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**environment**  
United Nations  
Environment Programme



**VOICES FROM  
THE LAND:**

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**RESTORING  
SOILS AND  
ENRICHING  
LIVES**

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# **VOICES FROM THE LAND: RESTORING SOILS AND ENRICHING LIVES**

The UN Environment Programme has been working hand-in-hand with the Global Environment Facility since 1992. Together we have implemented over 900 projects, helping governments and partners across more than 160 countries to preserve their environments and work towards a sustainable future for all.



# SHIFTING TO ACTION ON DEGRADATION



**Ibrahim Thiaw**  
Executive Secretary,  
UNCCD

When the UN Convention to Combat Desertification was created at the Rio Earth Summit over 25 years ago, it became the only international convention dedicated to protecting, managing and restoring our land.

The environmental benefits of that work are already well documented, particularly when it comes to the inextricable links with climate change and biodiversity. But this book goes much further by highlighting the impact on the well-being of over three billion people – nearly half the world’s population – who are directly affected by land degradation. Through the remarkable stories of people who decided to fight back rather than become another statistic tracking poverty, conflict or forced migration, it reveals the cost-effective results that can be achieved locally and scaled up globally when the right partners come together.

Throughout the book, the unstinting contributions and complementary nature of the UNCCD’s relationship with the Global Environment Facility, the UN Environment Programme and other key partners are clear. Not only in terms of the investment, technical and political expertise that they bring to these stories and many others besides, but also in terms of the convening power that nurtures wider partnerships capable of sharing and focusing their combined knowledge and experience through an international network of governments, scientists, businesses and citizens.

The individual and cumulative impact of these stories provides a tantalizing insight into how much is possible. From smallholders like Khatmah who are working with IUCN to restore traditional rangeland management in Jordan and Egypt, to tea growers like Thanh who are working with the Rainforest Alliance to restore natural soil fertility in Vietnam, China, India and Sri Lanka, it's clear that when we invest in the stewardship of our land, we automatically create some incredible opportunities for much wider sustainable development.

I would like to thank everyone who has contributed to these stories and to the thousands of other success stories around the world, which illustrate the shift from planning for a better world to taking action that will make it a reality.

A handwritten signature in black ink, consisting of stylized, overlapping letters, positioned above a horizontal line.

**Ibrahim Thiaw**

# JOINT FOREWORD FROM GEF & THE UN ENVIRONMENT PROGRAMME



**Inger Andersen**  
Executive Director,  
UNEP

As vital to our existence as air or water, land is one of our greatest shared assets – and degradation of that land one of our most pressing common challenges.

Unchecked degradation threatens not only human wellbeing but that of the entire planet, contributing to accelerating climate change and loss of biodiversity. Today, with a quarter of our land already degraded and almost half the global population directly affected by land degradation, we are losing this precious resource at a time when we can least afford the social, economic or environmental impacts of this loss.



**Naoko Ishii**  
CEO and Chairperson,  
GEF

The continued wellbeing of both people and planet relies on our ability to protect, manage and restore our land more quickly than we degrade it. The stories in this book provide a timely reminder of how local and global collaboration to achieve land degradation neutrality can tip the balance in our favor, offering a foundation on which to build a healthy, equitable and prosperous future.

Too often, environmental narratives focus on what we stand to lose through inaction. Yes, this threat is real, but so are the opportunities. Efforts to restore the two billion hectares of degraded land globally have enormous potential not only to increase productivity, sequester carbon and preserve biodiversity, but to boost employment in rural areas, strengthening our economies and creating opportunities for some of the most vulnerable people in society.

Restoring and sustainably managing degraded land globally could save between USD 4.3 and USD 20.2 trillion annually through the provision of ecosystem services alone.

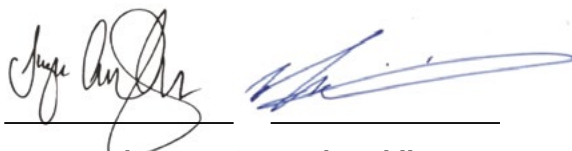
Research consistently shows how well land recovers when the right management practices are introduced, as do the communities whose livelihoods depend on it. But to fully seize the opportunities offered by restoration, we need to build public awareness, support forward-looking policy, back innovation and scale up proven solutions.

All of these aims require effective partnerships to be fully realized – science-policy partnerships to bring together the very best in research, technology, traditional knowledge and legislative approaches, and public-private partnerships to connect that expertise with small and medium-sized enterprises that hold potential solutions.

Facilitating partnerships that build capacities and link local will to global knowledge and resources is central to the work of the Global Environment Facility, the UN Environment Programme and our many collaborators around the world. The challenges we face cannot be addressed by any one actor, but when we combine our resources, knowledge and commitment, the opportunities of restoration become accessible to all.

We hope the stories that follow are a fitting testimony to both our commitment and that of our existing partners in the fight against land degradation, as well as an inspiration to others to redouble these efforts.

Together, a land degradation-neutral world is within our reach.



