

# COMMUNITY APPROACHES TO SUSTAINABLE LAND MANAGEMENT AND AGROECOLOGY PRACTICES



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# LIST OF ACRONYMS



PHOTO: FILTRATION  
MEASURING, OLGA  
ROMANOVA –SGP KAZAKSTAN.

|               |  |
|---------------|--|
| <b>ABN</b>    | African Biodiversity Network   |
| <b>AFSA</b>   | Alliance for Food Sovereignty in Africa                                |
| <b>CAPE</b>   | Cape Action for People and Environment                                 |
| <b>CBO</b>    | Community Based Organisation   |
| <b>COP</b>    | Convention of Parties  |
| <b>CPRI</b>   | Caribbean Permaculture Research Institute                              |
| <b>CSA</b>    | Climate Smart Agriculture  |
| <b>CSO</b>    | Civil Society Organisation   |
| <b>EMG</b>    | Environmental Management Group   |
| <b>ESAFF</b>  | Eastern and Southern Africa Small Scale Farmers Forum                  |
| <b>FMF</b>    | Fangsoto Marketing Federation  |
| <b>GCBC</b>   | Greater Cederberg Biodiversity Corridor                                |
| <b>GEF</b>    | Global Environment Facility  |
| <b>HA</b>     | hectare  |
| <b>HAC</b>    | Hamelmalo College of Agriculture                                       |
| <b>ICT</b>    | Information and Communication Technology                               |
| <b>IPM</b>    | Integrated Pest Management   |
| <b>ISTF</b>   | International Society of Tropical Foresters                            |
| <b>IUCN</b>   | International Union for Conservation of Nature                         |
| <b>KG</b>     | kilogram   |
| <b>LD</b>     | Land Degradation   |
| <b>LDFA</b>   | Land Degradation Focal Area  |
| <b>LDN</b>    | Land Degradation Neutrality  |
| <b>LID</b>    | Local Initiatives & Development  |
| <b>LREN</b>   | Land Resources and Environment   |
| <b>M</b>      | meter  |
| <b>MAFFW</b>  | Ministry of Agriculture Food, Fisheries, and Water Resource Management |
| <b>NASFAM</b> | National Smalholder Farmers' Association of Malawi                     |
| <b>NGO</b>    | Non-Governmental Organization  |

|                |  |
|----------------|--|
| <b>NTFP</b>    | Non-Timber Forest Products                                 |
| <b>PHERSSC</b> | Puxian Herder Ecological Relief Society of Shiqu County    |
| <b>PSP</b>     | Participatory Scenario Planning                            |
| <b>SAIPRO</b>  | Same Agricultural Improvement Program Trust Fund           |
| <b>SAT</b>     | Sustainable Agriculture Tanzania                           |
| <b>SDG</b>     | Sustainable Development Goal                               |
| <b>SFM</b>     | Sustainable Forest Management                              |
| <b>SGP</b>     | Small Grants Programme                                     |
| <b>SKEP</b>    | Succulent Karoo Ecosystem Programme                        |
| <b>SLM</b>     | Sustainable Land Management                                |
| <b>STAR</b>    | System of Transfer of Allocated Resources                  |
| <b>TABIO</b>   | Tanzania Alliance for Biodiversity                         |
| <b>TVET</b>    | Technical Vocational Education Training                    |
| <b>UNCBD</b>   | United Nations Convention on Biological Diversity          |
| <b>UNCCD</b>   | United Nations Convention on Combat Desertification        |
| <b>UNDP</b>    | United Nations Development Programme                       |
| <b>UNFCCC</b>  | United Nations Framework Convention on Climate Change      |
| <b>US\$</b>    | United States Dollar                                       |
| <b>WOCAT</b>   | World Overview of Conservation Approaches and Technologies |
| <b>WWOOF</b>   | World Wide Opportunities on Organic Farms                  |
| <b>ZIMSOFF</b> | Zimbabwe Smallholder Organic Farmers Forum                 |

# FOREWORD

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**Adriana Dinu**



**Gustavo Fonseca**

The high rate of land degradation is threatening livelihoods and leading to biodiversity and habitat loss. Population pressure and pervasive poverty resulting from political, social and economic stressors is increasing food insecurity in vulnerable communities across the developing world. Against this backdrop, the world will need to increase food production by 60 to 70 percent by 2050. Unless there is a shift in the way land and soils are managed for food production, biodiversity and ecosystem services may be locked into a downward trajectory from which recovery will be impossible or too costly to achieve.

The expansion of food production need not come at the expense of native habitat. Rehabilitating and restoring degraded lands offers tremendous opportunities to boost production and enhance food security. Improving land use practices can also go a long way in preserving the health of soils and optimizing the use of water. The GEF Small Grants Programme (SGP), implemented by the United Nations Development Programme (UNDP), has been working with community organizations around the world to identify, implement and scale-up innovative technologies in sustainable land management (SLM). Grassroots agroecological practices that integrate the management of land, water, and biodiversity are starting to meet rising food demands particularly in vulnerable communities of dryland countries. By investing and working with communities on sustainable land management and agroecology, SGP has introduced and disseminated appropriate policies and incentives to accelerate pro-poor growth, thereby contributing to the achievement of the Sustainable Development Goals, including SDG 15 – Life on Land.

As of 2017, SGP has awarded over 3,800 small grants to land degradation projects in over 120 countries, many of which are in regions with extreme levels of poverty and food insecurity across Africa and Latin America. Africa, in particular, is experiencing the highest population growth of the developing world, while being exposed and vulnerable to the rising impact from climate change. The collective outcomes of these successful projects show that with careful and targeted intervention communities are being able to address the drivers of land degradation, reverse the negative trends in soil fertility, secure nutritious food from their lands, and sometimes generating a surplus which provides much needed income to meet health and educational requirements of their children.

The project examples described in this publication reveal the power of communities in addressing land degradation through improved land management practices. For instance, organic farming and certification of agricultural produce have led to improved nutrition and economic empowerment in many communities. Projects in Tanzania and Barbados have been able to contribute to both local and national policies, achieving a larger impact well beyond their immediate communities. And the list goes on.

We hope that the experience reported in this publication can help practitioners and policy makers acquire valuable insights on how site-specific land management practices can serve as real-world laboratories to inform decision-making at the regional and national levels.



**Adriana Dinu**

*Executive Coordinator*

*Global Environmental Finance Unit*

*United Nations Development Programme*



**Gustavo Fonseca**

*Director of Programs*

*Global Environment Facility*

# MESSAGE FROM THE GLOBAL MANAGER

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Yoko Watanabe

Healthy land is fundamental for human life and wellbeing. It provides food, water, carbon, and other benefits that are essential for our life. However, land degradation is increasingly becoming one of the major global environmental issues today. It is estimated that almost a quarter (22.5 percent) of land has been degraded since the mid-twentieth century.

With the global population on the rise, coupled with climate change, the pressure on land and the natural environment are increasing. Local communities are often bearing the brunt of this burden. In particular, poor, women, indigenous peoples, youth, and other vulnerable communities are disproportionately impacted by land degradation.

The GEF Small Grants Programme (SGP), implemented by UNDP, has been playing a key role in promoting Sustainable Land Management at the community level. The focus of our program is on: 1) reducing pressures on natural resources from competing land uses in the wider landscapes; and 2) maintaining or improving the flows of agro-ecosystem services to sustain livelihoods of local communities. The program is fully in line with the Global Environment Facility's strategy on sustainable land management and other related programs. It also clearly supports the implementation of the United Nations Convention to Combat Desertification and its 10 year Strategic Plan on Land Degradation Neutrality.

The Sustainable Land Management program is quickly becoming one of the largest portfolios of the SGP. Together with partners, the SGP supports community organizations to use approaches, techniques and methodologies in line with the principles of agroecology and climate-sensitive land resources management. In this publication, you will find good practices and approaches that have been tested and proven successful by SGP projects around the world. These initiatives have shown evidence on improved land management by communities, nested on traditional knowledge and innovation.

It is also important to highlight that many of these cases have shown multiple benefits on the ground, not only on sustainable land management, but also on improved biodiversity, climate change mitigation and adaptation, and also on hazardous chemical management. In many instances, these good practices have been scaled up and replicated nationally and globally with partners. Further, SGP projects on sustainable land management contribute in empowering local communities and small-holder farmers, particularly women, while improving the health of the land.

I sincerely hope that this publication will provide useful lessons and experiences for local communities and partners on successful and innovative approaches and practices on land management, and enable upscaling of initiatives to secure Land Degradation Neutrality across the globe.

  
**Yoko Watanabe**  
Global Manager  
GEF Small Grants Programme



The Small Grants Programme (SGP) is a corporate programme of the Global Environment Facility (GEF) implemented by the United Nations Development Programme (UNDP) since 1992. SGP grantmaking in over 125 countries promotes community-based innovation, capacity development, and empowerment through sustainable development projects of local civil society organizations with special consideration for indigenous peoples, women, and youth. SGP has supported over 20,000 community-based projects in biodiversity conservation, climate change mitigation and adaptation, prevention of land degradation, protection of international waters, and reduction of the impact of chemicals, while generating sustainable livelihoods.



The Global Environment Facility (GEF), established on the eve of the 1992 Rio Earth Summit, is a catalyst for action on the environment — and much more. Through its strategic investments, the GEF works with partners to tackle the planet’s biggest environmental issues. Our funding also helps reduce poverty, strengthen governance and achieve greater equality between women and men. As such, we occupy a unique space in the global partnership for a more sustainable planet.



UNDP partners with people at all levels of society to help build nations that can withstand crisis, and drive and sustain the kind of growth that improves the quality of life for everyone. On the ground in 177 countries and territories, we offer global perspective and local insight to help empower lives and build resilient nations. [www.undp.org](http://www.undp.org)

*Empowered lives.  
Resilient nations.*

# TERMINOLOGY

## SUSTAINABLE LAND MANAGEMENT

Sustainable land management is the optimal use of land sources for the benefit of present and future generations, while focusing on inclusive and participatory approaches, integrated and sustainable use of natural resources, involving stakeholders at all levels, while generating income at the local level.

## SUSTAINABLE FOREST MANAGEMENT

Sustainable forest management is the use of forest and forest lands that maintains biodiversity, productivity, regeneration capacity and the potential to fulfill ecological, economic, and social functions for current and future generations at the local, national, and global levels without causing damage to other ecosystems.

## LAND DEGRADATION

Land degradation is the deterioration, either anthropogenic or natural, of soil productivity and fertility to the point of forest cover loss, erosion of rangeland, and a reduced ability to grow food, provide products, and maintain the health of local ecosystems and ecosystem services.

## CLIMATE SMART AGRICULTURE

Climate smart agriculture sustainably increases revenue and production of food, while promoting more resilient ecosystems, and increasing storage of or reducing greenhouse gas emissions.

## AGROECOLOGY

Agroecology focuses on sustainable farming systems that optimize and stabilize crop yields, while promoting a multifunctional role for agriculture in encouraging social justice, protecting identity and culture, and strengthening the economic viability of rural areas.

## SUSTAINABLE AGRICULTURE

Sustainable agriculture is the use of natural ecosystem services, minimizing external inputs, and integrating natural processes in achieving the agricultural outputs necessary to meet the demands of society. The goal is to achieve a system with long term benefits, while maintaining healthy ecosystems, ensuring profitability, and achieving social and economic equity.

## FOOD SECURITY

Food security is the assured availability and adequate access to nutritional and safe food, in sufficient amounts to maintain a healthy and active life.

Source: Food and Agriculture Organization, World Food Programme.



PHOTO: SGP CAPE VERDE

# AGROECOLOGY, SUSTAINABLE AGRICULTURE, FOOD SECURITY, LAND DEGRADATION



# COMMUNITY APPROACHES TO SUSTAINABLE LAND MANAGEMENT AND AGROECOLOGY PRACTICES

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## SUMMARY

The GEF Small Grants Programme (SGP), implemented by UNDP, provides grants as well as technical support to civil society organizations (CSOs), community-based organizations, and indigenous peoples' organizations to support sustainable land management (SLM) activities. Between 1995 and 2016, SGP supported 3,800 projects addressing land degradation. These projects represent a total investment of over US\$135 million in grants funded by the GEF with co-financing of more than US\$152 million.

In SGP, the land degradation focal area resources have mostly supported two objectives: i) maintain or improve agro-ecosystem services to sustain livelihoods of local communities, and ii) reduce pressures on natural resources from competing land uses in wider landscapes. These two objectives aim to sustainably manage agro-ecosystems and forested productive landscapes. These objectives also focus on forests where deterioration of ecosystems goods and services undermine the livelihoods of grassroots communities. Under the SGP upgraded country programs, the LD focal area (LDFA) resources mainly focused on agro-ecological intensification and supporting the establishment of mechanisms for SLM in wider landscapes.

Since 2011, there has been an increasing demand by CSOs and communities for Sustainable Land Management projects, including projects that address sustainable forest management issues. Land is central to community livelihoods and a critical resource in times of scarcity. The increasing need to manage land degradation resulting from various factors, including climate change impacts, are contributing to the increasing interest by CSOs to implement projects in this area.



PHOTO: BENEFICIARIES IN GARDEN, SGP ZIMBABWE



Among the results achieved by this growing portfolio of SGP projects, 758,260 hectares of land is estimated to have been brought under improved management practices since 2011. During the same period, it is estimated that 346,123 community members have demonstrated sustainable land and forest management practices.

## CONTEXT

Sustainable land management embodies the importance of tackling complex and interdependent issues in an integrated manner. The 2030 Agenda strives to achieve a land degradation neutral world through synergy in the implementation of three global conventions: the United Nations Convention to Combat Desertification (UNCCD), the United Nations Convention on Biological Diversity (UNCBD), and the United Nations Framework Convention on Climate Change (UNFCCC). The new Strategic Framework of the UNCCD for 2018-2030 focuses on supporting countries achieve Land Degradation Neutrality (LDN) by 2030. Therefore, how land is protected and managed will have multiple impacts on the sustainable development goals. The goals related to life below water (SDG 14), decent work and economic growth (SDG 8), gender equality (SDG 5), partnerships for the goals (SDG 17) and most important, life on land (SDG 15) target 15.3 (By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world) are greatly influenced by land management.

Despite the global nature of desertification and land degradation, the implementation of response measures continues to be a challenge. Over three quarters of the world's population considered as poor, live and depend on degraded lands, leading to the depletion of land resources and inextricably linking land degradation and poverty.

The portfolio of land degradation projects supported by SGP helps developing countries implement the UNCCD's 10-year strategic plan at the community level. This strategic plan, which is informed by the Millennium Ecosystem Assessment, provides the basic information and rationale for the strategic approaches proposed, one of which is the involvement of local communities as land and resource managers and stewards. To date, the SGP portfolio has demonstrated good practices of adaptive, community-based land management that combine indigenous and local knowledge with modern techniques

to address the degradation and destruction of agricultural lands, rangelands, and forest landscapes while also improving civil society capacity to implement integrated pastoral, agricultural, forest, and water approaches.

