



TERRA

TERRA:

INTEGRATED ACTIONS TO INCREASE CLIMATE CHANGE RESILIENCE AMONG PASTORAL COMMUNITIES IN NORTHERN TANZANIA



This report—enriched with testimonies from beneficiaries and local authority representatives—presents strategies, actions and results from the project “TERRA: Integrated actions for increasing the resilience of pastoral communities to climate change in Northern Tanzania” (Azioni inTEgrate per incrementare la Resilienza ai cambiamenti climatici delle comunità pastoRAli del nord della Tanzania” - AID 10930).

The aim of this project, that builds on several landscape programmatic interventions implemented by Istituto Oikos, was to complement and scale-up tested, successful actions, to find tangible and sustainable solutions to face the challenges of a changing climate and improve the Maasai community's livelihood.



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30,000

HA OF RANGELAND
monitored and patrolled by 40 Village
Game Scouts and Resource Assessors

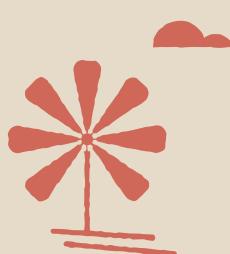


232,5

HA OF COMMUNITY
FORESTS established

31

VILLAGE COMMITTEES AND
COMMUNITY OWNED WATER
SUPPLY ORGANIZATIONS
established/strengthened



2

METEOROLOGICAL
STATIONS installed and
included in the network of systems
to collect climate data

and over

300

VILLAGE
MEMBERS
regularly involved
in their activities

40

BIOGAS PLANTS
constructed and working



175

BOMA
using solar bottles
to light up their houses



110

BOMA
protected by new live fences



146

FARMERS trained
on climate smart agriculture practices



114
WOMEN AND YOUTH
trained on leather tanning
and manufacturing



35 **WOMEN AND YOUTH**
receiving a regular income from
leather tanning and manufacturing
activities

3 **WOMEN-LED LEATHER
MICRO-ENTERPRISES**
established and operational

more than
22,000
EURO

annual turnover reached
by the 3 enterprises in 2019



more than
150
**LOCAL GOVERNMENT
OFFICERS AND
TECHNICIANS**
improved their
CC knowledge



more than
17,000
STUDENTS and
400
TEACHERS
involved in learning events
and tree planting activities

over
135,000

CITIZENS sensitized
through radio programmes, street-theatre
performances and awareness raising events



Project factsheet

Sector: Climate Change

Main goal: Improving the resilience of rural communities affected by the negative effects of environmental degradation and climate change in the Arusha Region (Northern Tanzania)

Project area: Arumeru District, Arusha Region, Tanzania

Budget: € 1,160,000

Funded by: The Italian Agency for Development Cooperation

Duration: March 2017 - February 2020

Implementing organization: Istituto Oikos

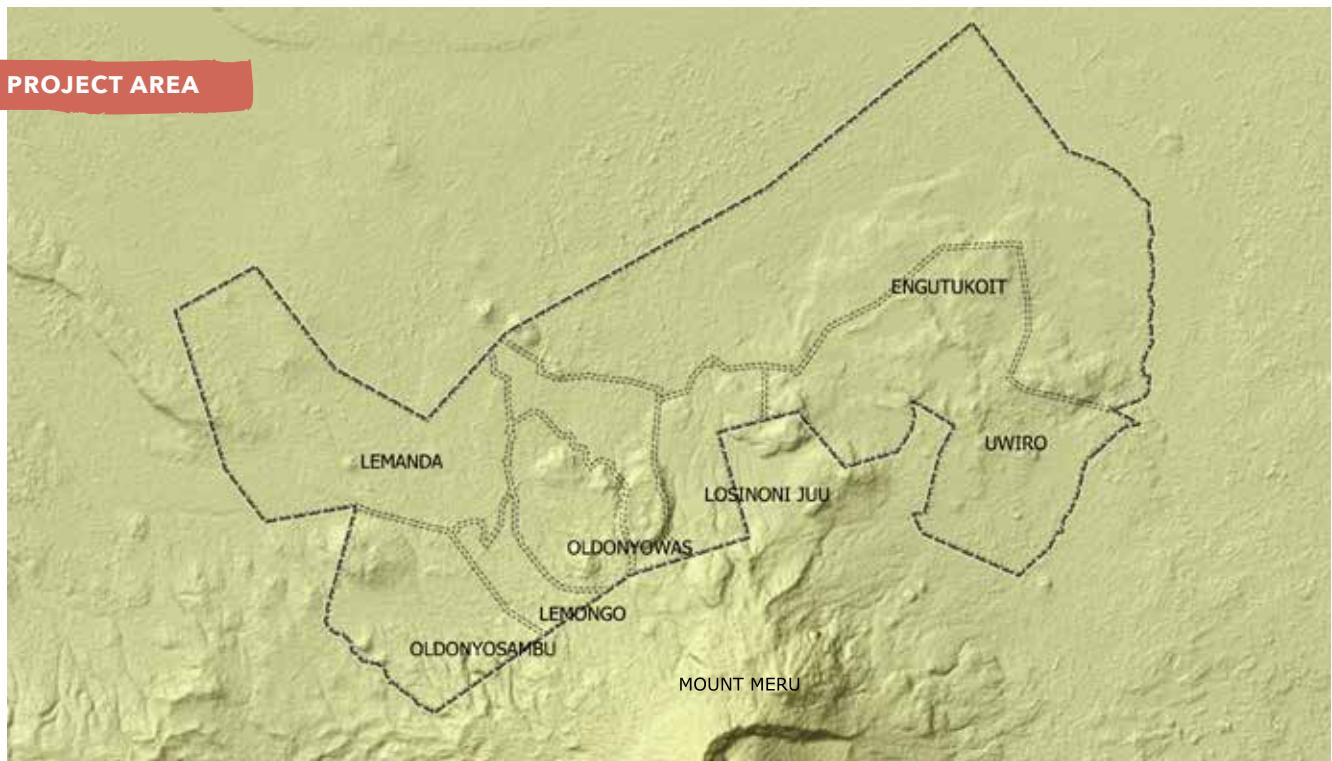
Local counterparts: Arusha District Council and Meru District Council

Partners: Arusha City Council, Tanzania Maasai Women Art, Municipality of Milan, Consorzio Ctm Altromercato, Conceria Newport, New Academy of Fine Arts of Milan (NABA), S.E.V.A. s.r.l.

In the past decade, Northern Tanzania experienced unpredictable rainfall patterns which have led to high levels of food insecurity among the poorest sections of the population, especially in rural areas and among pastoralist communities, who are recognised as the most vulnerable to climate change. In line with SDG 13 - CLIMATE ACTION, the TERRA project aimed to strengthen the capacities of the agro-pastoralist communities of Arumeru District to respond to the negative effects of climate change, promoting the sustainable management of ecosystem services and integrating traditional coping strategies with innovative practices and user-friendly technologies.

The four pillars of the project's intervention were:

- 1.** Development of sustainable strategies for proper rangeland management and capacity building of local institutions and communities;
- 2.** Promotion of best practices to enhance the resilience of the population living in the project area;
- 3.** Promotion of alternative source of income in the leather sector;
- 4.** Implementation of awareness campaigns to increase climate change knowledge and promote best practices to mitigate its negative effects.



