management. It also aimed to provide them with opportunities to communicate and share their experiences with other farmers and stakeholders within and beyond their own community. ESAPP supported use of radio, the most easily accessible information and communication technology, to disseminate existing knowledge and research results, and to facilitate interactive communication between local stakeholders and more distant stakeholders.

In Madagascar, ESAPP assessed the impacts of a farmer-owned community radio programme named *Mampita*. Researchers examined the programme's ability to reduce the marginalization of remote communities and improve communication between rural communities, farmer organizations, and development actors (Bachmann 2013; Médiascope 2011). In Kenya, where fewer and fewer farmers receive government-supported agricultural extension services, ESAPP facilitated radio broadcasts of relevant knowledge and research results. It produced a series of radio programmes on sustainable agriculture, natural resource management, and governance issues. They were broadcast by Radio *Musyi FM*, a radio station belonging to a privately owned company, Royal Media Services, in Kenya (Kiteme et al. 2013).



## Main messages

- It is possible to empower rural communities and partly overcome their marginalization by improving their access to information and exchange of knowledge and experience.
- The vast majority of rural people – even poor or illiterate community members – can be reached with radio broadcasts if these are made in vernacular language, and technical information is translated (literally and figuratively) into target audiences' language and discussion style.
- In light of dwindling government-supported extension services, it is important to maintain connections and lines of communication with isolated rural communities, especially by means of information and communication technologies.
- Innovation is needed to adapt these technologies and their contents to the needs of various local and regional contexts, even or especially in our age of fast-developing mobile phone access.



Radio *Mampita* broadcasts over Madagascar's FM band at 94 MHz. Its broadcast area covers a population of over one million, all of whom are potential listeners. Radio and similar media bear great potential for information dissemination and awareness creation, especially among remote rural communities. (Photo: Felicitas Bachmann)



## The project story

Radio *Mampita* is owned and managed by an association of farmer organizations. This not-for-profit radio station reaches about one million people in the Haute Matsiatra area of the Malagasy Highlands, where many communities live relatively isolated due to difficult terrain. Its programmes have an educational focus, including news on local affairs, announcements from service providers, and entertainment such as music, radio plays, and audience contributions. Most programmes are produced by local correspondents and staff, but development organizations occasionally reserve broadcasting time for programmes they have organized or produced.

ESAPP conducted a study to assess the impacts of Radio *Mampita*. It revealed several ways in which the broadcaster was supporting empowerment and reducing marginalization among rural people. First, the radio station was shown to greatly improve people's access to important information on agricultural techniques, laws, and civil rights. Second, producer organizations' negotiation power improved and rural economies were supported thanks to better access to timely market information as well as strengthened linkages (and fewer middlemen) between producers and buyers. Third, communication among communities and family members became easier and cheaper. Fourth, security improved as messages conveyed over the airwaves enabled quick responses to threats. Fifth, rural people became more self-confident and proactive in their interactions with service providers, resulting in more demand-driven support activities. Overall, Radio *Mampita* established itself as a strong voice by and for the rural population.

The study assessment was shared with the Centre for Training and Integrated Research in ASAL Development (CETRAD) during one of ESAPP's annual capitalization workshops. CETRAD was inspired to sponsor production of a series of radio broadcasts on sustainable agriculture, livelihoods, and natural resource management. This helped mitigate the decline of government-run agricultural extension services in Kenya. Extension services have become more client-oriented and demand-driven, with the result that fewer farmers benefit from them. Together with CETRAD, ESAPP produced close to 40 radio programmes broadcast over privately owned Radio *Musyi FM*, reaching over 2 million people in south-eastern Kenya, including Makeni County. Listeners were encouraged to call CETRAD to ask specific questions or to suggest new topics for further coverage. Depending on the issue raised, CETRAD would address it in-house or connect listeners (e.g. farmers) to relevant experts.

**Top:** Radio *Mampita's* programming includes entertainment but also information on relevant livelihood issues. Community members often listen to broadcasts together and debate their content. In this way, radio can also shape efforts towards community mobilization and organization. (Photo: Ernst Gabathuler)

**Bottom:** The studio crew of Radio *Mampita* maintains a well-equipped studio. Taking care of technical infrastructure is a major challenge for such community-based undertakings. Keeping studios running on a long-term basis requires careful planning, especially regarding reinvestment of funds from listener contributions and broadcasts paid for by development actors. (Photo: Ernst Gabathuler)





## Innovation and relevance

Having access to the latest information is crucial to avoid disempowerment in our age. So it is essential to find efficient, reliable ways of conveying relevant information to marginalized communities. This project demonstrated the continuing relevance of radio in this regard. It showed how rural radio stations, especially farmer-owned and managed radio, empower rural communities. It also directly supported on-air dissemination of relevant research results, knowledge, and experience on sustainable agriculture to rural communities. In addition, the reaction and feedback received from listeners offered important hints as to improvements that would help programmers reach an even bigger audience.

Despite fundamental differences between the two radio stations (e.g. public versus private ownership) studied and the role of rural people in production, both broadcasters were highly valued by their listeners especially because of their exclusive use of vernacular language in their programmes. Radio *Mampita* proved to be a truly innovative model for local radio. It was revealed to play a dynamic role in Haute Matsiatra and was highly appreciated by both its target audience and rural development workers. The following innovative elements and key success factors were identified. First, it established itself as a station by and for rural farmers, firmly anchored in their world. It broadcast exclusively in the local dialect, and 90 per cent of its programmes directly addressed issues in rural communities. It acted as an independent platform for interactive discussion on matters of importance to the community. Second, its political and religious independence was highly appreciated by development actors. By maintaining strict neutrality, Radio *Mampita* survived several political crises. Third, its local correspondents – villagers themselves – were intimately familiar with the needs and concerns of rural people in the region.



**Top:** An agro-pastoralist in Makeni County, Kenya, listens to a broadcast of Radio *Musyi FM*. Small radio receivers are affordable for much of the population, also in rural areas. Good existing coverage means that information disseminated via radio may even be accessed in very remote regions. (Photo: Samuel Makali)

**Bottom:** Radio *Mampita* works exclusively with local correspondents, who travel the area in search of interesting stories. It has become an important communication channel enabling community members to air their views on specific topics while informing and entertaining other listeners. (Photo: Ernst Gabathuler)



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## Highlight profile

This highlight is based on the achievements of 7 ESAPP priority action projects.

**Implemented during:**  
1999–2014

**Total funds contributed by ESAPP:**  
CHF 223,000

**Implemented in Madagascar by:**  
Médiascope, Antananarivo, Madagascar

**In collaboration with:**  
Association Radio Mampita, Fianarantsoa, Madagascar

**Implemented in Kenya by:**  
Centre for Training and Integrated Research in ASAL Development (CETRAD), Nanyuki, Kenya

**In collaboration with:**  
Radio Musyi FM, Royal Media Services, Nairobi, Kenya

**Main beneficiaries:**  
1 million people in the Haute Matsiatra highland area of Madagascar, and over 2 million people in lower eastern Kenya, including Makueni County

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### This highlight

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

### Citation

Bachmann F, Kiteme B. 2015. Radio for rural development. 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. 83–86. <http://doi.org/10.7892/boris.72023>.

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Funded by



## What is ESAPP?

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## 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](http://www.cde.unibe.ch) (keyword search: "ESAPP").

# University training in Mekelle, Ethiopia

Many educational institutions in the global South lack the means, personnel, and access to information needed to provide the high-quality inter- and transdisciplinary research crucial for sustainable development policymaking. ESAPP and CDE worked with institutions such as Mekelle University to help fill the gap, especially by training trainers to ensure continued capacity development.

## Sustainable development challenge

Many academic and tertiary education institutions in the global South struggle to fulfil the quality criteria in research and publishing set by the North. They lack the necessary means, personnel, and access to information. This also makes it difficult to adequately address development-related problems, which often require inter- and transdisciplinary research approaches. And yet, high-quality research is crucial for sustainable development policymaking.

Mekelle University in northern Ethiopia was founded in the 1990s as part of a programme to decentralize higher education in the country. A few experienced lecturers soon faced the challenge of providing training to a rapidly growing number of students. Fresh graduates had to take on teaching assignments without experience or a chance to practise what they had learned. Master's and PhD graduates assumed administrative positions as department heads or deans soon after completing their degrees. As a result, scientists had little choice but to pursue disciplinary research, with little scope for developing the inter- and transdisciplinary approaches essential to addressing sustainable development issues.

## ESAPP's response

North–South research partnerships can help research institutions in the South respond to these challenges and contribute to a more sustainable development. ESAPP supported academic partner institutions in the South in becoming competent centres of research for sustainable development, change agents in knowledge production, and forerunners of institutional networks. Within this process, training of trainers is key to ensuring continued capacity development.

From 2004 to 2011, ESAPP and the Land Resource Management and Environmental Protection Department of Mekelle University worked to fill the training gap. Researchers from the University of Bern, with many years of experience in Ethiopia, provided training content highly relevant for the context in which Ethiopian students and instructors work. Developing and implementing innovative student-centred training was a core aspect of this approach. It made the courses attractive for students and provided instructors with a mix of didactic and methodological tools to improve their own training. Finally, the use of inter- and transdisciplinary research methods made it possible to introduce an integrated approach, which is essential for investigations in the context of sustainable land management.



### Main messages

- A learner-centred approach actively involving students through a combination of classroom and field exercises deepens their knowledge and better enables them to recall and apply their knowledge later on.
- Innovative training material and didactic-methodological coaching helps participants change from top-down teaching to a learner-centred approach.
- A holistic approach integrating natural and social science perspectives makes it more likely that students will contribute to finding ecologically sound, socially acceptable, economically viable solutions.
- Not providing blueprint solutions makes students more flexible in negotiating with local actors, integrating expert and local knowledge, and increasing the applicability of solutions.



The Gegera watershed in Tigray, Ethiopia, is ideal for study and training. It is located in a semi-arid area bordering Ethiopia's Afar Zone, an hour's drive north-east of Mekelle. The watershed was treated with a number of soil and water conservation measures, allowing students to study the effects of the measures and their acceptance by the local population. (Photo: Karl Herweg)





**Top:** Gegera is within convenient distance from the university, but the watershed is not easily accessible by car. At its lower end, visitors have to cross the small river on foot, mostly under the eyes of farmers and curious children. Crossing the river implies overcoming a small "inconvenience" for students mostly working in the classroom, and gives them a first feeling of being in the field. This little exercise makes it easy to interact with the local population and impressively demonstrates an important effect of soil and water conservation measures further upstream – that there is still water in the dry season! (Photo: Asmamaw Tenko)

**Bottom:** In 2011, the transdisciplinary training course involved both Mekelle summer-school students and lecturers from various Ethiopian universities as well as from Kenya, Tanzania, and Madagascar. Confronting both groups with real-life situations helps to ground research and education ideas in the reality of the rural people who make up 80 per cent of the Ethiopian population. The most common form of teaching at university level is the classroom lecture, which mostly relies on academic papers describing case studies conducted in other parts of the world. At the same time, rural Ethiopia provides numerous study topics and would benefit from the assistance of researchers as it strives to achieve a more sustainable development. (Photo: Asmamaw Tenko)

## The project story

From 1981 to 1997, the University of Bern's Centre for Development and Environment (CDE) carried out the Soil Conservation Research Programme (SCRP) together with the Ethiopian Ministry of Agriculture, and supported by the Swiss Agency for Development and Cooperation (SDC). As the Ethiopian Government introduced decentralization policies, the SCRP was handed over to regional agricultural research institutions which still maintain most of the seven research stations established under the programme. A large share of the data measured at these stations was used to develop training material on sustainable land management at the School of Agricultural, Forest and Food Sciences of the Bern University of Applied Sciences. This training material was later adapted to the needs of Mekelle University, tested several times, and included in undergraduate courses. The cooperation between CDE and Mekelle University within ESAPP resulted in four distinct outcomes:

- (1) In 2004, CDE and Mekelle University worked together to produce a textbook entitled *Sustainable Land Management: A new Approach to Soil and Water Conservation in Ethiopia*, published in 2006 (Mitiku et al. 2006).
- (2) An ESAPP project was designed to update Bachelor's-level course material of Mekelle University, and to design and conduct a Master's-level course on "Advanced Approaches to Sustainable Land Management". This course was conducted twice a year for regular students by Mekelle University staff. From 2005 to 2011, CDE staff taught the course once a year for summer-school students.
- (3) The final summer course in 2011 was simultaneously offered as a training of trainers with more than 20 participants from Ethiopia, Kenya, Tanzania, and Madagascar. The trainers attended the entire course, which was supplemented by reflections, didactic and methodological inputs, and coaching. They converted their own case study material into a case study exercise for their students.
- (4) The course material and the collection of case studies together provide a sound training package for all trainers of trainers in the field of sustainable land management. Since 2012, the Master's course is conducted by Mekelle University staff only.



## Innovation and relevance

Ethiopian students in the field of sustainable land management until recently largely relied on training material from abroad, requiring a “translation” effort to apply it to their own context. Local case studies and research results better reflect the actual biophysical, economic, and sociocultural working background in Ethiopia. In contrast to previous, mostly text-based disciplinary training, the Master’s-level course developed with support from ESAPP takes an integrative inter- and transdisciplinary perspective, introducing a number of visual elements (photo interpretation, transect walks) and encouraging students to prepare well-illustrated presentations. Traditional lectures are very common in Mekelle University. By contrast, the new Master’s-level course in sustainable land management comprises a series of four-hour sessions beginning with an introductory presentation and continuing on to group work. The course tutor sets a clear task which the students have to tackle in self-organized groups. At the end, each group presents their results, followed by a discussion of all group work results; a final session comparing group results with SCRPs outcomes provides students with a benchmark to assess the quality of their own work. While many courses remain on a theoretical level, this course also includes a field day, where classroom knowledge can be applied in a real-life situation.

Participants said they learned more through the learner-centred approach than through top-down lecturing, and expressed the intention to adapt their own teaching practices. Supplied with many didactic-methodological hints and relevant materials, participants can thus create a multiplier effect. In encounters with local villagers and farmers, students come face-to-face with indigenous knowledge and technologies: an essential experience that prepares them for their future task of developing solutions that are relevant and applicable to the local context. Sustainable land management requires solutions that are environmentally sound, socially acceptable, and economically viable. Only inter- and transdisciplinary training can teach people how to work with local actors to develop solutions that fit the context.



**Top:** Students and lecturers engaged in role play, putting themselves in others’ shoes. It enabled students to sense how local farmers or decision-makers may feel when they meet researchers and face the impacts of research outcomes on their lives. The role play can be done either before or after fieldwork. Done before, it enables students to critically revise their assumptions about other actors during fieldwork; done after, it allows students to apply what they have learned in the field. (Photo: Karl Herweg)

**Bottom:** Visiting local people in their environment and talking with them about their situation, fears, and desires provides young students – future researchers – with first-hand information. They learn that there are other sources of information than books and academic articles, and that other parties involved in natural resource management may have different perspectives than researchers on issues of resource degradation and conservation. They learn to critically reflect on these different perspectives, including their own. Young students must be highly motivated to seriously engage in research or education that aims to create a significant impact on their country and society. Personal contacts with local actors help create empathy for their conditions and are an important source of motivation. (Photo: Karl Herweg)





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### Highlight profile

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

#### Implemented during:

2001–2011

#### Total funds contributed by ESAPP:

CHF 274,500

#### Implemented by:

Mekelle University, Mekelle, Ethiopia

#### In collaboration with:

Centre for Development and Environment (CDE), University of Bern, Switzerland

#### Main beneficiaries:

Mekelle University and its faculty and students, as well as lecturers in sustainable land management at other Ethiopian universities

#### This highlight

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Design: Simone Kummer (CDE)

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#### Funded by





# CETRAD short professional courses

Many organizations in Kenya lack the technical and integrative skills to plan and implement sustainable regional development. To bridge this capacity gap, ESAPP supported its Kenyan partner CETRAD in developing a set of short vocational training courses for technical officers from government and non-government organizations. The courses are now offered on an annual basis and attract participants from throughout Eastern Africa.