## TRENDS IN PORTFOLIO DEVELOPMENT OF LAND DEGRADATION AND AGROECOLOGY PROJECTS IN SGP

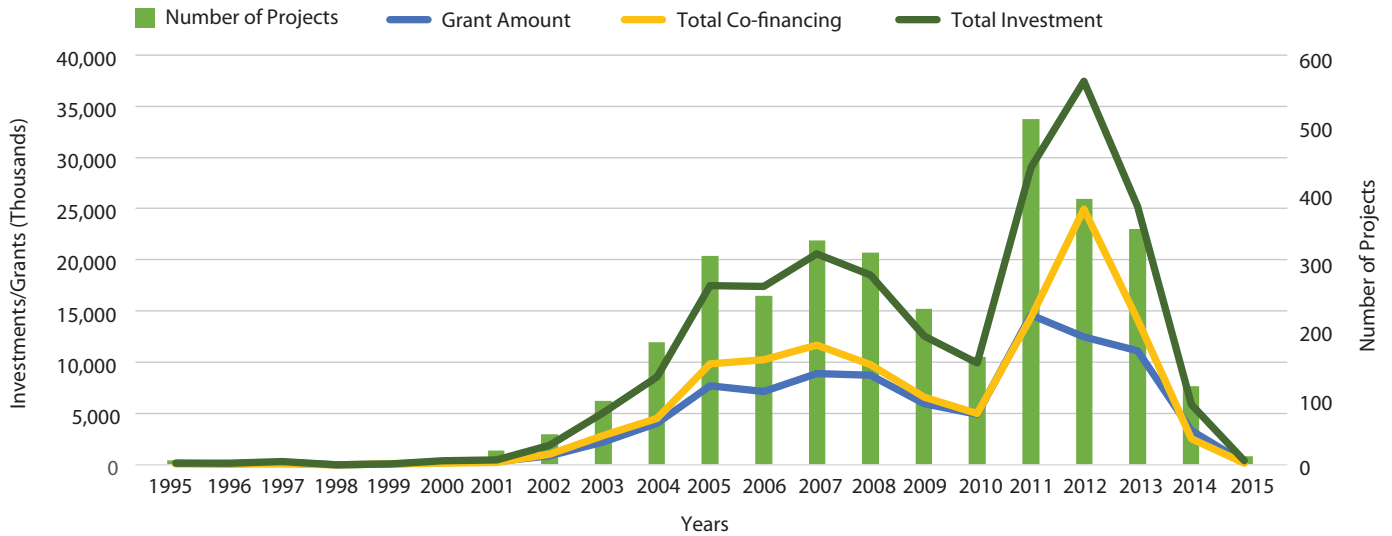
While SGP was conceived and established in 1992, the land degradation portfolio started only in 1995. Since then, SGP has supported the implementation of 3,800 land degradation projects. An additional 2,200 projects address land degradation as a cross cutting theme. The total grant funding allocated to these projects is over US\$135 million, and has leveraged US\$152 million in in-kind and in-cash co-financing from a range of partners. The programming improvements have been asymptotic in the last two GEF operational phases. Figure 1 below depicts the historical trend in LD programming showing a skewed upward bell curve trend in 2004 and 2005, which correspond to the beginning of the third operational programme of the GEF.

SGP's grant funding programming is guided by a highly participatory process in which the development of the country programme strategy helps identify the thematic and geographical focus for the programme, as well as the potential synergies between different focal areas and themes. Once a country strategy is developed, grantmaking starts with the formulation, approval, and implementation of projects on the ground. SGP projects are encouraged to mobilize both cash and in-kind contributions. This explains the dome shaped trends depicted in figure 1 between 2011 and 2015, which is the GEF fifth operational programming period. In-kind contributions are typically from community sources, and include provision of labor, materials and other related community goods and services required for the project's success. Cash co-financing helps bring additional resources into the projects and overall programme.

An analysis of the SGP land degradation portfolio in various countries between 2011 and 2015, indicates that projects have focused on the following practices: agroecology and agribusiness, integrated pest management, sustainable forest management, agro-forest-pastoral management, pastoral and range management, water management technologies, capacity building and energy savings within farms.

**FIGURE 1**

## Trends in Investments & Grants (1995-2016)



As the land degradation focal area continues to expand in number of projects and investment levels (figure 1), there has been an upward trend in the increase of hectares of land conserved and brought under improved management systems, and in the increasing number of community members involved as illustrated in Figure 2.

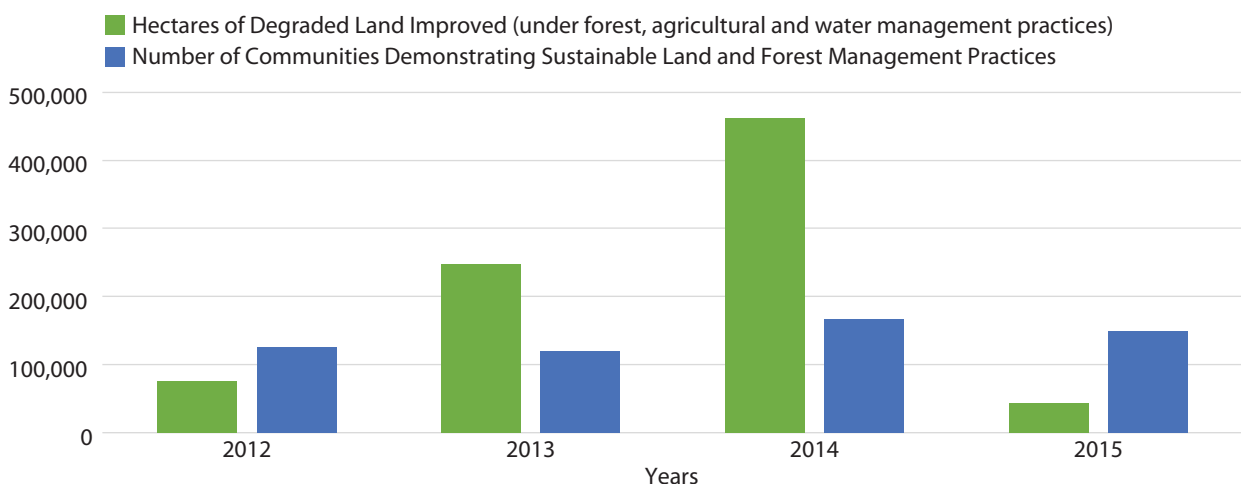
The above progress is attributed to increased interest of national stakeholders on land management issues, and to the greater involvement of communities in this area. Other reasons behind the increase in the LD portfolio are due to replication and scaling up of good practices, increased resource allocation from other focal areas into this cross cutting theme, and greater levels of STAR funding available to SGP for LD since 2002.

With regards to regional trends, Africa, Latin America and the Caribbean, Asia and the Pacific are the predominant regions for the implementation of land degradation projects (see figure 3). Land is a key resource for poor and vulnerable communities, and the regional trends re-affirm and correspond to poverty levels and regions where the economy is largely based on agriculture. Land is also a key asset for community livelihoods, thus the increasing interest of communities to improve their land management practices and address its drivers.

In the future, community level LD projects can be used to effectively illustrate the advantages of an integrated programme approach, particularly to demonstrate how food security can be reached among poor and

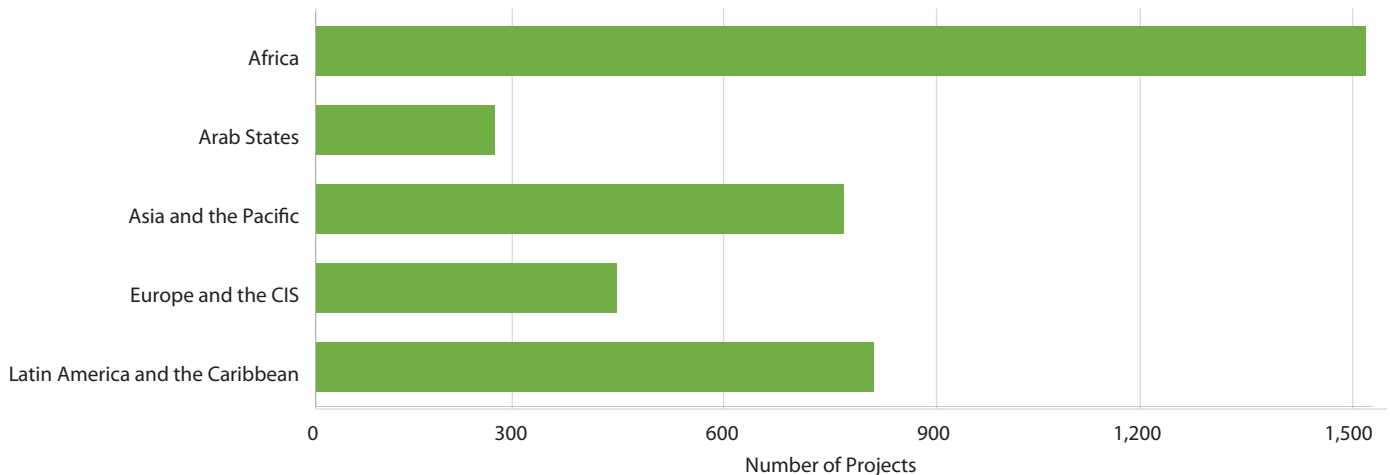
**FIGURE 2**

## Trends in Area Improved and Number of Communities Involved



**FIGURE 3**

## Regional Portfolio of Projects



vulnerable local communities. In Africa, where most LD projects are implemented, SGP projects demonstrate on-the-ground actions that can generate useful policies while also having potential for replication and adoption in similar environments.

Sustainable land management and sustainable forest management by communities continues to be promoted in most of the GEF focal areas (biodiversity, climate change mitigation from forestry related activities, et cetera). This multi-focal area approach to land degradation has helped to increase community interest in sustainable forest management. However, no resources are dedicated to it given the absence of a dedicated forestry convention.

In its current operational phase, SGP further focused its efforts on sustainable land and forest management to support climate smart innovative agroecology. Agroecological practices and principles are being realized through appropriate climate-sensitive agriculture and improved agroecosystem service provision to achieve short-and-long-term solutions at the local level.

Within the context of climate change related impacts, these approaches help to enhance resilience and integrate with other land based development priorities. SGP's portfolio seeks to support countries and other actors in securing the necessary policy and technical conditions to enable countries to: i) sustainably increase agricultural productivity and incomes in order to meet community's food security and development goals, ii) build resilience and the capacity of agricultural and food systems to adapt to climate change; iii) seek opportunities to mitigate emissions of greenhouse

gases and increase carbon sequestration from subsistence farmlands; and iv) help community based processes within farming systems on aspects of value addition, eco-labeling and certification of farm products. The latter objective is essentially promoting sustainable practices as well as generating value addition for producers of farm products, as well as creating increased awareness and demand from consumers

### PRACTICES, THEMES AND TYPOLOGIES OF PROJECTS

While most SLM and SFM projects are multifocal in nature, the typologies of the interventions within SGP's land degradation portfolio can be grouped under the following four broad categories based on the primary objective and results achieved by each project:

| THEME AND PRACTICE AREA  | COUNTRY EXAMPLES           |
|--|----------------------------|
| Agroecology and Agribusiness   | Mongolia, Gambia, Zimbabwe |
| Sustainable Forest Management  | Tanzania, Nigeria, Cuba    |
| Technologies for Water and Energy use Efficiency in Production systems and Farms | Armenia, Eritrea, Barbados |
| Pasture Rehabilitation and Rangeland Management                                  | South Africa, China        |

However, as many agroecology and SFM practices may be applied in different projects, it is possible to have a community project that covers all or some of the themes identified. Moreover, since communities see problems in an integrated way, their projects often undertake efforts on many fronts to address challenges and benefit from different environmental goods and services.



# I. THEME AND PRACTICE

## AGROECOLOGY AND AGRIBUSINESS

Given that agricultural economy is the backbone of most poor and vulnerable communities, a multi-dimensional and risk mitigating approach to farming is important in reducing significant crop failures, ensuring pollination processes and increasing agrobiodiversity services from subsistence and community farmlands. This theme also benefits from inter and intra community learning within farmer's networks. For example, in the African context, the work of these networks both informs and amplifies the voices of social movements fighting for food justice and sovereignty in Africa as a whole. Some of the organizations supported by SGP that are in alliance with regional networks in Africa and promote knowledge sharing of good practices are the Alliance for Food Sovereignty in Africa, National Smallholder Farmers' Association of Malawi, Zimbabwe Smallholder Organic Farmers Forum, Sustainable Agriculture Tanzania, Tanzania Alliance for Biodiversity, Eastern and Southern Africa Small Scale Farmers Forum, La Via Campesina and African Biodiversity Network.

Under large scale monoculture farming practiced over the years since the industrial revolution and the expanded focus during the green revolution in the 1950's, agricultural systems have suffered from and contributed towards many environmental ills. Farms continue to get contaminated from: i) pesticides, nitrates and phosphates from inorganic fertilizers use which leads to water contamination in farmlands and watersheds, ii) biodiversity loss originating from wildlife death and habitat pollution, hedgerow and woodlot loss from productive landscapes, bee colony decline due to over use of pesticides, vanishing crops varieties and breeds from unsustainable utilization of indigenous genetic resources. These problems are compounded by disappearance of wetlands caused by draining and tilling of natural water holding grounds, as well as drying of reservoirs and rivers. In addition to soil losses resulting from erosion, loss of organic matter and carbon; and air pollution from release of methane, ammonia, nitrous oxide and carbon dioxide from farmlands, climate impacting substances are also released.

Agroecology and sustainable agribusiness provide ways to reduce dependence on mechanized and polluting agricultural practices and reverse land degradation trends. Furthermore, multi-functional landscapes which provide ecosystem, social, cultural and economic services can be resilient to climate change and are important for securing healthy foods.



PHOTO: M&E TEAM INSPECTING FARMERS' PRODUCE, SGP NIGERIA.



# 1. MONGOLIA

## Improving Agricultural Soil with Bio-Humus



**GRANTEE**  
Mugez CBO



**SGP CONTRIBUTION**  
US\$16,165



**IN-KIND CO-FINANCING**  
US\$7,384



**START DATE**  
April, 2016

**END DATE**  
November, 2016



**NUMBER OF BENEFICIARIES**  
6,000 people

### CONTEXT

There are around 50-60 million heads of livestock in Mongolia with fluctuating numbers over the seasons. It is estimated that around 3 million tons of livestock manure is produced annually in Mongolia. The use of this manure for production of bio-humus can generate valuable organic fertilizer for improving soil fertility. To this end, SGP Mongolia partnered with the Mugez Community-Based Organization to improve soil quality through the promotion of bio-humus.

### IMPLEMENTATION

SGP awarded a grant in 2016 to the Mugez community based organization (CBO) to implement a project to improve soil fertility. The project aimed to promote the utilization of bio-humus, to bring additional profits to herders and farmers. Mugez CBO already had eight years of experience in producing bio-humus using red worms. Through the grant they were able to involve 124 participants from forest communities and small holder vegetable farmers and livestock herders, relying on SGP contacts and networks. With its knowledge, know-how and worms, the Mugez CBO organized field demonstration trainings in three provinces, Selenge, Khentii and Uvurkhangai. The trainings focused on producing a high quality organic fertilizer, using the composting first and then vermi-composting technology to make bio-humus from livestock manure. As the trainings were demonstrative and field based, all the participants were able to get hands on knowledge and practical experience in dealing with the production of bio-humus. Upon completion of the trainings, each participant was given a sack containing about 10,000 earth worms to practice and produce organic fertilizer at home upon their return.

Moreover, the Mugez organization has been working closely with the participants, providing practical advice and assistance in composting and vermi-composting to produce organic fertilizer at their respective locations.

### COUNTRY BACKGROUND

Land degradation is one of the most pressing environmental concerns in Mongolia. According to the Ministry of Environment and Tourism, 78 percent of pastureland has been degraded affecting 121 million hectares. Land degradation is resulting from both human-induced as well as natural causes. Human-induced causes include inappropriate farming practices, inadequate cultivation, overgrazing due to increasing number of livestock, and extensive migration of herder families to areas close to settlements. Natural causes contributing to land degradation include increased sand shifts, loss of vegetation cover, soil erosion caused by strong winds, and effects of climate change and global warming. Land degradation has resulted in decreased land productivity, reduced soil fertility, and has led to extensive desertification affecting people's livelihoods and increasing rural poverty.

Since 2015, SGP Mongolia started assisting local communities to introduce a series of agro-ecological measures, including the production of bio-humus from livestock manure, and the establishment of wind protection belts around vegetable fields owned by small holder farmers. SGP is also working with four farmer associations at the provincial level, as well as with local authorities, to organize field trainings for small holder farmers on production of organic fertilizer. SGP also works with the Partnership for Development network organization created by a coalition of SGP grantees on a voluntary basis since 2013 to disseminate improved climate-smart agro-ecological practices.