1. Improving rangeland's management and conservation

1.1. RANGELAND ECOLOGICAL MONITORING

Rangeland has an intrinsic capacity to **recover from stress and degradation**, if left undisturbed for enough time. For thousands of years the land in Northern Tanzania has ensured the survival of transhumant pastoralist communities. A good understanding of rangeland health is therefore a key factor to increase resilience to climate change. For this reason, the first year of the project was spent designing and testing an **appropriate methodology and suitable indicators** to measure resources' availability in the target area, and elaborate guidelines to **preserve the productivity** of local rangelands.

The entire process was not free of challenges, which ranged from extreme weather events to an overall lack of basic ecological data, and for its innovative approach it took some time to identify a good compromise between cost and effectiveness. Thanks to an intensive networking with researchers sharing the same interests in the landscape at large, TERRA identified an effective **monitoring protocol** that can be successfully transferred to local communities' members, and guide pastoralists in their strategic decisions on grazing regimes to encourage sustainable resources' utilisation.

Rainfall is one of the key variables determining of grass availability, but no rainfall data was available for the area targeted by the project. Therefore, in synergy with the Eco-boma project, funded by the European Union and implemented by Oikos, a network of **5 meteorological stations** was installed to collect the first rainfall data ever in the area. The management of the meteo-stations was gradually handed over to the Nelson Mandela African Institution of Science and Technologies (NM-AIST) of Arusha whose researchers have been involved in data collection and analysis since the beginning of the intervention.

In the second year the project's staff started working on the design and implementation of **an annual monitoring plan**, conducting data collection campaigns on a regular basis (three times per year). In order to ensure the long-term sustainability of the ecological monitoring, **17 Resources Assessors** belonging to the 8 target villages were trained on the use of working tools such as GPS and rangefinder and learnt to understand the importance of sampling along transects, to monitor the spreading of toxic weeds, to estimate the percentage and distribution of bare ground and grass cover and to estimate livestock density, another key factor impacting rangeland's health. The Resource Assessors were engaged in the field activities all along the project's implementation and under the supervision of a selected team of District officers previously trained in the basics of rangeland ecological monitoring, they shared and discussed the monitoring results with the village committees on a regular basis. This feedback mechanism initiated a more **data-driven grazing management decision process**.

One of the most innovative tools that TERRA developed in collaboration with a team of rangeland ecologists from the University of York is the **Grazing Decision Making Tool** (GDMT). The tool, although based on complex statistical models and integrated ground and remote sensing measures of grass greenness (NDVI - Normalized Difference Vegetation Index), is extremely intuitive and can be managed by Resource Assessors independently from external specialists. The effectiveness of this tool is based on its simplicity: the combination of two parameters, namely 'bare ground cover' and 'greenness of grass' feed the building of grazing scenarios; depending on the two indexes, the recommendations range from stopping grazing immediately to continuing grazing either because there is grass available or the situation has deteriorated beyond recovery. The toolkit will be disseminated among and beyond TERRA geographic scope and, if necessary, calibrated in the near future.

All the tools developed were integrated into **Rangeland Management Guidelines** aimed at ensuring a more effective management of the rangelands in the project's area. The guidelines were integrated with the precious inputs provided by village elders and traditional leaders, and after being jointly revised with the Livestock and Environment Departments of Arusha and Meru DCs, they were handed over to the target communities. The management guidelines are not instructions and were designed as a **dynamic tool** under regular review to inform the target communities and the relevant authorities about the parameters that affect rangeland management.



John Shirima - Arusha DC Wildlife Officer

"Most of Arusha DC inhabitants depend on livestock keeping as their major source of income, to them pasture is everything. TERRA project introduced us to ecological monitoring and proper ways of determining rangeland health, which is the key to ensure the survival of the livestock and wildlife and the conservation of nature. We are now able to determine the carrying capacity of the land and to prepare proper grazing calendars in coordination with the village livestock committees".

GRAZING DECISION MAKING TOOL

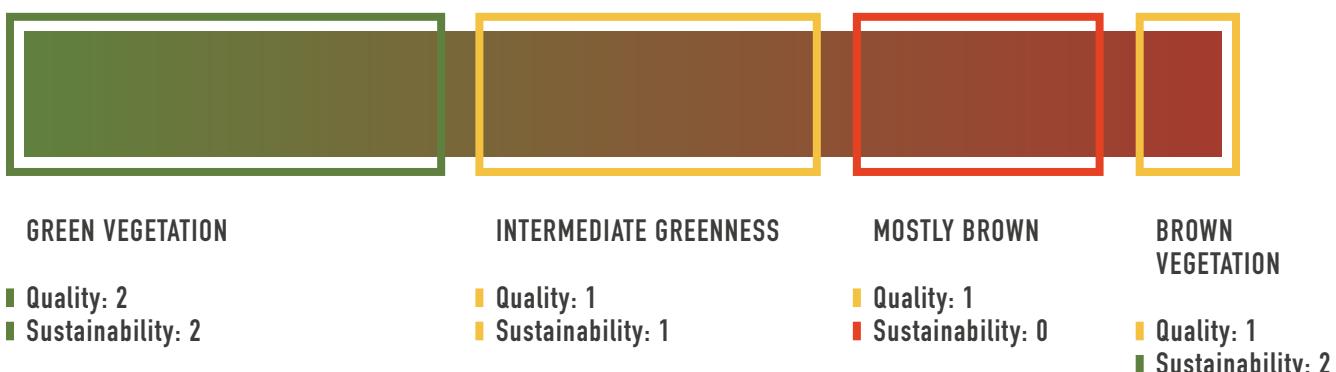
SUMMARY

Quality of grazing is dependent on **vegetation greenness** and amount **bare ground**

- Grazing that greatly reduces vegetation greenness and increases bare ground is **unsustainable**
- Current conditions are more important than the **number of animals** in identifying sustainability
- **Planning grazing** based on current conditions should lead to **improved rangelands**
- Use the decision tool to identify grazing **quality** and **sustainability** to inform decisions

GRAZING DECISIONS MAKING TOOL

QUESTION 1. HOW GREEN IS THE VEGETATION?

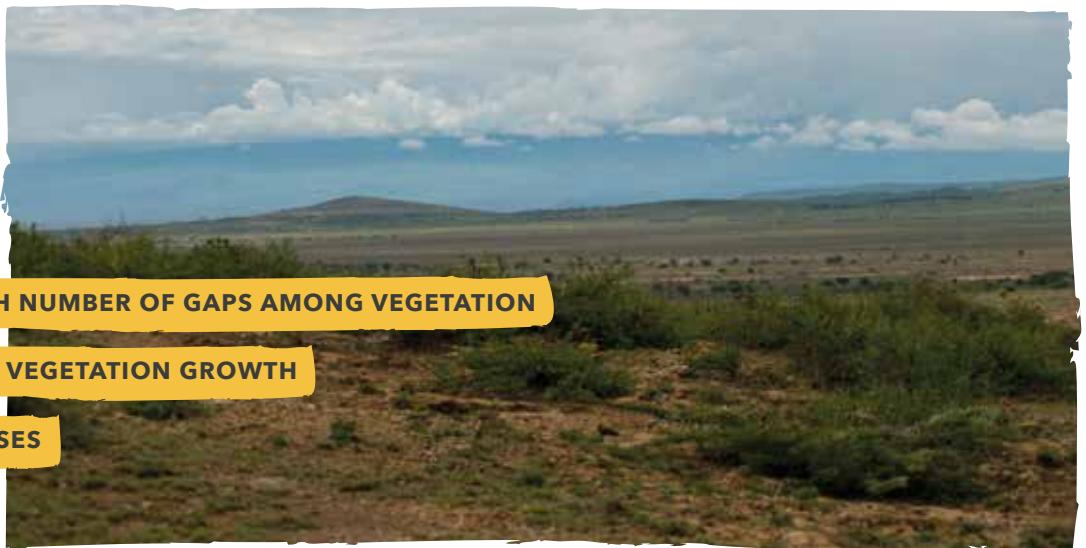


QUESTION 2. HOW MUCH BARE GROUND IS THERE?