## Sustainable development challenge

The effective governance of natural resources and associated challenges such as food insecurity and drought requires skills and experience. However, many organizations engaged in these fields in Eastern Africa lack adequate staff with the relevant abilities. This leads to uninformed decision-making and planning, especially in government institutions. Lack of experience with inter- and transdisciplinary approaches, in particular, results in decisions that are of little relevance on the ground. For example, extension services are often unable to translate findings from research, seasonal weather forecasts, and early warning services to farmers. In addition, most field officers lack the skills for context-specific spatial data interpretation and assessment, which are critical for land use planning and for designing appropriate interventions to address problems such as food security.

The Kenyan situation has been challenging, largely because of the successive reforms in the agriculture, water, forestry, and environment sectors that have ushered in new institutional arrangements for service delivery. For example, the National Agricultural Extension Policy of 2001 introduced demand-driven extension services; the Water Resources Management Policy of 1999 and the Water Act of 2002 created multilevel institutions with new tasks; and the National Environment Management and Coordination Act of 2004 introduced mandatory environmental impact assessment. However, these changes were never matched with a corresponding effort to develop the capacity needed to fulfil the new institutional mandates.

## ESAPP's response

Recognizing the magnitude of the capacity challenge facing Kenya in particular and Eastern Africa in general, and aware of the potential of tailor-made professional vocational training courses to reduce this gap, ESAPP provided the funds to conduct a nationwide training needs assessment in Kenya. On that basis, ESAPP then also supported the design of a training concept for a first generation of courses.

The aim was to craft a training programme consisting of tailor-made professional courses that impart practical, field-based skills to practising and newly appointed governmental and non-governmental technical officers. The courses were designed to help strengthen officers' ability to deal with the multi-faceted challenges of sustainable regional development at the local, regional, and national levels. ESAPP supported the training programme at CETRAD (Centre for Training and Integrated Research in ASAL Development) for the first five years. Although the goal of self-financing was not fully achieved, the steady increase in self-sponsored candidates was an encouraging development. Today, the programme is run entirely by CETRAD.



### Main messages

- Skills acquired through college-based training and field exposure do not provide the necessary capacity to effectively support sustainable regional development through knowledge-based innovations and decisions. This capacity gap can only be bridged with tailor-made, field-based, and practice-oriented vocational training courses.
- Vocational training helps participants develop the integrative knowledge they need to promote innovation, policymaking, and practice. Trainees, especially from the public sector, learn skills that allow them to become more competitive and have greater job mobility.
- Although the demand for tailor-made courses is huge and capacity gaps are still wide, institutional commitment is minimal, arguably because other pressing needs continue to dominate resource allocation. Core funding is important for initiating the development of training curricula and financing first training sessions before the course can start to attract self-financing students.



CETRAD's oldest course teaches the application of geographic information systems to map resources and resource use. Close collaboration with CDE enabled CETRAD to develop a comprehensive three-week programme that uses exclusively Eastern African data and exercises. (Photo: Albrecht Ehrensperger)



### The project story

CETRAD (Centre for Training and Integrated Research in ASAL Development) received a mandate from the Kenyan Government to develop a training programme to help address the huge technical capacity gaps in the public sector. These gaps strongly affect the government’s ability to play an effective stewardship role in fostering sustainable development. In response to the government’s needs, CETRAD set up a training programme that delivers tailor-made, field-based, and practice-oriented professional courses. Crafting of the programme began with a comprehensive nationwide training needs assessment. The assessment revealed a number of critical thematic areas, including rural livelihoods and food security, drought management, management and governance of natural resources, management of resource use conflicts, and knowledge about how to apply tools for resource mapping, assessment, and planning. Based on these findings, CETRAD designed and launched two pioneer courses: one on food security and drought management, and one on geographical information systems.

Meanwhile, the government concluded reforms in various sectors, including water, forestry, and the environment. The reforms resulted in additional critical capacity gaps, particularly with regard to understanding and implementing the new functions of the different departments. At the government’s request, CETRAD designed new courses to address these capacity gaps. The courses target practising technical officers from governmental and non-governmental organizations. Topics include integrated water resources management and governance, participatory forest management, environmental impact assessment and audit, and resource use conflict management. Participatory instruction methods are used for both coursework and fieldwork. Each course takes two to three weeks to complete. Currently, CETRAD grants ten scholarships annually. The rest of the participants have self-financing arrangements.

Five of the seven courses have since been offered on an annual basis, with very impressive results across the topics addressed. Over 700 people have been trained over the past ten years (see diagram). The training programme has grown very popular and has drawn regional attention, attracting participants from Malawi, Madagascar, Ethiopia, Uganda, and Tanzania. CETRAD has thus become a regional training institution of choice. At the local level, CETRAD short courses have become a major springboard for beneficiaries, promoting their prospects in the job market and advancing their careers.

**Top:** Geo-referenced information on resources, resource conflicts, and other features relevant to sustainable regional development is scarce in Eastern Africa. For this reason, data generation using hand-held Global Positioning System (GPS) receivers is particularly important for decentralized governance bodies. (Photo: Albrecht Ehrensperger)

**Bottom:** Since 2000, CETRAD has gradually enhanced its training portfolio. The courses on geographic information systems and on food security have the longest tradition and have had the highest number of participants so far. But other courses, such as the one on integrated water resources management, have also experienced a keen interest from governmental institutions working on this topic.

Course	Year	2000				2005				2010				2015				
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Geographic Information Systems (GIS)																		171
Food Security and Drought Management																		237
Environmental Impact Assessment and Audit																		111
Integrated Water Resources Management																		114
Resource Use Conflict Management																		70
Integrated Natural Resources Management																		31
Participatory Forest Resources Management																		39
<b>Total number of participants</b> ↗																		

## Innovation and relevance

At the time when CETRAD began to offer its training courses, very few organizations in Eastern Africa focused on capacity development among field-based governmental practitioners. Thus, with ESAPP's support, CETRAD was able to make its mark in this field, and the training programme has since been emulated by other academic and development organizations in Kenya. Innovations were also made in the teaching itself. For the courses on geographic information systems (GIS), for example, the Centre for Development and Environment (CDE) and CETRAD developed comprehensive training manuals based exclusively on local project examples and exercise data. They also rely on both commercial and open-source software solutions, taking account of the varying procurement budgets of public institutions for information and communication technologies (Gurtner et al. 2007).

CETRAD has followed the careers of a number of alumni who completed a course or set of courses, and found that the courses helped to improve trainees' competitiveness and mobility. For example, some of the government officers received attractive job offers within or outside their departments soon after their training. The job offers were directly related to the newly acquired knowledge, indicating that course participants benefit from improved career and income opportunities.

Today there is an increased participation of the public and private sectors in the funding of course participants. The courses on GIS and remote sensing, food security, integrated water resources management and governance, and resource use conflict management are especially popular. These developments are proof of the relevance of such courses for building individual and institutional capacity to address sustainable development challenges. However, these developments would not have been possible without the initial funding provided by ESAPP, which helped to establish the training courses and make them known among governmental and non-governmental institutions in Kenya and beyond.



**Top:** Gender aspects in earning a livelihood are an integral part of CETRAD's food security course. For example, participants from agropastoral communities assess men's and women's workloads and seek strategies to improve women's livelihood security and reduce their workload. (Photo: Chinwe Ifejika Speranza)

**Bottom:** Participants in the course on food security and drought management are interacting with the local community of Ilpolei, Mukogodo, during a field visit to analyse the food situation in this area. They are establishing a list of people's livelihood sources and coping strategies to better understand the community's resilience to drought. (Photo: Boniface Kiteme)





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### Reference and further reading

Gurtner T, Ehrensperger A, Hergarten C, Hösli C, Künzler-Roth S. 2007. *Capacity Building in Geoprocessing*. Bern, Switzerland: Centre for Development and Environment.

### Highlight profile

This highlight is based on the achievements of 13 ESAPP priority action projects.

**Implemented during:**  
2004–2014

**Total funds contributed by ESAPP:**  
CHF 400,000

**Implemented by:**  
Centre for Training and Integrated Research in ASAL Development (CETRAD), Nanyuki, Kenya

**Supported by:**  
Centre for Development and Environment (CDE), University of Bern, Switzerland

**In collaboration with:**  
Research and training institutions in Kenya, Tanzania, Switzerland, and other countries

**Main beneficiaries:**  
Over 700 governmental and non-governmental technical officers and their institutions, mainly in Kenya, but also in Malawi, Madagascar, Ethiopia, Uganda, and Tanzania

### This highlight

Language editing: Erin Gleeson (Gleeson's SciencEdit.CH); Tina Hirschbuehl, Marlène Thibault (CDE)  
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Centre for Training and Integrated Research in ASAL Development

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# A socio-economic atlas for informed decision-making

Kenya is in transition: urban and rural areas are transforming, and its 47 counties are taking over development-related functions, as envisaged under Kenya's 2010 constitution. This combination of rapid development and devolution of power was an ideal time to launch the initiative that resulted in the *Socio-Economic Atlas of Kenya*, a high-resolution information base.

## Sustainable development challenge

Many countries of the global South are experiencing considerable economic growth alongside social and political transformation. This rapid development is reflected in manifold changes in all subnational contexts, from urban economic hubs to marginal rural areas. Dealing with these changes in such diverse settings – without jeopardizing options for sustainable development – requires sound contextual information for informed decision-making. While more and more spatially explicit information is freely accessible on the Web, this geographic information is mainly place-based and not comparatively space-based. More importantly, crucial socio-economic information is missing for concrete local contexts.

Kenya is one country whose diversity of transitions requires such information. Its economic centres are rapidly growing; the economies in rural highland settings as well as the arid and semi-arid lands are transforming and diversifying. In addition, Kenya's new constitution – adopted in 2010 – envisages the devolution of some power and governance from the national level to 47 newly founded counties. These counties are currently taking over important functions relevant to development (e.g. spatial planning and environmental management). However, basic data for informed decision-making in these new political entities are missing.

## ESAPP's response

Sustainable development is a normative concept that aims at harmonizing multiple goals in the economic, sociocultural, and ecological dimensions of development. How such development looks and how these dimensions are linked can vary considerably between different geographic and sociopolitical contexts. Defining targeted action for sustainable development requires participatory discussions based on contextualized information and knowledge that addresses relevant aspects of all three dimensions. Ensuring the availability of contextual information – combined with sociopolitical debate and social learning – was a cornerstone of ESAPP's approach, especially in contexts undergoing rapid transition.

Kenya's rapid development, together with the devolution of power, has opened a window of opportunity to debate and reorient approaches to more sustainable development in the country. This triggered an initiative by the Centre for Training and Integrated Research in ASAL Development (CETRAD), the Centre for Development and Environment (CDE), and the Kenya National Bureau of Statistics (KNBS) to visually display high-resolution information on a broad range of topics relevant to sustainable development. The resulting Socio-Economic Atlas of Kenya was supported by ESAPP, the Volkswagen Foundation, the University of Bern, and the Swiss National Centre of Competence in Research (NCCR) North-South.



## Main messages

- Many countries of the global South are in a process of fast economic and sociopolitical transformation. This leads to a range of problems and options for sustainable development at the subnational level. Integrated contextual information is required to address these issues adequately, and to counterbalance decisions that are mainly power-driven.
- Even if such information is available, it has little relevance as long as it is not built into processes of sociopolitical negotiation and social learning. The format in which information is provided is decisive in making it debatable at different levels and in different contexts.
- Building contextual information systems and integrating them into development-oriented debates in emerging knowledge societies requires a long-term perspective and a socially well-rooted approach. Long-term research and development partnerships are important.



The *Socio-Economic Atlas of Kenya* presents and interprets relevant development indicators for all of the country's 47 counties and 7,149 sub-locations. (Source: Wiesmann et al. 2014)

- 1 Introduction & Background  
9 maps
- 2 Population Distribution & Dynamics  
14 maps
- 3 Water, Sanitation & Energy  
8 maps
- 4 Household Assets & Communication  
8 maps
- 5 Poverty & Welfare  
7 maps
- 6 Education  
9 maps
- 7 Economic Activities  
8 maps

## The project story

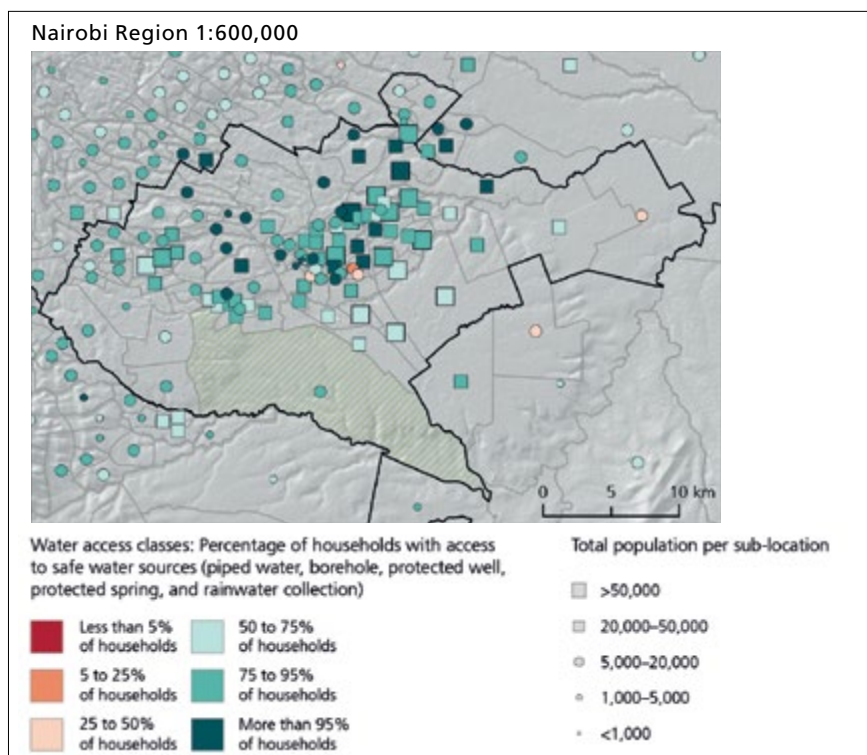
The *Socio-Economic Atlas of Kenya* is a nationwide high-resolution information base for negotiating and promoting sustainable development from the local to the national levels, with particular focus on the newly formed counties. The initiative to compile it was only possible thanks to long-term collaborative efforts and contextual knowledge within the ESAPP network. Access to national census and Kenyan household survey data at KNBS, as well as the comprehensive geographic information base at CETRAD, were enabled by the trust stemming from long-term research partnerships.

In a lengthy process, an inter- and transdisciplinary team negotiated and defined the themes and variables that could be derived from the above-mentioned databases and would provide important insights to trigger sustainable development efforts. In this way, 63 topics were identified and subsequently analysed in detail, classified to represent the variation within the country, mapped at sub-locational and county levels, interpreted in view of trends and required approaches, and finally grouped into seven themes that form the chapters of the atlas (see left). Much effort was also put into developing graphic representations of the information in maps and graphs that are adequate to the different political levels of sustainability negotiations. The final product was launched by the Kenyan Government and received broad media attention; a series of workshops were held for all 47 counties on how to use it for concrete planning and decision-making.

The results brought a wide range of new insights into the diversity and dynamics of aspects relevant to sustainable development in Kenya. To cite just a few examples: (1) demographic transition is variously advanced, meaning that population growth rates and age pyramid distortions vary greatly throughout the nation; (2) the mix of ethnic communities and religions increases along rural–urban gradients and is highest in the dynamic economic centres; (3) the dependency of households on solid biofuels is still very high, and access to safe water and improved sanitation follows clear centre–periphery gradients; (4) as a result of economic transformation, poverty and inequality show newly emerging patterns (see Highlight 8); (5) in high-potential as well as low-potential contexts, rural transformation is much faster than generally assumed, and the role of the informal sector is becoming paramount; (6) with the exception of some marginal areas, Kenya shows comparatively high education levels, and enrolment rates point to an evolving modern knowledge society.