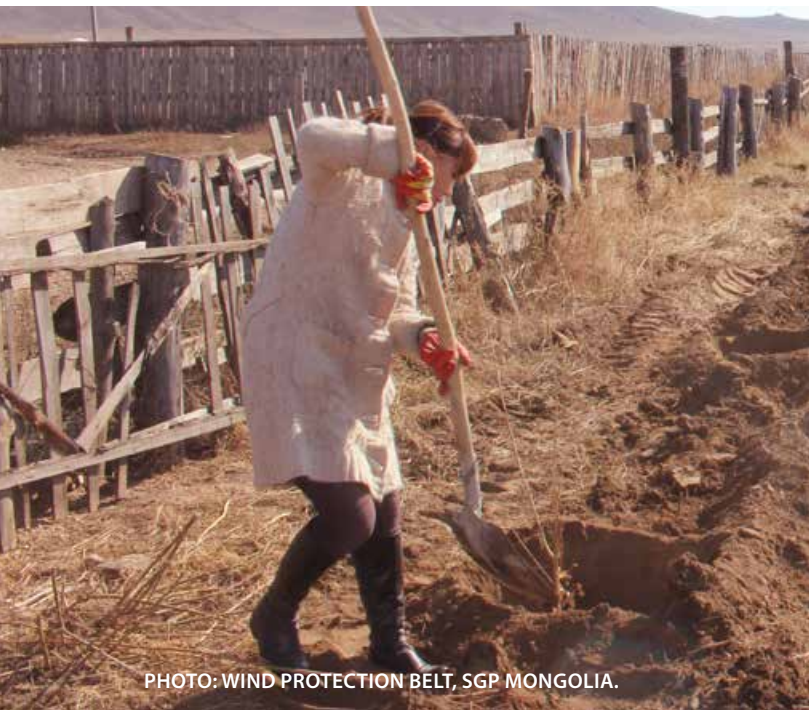


PHOTO: WIND PROTECTION BELT, SGP MONGOLIA.



PHOTO: FIELD TRAINING ON COMPOSTING, SGP MONGOLIA.

Vermi-compost contains water-soluble nutrients and is an excellent, nutrient-rich organic fertilizer and soil conditioner. It has a range of soil, plant growth, economic and environment benefits. Vermi-compost, sometimes named worm compost, contains more than 100 times as many beneficial bacteria and fungi as can be found in the surrounding soil.

### RESULTS AND SCALING UP

As a result of the project, 124 community members produced about 230 tons of organic fertilizer worth US\$93,500 in the first year of the project. Some started to sell the organic fertilizer they produced at local markets and trade fairs, while others have applied the fertilizer in their farms covering over 40 hectares of vegetable fields. This is a good result for the first year of grant implementation. It is estimated that the amount of mineral fertilizer that was used in the previous year was reduced by over 80 tons due to the increased use of bio-humus.

Four community groups, namely Eviin khuch, Bayanchatsargana, Jimsnii tugul and Bayan duhumiin uguuj have become small household entrepreneurs and have been able to sell a total of 92 tons of the organic fertilizer to their neighbours and at respective local markets. During project implementation, the practice and experiences of this project have spread to the Tuv, Bulgan and Dundgobi provinces and the number of interested communities, farmers and

individuals has increased to 400 farmers, each representing a farmer organization. To meet the demand of these new interested communities, three additional field trainings are planned for 2017.

### EXPERIENCES AND LESSONS LEARNED


Even though this project is still under implementation, results are very encouraging and the farmers are learning by doing, an aspect that is encouraged by SGP. Given that the raw material used for bio-humus production is in abundant supply throughout the country and can be seen as a renewable resource, this practice is very promising and has potential for replication and upscaling.

The project has provided information, knowledge and equal opportunity for every social group, including poor and marginalized people, women and youth to become involved in bio-humus production. By improving soil fertility these stakeholders have been able to increase productivity and yields of crops and vegetables. They have also empowered themselves with new knowledge and community applicable technology.

As bio-humus is now produced by many community groups in several provinces, and each producer tends to use their own label, the aspects related to quality control, branding, labeling and packing of bio-humus have become more complex. SGP Mongolia is looking to provide assistance and share experience on these issues in the near future.

## 2. GAMBIA

# Producing Organic Vegetables

|   |   |                                 |
|---|---|---------------------------------|
|  | <b>GRANTEE</b><br>Fangsoto Marketing Federation |                                 |
|  | <b>SGP CONTRIBUTION</b><br>US\$20,000           |                                 |
|  | <b>IN-CASH CO-FINANCING</b><br>US\$10,000       |                                 |
|  | <b>IN-KIND CO-FINANCING</b><br>US\$20,000       |                                 |
|  | <b>START DATE</b><br>September, 2016            | <b>END DATE</b><br>August, 2017 |
|  | <b>NUMBER OF BENEFICIARIES</b><br>3,500 persons |                                 |

### CONTEXT

Most vegetable production in Gambia is done by women. It is an important economic activity for women as it provides sustainable livelihoods for families and income when other agricultural activities are at low levels because of the season. Vegetable production is carried out in lowland landscapes where the water tables are relatively high and these landscapes are generally not used for cash crop production by men. To sustain crop yields, the women farmers use considerable quantities of chemical fertilizer and pesticides leading to pollution and health challenges. These chemical fertilizers and pesticides while being expensive, are also stored and handled in circumstances that pose health hazards to operators and consumers.

The Fangsoto Marketing Federation (FMF) is a community-based organization representing 35 affiliated farmer groups in the West Coast Region of the Gambia. The federation has 2,975 members, of which 80 percent are women, and focuses on addressing production and marketing constraints in agriculture. The federation operates several cooperative gardens and functions as a market for the produce of its members. Since 2016, SGP has been supporting FMF to phase out the use of chemical fertilizers and pesticides by promoting the use of compost and organic pesticide made from neem tree extracts which are considered as both safe, reliable and inexpensive while also enhancing soil productivity and pest control in horticulture.

### IMPLEMENTATION

A key activity of the project is to train women on how to make compost from animal waste, plant material and locally produced pesticides while also highlighting the many advantages that organic products have over chemical fertilizers and pesticides. Once the women have learned this technique, the same group of farmers will be trained on how to formulate pesticides from the neem tree.

The project identified and selected 111 farmers from the federation to receive training at the demonstration sites in the village of Bulock and provided the materials and

### COUNTRY BACKGROUND

In Gambia, lowlands are landscape units employed for vegetable production by women during the dry season. They are also used for upland rice production in the wet season and provide a range of important environmental goods and services to the local communities. Lowlands face several threats ranging from climate change to poor husbandry practices. One of the major threats facing lowlands in Gambia is the use of chemical fertilizers and pesticides that lead to pollution of water bodies and crop contamination thereby posing serious risks to humans and the environment. SGP Gambia has been supporting sustainable land management and agroecology practices on this landscape such as upland rice production during the rainy season and vegetable production in the dry season. Both activities are carried out entirely by women farmers. Practices for maintaining high soil fertility levels include the use of compost, animal manure and crop residue management. To support these efforts, SGP has been working with thirty five farmer groups in the West Coast Region of Gambia to disseminate agro-ecological practices.



PHOTO: SGP GAMBIA

equipment necessary for making the compost. Five hectares of the garden were cleared, levelled and fenced into individual plots and seed beds were prepared. A small part of the garden was set aside for demonstrations on sowing techniques, plant spacing, mulching, and other cultural practices aimed at enhancing crop yields.

Once the land was prepared the participants were divided into four groups and each group received a two-day training on composting. The training covered aspects such as site selection, steps involved, conditions required, stages the compost undergoes and the properties of the compost. Each stage of the process was discussed with the participants before moving on to the next stage. Along with the training demonstrations, the women farmers also participated in hands-on demonstration of practices such as correct plant spacing, mulching, crop rotation, plant hygiene, crop residue management, pest control and other cultural and agronomic practices that enhance crops and ensure higher productivity.



PHOTO: SGP GAMBIA

## RESULTS AND SCALING UP

Vegetable production in the Gambia is the domain of women farmers and is their main livelihood activity during the long dry season. The horticulture sub-sector is considered the highest user of chemical fertilizer and pesticides. Through local distribution in the form of weekly markets in communities all over the country, farmers secure these inputs for use on their gardens. Although government had attempted to reduce reliance on chemicals through regulations, sensitization and training, the dangers posed by the unregulated use of these agrochemicals continues to be a major challenge.

By demonstrating the many advantages organic manures have over chemical fertilizers in terms of human health, soil improvement, biodiversity conservation, plant nutrition and economic cost, the project enabled the women farmers to produce crops relying entirely on organic fertilizers and application of integrated pest management control measures for the past year. Following the positive results of the project, the 111 initial farmers involved were able to extend the training to 3,500 additional women farmers.



PHOTO: SGP GAMBIA

In previous years, about 250 kg of chemical fertilizer per hectare were used on each garden. This year, women used compost as a substitute for the chemical fertilizer, avoiding 8,750 kg of chemical fertilizer. In addition, the project generated additional income of over US\$3,371 dollars per hectare, plus an additional US\$53 dollars per hectare in savings due to the low cost of organic fertilizers.







The members of the federation also received training on project management, monitoring and evaluation, records and book keeping, marketing skills and food processing to prolong the shelf life of their produce. The federation operates a cooperative association that assists in the marketing their produce, thereby increasing marketing opportunities.

### EXPERIENCES AND LESSONS LEARNED

Composting is an easy-to-do technology that can be promoted among small scale farmers to boost agricultural productivity, maintain soil health and reduce the risks associated with chemical fertilizers. This project has demonstrated that it is possible to produce vegetables successfully by relying exclusively on organic fertilizer and pesticides and the technology is readily available to all.

# 3. ZIMBABWE

## Promoting Resilient and Sustainable Agriculture

|   |  |                               |
|---|--|-------------------------------|
|  | <b>GRANTEE</b><br>Local Initiatives & Development Agency |                               |
|  | <b>SGP CONTRIBUTION</b><br>US\$150,000                   |                               |
|  | <b>IN-CASH CO-FINANCING</b><br>US\$50,284                |                               |
|  | <b>IN-KIND CO-FINANCING</b><br>US\$35,350                |                               |
|  | <b>START DATE</b><br>August, 2016                        | <b>END DATE</b><br>June, 2017 |
|  | <b>NUMBER OF BENEFICIARIES</b><br>366 farmers            |                               |

### COUNTRY BACKGROUND

It is estimated that 10 percent of the soils in Zimbabwe are under high risk of erosion due to the nature of soils, which are sodic. The other contributing factors for land degradation include unsustainable land use patterns and high levels of deforestation. At present the estimated annual deforestation rate is 313,000 hectares per year, which is the highest in the Southern Africa region. This has led in turn to the silting up of reservoirs and waterways and falling levels of agricultural production. These problems are being worsened by the current spates of droughts.

Since Zimbabwe's economy is agriculture based, a great proportion of the country's environmental problems are related to agricultural practices and other land use systems. These practices are contributing to soil erosion, biodiversity loss, desertification and increased vulnerability of the rural poor. Therefore, the work of SGP Zimbabwe in agroecology aims to build resilience of the local communities by identifying their vulnerabilities and promoting Sustainable Land Management (SLM) and agroecology in production systems, rangelands and forest ecosystems. Key techniques used to support agroecology include conservation farming, maintaining the genetic diversity, reducing tillage to enhance soil cover and stabilization, diversification of cropping systems through crop rotation and intercropping, water harvesting and pest prevention through Integrated Pest Management (IPM). Farmers and relevant stakeholders have improved their capacities by receiving training on organic farming, certification procedures, holistic land and livestock management and efficient irrigation practices using renewable energy.

### CONTEXT

The Shurugwi district, located in the Midlands province of Zimbabwe is facing several environmental challenges that include climate change, wetlands degradation, deforestation and water shortages. All these pressing environmental challenges have resulted in increasing poverty levels and food insecurity for the local population. To address these issues, the Local Initiatives & Development Agency (LID), with the support of the GEF Small Grants Programme, is working with 366 farmers that are facing extreme water supply shortages because of droughts and erratic rainfall.

### IMPLEMENTATION

To improve the resilience of under resourced smallholder farming systems, the project used a Participatory Scenario Planning approach to climate change, through which the community integrates scientific and indigenous climate forecasts to develop scenarios that inform their agro-ecological practices. Some of these agro-ecological practices include conservation and organic farming, diversification of cropping systems, agroforestry, composting, water harvesting and Integrated Pest Management (IPM). To improve livestock and grazing management, the project introduced locally available tropical natural forage for livestock (*Brachiaria brizantha cv marandu*, *calliandra*, *accasia* and *lucerna*) for both grazers and browsers.

LID's strategy includes the promotion of value chains by providing linkages with the private sector for marketing and resource mobilization. To this end, LID established linkages with Unki Platinum Mine and Barclays Bank and trained 1,233 youths in beekeeping and honey production. It also supported the expansion of beehives through timber donations from the local Unki Platinum mine. A group of young farmers were also trained and linked to seed funding to establish a rabbit breeding program. Most of the youths are out of school, unemployed and with limited economic



PHOTO: BEAN CROP, SGP ZIMBABWE

opportunities, hence the importance of providing them with business and social entrepreneurship skills to reduce poverty and unemployment.

## RESULTS AND SCALING UP

The results from the interventions include improved soil moisture, increased diversified yields and improved conservation status of farm biodiversity. The project conserved ten hectares of natural woodlands through reforestation and establishment of 30,000 indigenous fruit tree seedlings from community nurseries including *Syzygium cordatum*, *Azanza garckeana*, *Berchemia discolor*, *Uapaca kirkiana*, *Sclerocarya caffra* and *Ziziphus abyssinica*.

Fish farming, beekeeping and organic farming cooperatives were established to increase food production and income generation for targeted households and 216 kg of fish have already been harvested. A total of 519,024 tons of organic vegetables were produced for local consumption and sale at the markets generating US\$167,908 in sales between March 2015 and December 2016 alone. All these practices improved the community's safety nets during the peak of the 2016 El Nino induced drought that was declared a state of emergency in Zimbabwe.

Furthermore, 538 pupils are benefiting from vegetables donated by local organic vegetable farmers to improve the health of malnourished children at local schools through the launch of the Participatory School Feeding program. Three additional solar energy kiosks were established to promote the use of clean and renewable energy for Simbaravanhu, Reskelf and Musavadha villages. For training purposes, the project established an information and communication technology and marketing centre at LID. The project also contributed to the development of one fodder demonstration plot in the Magumise community, the rehabilitation of two boreholes and construction of two drinking water tanks for livestock, reclamation of two gullies in Ngere village, construction of 100 energy saving stoves and three water harvesting weirs. With regards to wetland conservation, the project scaled up work of previous projects with four additional wetlands covering 45 hectares under protection.

The project has also helped to address inequalities. For the targeted communities, income, gender and wealth inequalities were very high, making poverty a key feature for marginalized groups. Inequality was affecting opportunities and growth for rural household economies, especially the vulnerable child headed and women headed households. A deliberate targeting for these groups has improved their food production and wealth. Most women headed households that were targeted by the project

recorded an increase in the number of nutritious meals from two to four per day thereby improving households' resilience to droughts and food insecurity during the 2016 season that was declared a national disaster. Training and capacity building activities increased leadership opportunities for women with 62 percent of leadership positions held by women. The agricultural value addition training component increased economic opportunities and access to sustainable markets by women, a sector predominantly controlled by men.

### EXPERIENCES AND LESSONS

Agroecology has been a useful and important practice that has strengthened adaptive capacity and resilience to climate change shocks for local farmers. For the LID project, what has been fulfilling is the heavy

dependence on locally available materials and integration of Indigenous Knowledge Systems in production systems which have enabled farmers to improve production in a cost-effective manner. Support for value chains through contractual agreements with Unki Mine and Midlands Spar has helped in terms of marketing produce, improving incomes and project sustainability as the farmers now have a guaranteed market.

The use of Participatory Scenario Planning in the context of climate change has been a critical tool for improving resilience and recognized the role of both Indigenous Knowledge and Scientific Systems. The weather forecasts used by smallholder farmers in developing seasonal scenarios for the conservation of farming systems helped to reduce damage/loss from climate and weather extremes.