COMPUTE THE SCORE:

SITE	SUSTAINABILITY		QUALITY	
	GREENNESS	BARE GROUND	GREENNESS	BARE GROUND
SITE 1	●	●	●	●
SITE 2	●	●	●	●



1.2. COMMUNAL SET-ASIDE AND COMMUNITY FORESTS

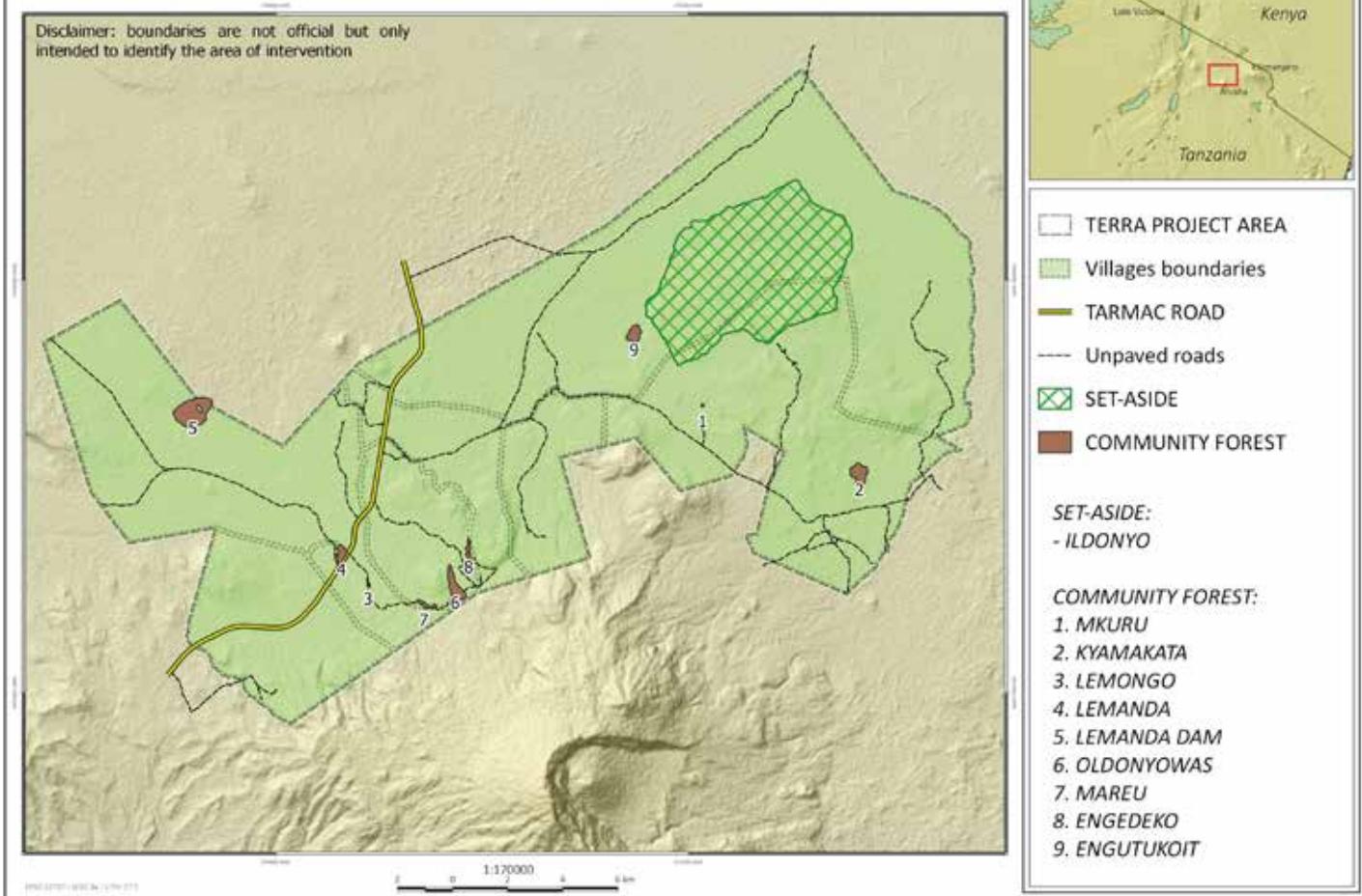
Guaranteeing the survival of young and sick animals is essential in times of scarcity. This is why Maasai grazing management has included the **set aside** of portions of rangelands. Extreme and frequent droughts have eroded this practice. The grazing regimes promoted by TERRA included the **seasonal set aside of grasslands** to function as grass banks during prolonged dry seasons. The findings of the ecological monitoring helped to identify areas at higher risk of degradation and areas where grass banks could be established. In this process, held in coordination with the Livestock Department of the Arusha District Council, community representatives including elders and traditional leaders played a key role. As a result, **a new communal set-aside of over 3,000 ha** was established in Ildonyo, Engutukoit village. Engutukoit holds most of the best pastures in the geographic scope of the project and it was particularly important to guarantee their protection as a mechanism to increase resilience for the whole target area.

Additionally, TERRA contributed to the establishment of **9 community forests** covering a total of 232.5 ha. The community forests are portions of woodlands identified as strategic for their role in water source protection and as stepping stones in critical wildlife corridors; in community forests **grazing and tree cutting are prohibited** through by laws; these micro forests play also a key role in the provision of extra ecosystem services in critical times. Although specific data on biomass changes are not yet available, direct observations show a much greater vegetation cover in these areas.

The establishment and consolidation of communal grazing areas and set-aside, and the creation of community forests, brought multiple benefits to the local communities. First of all, the availability of reasonable amount of grass during the periods of extreme drought; a better control of livestock access to pasture and water points; improved protection of dams' embankments and, last but not least, reduction of soil erosion.



COMMUNITY FORESTS AND SET-ASIDES ESTABLISHED BY THE PROJECT



Gasper L. Mollel - Village Executive Officer (VEO) Lemanda

"For the past 10 years Lemanda has experienced extensive droughts, unreliable rainfall patterns and less water in the village spring due to deforestation. TERRA project helped us to establish a Community Forest managed by our own by laws and terms. Protecting our spring has improved water recharge and we have much more water than in previous years".