**Top:** The atlas contains 63 maps organized into seven chapters. The maps in Chapter 1 present background information that was derived from the database at CETRAD. The maps in Chapters 2 to 7 are based on the 38 million records of the 2009 Kenya Population and Housing Census carried out by KNBS. Chapter 5 on welfare and poverty combines census data with data from the Kenya Integrated Household Budget Surveys by KNBS. (Source: Wiesmann et al. 2014)

**Bottom:** One of the specificities of the atlas consists in its use of symbols representing the population size of each sub-location (see legend). Unlike conventional area shading, this makes it possible to show simultaneously where the largest numbers of people live and which share of these people has access to safe water, for example. This map shows the situation in the city of Nairobi. The type of display used makes it easy to identify those parts of Nairobi where informal settlements prevail. (Source: Wiesmann et al. 2014)



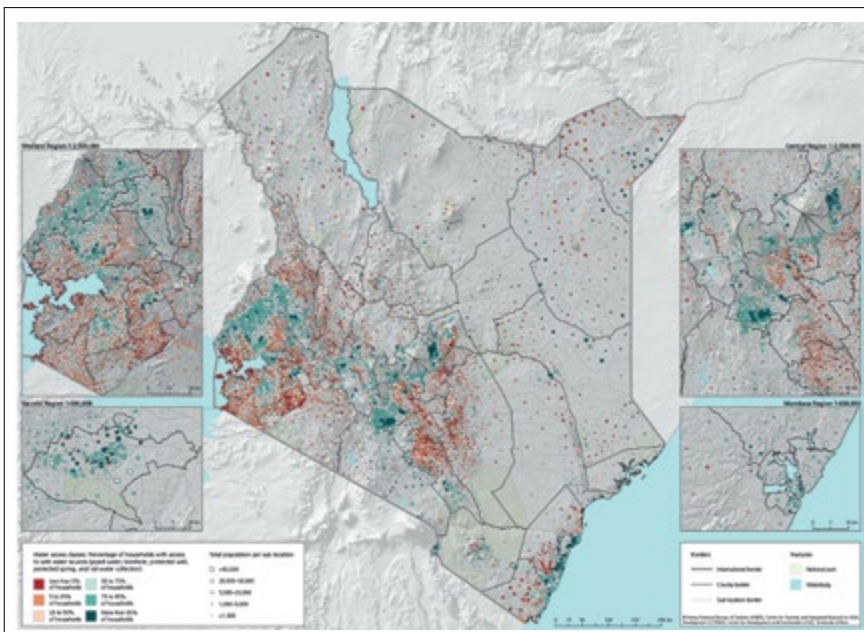


## Innovation and relevance

The atlas and its database are innovative because of their: (1) *High resolution*: The information is disaggregated to the 7,149 sub-locations of Kenya. This makes it possible to discuss the findings at the level of individual communities, and enables socio-economic indicators to be linked to remotely sensed land cover, land use, and ecological information. (2) *Comparative display*: Traditional area shades were replaced by symbols that accurately represent population sizes, enabling comparative display and discussion of very different contexts such as urban neighbourhoods and pastoralist communities. (3) *Data integration*: The data of all 63 topics uses sub-locations as the fixed common spatial and socio-economic reference. This allows users to characterize and discuss local situations in an integrated and participatory manner, fostering context-specific approaches to sustainable development. (4) *Diversity and dynamics*: The fixed and high-resolution spatial reference enables the datasets to be combined with one another. This permits the sustainability status of the different regions and contexts in Kenya to be assessed, and trends and dynamics to be interpreted.

The relevance of these innovations has been demonstrated in workshops and training courses on the practical use of the atlas, in particular with authorities and representatives of all 47 counties. On the one hand, the high-resolution information lays the foundations for contextual negotiation and priority-setting of sustainability-oriented interventions within the individual counties. On the other, the emerging patterns and trends of sustainability issues trigger debate on adequate policies and approaches among counties and at the national level.

The atlas and the dialogue it has triggered at local, county, and national levels have proven the high relevance of integrative and contextually differentiating information in an appropriate format, especially in nations that are in the process of fast and diversified economic and sociopolitical transition. The appropriate format should enable broad-based negotiations on concrete approaches to more sustainable development.



**Top and middle:** In November 2014, the Kenyan Government officially launched the *Socio-Economic Atlas of Kenya* at an event attended by Kenya's Cabinet Secretary for Devolution and Planning, Anne Waiguru, and the Swiss Ambassador to Kenya, Jacques Piteloud (top). The event attracted significant media attention (middle) and represented a first step towards popularizing the atlas at the level of Kenya's 47 counties. (Photos: Urs Wiesmann)

**Bottom:** Access to safe water is one of the development indicators displayed in the atlas. It is measured as the percentage of households of each sub-location who have this access (see legend on the previous page). Interestingly, access to safe drinking water does not reflect the distribution of natural water sources: rather, it is linked to the level of economic and infrastructural development. Accordingly, the map indicates where investment is needed to further improve the situation. (Source: Wiesmann et al. 2014)



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## Highlight profile

ESAPP contributed to this highlight with one priority action project.

**Implemented during:**  
2013–2014

**Total funds contributed by ESAPP:**  
CHF 50,000

**Implemented by:**  
Kenya National Bureau of Statistics (KNBS),  
Nairobi, Kenya; Centre for Training and  
Integrated Research in ASAL Development  
(CETRAD), Nanyuki, Kenya; Centre for Devel-  
opment and Environment (CDE), University of  
Bern, Switzerland

**Main beneficiaries:**  
Decision-makers in Kenya at national and  
county levels

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Website about the *Socio-Economic Atlas of Kenya*: [www.kenya-atlas.org](http://www.kenya-atlas.org); accessed on 2 October 2015.

## This highlight

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Design: Simone Kummer (CDE)

Proofreading: Stefan Zach (z.a.ch GmbH)

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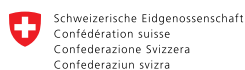
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## What is ESAPP?

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# Building spatial data infrastructure in Ethiopia

Highly dynamic planning and decision-making requirements in Eastern Africa need accurate and up-to-date information and knowledge, especially on the geographic distribution of key development indicators. In Ethiopia, ESAPP launched a capacity development and spatial data infrastructure programme to improve the availability of country-level geospatial data, significantly contributing to human resource development efforts.

## Sustainable development challenge

In Eastern Africa, government institutions at national and subnational levels are faced with the challenge of having to take decisions and conduct planning in a context of accelerating socio-economic dynamics. Investments in land, competing claims on natural resources, and soaring economic growth lead to ever-changing planning and decision-making requirements that can only be addressed with the aid of accurate and up-to-date information and knowledge bases. Unfortunately, the same institutions often lack such tools, causing planning and decision-making to constantly lag behind real-world developments.

The Government of Ethiopia is following an integrated growth and transformation plan that aims to achieve an annual growth level of almost 10 to 15 per cent of the gross domestic product, accomplish the Sustainable Development Goals, and attain middle-class income status by 2025. To reach these goals, the country is investing heavily in agriculture, infrastructure, and energy. However, project planning and impact assessments are hampered by a number of factors, including a lack of reliable country-level spatial data, missing standards for spatial data infrastructure, non-existent or contradictory administrative boundaries due to political instability, and an absence of expertise in data management among local institutions.

## ESAPP's response

Mindful of the importance of geoinformation technology for resource management, regional planning, and socio-economic development, ESAPP carried out several projects that aimed at improving spatial data and information bases at national scales in the region. ESAPP partners built on the experience of the Centre for Development and Environment (CDE) in the Mekong Region and on existing data from previous projects in Eastern Africa. The focus of these projects was to provide insights into the geographic distribution of key development indicators, especially in remote areas.

In Ethiopia, ESAPP focused on scaling up key environmental variables from single case studies to the national level, in view of integrating them into a spatial data infrastructure. Various capacity building projects were designed, implemented, and then tailored to address the needs of different institutional partners, in an effort to enhance the capacity, mainly of government institutions, for the spatial documentation and analysis of relevant environmental information. An important aspect of this effort has been to provide a platform for knowledge exchange and networking among partners, to make accessible to these partners the latest applications in hydro-informatics, and to strengthen communication and data exchange processes.



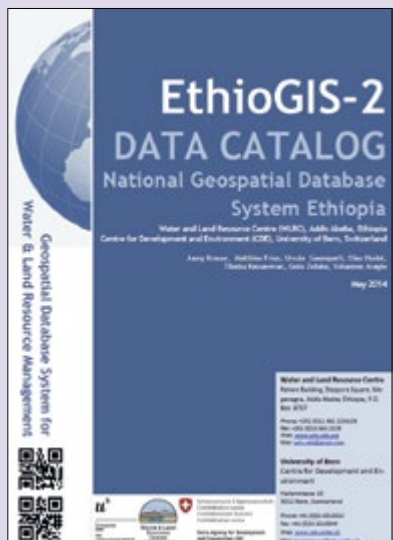
### Main messages

- Long-lasting research partnerships are a key asset for the successful implementation of projects with a strong focus on geoinformation and communication technologies.
- Many Ethiopian institutions realized that geospatial information – in particular open-source medium-scale remote sensing data – can greatly support their work processes. In the future, these data will have to be complemented with socio-economic data, for example on poverty and disparities, or on access to land and water.
- Information sharing and providing open access to data are new and far-reaching concepts for most African partners. Building trust and sharing the benefits and potential of open geospatial data among all involved partners were key lessons learned within the institutional context of Ethiopia.



This extension worker is participating in an EthioGIS training course. Participants of the course learned skills that are crucial for extension workers: how to read a map featuring contours, landmarks, and models, how to understand the scale of a map, how to interpret map legends, and many more. (Photo: Jürg Krauer)





### The project story

The former Soil Conservation Research Project (SCRP), coordinated by CDE, established comprehensive databases in six watersheds in the Ethiopian highlands (Krauer 2006). After the project ended in 1988, Ethiopian partners suggested expanding and harmonizing the SCRPs databases into one homogeneous spatial and statistical database for the entire highlands. For this purpose, they approached ESAPP with a request for financial and technical support.

The end of the SCRPs coincided with major breakthroughs in climate modelling using weather station data. One decade later, advances in remote-sensing technology made it possible to spatially capture and classify various types and patterns of vegetation, key variables for sustainable development research. The use of aerial and satellite imagery became standard practice for detecting spatial features such as infrastructure or conservation structures, and to model terrain and drainage systems. Technical limitations initially prevented successful scaling-up of environmental data beyond the six SCRPs sites, but these were soon overcome. After this, ESAPP began its first trials of modelling soil types, terrain characteristics, land cover, and other environmental data, and integrating them in a country-wide geospatial information system. However, modelling efforts were challenged methodologically by the sizable scale gap between the SCRPs research stations and the entire Ethiopian highlands, and by limited availability of data (let alone standardized data) and scarce ways of exchanging them.

In response to these challenges, ESAPP launched a capacity development and spatial data infrastructure programme to improve the availability of country-level geospatial data. The programme also contributes to the National Spatial Data Infrastructure (NSDI) and the development of spatial planning tools among project partners. In parallel, a network of Ethiopian experts was set up to foster long-term independent data analysis and compilation capacity. Network members gained expertise in field-based and online geospatial data collection. They also learned to analyse online data and validate their results in the field or through comparison with existing map models. As of 2012, the newly established centre of competence in integrated water resource management, the Water and Land Resource Centre (WLRC) in Addis Ababa, was able to find and further build capacity of qualified national staff – an important outcome of ESAPP’s human resource development efforts in Ethiopia.

**Top:** ESAPP’s efforts towards building up a national geospatial database system for Ethiopia culminated in the release of the EthioGIS-2 data catalogue by CDE and the Water and Land Resource Centre in 2014. The geospatial database contains administrative and topographic information as well as specific datasets about soil, land, and hydrological resources. It is widely known as Ethiopia’s most up-to-date and accurate non-governmental national geospatial database.

**Bottom:** Due to Ethiopia’s very large size, the majority of data contained in the EthioGIS database had to be derived from global data servers, governmental sources, or satellite images. Assumptions made during data processing and interpretation had to be verified in selected areas in the field. (Photo: Jürg Krauer)

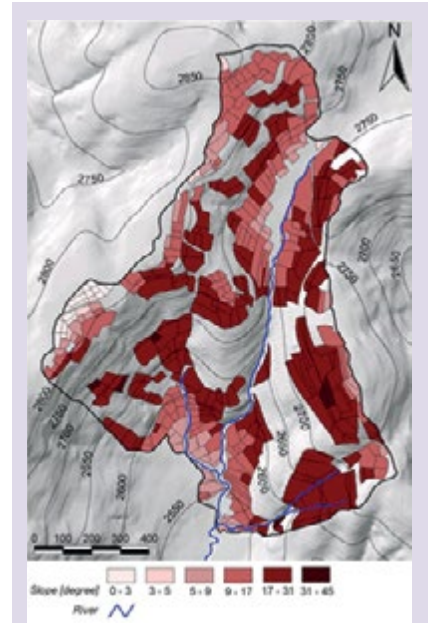


## Innovation and relevance

These days, satellite systems make it possible to track environmental changes in very remote areas with increasing precision, and the resulting data may be shared online. Platforms such as GeoWiki and map servers such as Google enable users to combine their own data with global geospatial datasets at various scales, greatly contributing to the standardization and dissemination of geographic information. ESAPP and its partners strived to acquire the competences needed for the productive use of these tools, and to adapt them to the specific requirements of the project context in Ethiopia.

The space provided for mutual exchange between participants was probably the most valuable contribution of ESAPP's capacity development programme in Ethiopia. The course structure that was developed for that purpose featured conferences, training programmes, and field components, helping participants to integrate theory with practical project work. The EthioGIS database has since become a reference in Ethiopia, widely used by a number of stakeholders. Finally, the efforts of ESAPP in facilitating long-term exchanges between experts within a multi-disciplinary network were highly instrumental in creating strong local expertise from which other programmes now benefit.

National governments in Eastern Africa are confronted with rapidly accelerating development dynamics, in urban and rural areas alike. Large-scale investments in land, competing claims on natural resources, infrastructure development, rapid economic growth, and other dynamics represent a huge challenge for planning. National governments need accurate and up-to-date information to help them harness and harmonize these dynamics and guide them onto sustainable pathways. Tools such as ESAPP's EthioGIS database therefore have increasing planning relevance. The extensive experience gained in Ethiopia can go a long way in helping other national institutions in the region develop similar decision-making and planning tools.



**Top:** A country-wide high-resolution digital terrain model was generated as part of the EthioGIS projects. Various topographic layers were derived from this model, for example slope gradients. This map shows the average slope gradient of crop fields in the Anjeni river catchment. Maps like this one can serve as a basis for planning soil and water conservation measures across an entire river catchment.

**Bottom:** Participants of a course on geographic information systems (GIS) and remote sensing in Ethiopia during a field trip in the Gerda watershed. Capacity building within ESAPP focused not only on enhancing technical skills, but also on confronting maps and spatial models with the reality on the ground. This enabled trainees to develop a better feeling for the potentials and limitations of these tools. (Photo: Jürg Krauer)



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### Highlight profile

This highlight is based on the achievements of 8 ESAPP priority action projects.