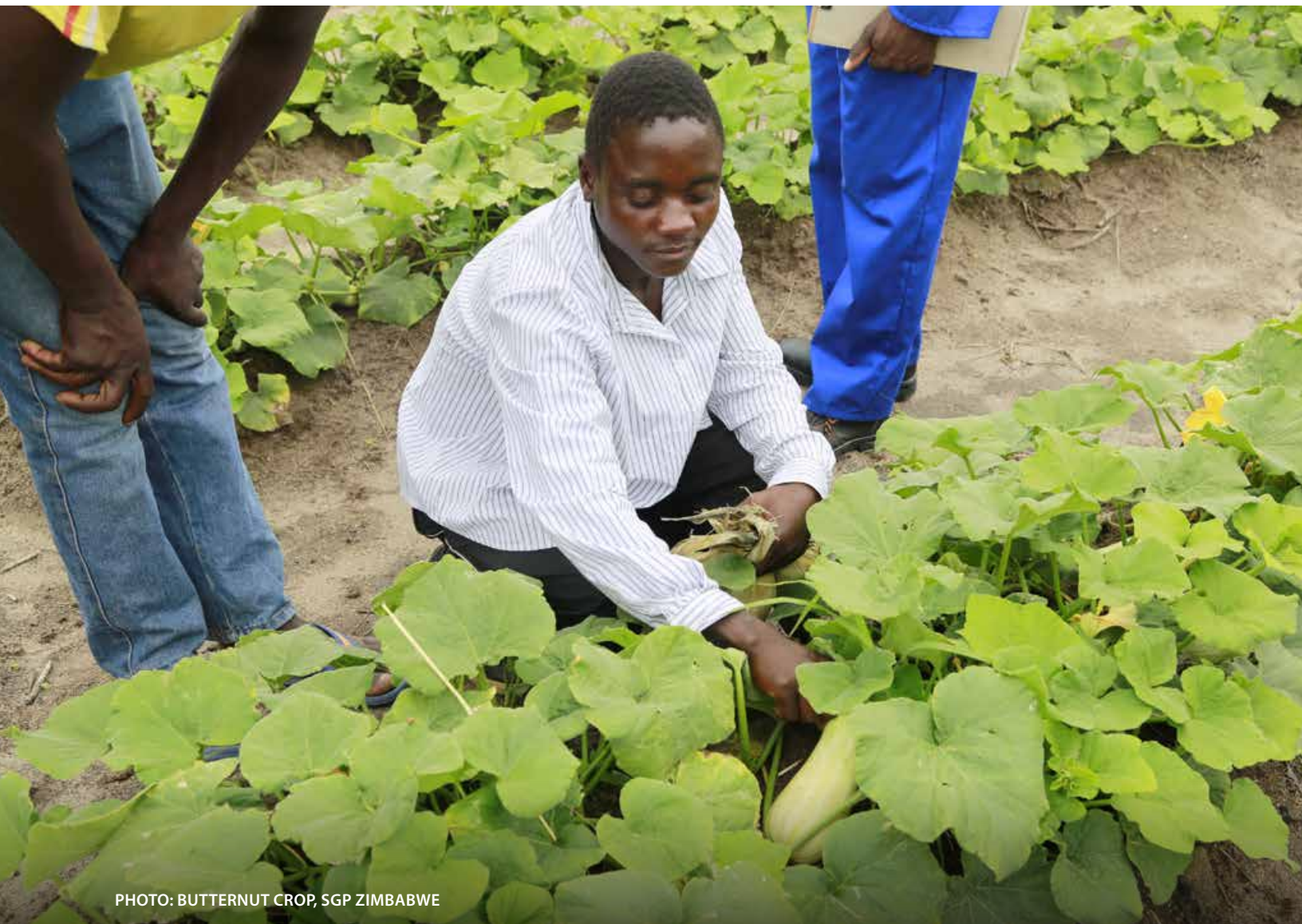


PHOTO: BUTTERNUT CROP, SGP ZIMBABWE

## II. THEME AND PRACTICE

# SUSTAINABLE FOREST MANAGEMENT

SGP's work on forests is often multi-focal and projects may be relevant to the focal areas of biodiversity, climate change and land degradation. Most projects aim to increase ecological connectivity and improve forest biodiversity values at landscape level by promoting good management practices at community level. Projects support small holder forestry and rangelands management as well as use of woodlots and protection of communal forest zones for medicinal and educational purposes. Communities prefer participatory joint management processes that ensure that in addition to state and local authorities, communities have access to and management rights over communal resources. Communities often develop their own forest management and utilization plans with an increasing focus on non-timber forest products. These shared management plans increasingly include access and benefit-sharing considerations as well.

The SFM practice area shows the clear preference of communities for joint management processes that ensure participation in the management of forests while generating access to and rights over communal resources, including forest products. Communities predominantly implement projects that lead to the development of forest management plans, with an increasing share in use of non-timber products. Additionally, benefit sharing is a key concern for most types of projects, especially those relying on forest resources for sustenance and livelihoods.



PHOTO: SGP VIETNAM



## 4. CUBA

# Protecting Biodiversity Through Agroforestry and Agritourism



#### GRANTEE

Viñales National Park Community Board



#### SGP CONTRIBUTION

US\$150,000



#### IN-CASH CO-FINANCING

US\$210,000



#### START DATE

March 2014

#### END DATE

December 2018



#### NUMBER OF BENEFICIARIES

50 people

### CONTEXT

The Viñales National Park, is a protected area of 11,200 hectares, located in the Guaniguanico mountain range, municipality of Viñales, Cuba. It is home to 80 percent of the endemic mogotes. One of the most important endemic and endangered species is known as cork palm (*Microcycas calocoma*), a species that together with its surroundings has been declared National Natural Monument. It is a site rich in wildlife species, where groups of insects, mollusks, amphibians, reptiles and birds stand out. However, extensive agricultural use of the land has led to soil degradation, deforestation, logging, fishing, and hunting of native species.

### IMPLEMENTATION

The project is in the buffer zone of the protected area and aims to integrate the rural communities in the protection of natural resources in the three types of ecosystems in the area: cárstico, roca de pizarra and valles intramontanos. The project works with the communities of El Moncada, Pan de Azúcar, El Sitio, Ancón and Republic of Chile, which are home to 2,389 people that depend on agriculture for their livelihoods.

To reduce the pressure on the ecosystem, the project supported the use of agroecological practices and involved the participation of local communities in the recovery of endemic native species threatened with extinction, and in the management and restoration of forests. Communities received training and support in the implementation of agroforestry systems, management and control of invasive alien species, soil conservation, fire mitigation, reforestation, agritourism, and integrated management of coffee pests and diseases. Students from different universities attended trainings in the United States in the management of agricultural resources and the development of agritourism.

The initiative also aims to replicate this experience to other areas of the National System of Protected Areas of Cuba.

### COUNTRY BACKGROUND

The Environmental Strategy of Cuba 2016-2020 recognizes the main environmental problem of the country is the degradation of its soils. Due to bad agricultural practices erosion processes affect 2.5 million hectares of soils, high acidity reaches about 3.4 million hectares, high salinity influences about 1 million hectares, drainage problems reach 2.7 million hectares and, in short, 60 percent of the country's surface is affected by these and other factors, leading to desertification. Only 28 percent of the agricultural soils are very productive, the rest are little productive.

The Small Grants Programme works in synergy with the Cuban Environmental Strategy in implementing the approach or principles of sustainable land management by helping to reduce land degradation and conserve the local ecosystems while improving their resilience. With 22 projects on sustainable land management, including four projects funded by the International Development Agency, SGP Cuba has been able to reach over 10,000 farmer leaders and involve them in successful demonstrations of agroecological practices to reduce farm-based emissions and enhance resilience to climate change. Through these projects, the country programme has brought 633 hectares under Sustainable Land Management, reforested 1,033 hectares installed and improved over 90 irrigation systems and 630 bio-digesters.

To support the implementation of these projects, SGP Cuba has supported the creation and strengthening of networks comprised of scientific institutions, universities, producer associations, cooperatives and communities.



## RESULTS AND SCALING UP

Although the project is still underway, results are very encouraging. Twelve hectares have been reforested and coffee production has been introduced in three farms. Using a methodology for the management and control of invasive alien species elaborated by the National Center of Protected Areas, four farms are controlling the growth of *Syzygium jambos*. The development of agritourism is growing with nine farms linked to the tourism industry of the Viñales National Park and the creation of 80 new jobs that improve the economic solvency of peasant families. A community environmental group in Cuajani was established and led to the development of the Nature and Community Festival in the communities of Puerto Esperanza and Cuajani.

The agritourism program, led to the reforestation, forest enrichment and soil conservation of 68 hectares. Ten agroecological farms have been established and environmental community groups have been created. These actions updated the ecotourism services of Viñales National Park to include agritourism, strengthening the agricultural systems selected by the program. Agritourism

has boosted farmers' profit growth and serves as a catalyst for the use of agroecological best practices by peasants. In addition, two of the farms function as training grounds for students of the Polytechnic of Agriculture. Agroecological practices have also been carried out in these farms with students from Venezuela, Spain, the United States, Germany and France.







This initiative received a prize for Technological Innovation from the Ministry of Science, Technology and Environment of Cuba and good practices emerging from the project were shared in a poster session at the 2016 IUCN World Congress and at the 22<sup>nd</sup> and 23<sup>rd</sup> Annual ISTF Conference organized by the Yale Chapter of International Society of Tropical Foresters.

## EXPERIENCES AND LESSONS

It is important to strengthen the capacities of rural communities in the management of natural resources, taking advantage of agroecological practices and sustainable tourism for the long-term conservation of forests and ecosystems.

# 5. TANZANIA

## Improving Water Management Through Reforestation

|  |  |   |
|--|--|---|
|   | <b>GRANTEE</b><br>Same Agricultural Improvement Program Trust Fund |   |
|   | <b>SGP CONTRIBUTION</b><br>US\$43,226                              | <b>UNDP CONTRIBUTION</b><br>US\$100,000 |
|   | <b>IN-CASH CO-FINANCING</b><br>US\$11,000                          |   |
|   | <b>IN-KIND CO-FINANCING</b><br>US\$7,778                           |   |
|   | <b>START DATE</b><br>June, 2012                                    | <b>END DATE</b><br>June, 2017           |
|  | <b>NUMBER OF BENEFICIARIES</b><br>1,095 people                     |   |

### CONTEXT

Located along the slopes of Pare Mountains, Same is a highland district with a difficult topography, and farming is mostly undertaken along steep slopes. When it rains, farms along these slopes suffer from soil erosion, which contributes to reduced fertility and lower yields per unit area. These effects in turn increase hunger and poverty. Soil erosion during rainfall cause floods downstream, often washing houses and crop farms, and depositing debris on the Moshi/Arusha highway, which renders it unusable for periods of the year. The project aimed to demonstrate how soil erosion in highland areas and periodic flooding in lowlands can be controlled through the construction of traditional micro-dams called Ndivas in the local language, bench terraces, contour ridges, and tree planting.

### COUNTRY BACKGROUND

In Tanzania, 61 percent of land is arid and semi-arid and land degradation in its different forms (desertification, soil erosion, soil nutrient depletion, deforestation and forest degradation) is experienced in almost all agroecological zones reducing ecosystem goods and services. In addition, land degradation has negative impact on people's livelihoods because reduced land productivity results in food insecurity and desiccation of water sources.

To address these issues SGP Tanzania prioritized interventions focused on afforestation and agroforestry, terrace farming, small scale irrigation farming and conservation of water sources. These interventions have resulted in the creation of favorable micro climates at the target areas, that have contributed to increased food security at the household level, and well-functioning water sources. These projects have also provided a sustainable supply of wood fuel for energy and have helped avoid conflicts between various land users particularly farmers and pastoralists. Ten civil society groups including farmer, youth and women groups as well as local governments have been engaged by SGP for the promotion of agroecological practices.

To increase resilience to climate change SGP has also been supporting the conservation of water sources, and the establishment of water reservoirs to collect surface water used for domestic water supply as well as farming irrigation. These interventions assure water availability for domestic and agricultural purposes.

### IMPLEMENTATION

To this end, the Same Agricultural Improvement Program Trust Fund (SAIPRO), with the support of the Small Grants Programme provided training to the local communities on soil and water conservation. The training included hands-on outdoor activities in a selected model farm also called Farmers' field school, along with study visits to enhance inter-community learning. Practical training on how to build bench terraces and contour ridges was conducted in targeted villages by staff from SAIPRO and a farmer's field was selected as a demonstration site for bench terracing and contour ridges. The training included community members, as well as village government leaders and extension workers.

For the establishment of tree nurseries, SAIPRO purchased the seeds and nursery tools while the participating farmers collected locally available materials such as sand and composite manure and provided the site for the nursery. After an indoor session, there was a practical demonstration that included sowing seeds in the nursery seedbed. The project also demonstrated how to establish traditional micro-dams, conducting one demonstration in each

of the three participating wards. These micro water dams are traditionally built out of stones and mud and the NGO engaged a skilled mason to help rehabilitate each of them.

## RESULTS AND SCALING UP

As result of the project, 250 farmers from Mwembe, Mwezi, Mshewa, Kihurio and Msindo acquired knowledge on soil and water conservation and used these skills to construct terraces, practice intercropping of crop plants with trees for agroforestry, plant trees around water sources to reduce evapotranspiration, and use mulch in horticulture. The use of these agroecological practices successfully rehabilitated degraded land by 60 percent on average, and increased water availability for irrigation, thus improving crop production and yields. In total 228 hectares of agricultural land has been rehabilitated by the project.

In terms of policy influence, the project successfully influenced the local government to pass a village regulation that requires all farms receiving water from the micro dam to terrace their farms and to plant trees along the contour. The project also helped strengthen the ability of village level authorities to enforce policy. Three years after the closing of the grant, farmers are reporting that they are seeing a 200 percent increase in yield. For example, maize production increased from 0.5 tons to 2 tons per hectare; beans from 0.5 tons to 1 ton per hectare; and vegetables realized an increase from 4 tons to 10 tons per hectare. All the 250 participating households reported to have achieved food self-sufficiency through the adoption of agroforestry farming techniques.

In May 2017, the project secured US\$100,000 from UNDP to scale up these practices. Results of this project have been documented in the study: "Understanding the Factors of Scalable Success: Natural Resource and Biodiversity Conservation Programming in Tanzania" as part of a joint research collaboration between Yale University and SGP. The Kiasa Ndiva Water User Group in Mshewa approached SAIPRO for technical advice on how to improve crop yields. As a result of this collaboration, the project replicated and scaled up some of these agro-ecological practices with the financial support of SGP.

Overall results have included increase in vegetation cover on the mountain slopes from 10 percent to 100 percent and reduction in the scale of soil erosion. Through continuing efforts by farmers, the improvements in rehabilitated land have been sustained.



PHOTO: MICRO WATER DAM, SGP TANZANIA, DANA BAKER

## EXPERIENCES AND LESSONS LEARNED

Training in soil and water conservation through terrace farming, contour ridges and tree planting led to rehabilitation of degraded land. However, this practice needs to be sustained because failure to sustain it will lead to land degradation. Good practices like these ones can be sustained through (i) repeated in-door and out-door training (ii) enhanced and motivated extension services and (iii) strong farmers groups who can help one another in sustaining the best practices.

The micro water dams increased availability of water for irrigation, which in turn increased crop productivity. Micro water dams are used to store water for use during the June – October dry spell, when demand is high for irrigation water. There are some slight differences in demand for irrigation water between the lowland and highland users because highland soils have relatively bigger capacity for retention of moisture as compared to the lowlands. The support provided by SGP through SAIPRO helped in rehabilitating the micro dams. However, farmers have the responsibility of maintaining the structures after they have been rehabilitated and have been encouraged to establish funds for this purpose.