Dominick A. Njuu - Village Game Scout (BGS) Chairman

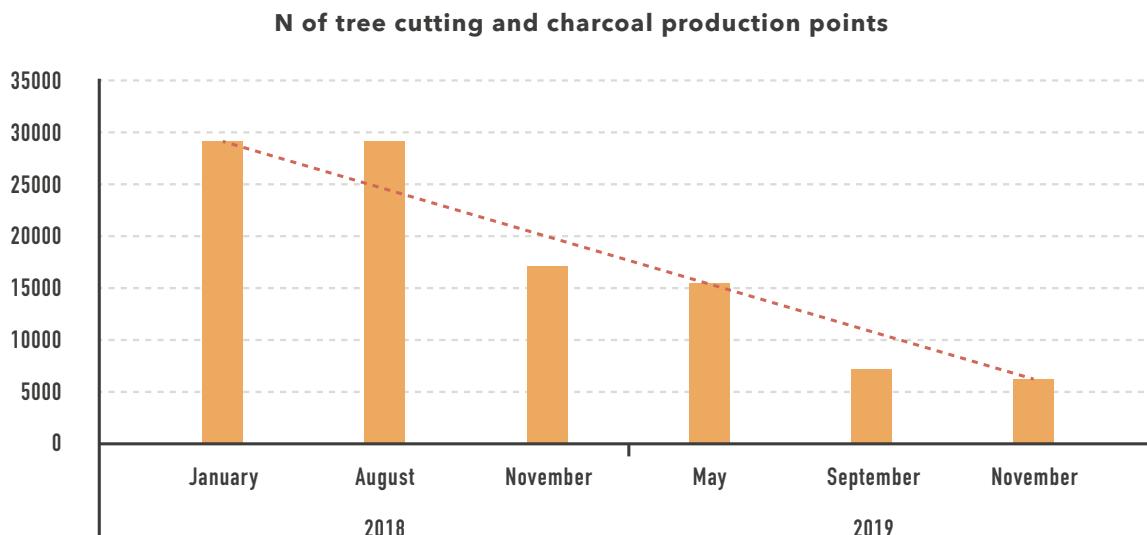
"Kiamakata forest has turned to be one of the best places in Uwiro, we have even witnessed appearance of wild animals like elephants. Floods in the surrounding areas, which were mainly due to poor conservation of the forest, also decreased. It is now our duty to keep it safe and conserved for the next generation".

1.3. EMPOWERMENT OF LOCAL COMMUNITIES

Local communities are the final beneficiaries of good water and grazing management and by providing them with good information and technical support, can become very effective actors and custodians of their natural resources. For this reason, a special effort was made to strengthen or facilitate the establishment of **livestock, water and environment committees** in each target village. More than 300 women and men from the target communities joined the committees and were supported to draft comprehensive bylaws regulating the management of natural resources in accordance with the national and regional legislation. Once endorsed by the relevant District authorities, the bylaws provided the communities with a clear legal framework to guarantee a more effective management of the rangeland and natural resources.

To ensure the enforcement of the bylaws, the project facilitated the creation of a community-based group of **Village Game Scouts (VGS)**. The VGS were trained by the Tanzanian Wildlife Authority (TAWA) and after being formally recognized by the District they started conducting regular patrols in the target area, **preventing illegal tree cutting and charcoal production** and sanctioning or reporting any other illicit behaviour to the village and District's authorities.

Although the collected data reflect a local perspective, evidence shows **a remarkable decrease** in illegal tree cutting and charcoal production since the VGS started conducting their patrols: the number of illegal tree cutting points dropped from over 29,000 to less than 6,500 (nearly 80% of decrease).



As an incentive to the **Village Game Scouts**, TERRA equipped the VGS with additional training and equipment to produce honey around the community forests and set-up tree nurseries for the reforestation of the most degraded areas.

Abraham Pallangyo - Uwiro Village Executive Officer

"The number one problem we had was the destruction of vegetation and deforestation at large. People only opted to charcoal production as major source of economic activities. We failed to control. But after the introduction of bylaws and VGS patrols from the TERRA project, we have witnessed massive changes of the environment and even charcoal production has decreased".

2. Scaling up actions to increase resilience to climate change

TERRA was instrumental to successfully scale-up tested actions to increase pastoralist's resilience to climate change and rangeland degradation. In particular, the project focused on strengthening the start-up of micro-enterprises for curing leather and consolidated the technical and administrative capacities of the female artisans, supporting a successful network of enterprises creating income for more than 100 artisans in Arusha Region. The network is, so far, **the largest hub for natural leather production and manufacturing in Tanzania**.

2.1. CLIMATE SMART AGRICULTURE: ALTERNATIVE FARMING TECHNIQUES TO COPE WITH DROUGHT

Pastoralism is **a culture in transition**. Due to land conversion and a policy framework openly discouraging transhumant lifestyles and livestock mobility, a growing number of pastoralist households changed their nomadic habits to **a more sedentary lifestyle** and were encouraged to farm small plots of land for subsistence. However, farming in rangelands with 300 mm rainfall a year generates neglectable harvests and causes severe rangeland ecological degradation. Oikos piloted the introduction of more drought tolerant crops, such as sorghum, in areas along the slopes of Mount Meru with higher rainfalls and settled agro-pastoralist communities. Even so, extremely scattered rainfall patterns were detrimental to the success of the pilot scheme and it became clear that farming under current rainfall patterns needed a new strategy. In collaboration with RECODA—a research and development organization with long term experience in working with community-based groups of farmers—the activity was hence redesigned to promote **Climate-Smart Agriculture (CSA)** techniques, including terracing and drainage systems to improve water conservation, in few selected areas close to the foothills of Mount Meru. Relevant District and Ward Agriculture Officers were trained and directly involved in the management of the field activities and communal and individual demo plots were established to introduce and share the CSA techniques. Based on the actual needs of the farmers, on-the-job training was also integrated with sessions on pest control and organic pesticide production. Almost **150 farmers were trained** and shared their experience with approximately 180 additional farmers during field learning events organized by the project.

Although maize is not a drought resistant crop, it was used to stimulate the interest of the local farmers, who are generally reluctant to introduce less familiar species. **Drought resistant crops**, such as pigeon pea and cow pea, were also tested and were partially successful.

Despite the extreme drought prevented a plentiful harvest, significantly larger harvests were obtained using the CSA techniques, encouraging more than 50 farmers to adopt at least some of them in their farms.



Luice Minja - Oldonyowas Ward Agriculture Extension Officer

"Farmers were initially reluctant to use new techniques but after the set-up of the first demo plots they could appreciate the benefits (e.g. better pest control, earlier and better harvest...) and slowly started to adopt, and now more than 50 farmers are using the climate smart agriculture techniques promoted by the project to cultivate their fields".

2.2. LEATHER (TANNING AND MANUFACTURING): A SUSTAINABLE ALTERNATIVE TO IMPROVE THE MAASAI COMMUNITIES' LIVELIHOODS

Illegal tree cutting and charcoal production for the urban market are unfortunately common practices that significantly contribute to the deforestation and landscape degradation of the Arusha Region.

In recent years, the vulnerability of pastoralist communities has dramatically increased by drought and loss of traditional grazing areas to agriculture and especially during the dry season—when men move their cattle away in search for pasture and water, Maasai women don't have any direct source of income to support themselves and their children. **Going into the bush to cut trees and make charcoal is often the only option** they have to make money to buy food and cover basic needs.