**Implemented during:**  
2000–2014

**Total funds contributed by ESAPP:**  
CHF 387,000

**Implemented by:**  
Centre for Development and Environment  
(CDE), University of Bern, Switzerland

**In collaboration with:**  
Water and Land Resource Centre (WLRC),  
Addis Abeba, Ethiopia

**Main beneficiaries:**  
Government and various ministries of  
Ethiopia, as well as Ethiopian regional  
planners and experts

### This highlight

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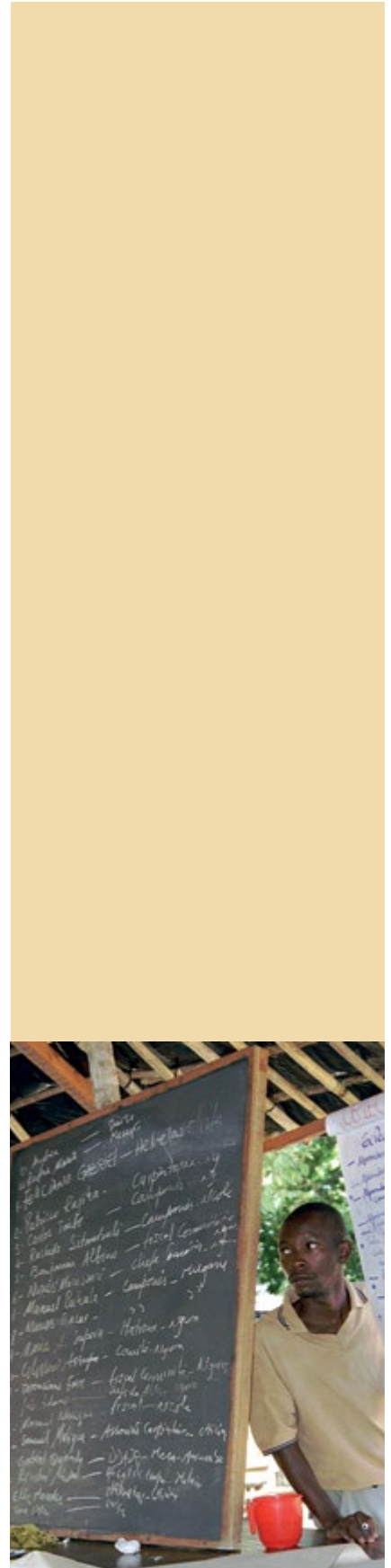


# Approach

Sustainable development is a partly experimental and iterative process that builds on context-specific knowledge, capacity, goals, and needs. What does this mean for the design of a research approach? First, it must take into account that the objectives of research for sustainable development, unlike those of conventional research, cannot be set from the start. Rather, objectives have to be defined, implemented, and redefined in a continual process of collaborative knowledge production and learning among research partners and non-academic stakeholders (Wiesmann et al. 2011).

Consequently, approaches in sustainability research need to be processual and experimental too. They have to provide stability and flexibility at once, guiding but not constraining programme implementation. The programme design, procedures, and tools need to have a firm and transparent orientation towards overall institutional, environmental, and sustainability goals – especially when research addresses issues that are socially and politically contested. At the same time, these elements need to be adaptive and open to development based on all partners’ voices and agency. They must enable flexible adjustment to new research results, emerging knowledge needs, and changes in the social and political research environment.

ESAPP responded to these requirements by basing its overall approach on three complementary features: (1) a dual programme structure accommodating baseline research and capacity development on the one hand, and action research on the other; (2) an adaptive management approach enabling gradual participatory adjustment of the programme design and management tools; and (3) a strong focus on producing context-specific knowledge and capacity. These three elements fit together ideally, mutually strengthening each other and providing an enabling institutional arrangement for linking empirical research with social learning and institutional development.



## Dual structure

Research for sustainable development tends to focus strongly on concepts. As a consequence, it is often not sufficiently in touch with realities on the ground to be applicable for implementing agencies in their projects. Conversely, sustainable development implementation is often caught in the idiographic traps of small-scale project contexts, lacking a conceptual framework that could guide reflection on activities and help align them with broader development priorities (Wiesmann et al. 2011).

Development agencies have attempted to overcome this divide by integrating research for sustainable development into their portfolios. But individual projects offer little scope for fruitful iterative loops between research and implementation. At best, a project's logical framework is based on a sound conceptual foundation in line with the principles of sustainable development; but in most cases this foundation remains static throughout the project's lifecycle. As a result, projects are unable to respond flexibly to emerging needs and insights.

ESAPP's programme design consisted of a dual structure: one component addressed basic research and capacity development, while the other concentrated on action research. Under the first component – labelled “basic mandate” – the programme team and core partner institutions worked on the scientific foundations, engaged in reflections, undertook human and institutional capacity development, and developed approaches, tools, and databases. Under the second component, the programme and a wide network of partner organizations implemented over 300 so-called “priority action projects” that were specifically tailored to national and local development priorities in the fields of sustainable land management and sustainable regional development.

Regular iterative interaction between the two components enabled ESAPP partner institutions to feed their practical project experience into conceptual reflections under the basic mandate, while at the same time drawing on these conceptual reflections to embed their activities in a broader conceptual framework and align them with the principles of sustainable development. ESAPP's dual programme structure was crucial in enabling programme staff and partners to establish themselves as equal research partners and key agents for sustainable development (Stöckli et al. 2014; Wiesmann et al. 2014). A good example for the fruitful interaction of the two components is a project in north-eastern Madagascar that applied ESAPP's scientific knowledge to link targeted local-level interventions and create synergies between them (Highlight 19).

## Adaptive management

Funding agencies' demands for greater accountability and control have increasingly pushed research and implementation projects for sustainable development into modes of operation determined by logical frameworks. Logically connected goals, outcomes, outputs, and activities are spelled out prior to project inception, and final project evaluation is based on the same goals, outcomes, outputs, and activities. This approach simplifies initial and final project evaluations substantially. But it assumes that development values and priorities in targeted project contexts are static and will remain valid throughout the project cycle; and it views project contexts as “empty landscapes”, disregarding the possibility that other interventions in the area might lead to changes which, in turn, might make it necessary to adapt the project objectives. In sum, a “log frame” approach does not factor in the need for short-term adaptations of project structures, management tools, and objectives.

ESAPP opted for an adaptive management approach that provided space for programme modification by partners. This enabled all partners to jointly develop a formal reflexive monitoring and evaluation system suited to ensure the programme's alignment with the principles of sustainable development. The success of adaptive management depends on its ability to promote equity and integration among institutional partners, and to constantly create and adapt the programme's design,

management tools, and procedures in line with changing needs. In ESAPP's case, adjustments were usually discussed and decided during annual "capitalization workshops" with core partners in Eastern and Southern Africa (Highlight 20). One example of such a jointly agreed adjustment was the decision to give certain short-term project activities a special status and link them into project series running for several years, because the development issue they addressed and the approach they had selected justified greater input and support from ESAPP. Partners in the programme region increasingly adopted the role of intermediaries between the programme team and local contexts. In this role, they promoted direct exchange between partners in the region and determined research topics within the fields of sustainable land management and sustainable regional development.

### Contextuality

Ongoing global development dynamics are rapidly increasing the diversity of geographic, social, and economic contexts. The resulting complex development patterns can no longer be addressed by means of standardized solutions. Moreover, the normative nature of sustainable development requires that stakeholders in a concrete societal context jointly define development goals and priorities for that specific context. Despite these insights, the international community is still trying to address global sustainability concerns – for example, climate change – using globally applicable tools and mechanisms such as REDD (Reducing Emissions from Deforestation and Forest Degradation). These tools are important in that they testify to the international community's determination to tackle global concerns. But their concrete implementation is often difficult. To be meaningful, global tools need to be adapted to the specificities of the national, regional, or even local contexts in which they are applied.

ESAPP partners were aware of the concrete societal, economic, and geographic contexts in which they implemented their priority action projects, and they took care to develop solutions that were adapted to these contexts' specific values and priorities. At the same time, they strove to ensure that projects were in line with long-term strategies for sustainable development.

To facilitate this task, ESAPP partners defined ten reference sites across the entire programme region. The sites were located in contexts experiencing typical development challenges – for example, food insecurity, biodiversity degradation, or competing claims on natural resources. The reference sites enabled ESAPP partners to consolidate their knowledge about the given context and to support the institutionalization of knowledge hubs in the South.

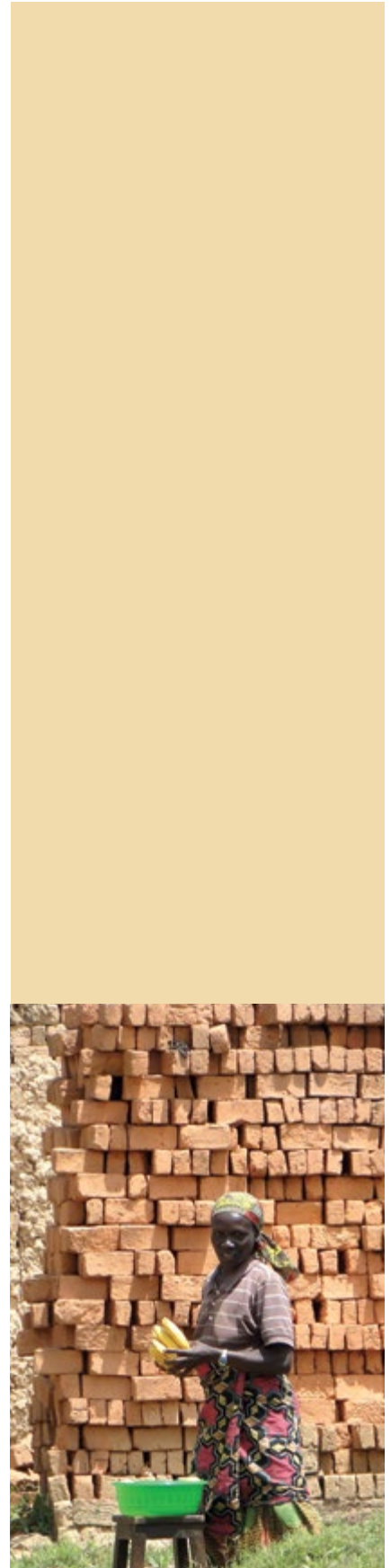
ESAPP also helped to translate global sustainable development mechanisms into nationally or locally applicable tools, particularly at the reference sites. In north-eastern Madagascar, for example, ESAPP partners helped develop a methodology to estimate the carbon sequestration potential of various local forest types (Highlight 21). Knowing a forest's carbon sequestration potential is crucial to accessing carbon credits under the global Reducing Emissions from Deforestation and Forest Degradation (REDD+) scheme.

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# Promoting stakeholder exchange in Madagascar

Potential solutions to local development problems often lack integration with wider conceptual reflections. The global biodiversity hotspot of north-eastern Madagascar is a case in point. Finding little exchange and cooperation among regional stakeholders active in conservation and development, CDE and ESAPP's Malagasy partners initiated the "Stakeholder Platform Madagascar".

## Sustainable development challenge

Speed is often crucial in addressing urgent development problems, especially at the local level. Implementation of possible solutions may falter, however, if these are not integrated with wider conceptual reflections on development issues. In turn, such reflections, by academics, development partners, and policymakers, may lack grounding in concrete contexts. There is thus a need to bring together conceptual reflection with implementation: mutual enrichment of thought and practice will enhance the relevance and efficiency of development research and interventions.

The north-eastern escarpment of Madagascar is a global hotspot of biodiversity, threatened by deforestation resulting from local subsistence farming practices (Myers et al. 2000; McConnell 2002). Efforts to protect remaining forests have focused on implementing alternatives to shifting cultivation (Kremen et al. 1998; Pollini 2009; Freudenberger 2010). However, most interventions were implemented on a case-by-case basis without integration with wider conceptual reflections. This – and the lack of exchange and cooperation among stakeholders from different sectors and scales – hinders creation of integrative strategies for development.

## ESAPP's response

ESAPP employed a dual programme structure to ensure that the projects it implemented also took into account sustainability implications. The dual structure comprised a "basic mandate" and "priority action projects". The basic mandate component served to steer demand-driven project implementation according to overarching sustainability principles, promote exchange of experiences and capacity building, help establish scientific foundations, and develop databases and tools. Priority action projects addressed development issues identified by partner organizations through concrete implementation support.

ESAPP's scientific knowledge on north-eastern Madagascar was generated at the regional level and complemented with targeted local-level interventions. Through region-wide surveys and analysis, ESAPP documented land cover change and its impacts on protected areas, as well as interventions in the field of land governance. At the same time, local-level reforestation activities and strengthening of community institutions contributed to more sustainable land management near protected areas. ESAPP's dual approach helped the integration of scientific and development activities at different levels.



## Main messages

- ESAPP's dual approach accommodating top-down conceptual requirements of sustainable development and bottom-up priorities of local partners improves consistency between local and global approaches for sustainability.
- While local priority action projects allow partner organizations to answer urgent demands from local communities, the basic mandate ensures that these projects adhere to overarching sustainability principles.
- In north-eastern Madagascar ESAPP's regional online database provides improved transparency and visibility of local realities and interventions, and facilitates planning of future interventions shaped into a strategy or management plan.
- However, there is a risk that, once established, such a tool will not be actively used and updated. To avoid this, a sense of ownership has to develop among a user community. This can be supported through personal exchange and contact.



ESAPP researchers on their way to a study village. (Photo: Julie Zähringer)



**Top:** Vanilla is the “green gold” of north-eastern Madagascar. It is planted by smallholders in biodiversity-rich agroforestry systems in the shade of large trees. Vanilla production is very labour-intensive, as the flowers have to be pollinated by hand. Flowers may only last for a single day, requiring farmers to walk to their often faraway fields every day. After harvest the pods are boiled and dried for three to four months. The high labour investments make vanilla a very high-value crop. However, farmers have to deal with extreme price fluctuations, a high risk of theft, and pests and diseases. They sell the vanilla to middlemen who visit the remote villages on foot. These middlemen are employed by wholesale merchants in the few large towns, who in turn sell to the exporting companies. In recent years the vanilla market has become increasingly dominated by Chinese traders, reportedly resulting in decreased quality. (Photo: Julie Zähringer)

**Bottom:** Accessibility is a major challenge in north-eastern Madagascar. National road no. 5, the only road connecting the city of Maroantsetra with the rest of the country, is in a very bad state and interrupted by numerous rivers flowing into the Indian Ocean. This makes it time-consuming and costly to transport goods and people. Where no bridges and ferries are available, cars have to cross on makeshift rafts. (Photo: Julie Zähringer)

## The project story

ESAPP’s Malagasy partners had been active in the country’s north-east for a number of years. Projects within ESAPP focused on assessment and mitigation of forest degradation, modelling carbon stocks in various forest types, monitoring and evaluating the impacts of conservation measures, and implementing participatory approaches towards land use planning in and around protected areas. The experiences gathered were exchanged with ESAPP partners in other countries during annual workshops, and fed into the overall conceptual discussion at the programme level. One important conclusion of this discussion was that there is very little exchange and cooperation among stakeholders active in conservation and development in Madagascar’s north-east. In response, the Centre for Development and Environment (CDE) at the University of Bern and ESAPP’s Malagasy partners initiated the “Stakeholder Platform Madagascar”, an open-access online database (<http://spm.esapp.info>) promoting information exchange between stakeholders involved in land governance at different decision-making levels.

The project started with a region-wide survey providing an overview of stakeholders and their activities in land governance. Researchers then developed an online relational and spatially explicit database, and entered interview data into it. The database includes a map of the region with the intervention zones of different activities. The stakeholders connected to these activities are linked to a table and their details can be accessed. Information on 55 activities and 94 stakeholders was available in the database upon closing the project in December 2014. About 40 per cent of the inventoried activities deal with conservation, other common sectors being agriculture and tourism. The stakeholders inventoried are mainly of Malagasy origin, followed by US and Swiss stakeholders. The most prominent Swiss stakeholder is Zurich Zoo, which financially supports the Masoala National Park. International NGOs are the most common type of stakeholder inventoried, followed by international enterprises and foundations.

In 2014, the database was presented to local stakeholders and the regional administration in a two-day workshop on challenges and available tools for improved land governance. At the workshop, numerous participants emphasized the need for a regional land governance scheme. This should encompass measures such as securing land tenure and land rights, improving agricultural extension services, fostering investments into on-site processing industries, providing capacity building for decision-makers at different levels, improving the quality and availability of agricultural and population data, as well as negotiating equitable benefit sharing agreements between the state and local communities in the context of, timber production under the Reducing Emissions from Deforestation and Forest Degradation (REDD+) scheme, and ecotourism initiatives.