# 6. NIGERIA

## Forest Rehabilitation and Crop Sequencing to Increase Yields



### GRANTEE

Rural Infrastructure Services for Under-Served Population



### SGP CONTRIBUTION

US\$30,000



### IN-KIND CO-FINANCING

US\$18,000



### START DATE

2012

### END DATE

2017



### NUMBER OF BENEFICIARIES

382 people

### CONTEXT

Obudu, the local government capital, is a town in Cross River State, Nigeria. More than 90 percent of Obudu farmers are small-scale operators cultivating plots of less than one hectare and live on less than US\$1 per day. The area is under threat from human induced land degradation. Its inhabitants experience irregular and unpredictable rainfall, flooding, land degradation, and low agricultural productivity. Consequently, some of the indigenous plants, trees, and vegetables are under threat of disappearing from local farms. Popular vegetable crops, such as afang (*Gnetum africanum*), consumed regularly by over 5 million people in Nigeria, are under severe pressure by over-exploitation and deforestation. Now, Nigeria imports afang, which is a conifer-related vine sometimes referred to as wild spinach from neighboring Cameroon. Protecting these crops is not only an economic issue to boost food production, but also significant for environmental conservation purposes.

The goal of the project, implemented by the NGO Rural Infrastructure Services for Under-Served Population (RISEUP), was to combat land degradation in Obudu through protection and restoration of key, poverty reducing ecosystem services. The main activities of the projects are to enhance the capacities of the community on sustainable agriculture practices including organic farming, the use of simple irrigation methods for soil and water management, and access to high quality, drought and disease-resistant hybrid seeds. Ten vegetables were selected for the project, including the threatened afang and bush mango species.

### IMPLEMENTATION

RISEUP introduced improved vegetable propagation techniques including crop scheduling and sequential growing to provide room for inherent fertilization from crop residues, use of manual pump irrigation, grafting and nurturing of vegetables which are difficult to propagate,

### COUNTRY BACKGROUND

In Nigeria, human activities and land use have resulted in dramatic changes in the country's landscape, in terms of deforestation, desertification, and agricultural intensification. The annual rate of deforestation in Nigeria is 3.5 percent, approximately 350,000-400,000 hectares per year.

Cross River State (CRS) is a coastal state southeast Nigeria, and occupies 20,156 square kilometers of land. The population of CRS is estimated at 2.89 million persons as of 2006, with over 75 percent of the population living in rural areas. Research carried out by University of Calabar reveals that of the total CRS land area, 72.1 percent is degraded. By implication, the nearby Obudu community also is under threat from human induced land degradation.

Since the GEF Small Grants Programme started operating in Nigeria, 40 community land degradation projects have been supported to address various land degradation and climate related agriculture challenges. SGP projects aim to improve and preserve farm produce through seed banking, increasing the capacity of farmers to build greenhouses while improving their resilience to climate change. To date, there are at least 100 farmers in target landscapes using agroecological practices. To share knowledge and promote scaling up and replication, SGP has been fostering the creation of farmer networks with 10 networks disseminating improved climate-smart agroecological practices.



PHOTO: FARM DEMONSTRATION, SGP NIGERIA.



PHOTO: SGP NIGERIA

mulching and composting. Over 380 farmers were trained in organic vegetable production and how to establish and maintain demonstration farms with irrigation systems. These farmers also received farming tools and improved vegetable seeds. Demonstration farm practices are replicated on 172 hectares of farmland by establishing farmer-to-farmer training extension services for collaboration. The NGO worked in collaboration with the **World Vegetable Center**, formerly known as the Asian Vegetable Research and Development Center (AVRDC), who supplied the vegetable seeds free to the farmers.

Despite the degradation of farmlands and deforestation, farmers are accustomed to experiencing periods of overabundance during the rainy season. Coupled with this, the introduction of high-yielding and disease resistant AVRDC seeds and good water management, the local markets were flooded with farm products, driving prices and income down. As an example, tomato production increased from 40 tons per hectare to 60-80 tons.

To address this increased agricultural yield, the project provided 3 solar driers for farmers to dry their produce. Now the products are dried and packaged for preservation and sale.

The New Forest Project, an NGO located in the United States, supplied training materials, educational assistance and high quality seeds of trees that fix nitrogen in the soil to complement efforts in conservation agriculture for reforestation projects. An indigenous Godilogo Farm provides accommodation, technical and marketing services to the project.

The community propagated over 4,000 afang vine and bush mango seedlings, which have been planted out as a reforestation effort, and used to establish a vegetable garden for demonstration purposes. Other seedlings were distributed to the community to nurture individually on their personal farmland. Sixty community members (35 women, 15 men, and 10 youths) were given special training and are taking care of 60 afang farms.

## RESULTS AND SCALING UP

The project improved farming practices, increased irrigation efficiency, opened market channels, improved food security and alleviated poverty. Nineteen communities in Wula, Obudu and Bishiri, three local government areas in the Cross River State, have increased their vegetable cultivation capacity, empowering the rural poor through improved agricultural and environmental practices.

The 4,000 propagated seedlings of afang vines and bush mango trees will boost the supply of these popular vegetables for local consumption, restore degraded farmlands, and produce income for the local farmers. At least 80 smallholder women farmers with approximately one acre of farmland were given improved tomato seeds to plant on their farms. Because of these activities, the initiative reclaimed almost 200 hectares of land through sustainable land management practices. In addition, farmers now have access to high-yielding and disease-resistant seeds, which have generated a 60 percent to 80 percent increase in yield.

The drip irrigation technology improved water conservation and helped to ensure water availability in the farms during dry season. The use of the drip irrigation system, in conjunction with Kick Start ergonomic manual pumps, allow farmers to irrigate about three-quarters of an acre in eight hours. This has improved the quality of the land and the farms by a factor of six. Farmers now cultivate tomato three times in the year; corn twice in the year as against the normal rain-fed once in a year cultivation. Farmers whose income was US\$1 – US\$2 a day now make between US\$6 and US\$12 a day resulting in about US\$4,000 annually per farmer. The introduction of solar dryers have reduced produce loss and increased farmers' incomes from the sales of farm produce that previously would have gone to waste. The application of this technology enables each household to make an average of US\$10-US\$12 daily, resulting in about US\$3,650 per annum on solar dried vegetables; a strategy being considered for adoption by two local government authorities.

Improved farming and produce preservation have enabled some women to acquire more income during the dry season than at other times. A typical woman now sells between US\$10 per weekday and US\$53 per weekend day, instead of US\$5 per day as it was before the project, on the sales of fluted pumpkin 'Ugu' alone. As a result, the initiative has had a positive impact on school enrolment, as many women are now able to pay school fees and send more children to school. Eighteen women now concentrate on marketing dried and packaged vegetables for extra income. Given that RISEUP buys and processes excess production directly from farmers, women now produce more than twice the usual amount. Solar-dried pepper is now packaged for sale at local and international markets and this is expected to improve after necessary certifications are obtained.

Another approach used to mitigate climate change and reduce poverty is planting of trees that provide agricultural commodities, such as fruits and nuts. This mitigation strategy has been adopted and prevents topsoil erosion, promotes soil conservation and increases agricultural income. Farmers also planted garlic and ginger as medicinal products for improved health and increased incomes. At least 120 trained participants on sustainable land management replicated the demonstration on one hectare of land. Many of the trained farmers have also trained others who are in turn establishing their farms using SLM practices to improve farm yield. The result of the project was replicated and spread from Obudu to six neighboring communities: Amunga, Buya, Utuhu, Busafo, Bilukona and Beebong.



PHOTO: M&E TEAM WITH SOME OF THE BENEFICIARIES, SGP NIGERIA.



PHOTO: SOLAR-DRIED PEPPER, SGP NIGERIA.

The NGO also introduced a “*Catch them Young*” programme by donating rooting and weaning propagators to Buentebe Secondary School as a demonstration, which other schools are encouraged to adopt. The children were trained on vegetative propagation of *afang* from vine cuttings and other methods for maintaining the propagators. The students raised seedlings and established a school *afang* farm for learning, demonstration and consumption.

Furthermore, 120 participants were trained on sustainable land management and replicated the demonstration on one hectare of land. Many of these farmers have started using SLM on their own farms. This effort was replicated in 6 neighboring communities. The project has contributed to forest conservation on about 220 hectares by reducing pressure on wild bush mango and *afang* stock by training farmers and others who use the forest in cultivation and sustainable management of these crops.

### EXPERIENCES AND LESSONS

The project demonstrated that conservation improves farm practices and yield while addressing soil degradation and erosion. The use of SLM and high quality seeds has

demonstrated to the community that forest restoration is advantageous in terms of reforestation, restoration, agricultural crop yield and economic empowerment. Other communities are following this example, which highlights its efficacy. This project responded to the vulnerability of these communities in relying on imported goods. A community leader expressed gratitude that the *afang* crop is returning to Cross River State, and that the dependence on imported crops is reduced. The successful results and lessons learned led to scaling up of the project by increasing the number of beneficiaries by 100 farmers.

The training in sustainable land management and free seeds distribution by the [World Vegetable Centre](#) has had a significant impact on the farmers in these communities. The results have encouraged other people, including veterans, to farm. A group of 10 retired military service men have engaged with farming and appreciate the opportunity to be active and productive. This has drastically changed the farmers’ status and gainful farming has had an activating effect on the communities.

### III. THEME AND PRACTICE

# WATER AND ENERGY EFFICIENT TECHNOLOGIES

Projects in this theme have the overall objective of strengthening the resilience of communities to reduced water availability and support poverty alleviation through small irrigation agricultural systems and agri-businesses. The overall strategy is to save water and use it efficiently, create awareness and support capacity building activities related to water security, and promote the sustainable management of natural resources. Activities often involve installation and maintenance of small scale irrigation systems and technologies, improvement of water retention facilities, and sustenance of water point sources as well as watersheds. In addition to these applications, specific local level actions are often accompanied by installations of greenhouses, aquaculture facilities, permaculture practices, re-creation of constructed wetlands, and the general use of aquaponics technologies.

Water management technologies support many agricultural activities aimed at efficient use of water in farms, promoting salt tolerant species, enhancing livestock dispersal strategies, range and pasture improvements, and general gravity driven irrigation network technologies. Construction of terraces, drainage for moisture retention and soil texture, and structure improvements including mineralization technologies are often a focus of the SGP projects. In a few cases the focus has been to help drain wetlands, or where water tables have risen, prevent frequent flooding. Canals and synthetic bio-degradable structures are often constructed to remove excess water and pollutants from farmlands and grazing areas.



PHOTO: SGP MAURITIUS



# 7. ARMENIA

## From Agricultural Waste to Sustainable Fuel



**SGP CONTRIBUTION**  
US\$44,600



**IN-CASH CO-FINANCING**  
US\$8,310



**IN-KIND CO-FINANCING**  
US\$5,190



**START DATE**  
2015

**END DATE**  
2017



**NUMBER OF BENEFICIARIES**  
389 people

### COUNTRY BACKGROUND

According to the National Action Programme to Combat Desertification, around 82 percent of Armenia's territory is subject to different degrees of desertification. The areas exposed to heavy impact make up about 27 percent of the total area of Armenia, strong impact – 26 percent, moderate – 20 percent and weak – 9 percent. Agriculture in Armenia is at risk due to limited land resources, existing environmental problems and changing climate, including rising temperatures and reduced rainfall, increased evaporation from the soil due to secondary salinization and erosion. The latter is worsened by flooding, droughts and strong winds. Loss of water due to inefficient irrigation practices, soil salinization, erosion, overgrazing, inappropriate cultivation methods, deforestation and pollution are among the most serious problems for the country's agricultural sector. While much of the land degradation occurring in Armenia is human-induced, due to unsustainable land and forest management and farming practices, there are also natural causes such as land cover patterns and soil properties. Unsustainable farming practices leading to land degradation mainly include inappropriate crop rotations, tillage on steep slopes, burning crop residues and poor soil fertility and nutrient management.

SGP Armenia has been contributing to the development and promotion of agro-ecological innovations to reduce agricultural emissions, increase carbon storage on farmland and enhance resilience of people, farms and ecosystems to climate change. The programme has provided practical support for innovative agroecology practices to be applied within 23 projects that integrate land, water, livestock and biodiversity conservation with the goal of restoring and conserving land pastures, hay lands and other productive landscapes. A key area of focus has been capacity building and knowledge sharing on climate-smart agro-ecological innovations that reduce agricultural emissions and enhance carbon stocks in biomass and soil. Because of these interventions, over 550 farmer-leaders, 303 of them women, are using agro-ecological practices. Several techniques and practical approaches in crop and livestock production are demonstrated including pellet production from agricultural waste, mulching, intercropping, organic farming, crop rotation, resilient food crops, integrated crop-livestock management, agroforestry, etc. Five farmer networks are disseminating improved climate-smart agro-ecological practices.

### PROJECT CONTEXT

Basen has a population of 1,780 people mainly engaged in cattle and sheep breeding, cultivation of cereals, fodder and vegetable crops. Agricultural lands largely consist of arable (1,440 ha) and pasture lands (1,382 ha) and most community farmlands are exposed to different forms of degradation due to wind erosion, soil compaction, natural waterlogging, as well as overgrazing of nearby pastures and improper use of fodder base in remote pastures. A significant part of the community grasslands is not used effectively because of the stony landscape, dominance of inedible plants and absence of a capping mechanism for the use of natural seeps and springs. Often, the community winter wheat stubble is unfit for forage and burnt in the fields causing the destruction of the upper layer of soil and producing carbon loss. The community has no natural gas supply and about 90 percent of the population traditionally uses cow dung (dried manure) as a fuel, which hinders using manure as a valuable bio-fertilizer. Improper grazing practices further degrade the land, and disrupt ecosystem services provided by grasslands, and crucial for local livelihoods.

### IMPLEMENTATION

The project aims to contribute to the improvement of agro-ecosystem services and reduce land degradation through introduction of integrated land and water management, and effective use of agricultural biomass to produce energy in the Basen community. Project activities included the establishment of water intake facilities at the foothills of Matner Mountain to collect natural seep and spring waters for agriculture and to rehabilitate (drain) four hectares of waterlogged pasture and hay-land areas. Backyard land plots of more than twenty-eight households are currently irrigated from the newly constructed water intake system. A pellet-production unit with 200 kg/hour capacity was installed and produces pellets out of agricultural waste.



PHOTO: PELLETS PRODUCED FROM BIOWASTE, SGP ARMENIA.

Due to the project, an energy-efficient pellet stove was introduced in the community kindergarten, and more than five tons of locally produced pellet fuel is stored for the heating season. To build local capacities on integrated management of land and water resources, a series of agro-ecological trainings, educational and awareness raising events were conducted. A synthesis of the knowledge, experience and lessons learned produced by the project, including a comprehensive analysis of environmental and economic benefits, was captured in a publication and distributed to the major stakeholders.

## RESULTS AND SCALING UP

The main result of the project was a change in the mindset of the local population with the adoption of new techniques such as the use of biomass waste introduced by the project. In 2016, no straw or other biomass waste was burnt in community hay lands, which resulted in the reduction of about 260 tons of CO<sub>2</sub> emissions.

More community members have started to make or obtain energy efficient pellet stoves and are gradually replacing dung with pellet fuel. Previously around

150-200 tons of manure was used to fertilize the farmlands, in 2016 it increased to 350-400 tons, fertilizing 10 to 12 additional hectares of farmlands. The community now tends to use cow dung as organic fertilizer to improve soil quality, which is time-saving and improves local livelihoods. The Basen Community Pasture Users Association Cooperative is thinking about obtaining a biomass grinder to make pellets from pruned tree branches, corn, potato and sunflower stalks, thorny plants/weeds and other agricultural waste. The community has produced more than 15 tons of pellets, saving 15-20 m<sup>3</sup> of firewood and 80-100 m<sup>3</sup> of cattle dung so far.