With an estimated 30 million cows, 16.7 million goats and 8.7 million sheep, **Tanzania has the third largest cattle population in Africa**. This provides locally available and low-cost skins and hides that could go up by 1000% in value once transformed into finished leather and leather products. This high potential led the Tanzanian Government to consider the development of the leather industry as a national priority to ensure the economic growth of the country. Uncured leather was also traditionally used by Maasai to produce clothing, bedding, saddles for donkeys and shields, making leather tanning and manufacturing a culturally acceptable practice.

On this basis, under the technical guidance of the project partner **Conceria Newport Srl** (Pisa, Tuscany), an Italian enterprise specialised in the production of natural leather, **an equipped tannery** was established in the sub-village of Mkuru. Natural leather tanning presents significant benefits for the environment if compared to the industrial tanning process, allowing to eliminate the use of highly toxic reagents, such as chrome, and to save 2/3 of the water needed for conventional tanning. In order to minimize the environmental impact, the tannery is **solar powered** and only **natural products**, such as mango and tea leaves, are used to dye the leather.

Local skins and hides, that once were discarded by the pastoralist communities, are now used for the leather production. After long and intensive on-the-job training, the group is currently able to produce and sell an average of 150/200 pieces of natural and coloured cow, goat and sheep leather per month.

A total of 114 beneficiaries were trained on leather tanning and manufacturing and with the support of the project's partners **Tanzania Maasai Women Art** (TMWA) and the **New Academy of Fine Arts of Milan** (NABA), other two groups, based in Oldonyowas and Uwiro villages, are now specialised on the production of leather handicrafts. Two years of intensive training on-the-job ensured the groups are able to produce a wide collection of leather goods, including bags, wallets, belts, bracelets and sandals, and to sell their products to the main lodges and tourist shops in the Region.

Thanks also to the support of the Small Industries Development Organisation (SIDO) – a parastatal agency providing technical assistance and support for the start-up of new small and micro-enterprises – the three leather groups were officially registered and authorized by the relevant local authorities to run their production activities and at the end of 2019 they reached an overall annual turnover of **approximately 22,000 Euro**.

A total of **35 women and youth** have today a steady income from the production of leather and leather handicrafts and a number of beneficiaries trained by the project are also working part-time for the groups when large orders are placed, furtherly increasing the positive spill over effects of this innovative component of the project.

Gladness Kalebi - Uwiro Leather Group

"I am 24 years old and I am a member of Uwiro Leather Group. In my community we knew very little on the use of traditionally tanned leather, but growing up I heard a lot of stories on our past uses of skins and leather. After the completion of my secondary school, I was not able to join higher education, I tried to learn tailoring but it didn't pay well, I used to join my family and help with farming, which is mostly a seasonal job, leaving most of my time wasted. After joining the leather group, I found myself busy throughout the year. Getting involved in leather activities has helped me to grow a sense of responsibility, as a mature woman. The leather group is an example to women in our communities who are attracted to what we do, and they are learning from what we are doing".



2.3. BIOGAS: A GREEN SOLUTION FOR PEOPLE AND NATURE

Maasai women spend an average of **25 hours per week collecting firewood for cooking**, a very heavy and time-consuming practice that drives deforestation.

Although **biogas** plants require time to collect livestock dung to feed the digester, the domestic use of biogas significantly shortens the time needed to cooking, **reduces the need for firewood** and improves the living conditions in the traditional windowless Maasai huts (i.e. no smoke and soot when cooking).

However, biogas is also an expensive investment which only few households living in the target area can afford and requires water, a commodity rarely available in rangelands. In order to overcome these two key limiting factors and facilitate the adoption of this green technology, the project tested an innovative design developed by the Tanzania Domestic Biogas Programme, the Solid State Digestor (SSD), which requires approximately **70% less water** compared to an average plant.

Many villagers attended the learning events organized by the project to show the benefits of biogas and the maintenance and inputs needed to ensure the proper functioning of the digestors. In addition, a **training programme** targeting local masons created a new skill in the villages. Beneficiaries interested to use the new technology and willing to contribute 20% of the value of the plant with manpower, materials or cash, were selected on the basis of criteria agreed with the village authorities. A total of 40 biogas plants, 9 of which provided with the SSD technology, were built.

LEARNING EVENT

The introduction of a new technology always requires technical support and advice. This is why the project's staff, in collaboration with the District officers, conducted regular monitoring visits to beneficiaries' households. The biogas plants have provided great benefit to households, in particular **reducing the intense workload of women**. Even though the investment in biogas is high, six households self-funded the construction of new plants for their homes, a strong indication that, if adequately promoted, **this technology is scalable**.