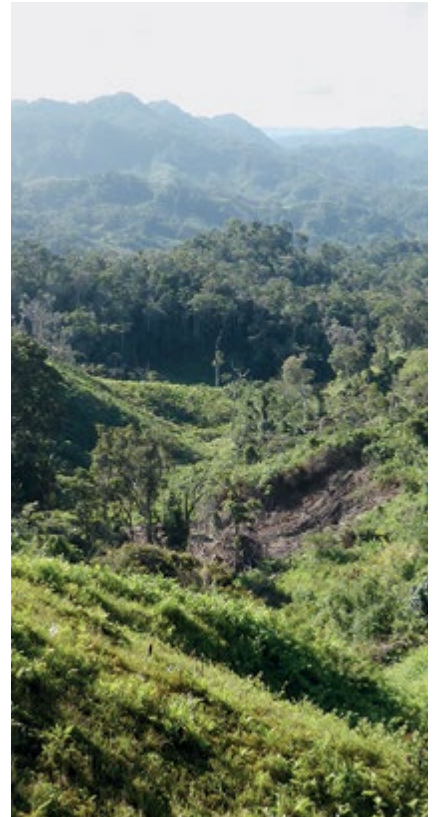


## Innovation and relevance

ESAPP's dual structure, described above, in combination with ESAPP's close links to CDE's research activities, provided several opportunities for all ESAPP partners to actively feed their field-based experiences into conceptual discussions at the programme level, compare notes with partners working in similar contexts, and jointly elaborate a strategy on how to overcome challenges. This process helped to identify the lack of exchange between development partners in north-eastern Madagascar as a systemic challenge facing sustainable development efforts in the region.

Large-scale land acquisition for the production of food and biofuels is on the increase in Eastern Africa. In north-eastern Madagascar, such investments in land are not yet very common. Nonetheless, local land use systems are increasingly linked to actors at the national and international scales, mainly through REDD+ and conventional conservation projects as well as development interventions to improve income generation. Local people's land use strategies aimed at meeting immediate livelihood needs face growing competition. In this context, the availability and exchange of information on external interventions is key to different stakeholders' negotiations on conflicting interests and objectives. It also supports decision-makers at the national and regional scales, as they can use the spatially explicit information to better steer development and land use planning.

The data platform successfully combines information from interviews with spatially explicit references in a map viewer. Different background layers such as administration, land cover, accessibility, and population density illustrate the context in which stakeholders' activities take place. Having an online and open-access platform such as this is a first in Madagascar, as is the use of crowdsourcing to collect data.



**Top:** Smallholders in the region grow upland rice in the traditional land use system of shifting cultivation. The vegetation is slashed and burned in order to increase nutrient availability in the soil and to give the rice seedlings a competitive advantage over weeds. The system is well adapted to the local context where farmers have to divide their labour between many different land use activities. Hillside rice is also more resistant to cyclones than irrigated rice in valley bottoms. However, maintaining soil fertility requires long fallow periods and thus a lot of land, threatening the existence of biodiversity-rich forests in the region. (Photo: Julie Zähringer)

**Bottom:** Shifting cultivation leaves a characteristic footprint in the landscape. Burnt plots occur together with fallow vegetation at different growth stages, leading to a small-scale mosaic landscape. This landscape is interspersed with small forest fragments that fulfil important sociocultural functions, for example as burial places, and provide villages with firewood and different plant materials for their daily needs. Villages are usually located near rivers, as this is the only source of water for the population. (Photo: Peter Messerli)



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## Highlight profile

This highlight is based on the achievements of 2 ESAPP priority action projects.

**Implemented during:**  
2012–2015

**Total funds contributed by ESAPP:**  
CHF 118,000

**Implemented by:**  
Ecole Supérieure des Sciences Agronomiques (ESSA), University of Antananarivo, Madagascar

**In collaboration with:**  
Savaivo, Antananarivo, Madagascar;  
Centre for Development and Environment (CDE), University of Bern, Switzerland

**Main beneficiaries:**  
Local stakeholders, as well as NGOs and national and international projects active in the north-eastern part of Madagascar; national planners and decision-makers

### This highlight

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Design: Simone Kummer (CDE)  
Proofreading: Stefan Zach (z.a.ch GmbH)

### Citation

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## 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](http://www.cde.unibe.ch) (keyword search: "ESAPP").

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# Institutionalizing joint programme management

Today's development agendas and priority settings are often dominated by Western science, mainstream institutions, and elites. In contrast, ESAPP provided space for counterbalancing unequally distributed decision-making power and knowledge. ESAPP partners met at annual workshops, devising tools and procedures for joint programme management. This allowed the partners to find common ground and build capacity and ownership, sparking innovation for sustainable development.

## Sustainable development challenge

Research for sustainable development differs significantly from conventional research, as its objectives and procedures are not predefined but are framed and revised jointly by partners throughout the research process. Research has to build stakeholders' perspectives into its design while maintaining its long-term sustainability orientation. Conventional North-driven programme management, funding, and evaluation systems do not support the inclusive, reflexive, and iterative techniques necessary for this process, nor do they address the experimental nature of producing knowledge in a context of demanding partner interactions.

Managerial tools are needed that continuously enable integration of partners' claims and new research results, fostering equal roles in setting the programme's direction and adapting institutional structures and procedures accordingly. Corresponding monitoring and evaluation tools should help partners benchmark the research process between short-term needs and long-term sustainability, and provide accountability to donors, research partners, and stakeholders alike.

## ESAPP's response

ESAPP opted for an active adaptive management approach (MA 2005, p. 599; Ott 2015) that embraces partners' claims, perceptions, and agency during programme planning, coordination, and review. It invested in partner institutions' capacity; in turn, these institutions supported local ESAPP activities. Modes and places of partner interaction were strategically enhanced to provide space to address power and knowledge disparities. This gave partners from the global South an increasing role in determining the programme's research objectives, managerial tools, and institutional structure.

As a major tool for joint programme management, partners gradually established and applied an innovative monitoring and evaluation system that combined standard formats (such as templates, criteria, logical frameworks, and statistics) and standard procedures (such as advisory group meetings, project-cycle steps, and external evaluations) with reflexive elements. Such a reflexive and recursive monitoring and evaluation system is best suited to the experimental nature of research for sustainable development. In order to overcome geographic distance and foster communication, combined with joint self-evaluation and strategic reorientation, annual one-week workshops were held in countries in the South, beginning in 2006. These so-called "Capitalization Workshops" immediately became a cornerstone of joint programme management and capacity development.



## Main messages

- Research for sustainable development must find new and adaptive ways to resolve conflicting priorities of different stakeholders and build on commonalities, address power disparities, and counterbalance mainstream scientific and institutional dominance.
- Corresponding standards and evaluation criteria must incorporate the voices and agency of all partners from diverse countries and institutions in both South and North.
- ESAPP's adaptive management approach fostered equity in the programme and increased human and institutional capacity in partner countries, particularly in the South.
- ESAPP's monitoring and evaluation system innovatively combined lean formal management tools with institutionalized, partner-driven reflection, self-evaluation, and implementation of lessons learned. It was accountable to funding agencies and partners in both South and North.



ESAPP partners attending a Capitalization Workshop in Nanyuki, Kenya, discuss ways of exchanging spatial and statistical data within the ESAPP network and beyond. (Photo: Albrecht Ehrensperger)





## The project story

ESAPP's research network was heterogeneous, with partners from six countries in the South and from Switzerland that varied widely in institutional strengths and rationales. Equity-oriented management in such a complex programme requires investment in communication, team building, and developing a sense of ownership. The annual Capitalization Workshops that began in 2006 as a way to exchange innovative ideas and capitalize on experiences drew on ties ESAPP partners had already developed through years of research cooperation. The workshops soon became a vital way to further integrate partners from the South in programme reviews and planning. ESAPP partners met every year in a different country for an intense exchange, field excursion, and team-building exercise. Participants shared data and methods, applied and further developed ESAPP managerial tools, and integrated the recommendations of regular external programme evaluations.

The 2009 workshop in Ethiopia was a milestone in consolidating ESAPP's partnership-oriented research approach. Twenty participants gathered for a week in Ambo Town, around 150 kilometres from Ethiopia's capital city, Addis Abeba, to look back on a decade of research cooperation and prepare for ESAPP's final years. The main themes addressed were institutional and strategic challenges faced by the research programme and the systematic mapping of competences, experiences, data, and scientific outputs of partner institutions for a final programme synthesis. In addition, participants reviewed research results and identified thematic and spatial focus areas within the fields of sustainable land management and sustainable regional development.

Acknowledging that the ecological, cultural, political, socio-economic, and historical setting strongly determines development challenges and solutions, ESAPP had formulated core foci of research in individual countries and subregions early on, and had later expanded them into national thematic networks. In the Ambo workshop, this process was further extended by creating thematic partnerships as institutional structures for cross-national exchange. This established a sound basis for further consolidation of thematically focused regional research sites, and for collaboration among ESAPP partner institutions in the South beyond ESAPP's lifespan.

**Top:** Coffee ceremony in Ambo, Ethiopia. Cultural diversity within Eastern Africa is enormous. The ESAPP Capitalization Workshops provided a space not only for conceptual and technical reflections, but also for partners to explore cultural linkages and their implications for transnational communication and exchange of experiences. (Photo: Albrecht Ehrensperger)

**Bottom:** ESAPP partners visit the Mandraka watershed on the eastern escarpment of Madagascar, where local partners implemented several ESAPP projects on sustainable watershed management. Such exchange visits during ESAPP's Capitalization Workshops offered opportunities to compare notes and reflect on possible synergies between different ESAPP project areas. (Photo: Albrecht Ehrensperger)



## Innovation and relevance

Putting into practice research for sustainable development follows no blueprint. Adaptive programme management is necessary to foster partner equity and inclusion while safeguarding sustainability orientation and programme accountability. To this end, ESAPP regularly brought partners together for communication, training, team building, as well as for review and adaptation of the programme. In those meetings, common understanding, human and institutional capacity, and a sense of programme ownership grew, and collaborative events triggered innovation. The Capitalization Workshops engaged regional partners in jointly organizing the research process. The 2009 Ambo workshop was a highlight, as participants from the South helped to progress ESAPP's thematic and spatial research foci and launched innovative South–South exchange and learning in the form of research partnerships between countries with comparable socioecological conditions and development challenges. More than 200 action research projects – initially proposed in local contexts, and approved when consistent with ESAPP research goals at the national and regional levels – were strategically evaluated, clustered, and put in sequence. Thereby, ESAPP partners ensured thematic consistency, spatial concentration, and legitimacy within the research fields of sustainable land management and sustainable regional development.

The workshops have thus been a major element in implementing ESAPP's vision to foster sustainable development according to the 11 principles and 7 questions formulated by the Swiss Commission for Research Partnerships with Developing Countries (Stöckli et al. 2014; Wiesmann et al. 2014). In sum, ESAPP's Capitalization Workshops can serve as a model for fostering equal research partnerships, sharing experiences, and scaling up research results to promote regional development in a way that strengthens ownership and demand in the global South while ensuring coherence in sustainability efforts from the local to the global level.



**Top:** ESAPP partners talk with villagers in southern Tanzania about emerging conflicts between farmers and recently resettled pastoralists (see Highlight 12). Competing claims on natural resources are a widespread problem in the ESAPP region, and lessons learned in one place can help in designing new strategies in another. (Photo: Albrecht Ehrensperger)

**Bottom:** Participants of the ESAPP Capitalization Workshop in Ambo, Ethiopia, developed the conceptual guidelines for the final stage of the programme, based on a systematic review of research and implementation results. (Photo: Hans Hurni)



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## Highlight profile

This highlight is based on the achievements of 8 ESAPP priority action projects.

### Implemented during:

2006–2013

### Total funds contributed by ESAPP:

CHF 377,000

### Implemented by:

Centre for Development and Environment (CDE), University of Bern, Switzerland

### In collaboration with:

Various partner institutions in the countries in which the workshops were conducted (Ethiopia, Kenya, Tanzania, Mozambique, and Madagascar)

### Main beneficiaries:

ESAPP management, partner institutions, and individuals of the ESAPP network

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Ott C. 2015. Reflections on the democratization of knowledge generation in research partnerships for sustainable development. In: Suominen A, Toivanen H, Nieminen M, editors. *The Book of Abstracts for the 2015 Annual Conference of the EU-SPRI Forum: Innovation Policies for Economic and Social Transitions – Developing Strategies for Knowledge, Practices and Organizations*. Espoo, Finland: VTT Technical Research Centre of Finland, pp. 292–295.

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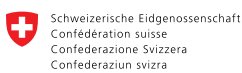
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# Carbon sequestration in Madagascar's forests

Global initiatives such as the United Nations' REDD+ programme hold great promise in harmonizing action towards sustainable forest management. But their success or failure in developing countries often hinges on local capacity and the availability of methods that may be adapted to local conditions. In Madagascar, ESAPP helped foster local expertise and develop transferable methods for estimating carbon sequestration and forest cover change.

## Sustainable development challenge

The basic principles of sustainable development are universal, so it might seem natural to create globally applicable sustainability initiatives. However, each place has its own bio-geographical, economic, social, and political characteristics, making it difficult to apply sustainability initiatives the same way everywhere. The United Nations' Reducing Emissions from Deforestation and Forest Degradation (REDD+) programme is a good example. REDD+ was designed to attach a financial value to carbon stored in forests and enable compensation for forest preservation, thus incentivizing developing countries to reduce emissions from deforestation. Unfortunately, difficulties in adapting the mechanism to local realities often hamper its implementation.

Madagascar's forests are among the most biologically rich ecosystems in the world, but massive deforestation and degradation have eroded their species diversity. Recent national estimates suggested rates of annual forest loss of 0.83 per cent between 1990 and 2000, and 0.53 per cent between 2000 and 2005 (Rasolohery and Steining 2008). However, observers say these figures overlook forest degradation caused by selective logging. To sustainably manage Madagascar's forests and properly implement REDD+, it is important to know the spatial distribution of non-degraded and degraded forests and their carbon stocks.

## ESAPP's response

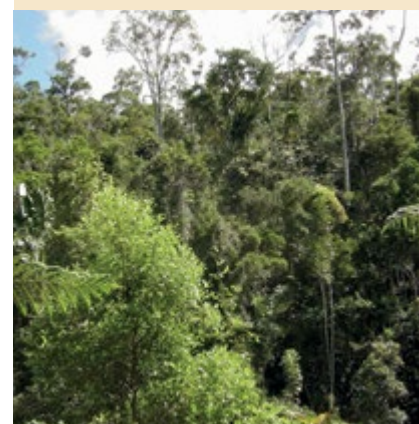
In an effort to generate context-specific knowledge, ESAPP collaborated on many local and subnational project sites throughout Eastern Africa. The resulting knowledge often made it possible to identify ways of adapting and implementing global sustainable development initiatives such as REDD+. Successful adaptation to local contexts depends on individual and institutional capacity at the local level, and on people's knowledge of global schemes and the nuances of their own setting. To build capacity and fill knowledge gaps, ESAPP frequently collaborated with local academic institutions.

At ESAPP project sites in north-eastern Madagascar, participants sought to quantify carbon sequestration in the tropical rainforest. Their scale-independent methodology was specifically designed to map different stages of forest degradation, quantify carbon stocks in relation to the degradation stage, and monitor the loss of biomass and carbon stocks over time. Based on their results, a regional baseline was developed and estimates of future (2020) forest cover were made according to different management scenarios. Training was provided to young scientists from the University of Antananarivo, enabling them to adopt and further develop the method.



## Main messages

- Sustainable forest management requires detailed, accurate, and up-to-date information on forest cover change, forest degradation, and forest carbon storage. This can only be achieved by developing or adapting methods that are adjusted to local contexts and forest types.
- Allometric equations adapted to the local context are essential for accurately estimating carbon stocks. Similarly important are methods of assessing forest cover, degradation, and deforestation using remotely sensed data.
- Young, local scientists in the global South should be supported to become experts in their fields. Local centres of research excellence, headed by home-grown talent and internationally renowned experts, are crucial to sustainable development.