The livelihoods of the seventy children attending Basen kindergarten, where the pellet stove is demonstrated have improved significantly. Previously, the kindergarten was only able to function for six to eight months out of the year due to the lack of heating, now it operates year round facilitating education of children in this community. The 149 members of the Basen Community Pasture Users Association Cooperative benefit from the pellet production unit and produce a price-competitive and energy-efficient fuel from agricultural waste. Twenty-eight households, about 100 people, receive irrigation water from the newly

constructed water intake facilities; and the intake facilities ensured provision of an additional 7 liters per second of high quality spring water to the community. Other indirect beneficiaries include participants of trainings, seminars, discussion sessions and other meetings held within the project, while up to 100 community members participated by volunteering in the construction and installation work.

Because of this and other SGP supported projects, Basen has become a leader in the province and the country in employing new technologies to solve basic environmental and agricultural problems. More than 800 representatives of different rural communities, CSOs, international organizations, business sector, central and local government have visited the site.

## EXPERIENCES AND LESSONS







Experience obtained during the project implementation has shown that initiatives similar to this, aiming at introduction of new techniques and practical approaches in integrated natural resource management, imply obvious economic benefits for local population. In terms of knowledge adoption and transfer, these innovations are very effective and accepted with great enthusiasm by communities. It is expected that the use of biomass pellet fuel introduced by this project will be further adopted by the local population and spread throughout rural Armenia, as was the case with the introduction of solar hot water use systems in Basen by SGP in 2013. The solar hot water systems have already been replicated by more than 60 community households and the number keeps growing



PHOTO: STRAW PELLETS PRODUCTION PROCESS, SGP ARMENIA.

## 8. ERITREA

# Optimizing Tillage for Rainwater Conservation

|   |  |                               |
|---|--|-------------------------------|
|  | <b>GRANTEE</b><br>Hamelmalo College of Agriculture |                               |
|  | <b>SGP CONTRIBUTION</b><br>US\$40,000              |                               |
|  | <b>IN-CASH CO-FINANCING</b><br>US\$23,000          |                               |
|  | <b>IN-KIND CO-FINANCING</b><br>US\$17,500          |                               |
|  | <b>START DATE</b><br>November 2012                 | <b>END DATE</b><br>March 2014 |
|  | <b>NUMBER OF BENEFICIARIES</b><br>7,600 farmers    |                               |

### COUNTRY BACKGROUND

Eritrea is divided into six agro-ecological zones namely the semi-deserts (39 percent), arid lowlands (32 percent), moist lowlands (16 percent), moist highlands (7 percent), arid highlands (3 percent) and sub-humid (1 percent) (FAO 1997). The agricultural sector in Eritrea provides livelihoods for about 70 percent of the rural population. Yet, due to land degradation, even during rainy season, the country is not able to meet its food demand. Rainfall in most parts of Eritrea is sparse and highly variable, inadequate to sustain good harvests every year. In one third of the country, the coastal plains in the arid lowlands, rainfall is below 200mm. Only after incidental rain showers can livestock get abundant pasture in the sparse vegetation growing in these hot and dry semi-deserts.

The agricultural sector in Eritrea provides essential services for poverty alleviation, food security, and economic growth. However, agriculture is undermined by land degradation including soil depletion, erosion, and lack of adequate plant-nutrient supply. Climate change has also contributed to land degradation in Eritrea. Because of land degradation and low agricultural productivity, Eritrea suffers from food insecurity.

SGP Eritrea has partnered with NGO and CBOs, communities and the government to develop and promote sustainable land management in its efforts to improve environmental conditions, ensure sustainable and increased agricultural production and reduce poverty. SGP has also partnered with the Hamelmalo Agricultural College, the Ministry of Agriculture, Ministry of Land, Water and Environment and Ministry of Local Government. The main practices promoted by SGP in the Maekel and Anseba regions are the optimization of tillage and rain water conservation to arrest soil degradation and achieve sustainable high crop yields, rehabilitation of degraded land through composting and afforestation, and demonstration of low carbon home systems.

### PROJECT CONTEXT

Agriculturally, due to its rugged topography and erratic rainfall pattern, the Anseba region is one of the poorest regions in the country and requires heavy soil and water conservation interventions and tillage management practices to minimize soil losses due to rain and wind erosion.

To address the land degradation in the area and achieve high crop yields, the Hamelmalo College of Agriculture (HAC) with the support of the Small Grants Programme, aimed to optimize tillage and rainwater conservation in the Bashery village micro watershed. This watershed served as a demonstration site to promote the dissemination of sustainable land management practices to its students. The selected watershed covers 28 hectares of land and serves 25 farmers and their households.

### IMPLEMENTATION

The main activities of the project included the selection of farmers and artisans from nearby villages, a participatory survey of farmers' fields and assessment of soil loss and runoff to educate farmers about the extent of the land degradation problems, as well as hands on training and field courses. Trainings focused on tillage and rainwater conservation practices including crop management practices suitable for local farmers. The training improved the knowledge of farmers and government officials involved in the development and management of the watershed in aspects such as soil management, water nutrients, tillage, insect pests and disease infestation. Demonstration practices also focused on improving crop yield.

A survey of the selected watershed at HAC farm was conducted and a planning strategy was developed. Farmers from the Hamelmalo sub-zone participated in the survey and contributed to the development of the layout for terraces and bunds. This training continued through students' involvement in field days along with



PHOTO: PLOUGH CUM SEEDER IN OPERATION, SGP ERITREA.

concerned sub-regional staff and personnel from the Ministry of Agriculture. Farmers in the Bashery watershed also participated in training for terracing, leveling and bunding, first at HAC farm and later applied it on their own field in the Bashery watershed.

The watershed land was fully developed before the start of the 2013 rainy season with the assistance of 100 students from the department of Land resources and Environment (LREN) supported by students from other departments. The developed watershed was used by the college for field crop production. Among the selected and trained farmers, some farmers undertook soil bunding on their fields, which was supported through trained students of the Department of LREN. The remaining farmers undertook soil conservation and rain water conservation activities during the summer of 2014. Yield in the area where intervention took place was comparatively much higher than the non-intervention area mainly due to increased moisture level in the soil, thanks to the optimized tillage and rainwater harvesting technologies.

Multiple cropping and alley cropping experiments were demonstrated in the model watershed at HAC. These cropping systems demonstrated the integration of legumes and cereals in the farming system to enable farmers to generate income not only from field crops but also pulses.

Most agricultural watersheds receive runoff from nonagricultural lands on the upstream side that causes repeated flooding of downstream fields rendering them unsuitable for cultivation during the rainy season. Observations have shown that such lands can be used for rice cultivation by constructing simple cost-effective runoff storage from disposal canals. Such a canal system with a reservoir on the upstream side of rice field was constructed at HAC to manage runoff produced from about 11 hectares catchments for rice cultivation in the downstream fields. The runoff collected was sufficient to cultivate rice in a field of more than 2 ha. The stored water recharged the ground water table to serve as source of sub-irrigation directly into the crop root zone.

## RESULTS AND SCALING UP

The technology demonstrated to various stakeholders using the on-the-job learning reached 7,600 farmers of Hamelmalo sub-region including SGP grantees, women and the youth organizations, farmer's associations, government ministries at the national level, local government, the forest and wild life authority and agricultural students. This project directly helped develop the capacity of 105 students of the academic department of Land Resources and Environment of Hamelmalo Agricultural College as direct participants.

Demonstration of tillage and rain water management on crop performance to farmers, concerned regional administration, including the Minister of Agriculture led to the planning and execution of soil management & training plans during the 2012 and 2013 cropping seasons.

Soil fertility methods such as composting techniques were transferred and introduced to farmers of 57 villages of Maekel region. Over 1,850 students of HAC learned how to optimize tillage and rain water conservation practices and are equipped to work as extension workers in the replication and further dissemination of SLM technologies to farmers and agro-pastoralists expanding the geographical coverage of the results produced by the project. Through support of the project it was possible to demonstrate the feasibility of not only sorghum and legume in the Hamelmalo soils, but also the sustained production of rice which is habitually thought to have higher water requirements than the other dry land cereals.

In 2015, the national meteorological service indicated that a large part of the country was expected to receive lesser amounts of rainfall than in previous years. However, despite this, farmers and agro-pastoralists in the Hamelmalo sub-region benefited from the rain water harvesting technologies as the little amount of rain was intercepted by the soil bunds and it was possible to plant their fields earlier. This demonstrates that even with little amount of soil moisture, it is possible to harvest modest yields of cereals and pulses in the intervention areas within and outside the demonstration plots.

The demonstration of the techniques introduced by the project convinced the farmers and the local authorities of the Hamelmalo sub-region of the importance of using agroecological practices in their fields. The Anseba Regional Administration and the Ministry of Agriculture are advocating for introduction of these techniques in the public seminars they hold regularly in all the sub regions of Anseba. In addition, the national newspapers, television broadcasting and radio have disseminated the positive results of the interventions.

The project has supported local communities to gain both short and long-term benefits. In the short-term targeted farmers reduced soil erosion and increased grain and fodder production, due to the improved agricultural inputs applied on their farms covering about 33 hectares. The demonstration plots showed that organic carbon and nutrient loss was significantly reduced as a result of intercropping of cereals with legumes and rotation in the next year. The fabrication of the innovative agricultural practices helped farmers to prepare efficiently and effectively; and the know-how is also transferable to beneficiaries with reasonable costs.

In the long run, soil fertility will increase gradually and farmers will harvest the accrued benefits from the agroforestry interventions in the form of parklands or trees planted on the alleys producing wood and non-wood products with direct economic benefits to the households. Soon Acacia Senegal planted on bunds or in the fields under agroforestry systems will produce gum. Also, in an agroforestry system it is also possible for farmers to harvest fire wood from pruning for domestic household consumption.

Environmentally, the roots of trees have positive effects on soil quality improvement as they increase soil organic matter and improve the water holding capacity of the soil. Moreover, maintaining vegetation cover enhances carbon sequestration

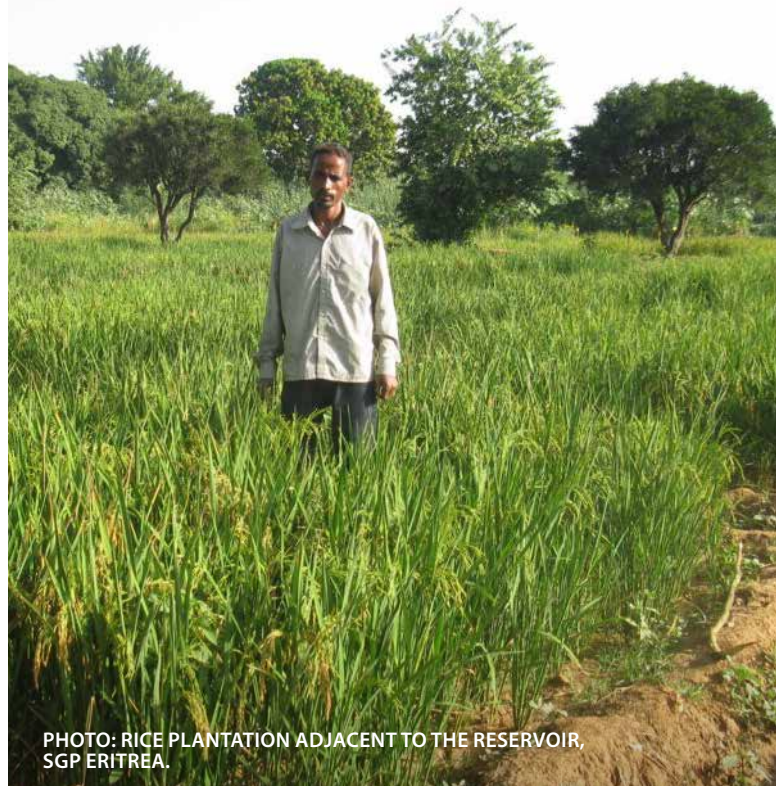


PHOTO: RICE PLANTATION ADJACENT TO THE RESERVOIR, SGP ERITREA.








and improves the soil plant atmosphere relationship. Trees are also capable of tapping plant minerals from deep soil and bringing them to the soil surface through litter which eventually decomposes and is integrated into the soil plant nutrients. The plant nutrients brought up to the surface soil are easily absorbed by annual crops such as sorghum and pearl millet, staple crops in Eritrea.

## EXPERIENCES AND LESSONS

This project opened an opportunity to connect the training of regular college students within universities, the research carried out by research institutions, and the outreach services undertaken by the Ministry of Agricultural Service. Often such activities are undertaken in parallel through different institutions, and sometimes with conflicting interests. HAC's mission which combines education, research and outreach, provided the opportunity to test these approaches in an integrated way to solve the rural households' problems. This approach was holistic and applied at the watershed level. Hence, the project became a source of inspiration for students, providing demonstration opportunities for farmers, and scientific trial fields for researchers. Many thesis dissertation about the results of the project in crop diversification and tillage and rainwater conservation practices were written by students of HAC.

# 9. BARBADOS

## Using Permaculture to Improve Soil Management and Sustainable Agriculture

|   |   |                               |
|---|---|-------------------------------|
|    | <b>GRANTEE</b><br>Caribbean Permaculture Research Institute of Barbados |                               |
|    | <b>TYPE OF ORGANIZATION</b><br>NGO                                      |                               |
|    | <b>SGP CONTRIBUTION</b><br>US\$50,000                                   |                               |
|    | <b>IN-CASH CO-FINANCING</b><br>US\$30,000                               |                               |
|   | <b>IN-KIND CO-FINANCING</b><br>US\$90,151                               |                               |
|  | <b>START DATE</b><br>December 2013                                      | <b>END DATE</b><br>March 2016 |
|  | <b>NUMBER OF BENEFICIARIES</b><br>300 people                            |                               |

### CONTEXT

The Caribbean Permaculture Research Institute (CPRI) of Barbados with the support of the Small Grants Programme is applying the new approach of permaculture to promote sustainable regenerative soil practices and a climate smart approach to agriculture in communities across Barbados.

With support from the Ministry of Agriculture, Food, Fisheries and Water Resources (MAFFW), the project helped to create a financially solvent organization to serve as a permaculture educational facility and tropical training site. The CPRI site now serves as a catalyst for the adoption of agro-ecological approaches in Barbados and the region. The main objectives were to establish the Centre of Operations and Teaching facility of the CPRI, to create and implement a Permaculture Whole Systems Design Demonstration Site Plan, repair and regenerate 15 acres of land into sustainable productive systems, and to design and deliver a multi-tiered Permaculture Educational Programme and produce competent permaculture designers and experts. In addition, the project aimed at developing community outreach activities to build resilient communities and to train locals to operate the training facility which is financially stable and internally sustainable and self-replicating.

### IMPLEMENTATION

The CPRI Centre of Operations was established within the first twelve months to ensure that there was an enabling space to operate and teach from. The permaculture whole system demonstration site plan was designed within the first two months of the project and implemented over the duration of the project. This site plan included: field design plan to foster diversity, growth succession to facilitate the creation of microclimates, resource plan to maximize the

### COUNTRY BACKGROUND

Land degradation is among the top three environmental challenges in Barbados. The island's soils are prone to erosion and the Scotland District which comprises 15 percent of Barbados is particularly prone to land degradation due to the unstable rocks and soils within this area. Land degradation in Barbados has been recorded since the 1600's and is caused by natural and anthropogenic factors. The main anthropogenic causes are agriculture, settlement, quarrying, deforestation and fire. The natural causes of land degradation include land topography, strata orientation, adverse climatic factors and climate change. Loss of soil fertility, land productivity, landslides, housing relocation and the resulting reduction in sustainable livelihood opportunities are some of the consequences of land degradation experienced in Barbados.

Thirty eight percent of the portfolio of SGP Barbados is focused on the prevention of Land degradation. Practices supported by SGP Barbados include: contour swales and berms, water harvesting, poly-culture, wind breaks, vermin-composting, compost tea, no-tillage, mulching, CSA practices, use of solar PV to power farms and cool protected structures, water harvesting and recycling, solar lighting, and composting. From 2014-2016, SGP Barbados supported 21 projects in this area and contributed to the application of SLM and agroecology practices in over 60 communities across Barbados.

use of biological and physical resources through multiple use and energy recycling, energy efficient plan that guides the creation of zones, elevation and sectors, and a community engagement and livelihoods plan to ensure sustainability of the initiative.