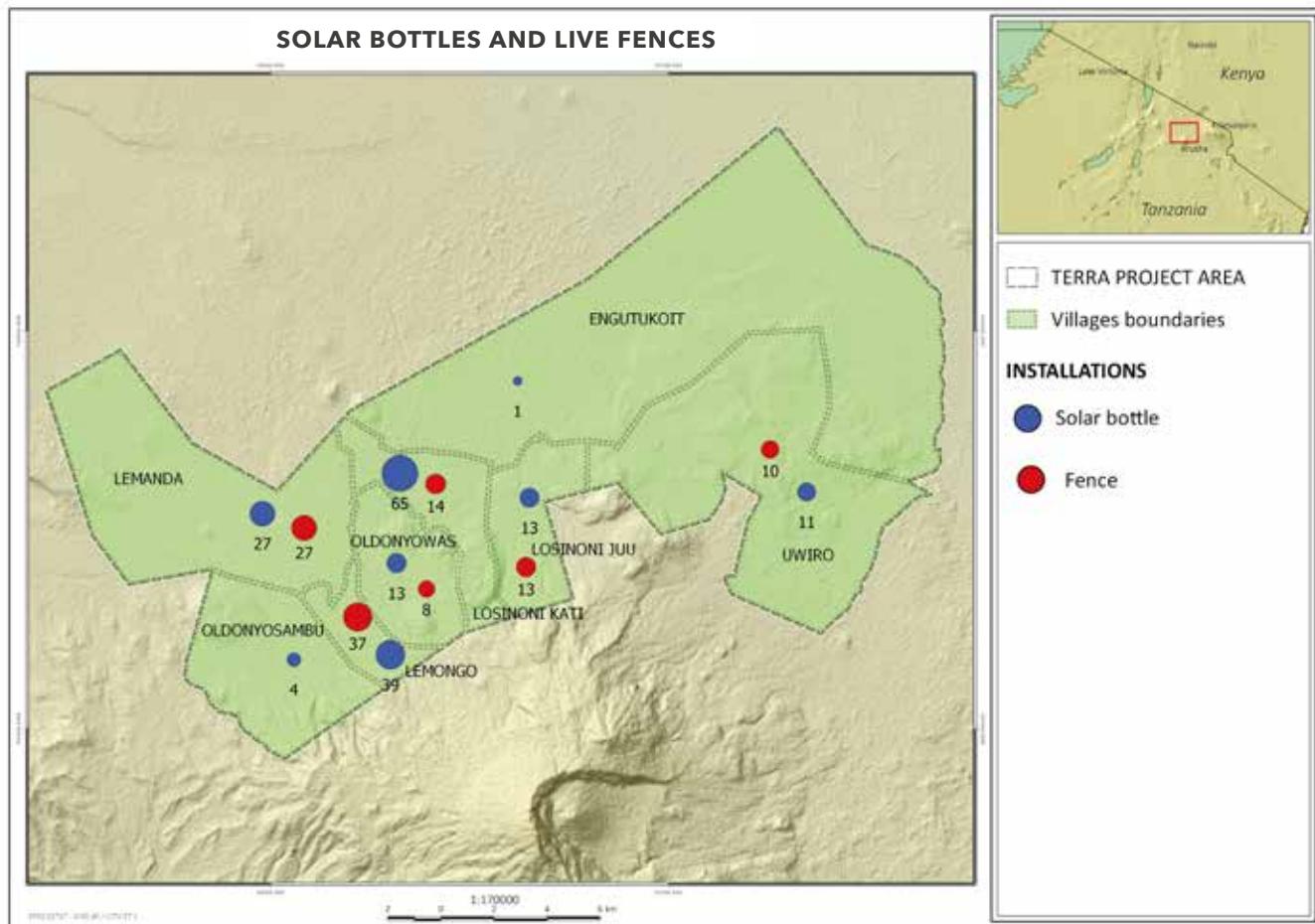


Katarina Emanuel Msando - Biogas Beneficiary, Lemong'o village

"I used to walk for more than half a day or even a complete day to collect firewood. Sometimes what I got was not even enough for the family. Those are not good times for me to remember. Since I have a biogas plant, I don't need to go and search for firewood, I feel better because biogas stove does not produce smoke, I have good natural fertiliser available for my crops, and a lot of free time to expand my vegetable shop."

2.4. LIVING FENCES: RENEWING TRADITIONS TO PRESERVE THE ENVIRONMENT

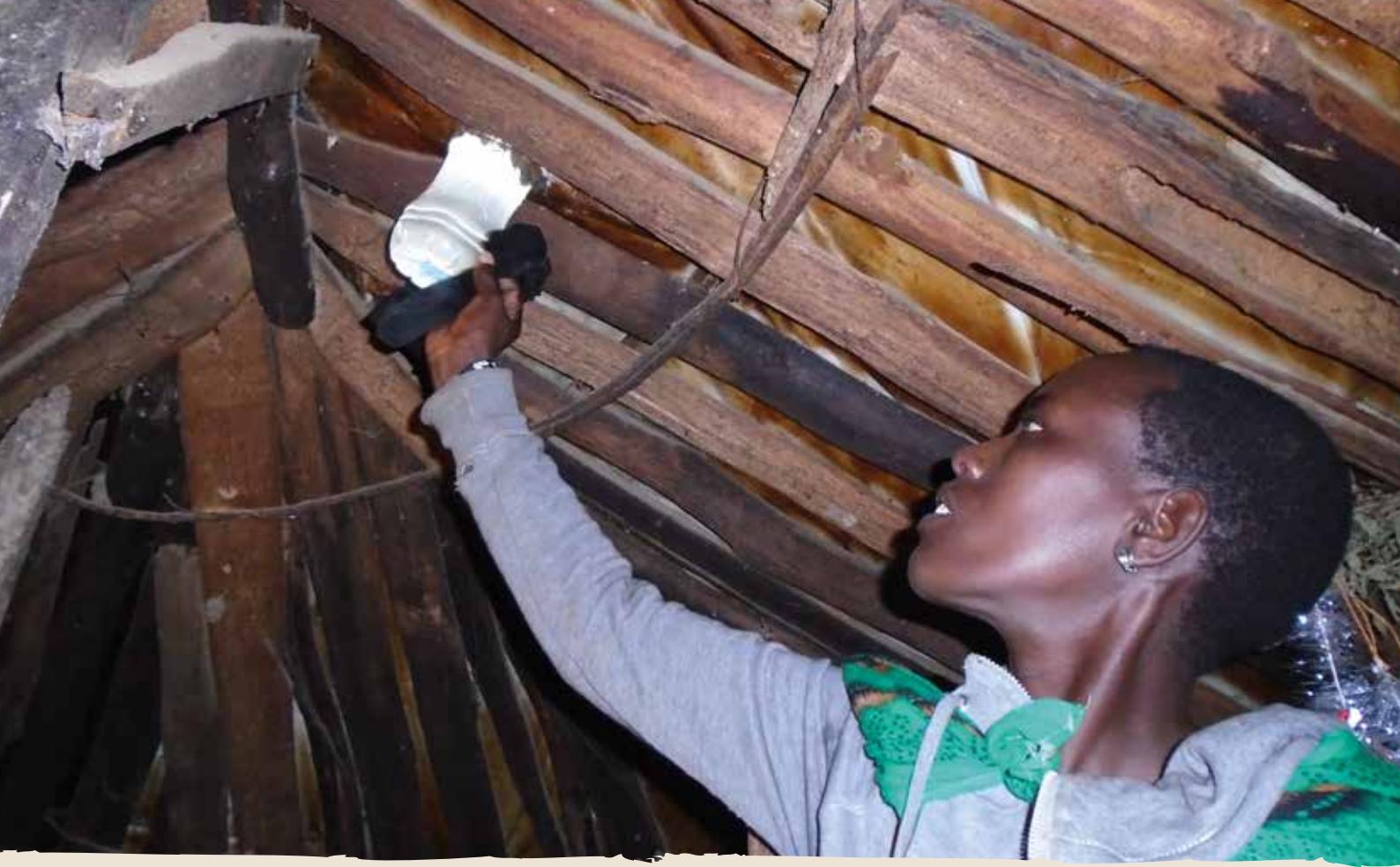
A typical Maasai homestead, called *boma*, is surrounded by an external fence made of thorny branches and has a central paddock (*kraal*) where livestock are kept safe during the night; a circle of huts is placed between the central *kraal* and the external fence. To build and maintain those fences, whose perimeter can easily reach 1000 mt, is very time consuming and depletes the woody vegetation around the *boma*. The project promoted the **construction of spiny living fences** which eliminate the need to cut branches and produce small quantities of firewood. Learning events were organized in each target village and 110 bomas were fenced with approximately 30,000 cuttings of *Commiphora* sp. and other indigenous species, with a 65% survival rate.



2.5. SOLAR BOTTLES: LIGHT COMES FROM RECYCLING

Traditional Maasai huts have no windows and are very dark inside. However, nowadays most of the pastoralists are turning into a more sedentary life and a better indoor lighting could definitely benefit their living conditions. Taking this into consideration, the project tested **an innovative, user friendly, low cost technology**: the "Litre of light", a 1.5 litre used PET plastic bottle, filled with water and two capfuls of bleach to prevent the growth of algae. Inserted in the roof and sealed with silicon to prevent any leakage, the bottles, simply by refracting the sunlight through the water, provide an indoor brightness equivalent to a 60-Watt bulb. The 5-minute installation costs 2.5 USD and the bottles last for years.

The project trained a total of **27 beneficiaries** and provided them with all the tools and materials needed for the installation. The bottles were first installed in few pilot boma in each target village to show how the technology works. After an initial phase of slow adoption, a total of 175 families requested to have their huts illuminated with a solar bottle and were supported by the project to cover the costs of the installation. At least other 60 families directly contacted the beneficiaries trained by the project and paid with their own means to have a solar bottle installed in their *boma*.