Non-degraded forest has a closed, dense canopy and a high level of plant diversity. It also has significantly higher carbon storage capacity than degraded forests. (Photo: Harifidy Rakoto Ratsimba)



### The project story

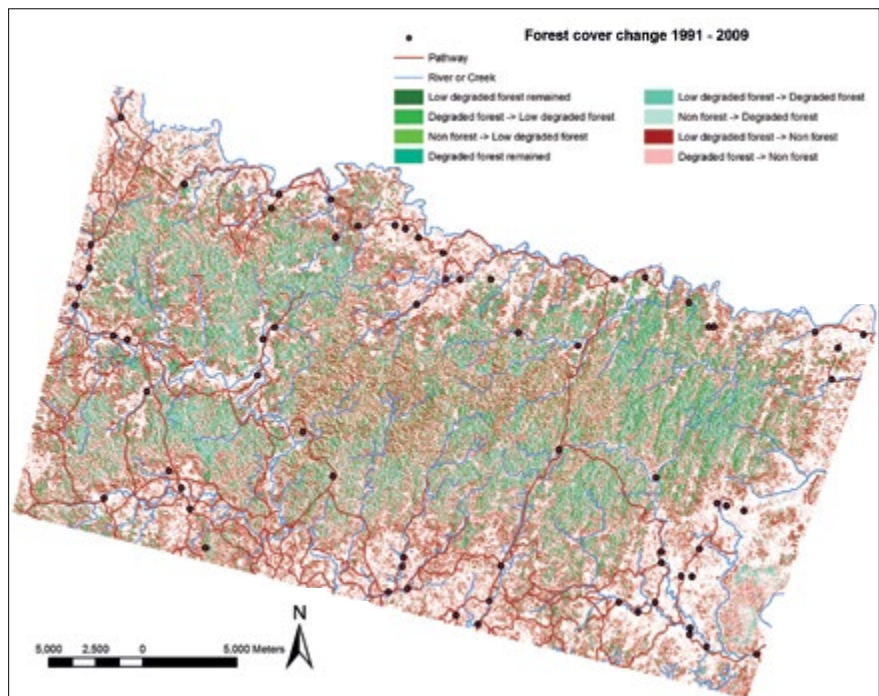
The project began with a site-specific inventory of the tropical rainforest. Selective logging (mainly of precious woods) has degraded vast stretches of forest, creating gaps in the canopy. While these degraded forests still have a high diversity and quantity of plants, they are bound to store less carbon; the aim was to find out how much less. The inventory was done by local Master’s students in forest engineering. They collected plant samples and analysed them in the laboratory at the Water and Forest Department of the School of Agronomy (ESSA Forêts) at the University of Antananarivo. By relating tree size and dry weight of their samples, they developed so-called allometric equations to estimate the biomass and carbon stocks of non-degraded and degraded forests. The calculations revealed that degraded forests store 32 per cent less carbon than non-degraded forests. This means that distinguishing between degraded and non-degraded forests is highly important: failing to account for degraded forests can lead to substantial overestimation of above-ground biomass and carbon stocks.

Subsequently, a PhD student at ESSA Forêts analysed forest change over time using satellite data for the years 1991, 2004, and 2009 (Rakoto Ratsimba 2011). His work was mainly funded by academic institutions in Belgium, Switzerland, and Germany; ESAPP made a small contribution to it. The student distinguished non-degraded and degraded forest classes, and mapped them for the three selected years. He then generated forest change and degradation maps. By combining the allometric equations with the map information, he was able to estimate forest carbon stocks and their change between 1991 and 2009. He used existing scientific methods, but adapted them to the Malagasy tropical rainforest to achieve accurate results. This was done in close collaboration with experts from the Centre for Development and Environment (CDE).

For the period from 1991 to 2009, the researchers estimated that 15,000 hectares of forest were lost. This corresponds to a decline of 34 and an annual deforestation rate of roughly 1 per cent – well above the original national estimates. Results also showed that the forest was heavily fragmented and that degraded forest areas increased from 39 to 64 per cent over the same 18-year period. These developments resulted in an estimated loss of 142,385 megatonnes of stored carbon (72 per cent). Based on their findings, researchers modelled baseline carbon stocks and generated change prediction maps for 2020 according to different management scenarios (Eckert et al. 2011; Eckert 2012).

**Top:** The modelling of carbon stocks was based on both remotely sensed information and field data. Allometric equations were used to estimate the above-ground and below-ground biomass of various forest types in randomly selected test plots. (Photo: Sandra Eckert)

**Bottom:** Between 1991 and 2009, forest cover in the study area changed in different ways depending on its accessibility: forest areas close to settlements and pathways frequently experienced degradation or deforestation, while forest areas far away from settlements and pathways experienced little or no degradation.



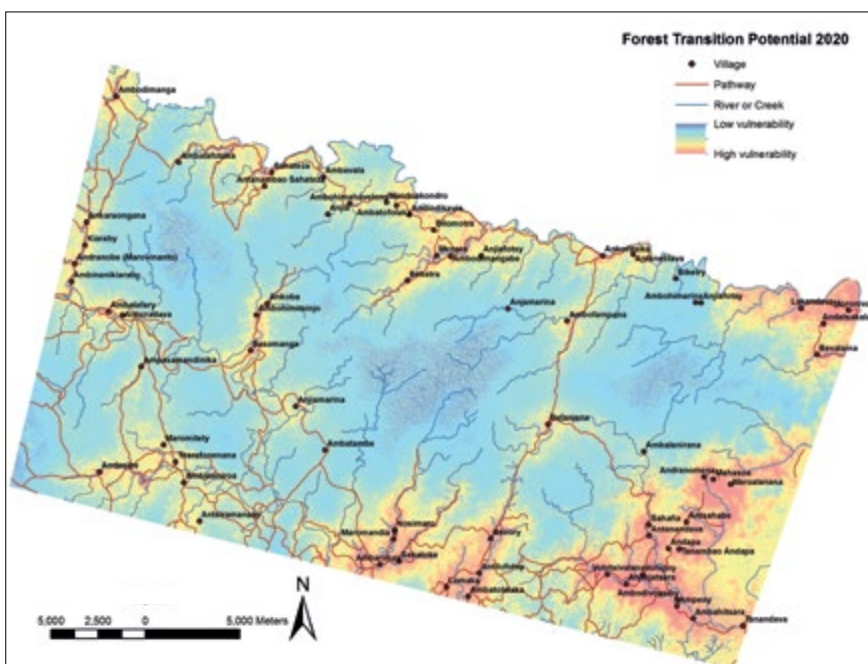


## Innovation and relevance

Most existing carbon assessment and monitoring methods were developed for temperate forests, whose vegetation cover is not nearly as dense as that of tropical rainforests. These methods fail to produce accurate results for tropical rainforests. The method developed in this project is innovative in several ways: (1) it works for non-degraded and degraded tropical rainforests; (2) it integrates different levels of forest degradation into the calculation of carbon stocks (overlooked by other methods); and (3) it can be transferred both to larger areas and to other regions with similar forest types. This makes it valuable for both the international research community and local stakeholders active in forest conservation and monitoring.

Because of its ability to predict possible carbon loss and the locations of future deforestation and forest degradation, the methodology developed is highly useful to REDD+ implementation. Importantly, the project confirmed that different forest classes contain different quantities of carbon. These differences had never been quantified before in Madagascar. They indicate that forest degradation, for example from selective logging, causes substantial carbon emissions, and confirm the importance of conservation, restoration, rehabilitation, and sustainable management of forests. These findings are not only of interest for research scientists but should motivate conservationists to continue their efforts. The project findings can also help policymakers improve the coherence of REDD+ activities, which are currently implemented at multiple levels and face risks of inconsistency.

The Malagasy junior scientists trained in the ESAPP project became national experts in their field. They have gone on to advise national and regional policymakers as well as to support the implementation of REDD+ projects in Madagascar. Their tasks at the national scale include setting national standards and registries, monitoring performance, generating data, and designing national programmes.



**Top:** Degraded forest is characterized by an open canopy cover, but still contains a high level of plant diversity and quantity. Distinguishing degraded forest as a separate category in forest models proved crucial, as it stores less carbon. Prior modelling attempts in the region ignored this, leading to significant over-estimates of remaining carbon stocks. (Photo: Harifidy Rakoto Ratsimba)

**Bottom:** Based on analysis of prior forest cover change, researchers predicted where deforestation and forest degradation were likely to occur in the future. The resulting vulnerability map is a useful tool for sustainable forest management in the region.





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## Highlight profile

This highlight is based on the achievements of 2 ESAPP priority action projects.

**Implemented during:**  
2008–2014

**Total funds contributed by ESAPP:**  
CHF 159,000

**Implemented by:**  
Ecole Supérieure des Sciences Agronomiques (ESSA), University of Antananarivo, Madagascar

**In collaboration with:**  
Savaivo, Antananarivo, Madagascar; Centre for Development and Environment (CDE), University of Bern, Switzerland

**Main beneficiaries:**  
Academic staff of ESSA, relevant government offices in Madagascar, and international experts

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## This highlight

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<http://doi.org/10.7892/boris.72023>.

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Funded by



## 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](http://www.cde.unibe.ch) (keyword search: "ESAPP").

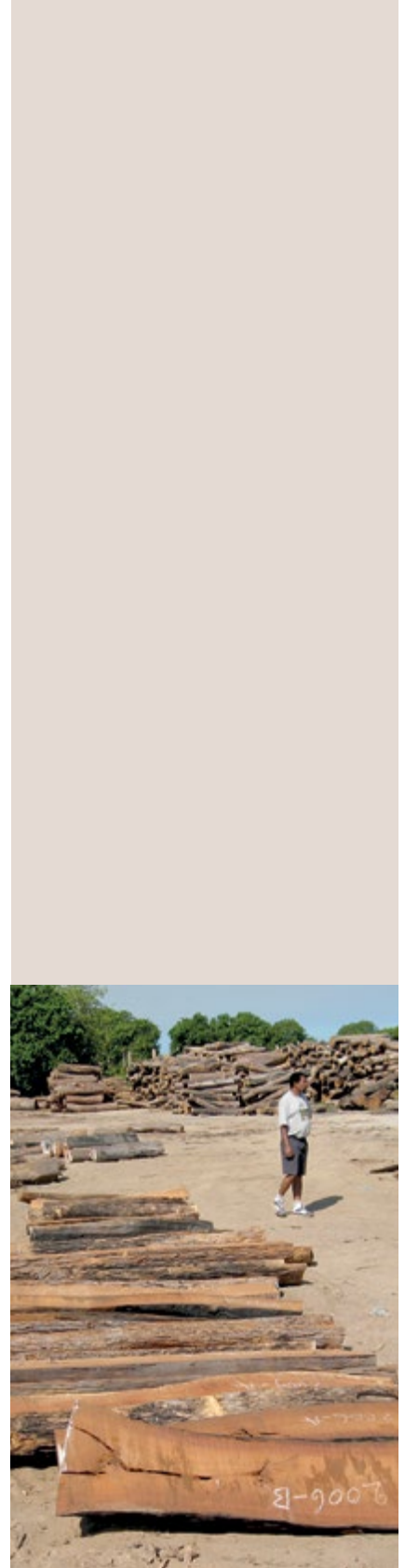
# Foundations

Sustainable development is not just a matter of catching up with a certain development model or standard. It is a global development process that is goal-oriented and tries to harmonize various target dimensions, such as social justice, economic prosperity, and environmental integrity. Similarly, sustainable development research is not just about understanding how a system works, but also about organizing societal processes to transform this system towards greater sustainability.

In these processes, everybody should have an equal say, which is why researchers in sustainable development argue that this concept is both systemic and normative at the same time (Wiesmann et al. 2011). It can be grasped and understood at the conceptual level, but its practical manifestation in concrete contexts depends on local actors' prevalent priorities, perceptions, and values. The challenge is therefore to bring together actors and knowledge systems with the help of adequate reflections, concepts, and methods. In other words, it is not enough for sustainable development research simply to transfer knowledge to a hypothetical recipient: it also has to acquire relevance to support social transition processes towards sustainability. Only in this way can it enable a legitimate answer to the question posed by practitioners and decision-makers: "What should we do?"

ESAPP held the view that sustainable development research in a North–South context should free itself from the dominance of Western science and its development paradigms. Equity-based partnership frameworks and transdisciplinary research approaches should be explored as a suitable means to balance science–society interaction, with a view to fostering joint knowledge production as well as learning and institutional development.

Sustainable development became a buzzword in 1992 and has remained one ever since. Gaining momentum for true sustainability transformation requires responsible leadership – also by science. ESAPP tried to concretize and operationalize such transformation by acknowledging and fully embracing the normative aspect of sustainable development when working in specific contexts. It consistently worked towards enhancing the quality of its partnership with actors in the region, developing and using field-based, communicative methods that enhanced transdisciplinary knowledge production.



## Sustainable development

In the 1970s and 1980s economic shocks revealed the limits of economic development, and social and ecological crises began to manifest themselves, drastically and globally. In reaction, a global community framed sustainable development as a new concept based on global equity, justice, and inclusion. Since then, sustainable development has partly replaced aid delivery and economic benefit-sharing as a paradigm for poverty-oriented approaches in development policy and practice. The basic premise of this new paradigm is that science and society should interact in realizing a shared vision of a future that encompasses inter- and intragenerational equity within the planetary boundaries. This requires new relationships and modes of exchange.

However, despite efforts from funding agencies to allow submitting institutions to consult with Southern partners in defining project priorities, topics, and approaches, typical project lifecycles tend not to favour research for sustainable development. This is because research for sustainable development is inherently dynamic and thus requires an adaptive management approach and long-term interaction between countries.

ESAPP's mission to promote sustainable land management and sustainable regional development was bound to the normative and ethical foundations of sustainable development (Wiesmann et al. 2011). In science–society interaction, ESAPP explored and opened new avenues for more equitable, just, and inclusive knowledge generation and development solutions. ESAPP researchers played a decisive dual role of generating knowledge while supporting the development of civil society. It gave rise to innovative concepts and tools, as well as contextualized data and solutions, which helped enhance the capacity of Southern institutions. Such was the case in the region north-west of Mount Kenya, where ESAPP was present with an integrated approach towards sustainable development from the early stages of the programme (Highlight 22).

## Partnership

The normativity of sustainable development broadens our understanding of research and implementation partnerships: the idea of North–South knowledge transfer has given way to that of co-production of knowledge by equal partners, and the creation of new institutions for sustainable development (Stöckli et al. 2014). Equity and inclusion are of specific concern in North–South partnerships, where research is generally financed, initiated, and steered by Northern institutions.

New buzzwords and priorities are regularly pushed centre stage in the context of sustainable development research and implementation, often at the expense of existing focal topics. These frequent changes can undermine work on building long-term partnerships between institutions in the North and South, and hinder creation of sound data and knowledge bases. This is unfortunate, as such partnerships make it possible to consolidate loose institutional networks, transforming them into sustainable knowledge hubs that are capable of designing and implementing context-specific sustainable solutions. Long-term partnerships also help such networks make their experiences as implementers and service providers visible, both in the national knowledge production landscape and for international donors.



ESAPP partner institutions decided that the Swiss coordinating institution – the University of Bern’s Centre for Development and Environment (CDE) – is not only accountable to the funding organization, but also has to transfer decision-making power to partner institutions in the Eastern and Southern African region. This was done in view of advancing Southern determination, competence, and ownership in the formulation of pathways for sustainable development (UNESCO 2010). Long-term cognitive and emotional interaction with partners in research and programme implementation facilitated equity and joint programme management. This allowed a gradual transfer of financial, organizational, and thematic responsibilities, which in turn provided the foundation for strong research institutions and networks in the South.

Concretely, ESAPP participated in long-term capacity development of several partners in the region. Two of the institutions that benefited from several years of close collaboration are located in Madagascar (Highlight 23). Capacity development efforts included the joint development of learning and community mobilization approaches, as well as the identification of institutions’ thematic portfolios and the shaping of their thrusts and methodological areas or expertise. This was done over a long period: for some institutions, the joint learning process lasted for the entire duration of the ESAPP programme.