A multi-tiered Permaculture Educational Program was developed and delivered over the course of the project period to facilitate the training of competent permaculture designers and skilled peoples. The Educational Program allowed participants to explore aspects of permaculture such as: food and land systems, social and community systems, shelter and home systems, and livelihood and business systems relevant to permaculture.

Community outreach through community meetings, community permaculture gardens and perma-blitz (mini permaculture training in communities) was initiated in various communities across Barbados using permaculture as a tool to build more resilient communities and promote a wide-scope sense of project ownership among communities. The website and social media sites such as Facebook

and Twitter were also used to facilitate this. The final component of the implementation process ensured that this initiative could remain sustainable after project closure by training three Barbadians to operate the institute and achieving long-term community ownership and leadership of the project initiative.

## RESULTS AND SCALING UP

Because of the project, CPRI secured approximately 6 hectares of land on the border of a Ramsar wetland from the Ministry of Agriculture to use as a Permaculture Whole Systems Demonstration site. The first five acres are under sustainably agricultural practices including the construction of swales to manage water runoff and increase rainwater infiltration; the establishment of a vermicomposting beds to help stabilise organic materials and convert them to valuable soil structure and source of plant nutrients; and the construction of kitchen and mandala gardens to promote food security and easy access. The project also installed a rainwater harvesting system as a strategy for sustainable water management.



PHOTO: HANDS-ON COURSE ON PERMACULTURE, SGP BARBADOS.



PHOTO: FARMER MARKET, SGP BARBADOS

The training facility utilized two income generating mechanisms to support its operations and the livelihoods of organic farmers. One was the Permaculture Design Course and the other hosting the weekly Graeme Hall Farmers' Market, in collaboration with the Ministry of Agriculture. These revenue streams generated a total of US\$11,460 in the period from March to July 2015. The market allows organic farmers to sell directly to consumers generating additional income from selling produce and crafts; and continues to function on a weekly basis.

The Institute is fully operational and the center includes an office, teaching area and kitchen as well as on-site accommodation for facilitators. To date four Permaculture Design Course groups have been conducted with 74 males and 58 females certified as Permaculture Designers. Over 100 persons from the wider community have also been engaged through seven on-site permaculture farm tours hosted by CPRI. A South-South exchange with St. Vincent & the Grenadines, allowed for the training of three men and one woman to get trained in permaculture ethics and principles, soil regeneration and preservation by a certified CPRI Consultant and farmer. A local has been

trained as a permaculture teacher and is in the process of being internationally certified as a permaculture teacher. Furthermore, in June 2015 CPRI achieved the status of an approved Technical Vocational Education Training Centre in Barbados.

The project also influenced the government policy and agricultural training programs for youth and young farmers with the Ministry of Agriculture Food Fisheries & Water Resource Management (MAFFW). As a result of this project MAFFW incorporated permaculture into its development plans for the Central Agronomic Research Station and paid for the training of four of its agricultural officer in Permaculture Design. Now, the MAFFW fully supports the Bio-Vital Sustainable Soil Management course on Organic Farming that started on August 2015 and contributed financially to the formation of 23 students of the Agro-entrepreneurship course, a two week programme which includes extensive hands-on training.

In terms of replication, this initiative has inspired many individuals and organizations to replicate these practices. For example, one community garden has been established adjacent to Graeme Hall Sanctuary with support from

community members and CPRI volunteers, and other SGP grantees are applying permaculture in their projects. The project can be easily replicated in other communities and led by certified permaculture designers.

A key element of the success of the project has been partnerships with the private, public and civil society. Through these partnerships, the business community enabled the facility to offer 55 full scholarships to people within the communities. Under the Youth Agro-entrepreneurship Incubator Programme, implemented by MAFFW, 23 students between 18-35 completed certification. Volunteer support was provided by the World Wide Opportunities on Organic Farms and the utilization of the global crowdfunding site, Indiegogo, yielded US\$1,900 to support the programme.

### EXPERIENCES AND LESSONS

Key lessons include the importance of respecting the community and its culture, allow for slow implementation and small solutions, accept feedback, and never giving up! Other specific lessons that can use useful include:

- Using a reward system that allows volunteer hours to be exchanged for full course sponsorship.
- Strong partnership can be developed through tenacious/sustained community outreach efforts.
- Skills from permaculture are easily transferable to other forms of sustainable agricultural systems.
- The selection of the right crowd financing platform that properly caters for your resource mobilization target is critical to reaching funding targets.

For full information on CPRI, please visit their website: [www.cpribarbados.com](http://www.cpribarbados.com).



PHOTO: PERMACULTURE DESIGN COURSE, SGP BARBADOS.

## IV. THEME AND PRACTICE

# MANAGEMENT AND REHABILITATION OF DEGRADED PASTORAL LANDS

The examples in this theme are projects working under marginal environmental conditions of low and erratic rainfall, poor soils and pasture conditions, degraded landscapes through gully formations, and persistent droughts. Smallholder livestock farmers in these regions depend mainly on livestock production for their livelihoods, collection of resins and gums and frankincense. Small scale agriculture may also be practiced to a lesser extent, relying on micro-dams and other types of rain-fed micro-catchments for water collection, apiculture, and sericulture systems. Animal and emerging livestock husbandry are the major production activities given the harsh environmental conditions. Communities under these conditions are often confronted by poverty and in need of sustainable livelihood strategies. In addition to rainfall unpredictability, infrastructure for pasture and farmland development is often lacking or insufficient. These areas are also commonly underutilized and less populated, and may suffer from pest infestation.

SGP projects implemented in these pastoral zones are aimed at restoring, rehabilitating, improving the quality of degraded pasture lands and livestock health using stormflow conservation techniques, deploying methods of integrated pest management techniques and natural fertilization through animal droppings. Management of pests through biological control forms a key intervention area of SGP in many projects. Integrated Pest Management (IPM) projects focus on prevention, monitoring, and control of pests and offer the opportunity to eliminate or drastically reduce the use of pesticides, while minimizing the toxicity of and exposure to any toxic products used.





# 10. CHINA

## Rotational Grazing to Improve Degraded Farmland



### GRANTEE

Puxian Herder Ecological Relief Society of Shiqu County



### SGP CONTRIBUTION

US\$47,620



### IN-CASH CO-FINANCING

US\$1,890



### IN-KIND CO-FINANCING

US\$11,939



### START DATE

December, 2012

### END DATE

December, 2013



### NUMBER OF BENEFICIARIES

2,193 persons

### CONTEXT

The Village of Ranri is located in Sichuan Province, in the southeastern part of the Qinghai-Tibet Plateau. With population growth and rapid development of the economy, increasing road construction, mineral exploitation, overgrazing and over-exploitation of wild medicinal plants is occurring. These land use activities have caused severe damage to the fragile alpine grassland ecosystem.

In October 2011, the Puxian Herder Ecological Relief Society of Shiqu County (PHERSSC) organized a community meeting in which they identified the division of communal grasslands among individual households as a key challenge to traditional rotational grazing practices. Since each family's livestock could only stay at their own rangeland area for the four seasons in the year, this heavily increased the pressure on the grassland. Other challenges identified by community members included overgrazing and unregulated exploitation of wild medicinal plants, which further destroyed the fragile alpine grassland ecosystem and ended up being conducive to rodents and pest infestation, desertification and sand accumulation.

### IMPLEMENTATION

To address the challenges faced by the community in Ranri village PHERSSC requested technical and financial support of the GEF Small Grants Programme to implement a project to bring back the rotational grazing system. To this end, the community elected a project management committee comprised of seven members, each one representing one community to carry out the project activities and monitor progress.

At first, representatives of four communities agreed to remove fences from land areas and share their rangeland. This was followed by the remaining three communities also deciding to join the rotation grazing system. Other project activities included setting up stakes to attract eagles to control rodents and pests, planting grass to restore

### COUNTRY BACKGROUND

China is one of the countries in the world suffering from severe desertification over a vast area. Several complex causes contribute to this. According to the Fifth round of national desertification and sandification monitoring carried out by the State Forestry Administration by the end of 2014, China had a total desert land area of 2,611,600 square kilometers making up 27.2 percent of the national territory and spread within 18 provinces. The total sand covered land area was 1,721,200 square kilometers making up 17.93 percent of the national territory and found within 30 provinces.

Since 2010, SGP China has supported 10 projects in western areas of China including Gansu, Inner Mongolia, Shannxi, Sichuan, Guizhou and Yunnan provinces and Chongqing municipality where desertification and sand accumulation are severe issues. SGP has demonstrated and promoted sustainable land management practices through water and soil conservation, afforestation and reforestation, agro-forestry, revival of rotational grazing and sustainable livelihood development for local people at community level. To date, 10,886 hectares of land have been restored and are under sustainable management through SGP supported projects benefitting 8,698 people, of which more than half are women.



PHOTO: SGP CHINA

bare grassland and developing traditional handicrafts as alternative livelihood.. All the activities were decided upon by the community project management committee after consulting their communities. After the project concluded, the community project management committee was transformed into the Pasture Management Committee, which became a community self-governance mechanism to manage pastures and support livelihood improvement.

## RESULTS AND SCALING UP

With support from SGP China, PHERSSC improved the capacity of the local communities in natural resource management with the aim of reducing the pressure on degraded alpine grasslands. As a result, these communities brought over 10,000 hectares of grassland under a sustainable land management system and benefitted 2,193 indigenous Tibetan people, including 646 women.

Harvesting of wild medicinal plants such as *Cordyceps sinensis*, a plant very common in the Qinghai-Tibetan plateau area and the main cash crop for the local people,

also causes deterioration of grasslands. To address this issue, the project developed and disseminated a manual on sustainable wild medicinal plants harvesting to over 8,000 local people residing in the area, dramatically reducing the damage to the local natural resources. Through this manual, the project was able to reach a wider audience including an additional 18 communities residing in three neighboring towns.

Furthermore, over three hectares was set aside as a forage cultivation field in order to provide for sustainable winter and summer grazing. Turnips were planted in the winter grasslands which provided forage for up to 6,000 livestock during snow storm emergencies. Trainings were organized on alternative livelihoods such as traditional Marnyi-Jingfan' stone carving and traditional prayer flag craftsmanship. These new skills helped 50 villagers to increase their annual income by US\$150 per household. Using the proceeds from these livelihood activities, the project established a community fund with an initial investment of US\$16,600 to support the community in establishing sustainable livelihood activities in order to reduce pressure on their grasslands.

Pests and rodents such as *Ochotona alpine*, eat the stems and roots of forage grass and dig tunnels under the grassland, contributing to land degradation. To address these challenges 230 wooden posts were installed to attract birds of prey in the grasslands, which led to 67 percent reduction in rodents between 2012 and 2014, leading to 10 hectares of recovered grasslands.

## EXPERIENCES AND LESSONS LEARNED

*Traditional knowledge of the communities should be respected and revived.* Rotational grazing which was practiced for decades by pastoralists in grassland areas, respected the fragility of the ecosystems and allowed for the grazing pressure to be dispersed and managed. However, this tradition was broken by modern institutions and practices which were based on property allocation to household units. The project was able to successfully bring back the commons based grazing system and apply the traditional knowledge and practices of the communities.

*Community governance is fundamental for the success of the project.* At the very beginning of the project, the community set up their own management committee, which was the decision-making body for this project. Since all the members are elected by the community members, the committee's decisions

are fully supported and implemented by community members, guaranteeing the success and efficient implementation of project activities.

*Improving the capacity of the local community is important to sustain project results.* After the project concluded, the community project management committee converted into a pasture management committee that became a permanent mechanism for the community to sustainably manage their rangeland and regulate other community affairs. The community also established a community public fund with seed capital that came from the project livelihood activities. Following the success of the project, the community decided to reserve some portion of their income as a public fund to solve public problems that confronted them. The public fund is also managed by the pasture management committee.

*Respect and understanding of cultural norms.* An important element in this project is the fact that all these communities share the same cultural values and worship the same sacred mountains. This allowed them to work harmoniously together towards the same goal. The project used traditional culture as an asset and a foundation to bring different communities together to work towards one common objective: to restore their collective grasslands and reduce severity of land degradation problems.



PHOTO: TRADITIONAL MARNYI-JINGFAN STONE CARVING, SGP CHINA.



PHOTO: TRADITIONAL MARNYI-JINGFAN STONE CARVING, SGP CHINA.

# 11. SOUTH AFRICA

## Reducing Erosion in Smallholder Farms



### GRANTEE

Environmental Management Group



### SGP CONTRIBUTION

US\$50,000



### IN-CASH CO-FINANCING

US\$45,000



### START DATE

November 2012

### END DATE

May 2015



### NUMBER OF BENEFICIARIES

165 people

### COUNTRY BACKGROUND

In South Africa, there is strong interest among small-scale farmers to implement agroecological methodologies as many are aware of its benefits, such as, improved soil fertility, increased output per hectare, and the ability to harvest crops in drought and non-productive conditions, all leading to an increase in income. However, most community based organizations and farmer cooperatives working in this area are still developing their capacity and often rely on more experienced NGOs for support. Moreover, South Africa has not yet finalized its National Agroecology Strategy, which constrains the growth of this subsector in favor of conventional agriculture.

SGP has been instrumental in supporting farmer-to-farmer horizontal knowledge exchange on agroecology among its projects and partners. More than 400 women and 250 men are among the farmer-leaders involved in successful demonstrations of typologies of agroecological practices within SGP's portfolio. Fifty farmer organizations or networks are further disseminating improved climate-smart agroecological practices and knowledge.

Recent SGP agroecology projects are also challenging the reliance on current commercial seed systems in the country which do not recognize the traditional informal seed banks and exchange mechanisms. SGP grantee partners have provided parliamentary inputs on agroecology related policies such as Plant Breeders Rights and the draft Agroecology Strategy while also raising issues of land and food justice.

### CONTEXT

After 230 years of farming on the Avontuur farm, a 1,300 hectares agricultural and conservation property, grazing and agriculture negatively impacted its diverse flora. However, large sections of the property retained its biodiversity with 483 known species recorded. The small-scale farmers required concrete examples of successful rehabilitation, soil control and sustainable land use interventions to enable them to learn and implement appropriate approaches and techniques. This led to the creation of a platform known as the Environmental Management Group (EMG) which sought an SGP grant to teach small-scale farmers in the Northern Cape area how to manage land sustainably and rehabilitate degraded lands.

Avontuur farm has become known as a center of innovation and learning with several scientists becoming regular visitors to the property. Now the government aims to increase land access for historically disadvantaged farmers, this will result in an increasing number of individuals who need to learn about sustainable land management (SLM) and alternative approaches to agricultural production that are both climate sensitive and biodiversity friendly. The objective of the project was to develop the capacities of small-scale land users and aspirant land users to manage land sustainably and to rehabilitate degraded range and plough land to enhance the long-term viability of their farming operations.

### IMPLEMENTATION

In this project, EMG partnered with Avontuur Sustainable Agriculture, a small organization managing the Avontuur farm. The project targeted 90 small-scale farmers in the district whose farming operations would benefit from the application of sustainable land and water management and techniques. Workshops were held to: i) launch the project with the involvement of the community and conservation organizations, (ii) determine the causes and results of degradation, (iii) assess the current management



PHOTO: ESTABLISHING CONTOURS IN THE DOBBELAARSKOP AREA, SGP SOUTH AFRICA.

practices, (iii) share knowledge among participants in connection with sustainable land use, and (iv) develop plan of action and resources. Farmers established groups to design and implement practical examples of interventions which were later scaled up.

Intervention measures implemented by these farmers on Avontuur farm include the construction of check dams in gullies using stone packs and geotextile with poles of alien wood to slow water flow, filter runoff and create reservoirs of runoff that could gradually release moisture downstream and encourage establishment of vegetation in gully beds. Micro-catchments were also implemented such as demi-dunes and pits, placement of geotextile on surfaces to retain rain and runoff water, seed and sediment. Indigenous seed varieties collected on the property were introduced in affected areas. EMG provided training and mentorship support to farmers with the design of erosion control measures and provided limited amount of inputs such as geotextile.