Neema Mellubo - Engutukoit Village

"Traditionally our huts have no windows at all and are always dark and before installing a solar bottle in my hut I normally used a torch to cook, even during the day. I see a huge difference after I chose to install the solar bottle and I am thankful to TERRA project for this innovative idea. I can see all my items in the hut and arrange them well, I can comfortably cook with all the light and even bugs cannot stay in the hut due the presence of light compared to before. Only during the rainy season, when there's not enough sunlight, it's a bit of a challenge, but generally speaking installing a solar bottle has made a big change and improved significantly the living conditions inside my hut."

Elibariki Ole Mtoto - Engutukoit village

"Commiphora is one of the native species in our community, but before TERRA we mainly used it for medicinal purposes when indeed can provide strong fences to our bomas against predators and unpredicted weather patterns and can help us to have additional cooking firewood without affecting our environment."

3. Promoting climate change awareness and knowledge

TERRA implemented a pool of initiatives directed at increasing knowledge of risks and opportunities brought by climate change. Culturally appropriate **communication campaigns and learning initiatives**, training manuals, posters, informative brochures and short videos, were among the tools that the project developed to promote climate change in the public discourse.

One very innovative outcome of the climate change awareness activities is the production of a **20' documentary** portraying the perception of climate change in Maasai women, a deeply under documented aspect of climate change adaptation. The film, directed by the visual-anthropologist Adreanna Rodriguez, was projected in all the local schools targeted by the project. In November 2018 the film was awarded as **best documentary** at the Society for Visual Anthropology Film & Media Festival of San Josè, California.

The documentary has also been presented within the film festival "Di Terra e Di Cielo", that took place in Varese (Italy) on May 7th 2019.



More than 17,000 students of primary and secondary school and approximately **400 teachers** attended thematic lessons, practical learning activities and participatory street theatre performances. The students, together with their parents, were also actively involved in **tree planting activities** in occasion of the celebration of the World Environment Day and the World Earth Day. Specific lessons on disaster risk management, hopefully helping to prevent future unnecessary losses of children's lives during extreme weather events, were included as part of the syllabus addressed to the pupils of the primary schools. The syllabus, designed in collaboration with the NM-AIST of Arusha, has been then adopted and replicated by almost all the primary schools targeted by the campaigns.

Technical workshops led by international experts and specifically addressed to district officers, local journalists and NM-AIST students and researchers were organized throughout the whole implementation of the project and a

conservative estimate of **135,000 people**, including the citizens of Arusha, were also reached by the campaigns through **radio programmes and thematic events**.

The awareness campaign has crossed national borders to reach Italy as well. Here the topic of climate change has been brought to the attention of local institutions, schools, and public opinion at large, through a set of different educational and promotional products and initiatives.

A science theatre play has been performed to encourage secondary school students to critically thinking about the importance of protecting territory and on the threats of climate change (350 students and 28 teachers reached); more than **15 seminars** addressed to more than 130 young people (between 18 and 30 years old) aimed at introducing them to the development cooperation sector; a **digital campaign** promoted through a series of posts, infographics, news, videos on social channels (Facebook, Instagram, Youtube), and a public event held in Milano. The campaign has reached about **68,000 people**.

Theresa Milanzi Mwalimu - Teacher Elerai Primary School, Arusha

"We have learned a lot, not only the children but us too. Our national science curriculum does not cover the climate change, but after the trainings we have seen what we have been missing and the practical applications that will help us fight climate change. Children are now aware of the climatic hazards and how to be safe, they have started their environmental clubs and tree planting activities. We have the syllabus and manuals which will be able for us to continue with the training".

4. Strengthening capacities of local institutions for a more effective use of natural resources

TERRA supported and continued the foundational work of Eco-boma aiming to strengthen technical capacities of District officers which were exposed to advanced training held by national institutions such as the Nelson Mandela African Institution of Science and Technology (NM-AIST) and the National Land Use Planning Commission (NLUPC). **Landscape planning** is particular critical in transhumant communities that rely on resources scattered over much greater areas than the ones of a single village. TERRA worked with the NLUPC team to transfer some innovative discussions held at national level and created two new **Planning Units** in Meru and Arusha Districts that engage **36 officers** from different departments. The NLUPC and the newly established Planning Units assisted the preparation of Land Use Plans. The village of Uwiro successfully completed the process and integrated climate change considerations into land uses allocations. The new Land Use Plan was submitted to the government relevant authorities in 2019, for the final revision.

TERRA engaged with four officers from the Livestock and Game Departments of the Arusha and Meru DCs for nearly two years, conducting on the job training. The officers worked hand in hand with the project team during the **rangeland monitoring campaigns** and were trained in Geographical Information Systems. The training included theoretical and practical modules, including the planning and implementation of several data collection campaigns and data analysis.

Finally, it is worth mentioning that at least 150 members of LGOs from Regional to sub-village level were capacitated through specific training, learning events and study visits, and on the job learning.

Joseph Massawe - Arusha District Land Use Team

"Ensuring a proper and sustainable use of the land and reducing land conflicts between neighbouring villages are among our priorities. Thanks to the project we received tailored, intensive, on the job training from the National Land Use Planning Commission which showed us the way to fully achieve these goals".

5. Future governance and sustainability

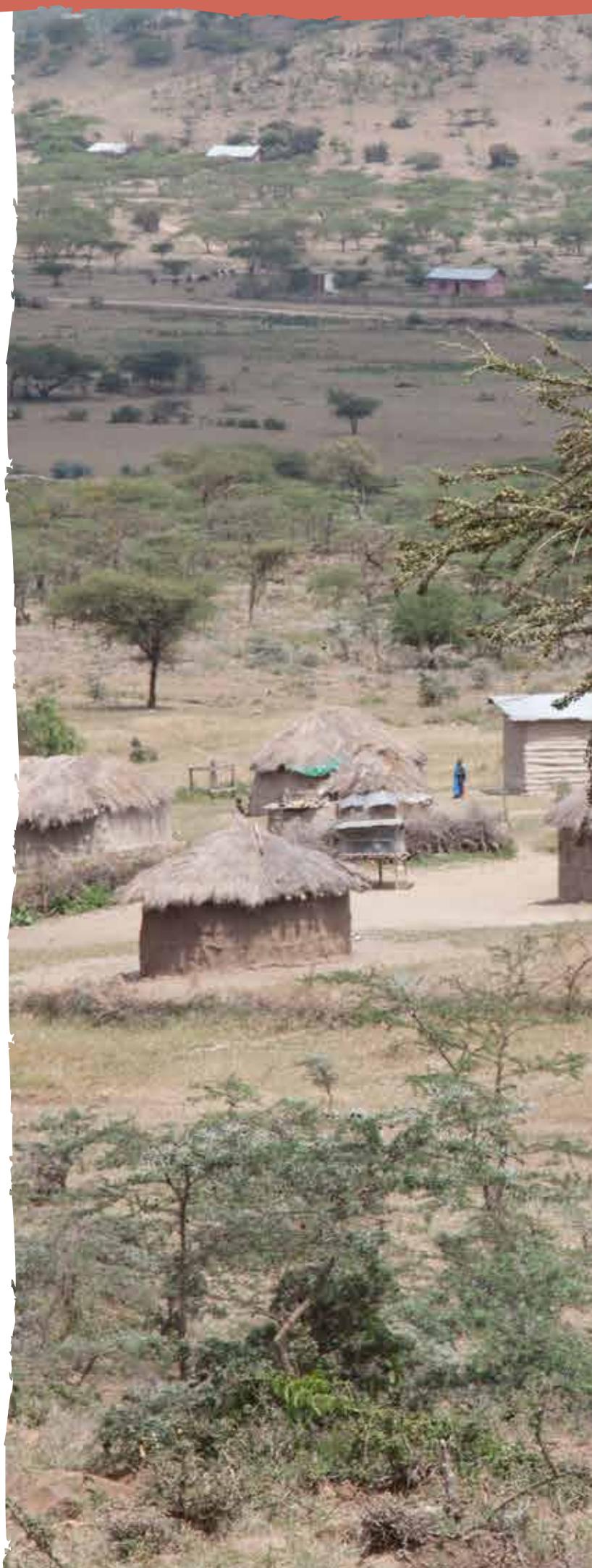
In order to ensure an effective implementation of the activities, as well as their future governance and sustainability, since its start the project actively **engaged with all the relevant government institutions** of the target area. Coordinated by the project's staff and consultants, a team of district, ward and village officers and traditional leaders took part to **technical surveys and assessments**, ensured the mobilization of the target communities and was gradually involved in the management and monitoring of the field activities.