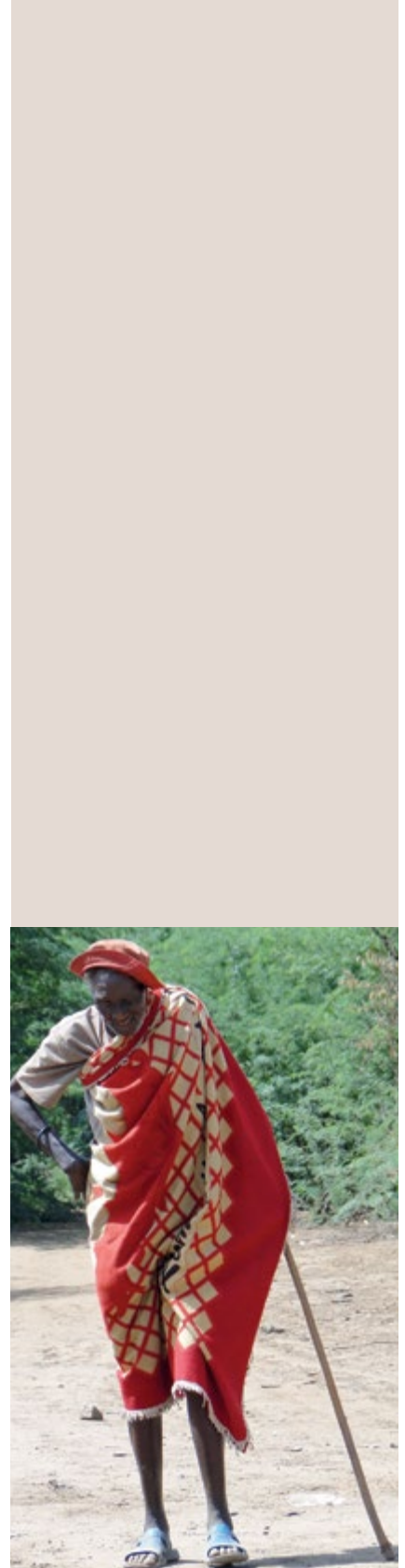
### Transdisciplinarity

In sustainability-oriented development research, transdisciplinarity is framed as a concept to bridge science and society. It is seen as a means of making research both a part and a driver of social learning processes for societal problem-solving, and as a means of increasing the coherence of policies and strategies across organizational levels. However, this interaction between scientific or research communities and society as a whole – transdisciplinary knowledge production – remains largely experimental. How do science and society exchange with one another, and where can they enter into joint learning processes despite contradictory interests? These are questions that still require answers.

Based on the understanding of transdisciplinarity as an integrative approach, ESAPP organized its research around three major principles (Pohl and Hirsch Hadorn 2007; Stöckli et al. 2014): (1) integration of disciplinary, interdisciplinary, and non-scientific (“endogenous”) knowledge systems; (2) integration of scientific, societal, institutional, and governmental actors; and (3) integrative learning processes compiling systems knowledge defining the scope of action, target knowledge as a shared vision of a sustainable future, and transformational knowledge as the path to follow. In northern Mozambique, ESAPP applied these principles in a series of projects that used the Learning for Sustainability (L4S) approach to find pathways towards sustainable forest management (Highlight 24).

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# Integrative sustainable development in the Mount Kenya region

Conflicts over scarce resources – notably water – are often related to other underlying issues, such as poverty and the interdependence of upstream and downstream areas. To be successful, projects addressing such conflicts must be long-term and take into account all three dimensions of sustainable development – the ecological, the economic, and the sociocultural.

## Sustainable development challenge

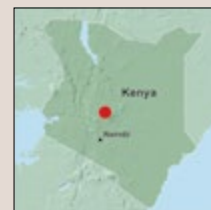
Transnational river basins have received much attention in recent decades from international agencies and donors. Efforts were made to mitigate conflicts over natural resources, especially water, between upstream and downstream countries experiencing rapid economic growth. However, this attention largely failed to take into account that intra-national conflicts in dynamic highland–lowland systems are particularly widespread, critical, and pronounced. Promoting more sustainable use of natural resources and mitigating conflicts between upstream and downstream users in intra-national river basins is therefore an urgent, highly complex sustainable development challenge.

What this challenge entails can be seen at the Ewaso Ng'iro Basin, which originates at tropical Mount Kenya and extends north to semi-arid lowlands. This heterogeneous intra-national highland–lowland system is undergoing rapid socio-economic and land use change. The different land use systems – pastoralism, small-scale farming, large-scale ranching, and export-oriented horticultural production – evolved over time in a complex process. Historical and recent dynamics have created a situation of immigration-fuelled fast population growth, widespread poverty among smallholders and pastoralists, large disparities between different population segments, and multi-dimensional conflicts over scarce and increasingly degraded natural resources, particularly water.

## ESAPP's response

Mitigating competition and conflicts over natural resources between diverse stakeholders at multiple levels is a difficult task that involves all three dimensions of sustainability. Resource conflicts usually arise when environmental services decrease due to overuse and degradation of resources (ecological dimension). At the same time, they are often rooted in widespread poverty and large economic disparities (economic dimension), while the social and cultural setting determines how they are expressed and handled (sociocultural dimension). In the case of water, this complexity is further augmented by the interdependence of upstream and downstream areas at various scales. Addressing such complexity requires a long-term, integrative approach that takes into account multiple levels, sectors, and stakeholders.

ESAPP developed and applied such an approach to address the multi-dimensional water conflicts in the Ewaso Ng'iro Basin. The strategy built on previous projects by ESAPP partners in the region, and simultaneously addressed the urgent need for reliable water supply and the requirement to reduce the demand for water, particularly river water, at all levels from household to national. This enabled ESAPP to carry out a range of priority action projects and demand-driven initiatives, each of which directly contributed to resolving the complex sustainability issues in the region.



## Main messages

- In most contexts there are no easy solutions to sustainability issues such as conflicts over scarce water resources. This is because they are related to other issues such as high poverty incidences and disparities, and can therefore only be successfully addressed in combination with these.
- Series of successive participatory action projects guided by a transdisciplinary sustainability strategy are a strong and successful alternative to large-scale and logical-framework-driven development programmes, as they build on social learning processes and can adapt to societal and political dynamics and transformations.
- Such an approach requires long-term involvement and commitment by research and development institutions. This means going beyond carrying out commissioned projects, and taking active responsibility for agenda-setting in relation to the sustainability issues at hand.



The water originating from Mount Kenya and its rainforest is vital to all downstream ecosystems and livelihoods. It is highly contested and heavily overused. (Photo: Urs Wiesmann)





**Top:** After Kenya became independent, former colonial large-scale farms in the footzone of Mount Kenya and on the semi-arid Laikipia plateau were subdivided into small plots. In the decades that followed, small-scale farmers immigrated to the area and settled on these plots, causing rapid population growth. They came from Kenya’s high-potential farming areas, where land had grown scarce. In the Mount Kenya area, they now face the risks of semi-arid conditions. Low harvests and crop failures contribute to high poverty rates and insecure livelihoods, resulting in heavy pressure on water flowing from Mount Kenya. (Photo: Urs Wiesmann)

**Bottom:** In the highly dynamic and conflictual highland–lowland situation there is no silver-bullet solution to prevent overuse and degradation of water resources and achieve sustainable development. These goals can only be attained through a multi-level and multi-stakeholder strategy that aims at enhancing water supply to secure livelihoods while reducing water demand to safeguard critical water flows even in the dry seasons. ESAPP helped implement crucial components of this strategy. (Source: Wiesmann et al. 2000)

## The project story

A wealth of information on the socioecological system of the Ewaso Ng’iro Basin had already been collected prior to ESAPP, through various projects carried out by ESAPP’s partners. Based on this knowledge, ESAPP developed a strategy that focused, at multiple levels, on the contentious issues of water supply, demand, management, and governance. Following this strategy, ESAPP identified several fields of activity, which were then addressed by successive priority action projects. The projects were implemented together with relevant stakeholders at the various decision-making levels.

A first succession of projects dealt directly with issues of water management and governance. These projects focused on providing information for better management and planning, creating and compiling detailed information in the form of sub-catchment directories, a wetland inventory, and maps of water use conflicts in the region. Substantial contributions were also made towards the creation of Water Resource Users Associations (WRUAs), and to developing their capacities as participatory governance structures in the water sector, particularly in the fields of water allocation, control, and conflict resolution (see Highlight 3).

Demand for irrigation water and conflict over that water within and between different actor categories – such as poor small-scale farmers and international agribusinesses – were identified as two of the most critical sustainability issues. For this reason, activities were expanded, with additional series of successive projects simultaneously aiming at lowering demand for irrigation water and reducing poverty. More specifically, a second strand of projects dealt with conservation agriculture, which in this region mainly meant water-conservation agriculture. It addressed issues of agroforestry, mulching, minimum tillage, drought-resistant crops, and capacity development among farmers. A third strand successfully explored avenues of alternative income sources, in particular for small-scale farmers and pastoralists (see Highlight 11).

Finally, a fourth series of projects aimed at environmental sensitization by focusing on two important wild animals. Sensitization and capacity development in relation to the rare and endangered Bongo antelope emphasized the importance of mountain rainforests for biodiversity but also for water resources. Further, by extensively addressing human–elephant conflicts (see Highlight 5), attention was directed towards the danger of further subdividing large-scale ranches into smallholder settlements, as these would significantly increase conflicts over scarce water resources.

Multi-level strategy		
Relevant levels	Enhance water supply	Reduce water demand
(International)		
Country	Legal framework	Land tenure policy
Province		Infrastructure
Basin	Negotiations & control	
District	Supply planning	Land use planning
Location		Infrastructure
Community	Water use efficiency	Off-farm jobs
Household	Water use efficiency	Farming techniques

## Innovation and relevance

There are no silver-bullet solutions to sustainability issues in certain contexts. This was an important conclusion of ESAPP's involvement in the Mount Kenya region, and applies to areas in which dynamic socio-economic and land use change is coupled with high poverty rates, disparities, insecure resource access, high dependencies between upstream and downstream communities, and overused and increasingly degraded natural resources, particularly water.

ESAPP's strength lay in its innovative multi-level, multi-sectoral, and multi-stakeholder approach in the region. This approach involved systematically portioning complex sustainability issues into manageable fields of participatory action. This constituted a structural innovation, as it enabled a departure from large-scale and logical-framework-driven programmes that raise high expectations but lack the flexibility needed to have a societally and politically sustainable impact. Instead, it allowed for small, participatory, and targeted initiatives that could be executed independently and still contribute to overarching sustainability goals. At the same time, it enabled sequences of participatory action to be fine-tuned, based on the social learning processes triggered by the various projects. This, in turn, led to higher impact and multiplier effects in relation to overarching sustainability goals. ESAPP's basic programme structure was ideal in promoting this participatory action approach, which it successfully scaled out by establishing exchanges and joint learning platforms with similar contexts in the programme region, for example the Pangani Basin in Tanzania.

Nonetheless, it is important to note that some conditions have to be met before applying such an adaptive and participatory-action-based approach. It requires (1) an integrative strategy that combines a wide range of disciplinary knowledge with intense science–society interactions, to take into account the normative nature of sustainability; (2) a long-term involvement by contextually rooted institutions that bridge research and development and are able to guide and fine-tune projects in line with the integrative strategy; and (3) that the involved research and development institutions actively take responsibility to guide and harmonize successive initiatives in the direction of the overarching sustainability strategy. These requirements mean that such approaches cannot simply be commissioned by development agencies or governments.



**Top:** Prior to the colonialist era, pastoralist communities occupied the entire region north of Mount Kenya. The colonial regime forced them to withdraw to the semi-arid and arid downstream areas, cutting them off from their former dry-season pastures. In recent decades, the arrival of immigrant small-scale farmers, the expansion of horticultural farms, and rapid growth of urban centres have created a highly dynamic situation in the Upper Ewaso Ng'iro Basin that has heightened pressure on water resources and turned the region's perennial rivers into episodic streams. These developments are heavily affecting the livelihoods of pastoralists downstream. (Photo: Urs Wiesmann)

**Bottom:** ESAPP helped to implement the multi-level and multi-stakeholder strategy for more sustainable development and better water management in the Mount Kenya region. In particular, the programme supported the formation of Water Resource Users Associations (WRUAs) to improve water management and sharing (left), promoted conservation agriculture for more efficient soil-water use (middle), and fostered the development of alternative income sources for poor small-holders and pastoralists to reduce their dependency on primary production (right). (Photos: Urs Wiesmann)



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## References and further reading

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## Highlight profile

This highlight is based on the achievements of 10 ESAPP priority action projects.

**Implemented during:**  
 1999–2014

**Total funds contributed by ESAPP:**  
 CHF 384,000

**Implemented by:**  
 Centre for Training and Integrated Research in ASAL Development (CETRAD), Nanyuki, Kenya

**Supported by:**  
 Centre for Development and Environment (CDE), University of Bern, Switzerland

**In collaboration with:**  
 Numerous development partners and stakeholders in the region

**Main beneficiaries:**  
 Communities in the Mount Kenya region

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 CENTRE FOR DEVELOPMENT  
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# Building up regional competence centres

Disparities in power and knowledge are a challenge in North–South partnerships. To counter this, ESAPP fostered the development of its Southern partners, promoting competence and ownership beyond the programme. Focusing on two local institutions in Madagascar, Savaivo and DERAD, ESAPP worked to develop human capacity and strengthen their institutional set-up, while providing space for them to proactively navigate the research programme.

## Sustainable development challenge

Sustainable development is a normative and integrative concept that entitles all members of the human society to a just share of resources and an equal voice in shaping a sustainable future. For research cooperation, this implies working in equity-oriented partnerships. But while partnerships are standard practice, they vary greatly in the application of principles such as equity, ownership, and transparency, and often fail to adequately integrate knowledge, perceptions, and values of all partners and stakeholders.

This challenge is most acutely felt in North–South partnerships, as Northern institutions usually initiate, fund, and define research contents. Disparities in power and knowledge are a serious hurdle for mutual interaction and exchange between partners on an equal basis. Thus, a key challenge is to design approaches that enhance joint knowledge generation in accordance with human and institutional capacity development. Such approaches can improve the basis for a gradual transfer of decision-making power to partners in the South, and a better integration of their voices and agency in joint programme management in accordance with the 11 principles laid out by the Swiss Commission for Research Partnerships with Developing Countries (KFPE) (Stöckli et al. 2014).

## ESAPP's response

In order to bridge the divide in power and knowledge between North and South, ESAPP committed itself to fostering the development of its Southern partner institutions, and to securing their competence and ownership in sustainable development beyond the programme. The main target was to enable these institutions to become: (1) centres of competence for sustainability research; (2) active agents in knowledge production and policy formulation; and (3) collaborative networks with the ability to formulate alternative pathways for sustainable development at a regional level in Eastern Africa.

For this endeavour, ESAPP was able to build on decades of research collaboration between Switzerland and the respective countries (e.g. Madagascar). The programme implemented an adaptive set-up that provided space to organize human and institutional development in combination with a gradual integration of Southern partners in programme management activities. This strengthened capacity in both South and North, and expanded research that had started out as disciplinary endeavours into integrative transdisciplinary cooperation. It allowed ESAPP to train and establish local institutions in Southern partner countries as competent actors and knowledge brokers for sustainable development beyond the programme's lifetime.



## Main messages

- Actors in the global South need a stronger voice and role in advocating their own visions for sustainable development.
- ESAPP's experience shows that institutional and human capacity development is the main driver of greater equity and a reduced North–South and South–South divide within research partnerships, in accordance with KFPE's 11 principles.
- Capacity development also supports the establishment of more stable research institutions, non-governmental organizations, and networks in the South. Stability and reach of ESAPP partners and networks are important indicators of successful or promising North–South and South–South interaction.
- Stability increases opportunities for local institutions to act as implementers and service providers for governments, national and international research institutions, and donor agencies.