Water and soil conservation workshops were held with small-scale farmers, and a video was produced. Further workshops and in-situ trainings were undertaken with 30 additional farmer groups of farmers in the district based on successful measures applied on Avontuur and best practices which enabled them to learn the SLM principles as well as skills and techniques to rehabilitate degraded land. A manual on sustainable land and water management was developed for land users, service providers and learners. Successful techniques and outcomes were also shared with local and global audiences to enable others to learn from these examples.

## RESULTS AND SCALING UP

The project succeeded in ensuring effective management of erosion on 100 hectares of severely degraded land and 400 hectares of moderately degraded land on Avontuur farm using appropriate low-cost interventions. According to EMG, as a result of the low-cost rehabilitation measures implemented over a 5 year period, more than 90 percent of the land surface in the Avontuur property is now stable and conserved; and earthworm populations have rebounded on old plough land, which is a good indicator of soil quality.

Three demonstration contour banks covering 1,500m were constructed in the Dobbelaarskop farm, which was extensively eroded. Soil and water conservation demonstration activities and erosion control were undertaken on the Avontuur farm including the construction of 260 check dams and 110 micro-catchments, 6 gabions, surface remediation by means of geotextile and spreading of seeds and breakers on crusted soil. These control measures have resulted in plant re-growth and reduced soil and water runoff.

Small-scale farmers are now using soil and water conservation techniques while also sustainably harvesting wild rooibos tea. These practices have contributed to the conservation of rich biodiversity found in the wild rooibos habitat, including protection of Fynbos vegetation.

In term of capacity building, seventy-four small-scale farmers from the Bokkeveld area enhanced their capacities and skills to practice sustainable land management on their farms; and sixteen additional farmers from Namaqualand engaged in learning activities through an exchange visit to the Avontuur farm.

The results of the project were published in a poster at the World Overview of Conservation Approaches and Technologies global meeting in Pretoria in 2014 and at the UNCCD COP11, and included in the book "Living Land" published by the UNCCD. The project developed a 10 min educational film called 'Healing the Land' reflecting the work of the project in Avontuur and Dobbelaarskop. The project also developed a practical manual on soil and water conservation, which is now available to the public.

Although the focus of the project on Avontuur farm was a relatively small, through the collaboration of the Avontuur Board with a number of networks this experience has been further expanded. Networks such as the Greater Cederberg Biodiversity Corridor, Cape Action for People and Environment, Succulent Karoo Ecosystem Programme, the Adaptation Network and Drynet, the Avontuur learning experiences have contributed towards knowledge exchange and have informed policy.

## EXPERIENCES AND LESSONS

The project has demonstrated what can be achieved by capacitated small-scale farmers using low-cost rehabilitation measures to enhance sustainable land

use in circumstances of changing climate and faced with increased intensity of extreme weather events. Small-scale farmers can contribute to land degradation, therefore it is critical to involve them in problem identification and design of mitigation measures through Sustainable Land Management practices, as demonstrated in this project.

Success on the ground is more likely to be achieved by advocating and implementing several low-cost measures that are locally available to the community, instead of few highly technical or expensive land rehabilitation interventions. Communities become more active in conservation measures when they can derive economic and livelihood benefits from implementing such measures. Rooibos is a key source of livelihood for many small-scale farmers in the area. For example, EMG trained more than 60 small-scale organic rooibos farmers from the Heiveld Cooperative, another SGP grantee, on SLM approaches. Now they are exporting organically certified rooibos to international markets and won the Equator Prize for SLM in 2014.

SLM projects like this take time to implement, and results are not achieved overnight. The impacts of land-based measures can take years to be achieved and it is important to explain and address these issues from the beginning of the project.



PHOTO: CULTIVATED ROOIBOS TEA IN THE BOKKEVELD AREA, NORTHERN CAPE, SGP SOUTH AFRICA.

# CONCLUSIONS AND LESSONS LEARNED

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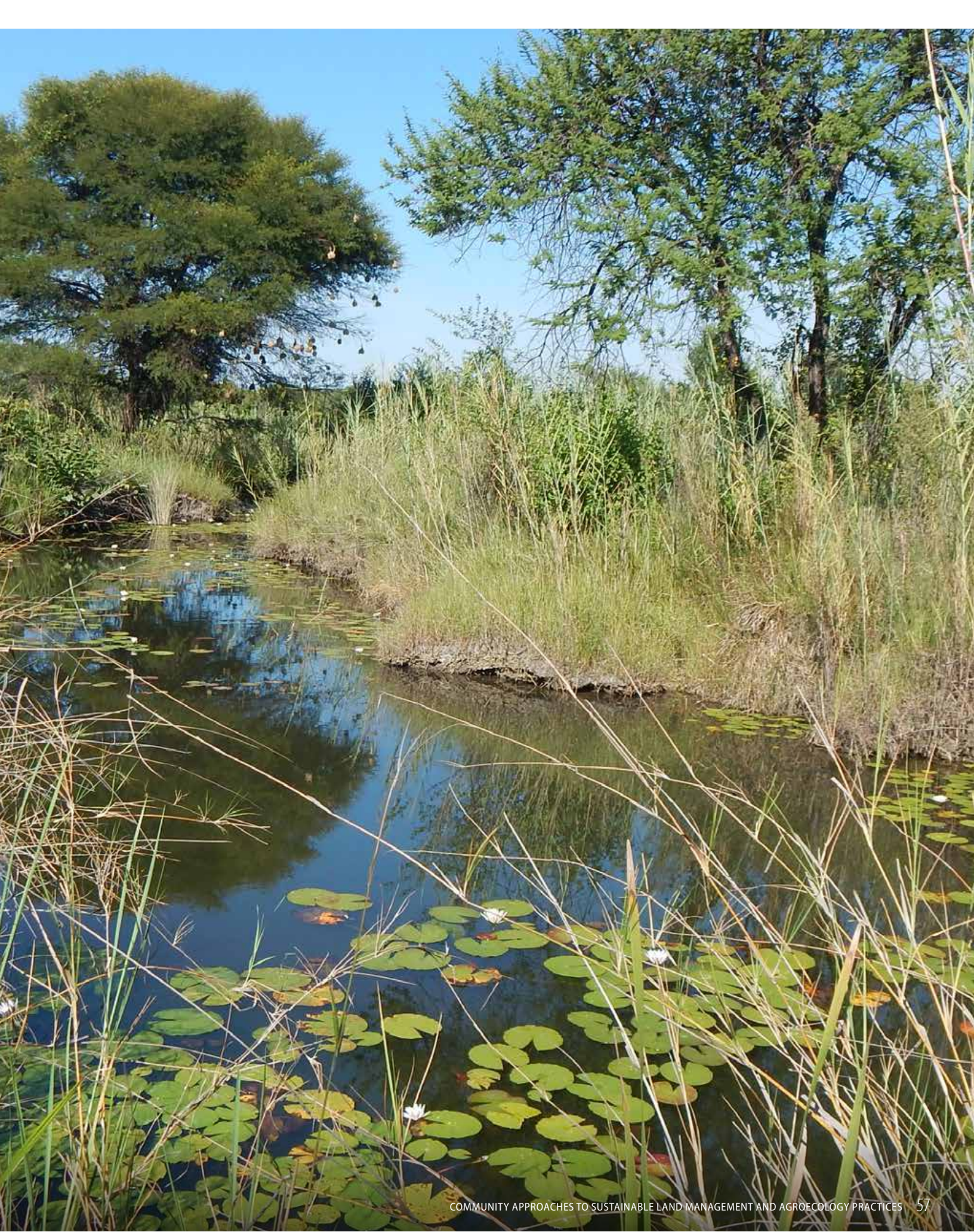
The global cost of land degradation is estimated at above US\$40 billion. These costs do not include indirect costs associated with loss of productivity, biodiversity, and unique landscapes. Land degradation strongly contributes to socioeconomic adversity and problems such as food insecurity, limited development, and can be a driver of migration. Damaged land is costly to re-claim and if severely degraded, its inability to provide ecosystem functions and services leads to vast environmental, social, and economic losses, as well as other benefits that are particularly critical for local communities and their incentives to invest and protect land. The examples of projects illustrated in this publication show concerted efforts to keep communities interested in working towards sustainable land management, and highlights selected activities that underserved communities can use to generate significant income. The case studies also provide successful models, strategies and action plans, which can help to improve livelihoods while generating global environmental benefits.

One critical issue emerging from the projects analyzed in this report is the fact that crops produced in a sustainable manner, which lead to improved land, forest and other environmental values do not always increase local and international market prices, mainly because certification processes are barely pursued by small holder farmers. Only when small-holder farmers come together in the form of associations or cooperatives, that they have been able to benefit from economies of scale and the ability to negotiate better prices. However, even under these circumstances, middlemen tend to get the largest share of the profits. The lack of recognition of smallholder crops production methods, as well as the associated cost of certification processes, is one of the reasons for the widespread failure to practice and recognize the importance of sustainable land and forest management practices.

The challenges of measuring improvement and restoration of land at the community level are still an area that requires further development. Many of the methods currently in use still appear complex for communities. For example, the use of “greenness” as a proxy indicator of improved productivity is quiet a subjective measure if not supported by scientific process. The improved livelihoods measured through child nutrition surveys as proxy indicator for better living conditions at household levels are far-fetched for communities to appreciate or ascribe to.



PHOTO: REHABILITATED WETLAND - ECOSYSTEM, SGP ZIMBABWE.



What is feasible and easily acceptable at the community level is, for example, the investment in a land use practice, which could be used as a management tool to assess interests and buy in by communities. This value could be generated by the amount of co-financing raised by community projects from state and non-state sources during implementation. While this is a simplistic approach on otherwise complex projects implemented by communities, the use of simple quantitative indicators such as number of farmer leaders and networks or associations practicing and advocating for improved practices of land management, is important to assess progress at the local level. To this end, SGP in its sixth operational phase has embraced the development of simple indicators and uses these types of indicators to measure the success of the agroecology projects at the global level.

Furthermore, the projects highlighted in this publication provide practical ways to assess the sustainability of community actions to address land degradation and its drivers. In the context of the land degradation neutrality objectives, these projects have a direct link to SDG 15, target 15.3, and related goals such as SDG 1 - No Poverty, SDG 2 – Zero Hunger, SDG 6 – Clean Water and Sanitation, and SDG 13 - Climate Action.

An important consideration for the sustainability of good land management practices is the importance of respecting and understanding the knowledge and skills that communities have of their ecosystems. Traditional knowledge as well as the cultural practices communities have towards land can sustain healthy production systems. For this reason, SGP projects integrate natural and social processes as well as ecological and traditional knowledge.

Design adaptability and responsive flexibility in the implementation stages are essential to meeting the community needs, as well as building capacity and fostering empowerment. These virtues are important for

long-term vision on the sustainability and productivity of landscapes and for the enhancement of healthy ecosystems health. Most projects analyzed in this publication feature appropriate and affordable technology for farmers based on SGP's principles, which require and support teaching, promote advocacy and social inclusion, institutional building, and awareness and capacity building for climate smart practices. Community engagement and agroecology are both necessary tools in combatting land degradation, increasing resilience to climate change impacts, and meeting the demands of the future in an economically and environmentally sustainable manner.

As such, a good SLM and agroecology project should address and focus on win-win solutions that integrate and provide social, environmental, financial, and economic contributions to the community. These solutions should be supported with a friendly and an inexpensive technological solution, which can easily be implemented and sustained by community resources.

Finally, as the projects in this publication highlight, it is critical to scale up and replicate these small, community-based SLM and agroecology approaches through national and sub-national level policies and programs to enable larger impacts. Scaling up and replication of successful community based technologies and approaches can be achieved through strengthened community networks and platforms, while influencing both government and private sector. Many SLM projects supported by SGP have also worked with larger GEF projects and programs, including the Food Security Integrated Approach Pilot and other initiatives, to scale up innovative approaches and initiatives at the community level. SGP will continue to work on and strengthen its SLM approaches through its global portfolio of projects by working in partnership with wide range of partners, including government, private sector, CSOs and CBOs, among others.



PHOTO: SGP VIETNAM



PHOTO: ESTIMATING WATER FLOW, SGP KAZAKSTAN, OLGA ROMANOVA.

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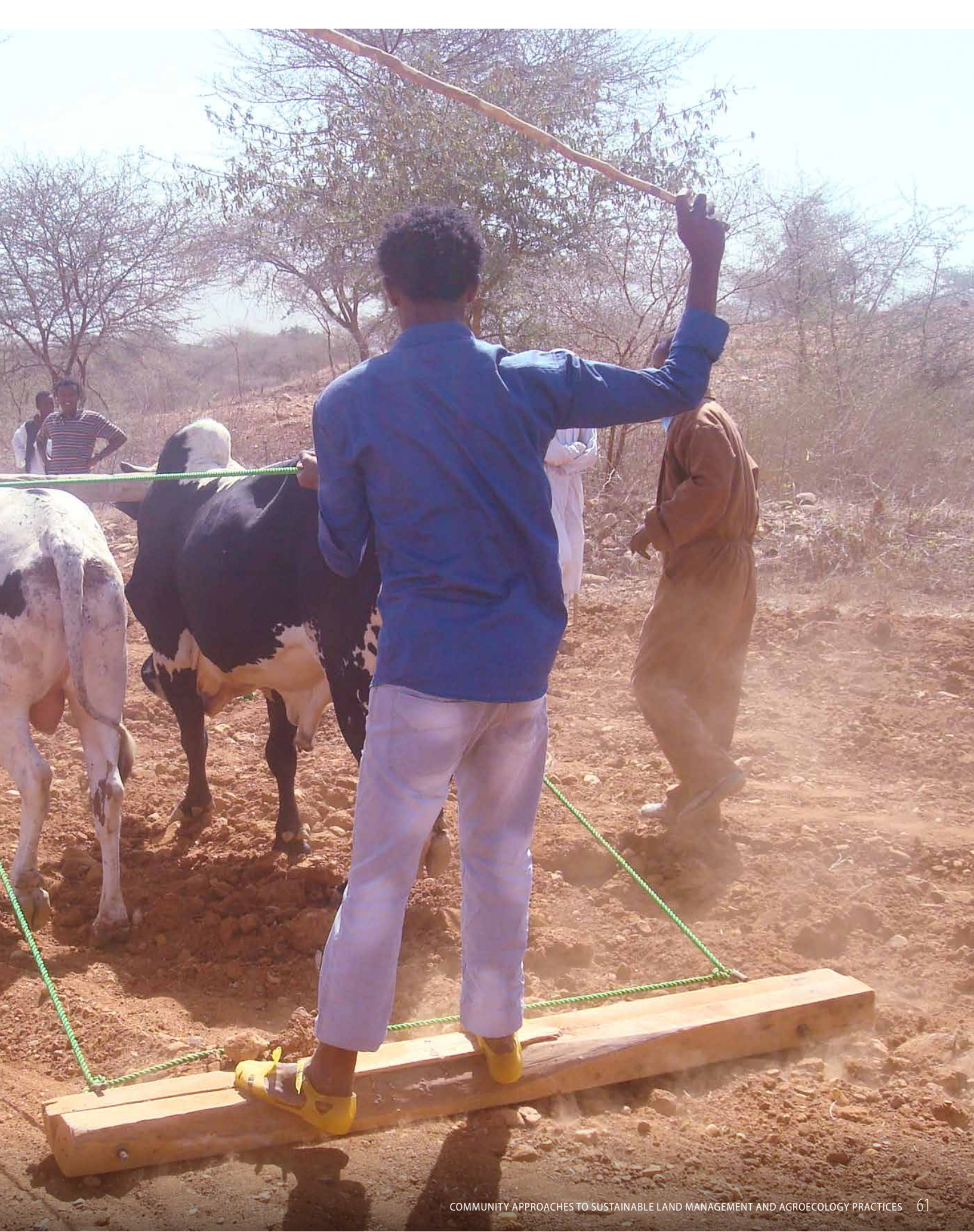
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PHOTO: SGP ERITREA





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