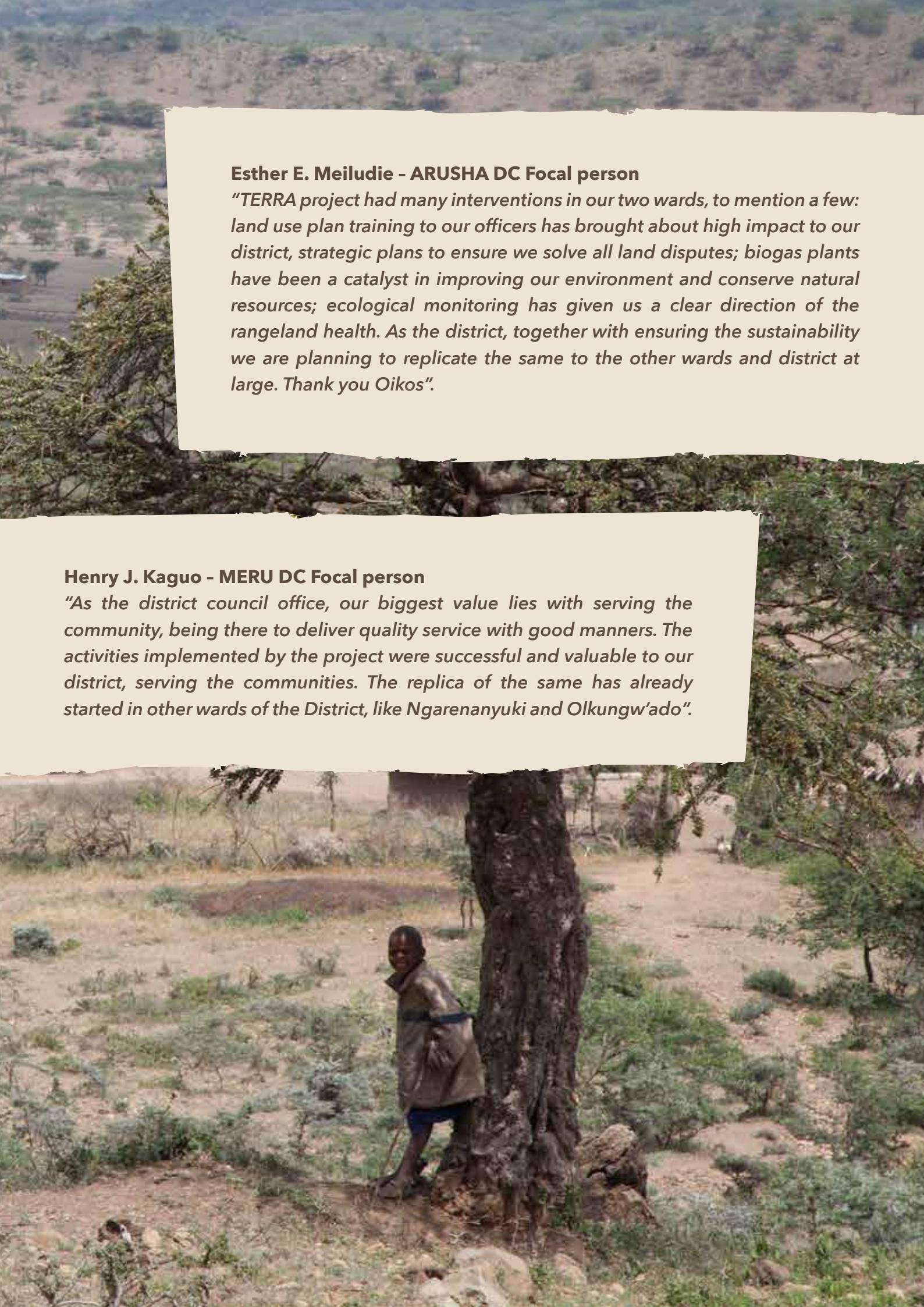
This approach ensured the regular presence in the field of LGOs and allowed to strengthen the trust between the rural communities targeted by the project—traditionally skeptical—and the local government institutions.

Under the technical guidance of the project's staff and the relevant District officers, each village was indeed able to draft **comprehensive bylaws** regulating the management of natural resources in accordance with the national and regional legislation and following the endorsement of the District's authorities is now provided with a clear legal framework to guarantee a more effective management of the rangeland in the target area.

Additionally, following the tailored training sessions conducted throughout the whole project's implementation, a **District Land Use Team**, formally endorsed to prepare District Land Use Plans and guide the elaboration of Village Land-Use plans, and a **District Technical Unit** in charge of supervising and coordinating the ecological monitoring and patrolling activities carried out by the VGS group in the target area, have been established.

Finally, the close collaboration and the fruitful work conducted in partnership with the project led Arusha and Meru DC to include the most relevant project's activities in their development plans and to allocate part of their annual budget to pilot CC adaptation in their area of responsibility, **ensuring the continuation of the actions** promoted by the project.





Esther E. Meiludie - ARUSHA DC Focal person

"TERRA project had many interventions in our two wards, to mention a few: land use plan training to our officers has brought about high impact to our district, strategic plans to ensure we solve all land disputes; biogas plants have been a catalyst in improving our environment and conserve natural resources; ecological monitoring has given us a clear direction of the rangeland health. As the district, together with ensuring the sustainability we are planning to replicate the same to the other wards and district at large. Thank you Oikos".

Henry J. Kaguo - MERU DC Focal person

"As the district council office, our biggest value lies with serving the community, being there to deliver quality service with good manners. The activities implemented by the project were successful and valuable to our district, serving the communities. The replica of the same has already started in other wards of the District, like Ngarenanyuki and Olkungw'ado".









TERRA

AICS SUPPORT

TERRA project is part of a wider Oikos' programme to fight climate change by strengthening the resilience of rural communities and helping to integrate traditional adaptation strategies through the use of new tools and skills.

The close collaboration with local communities in Tanzania, Mozambique and Myanmar to find tangible and sustainable solutions to face the challenges of a changing climate is also possible thanks to the support of the Italian Agency for Development Cooperation (AICS).

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