To collect information needed to inventory the resource base, DERAD team members conduct semi-structured interviews with resource users. (Photo: Sarah-Lan Mathez-Stiefel)



**Top:** Capacity development at individual and institutional levels enabled DERAD to position itself in the consultancy and research support market. The photo shows the DERAD team during CDE-taught training in applying the Sustainable Development Appraisal (SDA) tool. SDA guides participatory assessment of development-relevant baseline data in a given area, as well as evaluation of the local setting from different actors' perspectives with regard to sustainable resource management and sustainable development. (Photo: Markus Giger)

**Bottom:** Here, Savaivo team members are conducting a Learning for Sustainability (L4S) workshop on conflict management in the rural municipality of Mandialaza bordering the Anjozorobe-Angavo protected area. L4S workshops bring together community members, resource users, and technical personnel from governmental rural advisory services or NGOs. Mutual learning is used as a springboard for finding consensus and jointly drafting development plans later on. (Photo: Nicolas Rakotondramaka)

## The project story

In the 1980s, CDE was engaged in two mandates funded by the Swiss Agency for Development and Cooperation in Madagascar: *Terre-Tany*, a project that supported natural resource management in rural areas, and *BEMA*, a project on the ecological balance of slash-and-burn agriculture on the eastern escarpment of Madagascar, implemented jointly with the Swiss Federal Institute of Technology in Zurich (ETH Zurich). Two local institutions were born of these mandates: Savaivo and DERAD (Diagnostic environnemental et recherches appliquées pour le développement en milieu rural). Both are specialized in studying and implementing sustainable management of natural resources.

When ESAPP was started in 1999, collaboration with Savaivo and DERAD was resumed and brought to an entirely new level: ESAPP invested significantly in the development of human capacity in both institutions and strengthened their institutional set-up. At the same time, it provided space for the institutions to assume a proactive role in navigating the research programme.

Specific scientific training was provided in the application of ESAPP's concepts, tools, and methodologies designed to foster transdisciplinary knowledge generation and local sustainable development strategies. For example, Savaivo staff were trained to moderate workshops on Learning for Sustainability (L4S), a tool that fosters joint capacity building between representatives of local communities and local development agencies or NGOs (see Highlight 24). Savaivo and DERAD were also trained in managing and analysing a variety of ESAPP data using geographic information systems (GIS) or statistical packages.

Key staff of Savaivo and DERAD played an important role in ESAPP's programme milestones such as the annual "Capitalization Workshops" (see Highlight 20), where project partners from throughout the region came together to exchange conceptual foundations, research results, and new tools, and to plan further programme activities in a participatory manner. In addition, major emphasis was put on individual and thematic exchange between all partner countries. DERAD and Savaivo staff participated in research and planning in other countries, especially in the scaling-up of innovations gained in action research projects, and in the establishment of ESAPP thematic focal points and reference sites. Thus, both institutions were able to broaden their network within Madagascar as well as in the whole ESAPP region.





## Innovation and relevance

ESAPP's research approach was innovative because it combined knowledge production for informed decision-making with the improvement of science–society interaction and fostering of institutional development in the programme region. It not only organized transdisciplinary research according to principles of democratized knowledge generation, social learning, and institutional development, but also pursued equity as a structural goal within partnerships themselves.

There are two structural features of ESAPP that were highly instrumental in achieving the individual and institutional capacity development described above: First, ESAPP ran for more than 15 years, making it significantly longer than comparable research partnership frameworks. This consistency spawned partnerships beyond the usual short-termed project logic, enabling partners to jointly shape capacity development strategies, a regional network, and future programme orientation. Second, ESAPP only relied on a logical-framework approach for individual priority action projects, but not for other interactions with partner institutions. This mode of operation enabled network partners to react flexibly to stakeholder demands and encouraged them to participate in the constant redefinition of development priorities in specific contexts.

In this way, decision-making power was gradually transferred, and institutions such as Savaivo and DERAD eventually became proactive leading partners within the programme, enabling them to grow into local centres of excellence in sustainable land management and sustainable regional development. They are now able to act as strong partners for governments, research institutions, and development agencies in identifying pathways towards sustainability. Thus, the idea of North–South knowledge transfer slowly gave way to the idea of co-production of knowledge by equal partners, a highly relevant process in terms of building governing capacity among domestic institutions in the South.



**Top:** Savaivo, a consultancy and research institution, gradually increased its portfolio and positioned itself in the national market, especially by offering analytical competence and effective approaches for community mobilization. Work with local communities often involves long travel. Here, a member of the Savaivo team and a colleague from a partner organization are on their way to a community mobilization event in a remote part of Madagascar. (Photo by Rodolphe Randriamanana)

**Bottom:** Representatives of a local community take part in a participatory impact analysis of a former reforestation project in Madagascar. ESAPP did research in close collaboration and interaction with local people and institutions in their respective environment. Close interaction with civil society in the local surroundings is indispensable in research for sustainable development. Joint generation and implementation of knowledge helps to balance knowledge and power disparities and to secure coherence in local to global development approaches. Human and institutional capacity development within ESAPP reached far beyond the partnership network into the public sphere. (Photo: Ernst Gabathuler)





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## Highlight profile

This highlight is based on the achievements of 10 ESAPP priority action projects.

**Implemented during:**  
2002–2014

**Total funds contributed by ESAPP:**  
CHF 212,000

**Implemented by:**  
Centre for Development and Environment (CDE), University of Bern, Switzerland

**In collaboration with:**  
Partner organizations in all ESAPP countries

**Main beneficiaries:**  
Savaivo, Antananarivo, Madagascar; DERAD (Diagnostic environnemental et recherches appliquées pour le développement en milieu rural), Antananarivo, Madagascar; ESAPP network in Kenya (CETRAD and partners); ESAPP network in Ethiopia (Regional Coordination Office and partners); and ESAPP partners in Eritrea

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## 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](http://www.cde.unibe.ch) (keyword search: "ESAPP").

# L4S: multi-stakeholder cooperation

The dominance of some actors over others can perpetuate disparities and poverty. While some actors work to access natural resources (e.g. natural gas exploration), poverty and pressure on the livelihoods of local communities persist. To deal with the resulting complexity, ESAPP used a transdisciplinary approach that includes the Learning for Sustainability (L4S) tool. L4S integrates research and capacity development at local, regional, and national levels.

## Sustainable development challenge

When addressing issues of sustainable development, most development practitioners use a “logical-framework approach”, a development approach which presumes a predefined perception of the project context. As a consequence, priorities change depending on decision-making levels and stakeholder interests. The resulting development processes are fragile and often hindered or even misused by some stakeholder groups. The dominance of some actors with strategic relations to and support from other strong actors can perpetuate disparities and poverty.

Such disparities are on the rise in the province of Cabo Delgado, in the north of Mozambique. The growing tourism industry, natural gas exploration, and, to a lesser extent, timber logging and fishing, all fuel marginalization processes. They also contribute to the ongoing degradation of the diverse *miombo* forest landscape (see photo, right). Segmented development interventions mean that efforts to mitigate forest degradation and secure local livelihoods – through collaboration between local communities, logging companies, and government authorities – remain inconsistent and inefficient. Thus, while a number of outside actors are interested in accessing the area’s natural resources, poverty and pressure on local communities’ livelihoods persist.

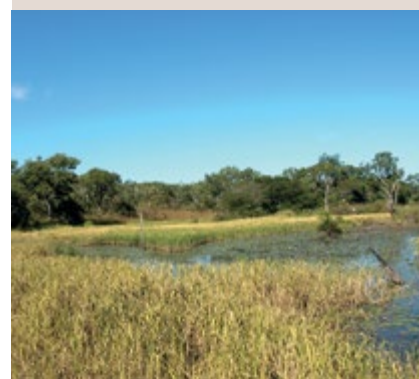
## ESAPP’s response

ESAPP used a transdisciplinary approach to deal with complexity and a multiplicity of actors. An important component of this approach was the Learning for Sustainability (L4S) tool. L4S was designed in the 1990s by the Centre for Development and Environment (CDE) and has since been adapted to a number of development topics and contexts. The tool integrates research and capacity development at local, regional, and national levels. Workshops based on knowledge exchange between stakeholders and researchers help to identify the social, economic, and ecological dynamics leading to competing claims on natural resources. This analysis then forms the basis for defining sustainable development pathways. In Cabo Delgado, ESAPP worked to achieve a better understanding of ongoing development deficits and resource degradation, sharing this knowledge with relevant stakeholders as a basis for mutual supportive action. The process started out with experiences and preliminary research in the governance and management of natural resources, with the aim of developing a differentiated perception of the context. A partnership between the Eduardo Mondlane University (UEM) in Maputo, CDE, and the Mozambican logging company MITI made it possible to work with the main stakeholders and to grasp the whole complexity of development processes.



## Main messages

- Co-production of knowledge and capacity development (both individual and societal) for sustainable development require a transdisciplinary approach and a participatory appraisal of the local resource base and of competing claims on natural resources.
- The complexity of development issues in Cabo Delgado can be addressed through such an approach by investing enough time and means. To date, development partners have refrained from doing so because of their focus on fast economic impact and lack of awareness of underlying reasons for negative development trends.
- Fire management is key to preventing further degradation of the *miombo* forests in northern Mozambique. The main stakeholders need to understand this and jointly address fire management using established techniques.



*Miombo* woodlands are Eastern Africa’s dominant forest type. A highly diverse ecosystem, they provide a number of important resources to local communities, as well as high-value timber for export and habitats for wildlife. Finding ways of managing them sustainably is a crucial precondition for securing local communities’ livelihoods and sustainable development in Mozambique. (Photo: Andreas Kläy)



## The project story

ESAPP started its activities in Mozambique in 2002, on request from the Swiss Agency for Development and Cooperation (SDC), with a project in Cabo Delgado province, in the north. This project was conducted in cooperation with Helvetas and Gecorena, a local NGO.

The Learning for Sustainability (L4S) tool was first applied in Mozambique in the village of Ngura, Ancuabe district, using the local language Macúá. Typically, L4S workshops on sustainable resource management are conducted in villages over a three-week period, fostering co-production of knowledge between smallholder farmers and other stakeholders. This design is ideal for addressing local resource use and development issues. The concept proved effective to obtain new insights, and to sharpen the understanding of different stakeholder groups' perceptions and interests.

Encouraged by this success, ESAPP decided to scale out the tool. Subsequently, the project team implemented eight workshops, one of which was used to train Mozambican L4S moderators. The workshops were conducted with different university and NGO partners and in different contexts, in the Cabo Delgado and Maputo provinces.

Workshop participants mentioned that sustainable management of *miombo* forests is a major concern in Cabo Delgado. The ESAPP team therefore decided to focus on this topic in the northern part of the province, where degradation is less advanced. In parallel, the decision was made to build up long-term partnerships with relevant stakeholders. In 2008, collaboration was initiated with the Chair of History at the Eduardo Mondlane University (UEM) in Maputo, and a memorandum of understanding was signed with MITI, a private logging company and holder of forest concessions. The partnership focused on understanding natural regeneration of *miombo* forests and improving it through better forest management by MITI and local communities.

Research on the above topics was mainly conducted by Master's- and Bachelor's-level students. Three of them were Mozambicans registered at UEM, and three were Swiss students from the Swiss Federal Institute of Technology in Zurich (ETH Zurich) and the University of Basel. Their studies were integrated into the transdisciplinary project interactions and thus into an overall action research process. Their findings showed that combatting uncontrolled forest fires is the best way of reducing ongoing soil degradation and promoting biodiversity.

**Top:** Stakeholders participating in an L4S workshop in Nkonga village are discussing access to and management of natural resources. Stakeholder groups sometimes defend their interests vehemently against those of other groups. Guiding participants through the different groups' particular views and leading them towards a shared perception of the socioecological system and their common interests in it is the main aim of the L4S approach. (Photo: Andreas Kläy)

**Bottom:** Another L4S workshop brought together traditional healers and researchers to discuss sustainable management of *miombo* woodlands. Traditional healers are widely respected as environmental and social experts and as resource persons, based on their vast experience and knowledge. This experience and knowledge, and the fact that they have no direct stake in resource governance, makes them more open-minded and sensitive to the larger picture. (Photo: Martin Brüllhardt)





## Innovation and relevance

ESAPP's long-term experience in Cabo Delgado helped to raise the team's awareness of the complexity of development trends. It also forged a strong personal network that fostered innovative public–private cooperation between academic and government institutions and a logging company. This set-up was instrumental in facilitating transdisciplinary research and learning processes at the grass-roots level. It was complemented by students' research, which enhanced stakeholders' knowledge on the dynamics of *miombo* forests in Cabo Delgado and pointed out options for their improved management.

The L4S tool further improved the capacities of relevant stakeholders to cooperate. It helped make clear that the enforcement of forest laws in Mozambique is failing mostly because of a lack of capacity and competence, as well as of cooperation between different decision-making and planning levels. Indeed, conflicting stakeholder interests tended to block reflections on the socioecological dynamics of *miombo* forest degradation.

The ESAPP team was able to contain these conflicting interests by inviting 20 healers, mainly women from four villages, to take part in an L4S workshop in 2011. Most stakeholders recognize healers as environmental and social experts who do not have a direct stake in resource governance, and who can therefore mediate between other stakeholders. Thus, their involvement in the workshop was an invaluable asset for the project.

In terms of forest management, the project made it clear that uncontrolled forest fires are the main ecological cause of the continuing degradation of *miombo* forests, as they hamper the biome's capacity to regenerate. Subsequent ESAPP activities thus concentrated on creating knowledge and capacity to reduce uncontrolled forest fires. It soon became clear that cooperation between the communities and the forest concession holder is the only promising approach to achieving this goal. This project focus is highly relevant throughout Eastern Africa. *Miombo* forest degradation is already advanced in many areas of the region and management concepts are urgently needed.



**Top:** Local communities establish their crop fields in the *miombo* woodlands. They use fire to clear the natural vegetation before planting. Sometimes their fires get out of control and damage large areas of woodland. Uncontrolled fires were identified as the main cause of forest degradation, making improved fire management a key ingredient of sustainable resource management in Cabo Delgado. (Photo: Andreas Kläy)

**Bottom:** High-value timber is transported by lorry to the ports of Mocímboa da Praia and Pemba before it is exported, mainly to China. Concession holders play an important role in managing the *miombo* woodlands. However, most of them lack adequate entry points for collaboration with local communities and with government institutions. The project helped to establish such collaborative links. (Photo: Andreas Kläy)



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## Highlight profile

This highlight is based on the achievements of 7 ESAPP priority action projects.

**Implemented during:**  
2001–2014

**Total funds contributed by ESAPP:**  
CHF 316,000

**Implemented by:**  
Centre for Development and Environment (CDE), University of Bern, Switzerland

**In collaboration with:**  
Eduardo Mondlane University (UEM), Maputo, Mozambique; MITI, Cabo Delgado, Mozambique; Gecorena (Comité de Gestão Comunitária dos Recursos Naturais/The Coalition for Community Resource Management), Pemba, Mozambique; various governmental institutions

**Main beneficiaries:**  
Communities in Cabo Delgado Province of Mozambique

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Sustainable land management and sustainable regional development are critical issues throughout the global North and South. Generating new knowledge, developing innovative approaches, and consolidating experience-based lessons for sustainable development are fundamental to charting the way forward. This publication summarizes crucial experiences and knowledge gained from 15 years of partnership-based research and action with numerous institutions in Africa. It presents 24 representative highlights carefully selected from over 300 demand-driven, small-grant projects carried out in Madagascar, Mozambique, Tanzania, Kenya, Ethiopia, and Eritrea. Launched in 1999 and concluded in 2015, the Eastern and Southern Africa Partnership Programme (ESAPP) was funded by the Swiss Agency for Development and Cooperation (SDC), coordinated by the Centre for Development and Environment (CDE) of the University of Bern, and implemented by CDE and partners throughout the region.



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