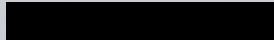
The image shows two handwritten signatures in blue ink. The signature on the left is for Inger Andersen, and the signature on the right is for Naoko Ishii. Below the signatures is a horizontal line.

**Inger Andersen & Naoko Ishii**



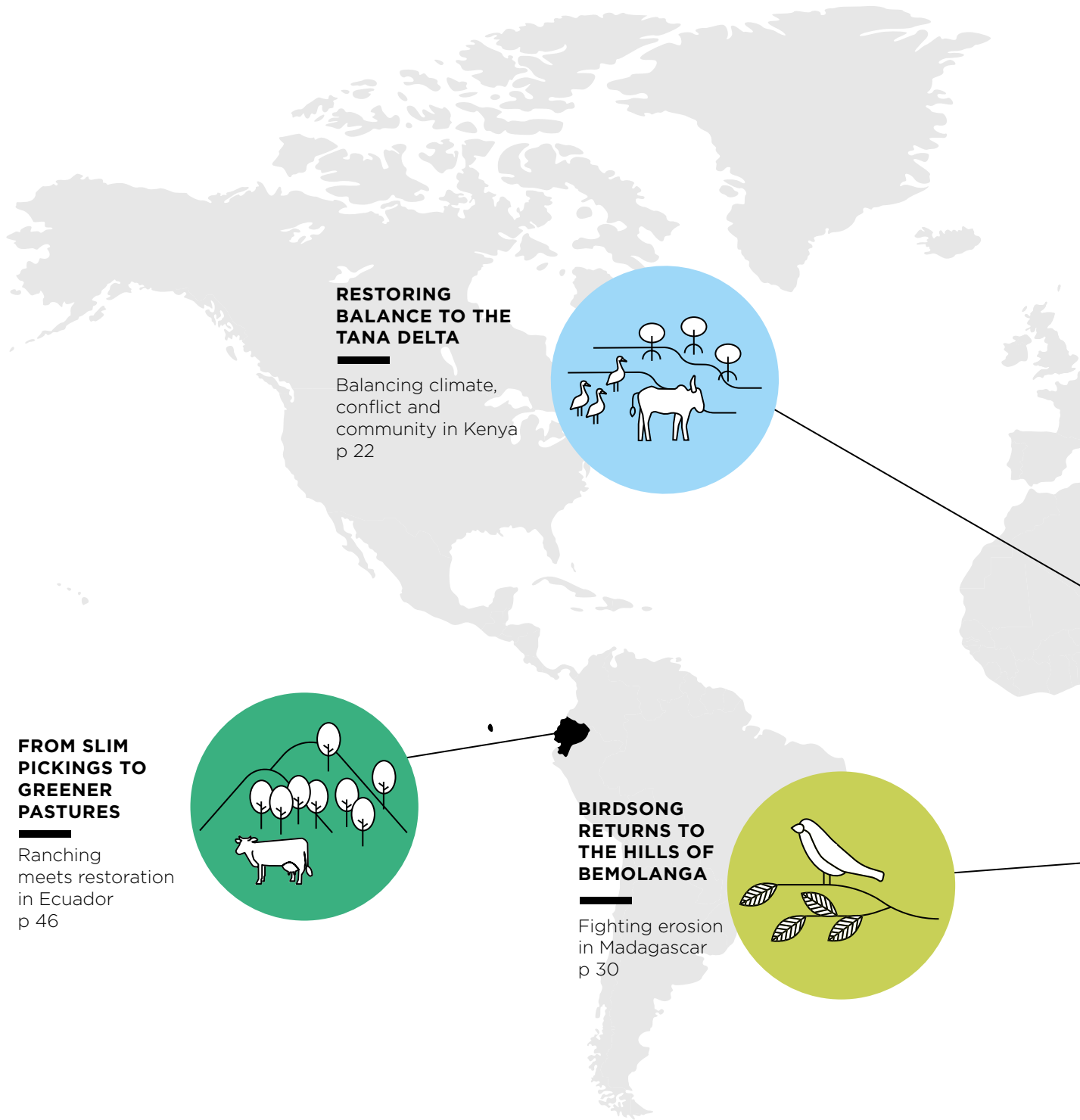


**LAND DEGRADATION  
THREATENS THE  
WELLBEING OF OVER  
3 BILLION PEOPLE<sup>1</sup>**



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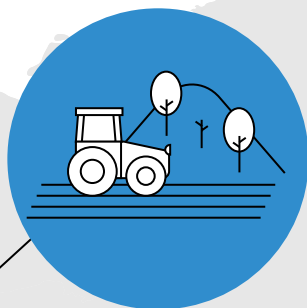
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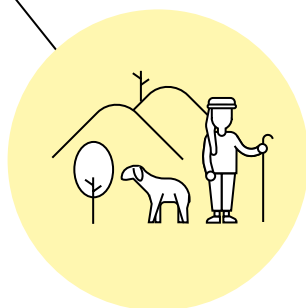
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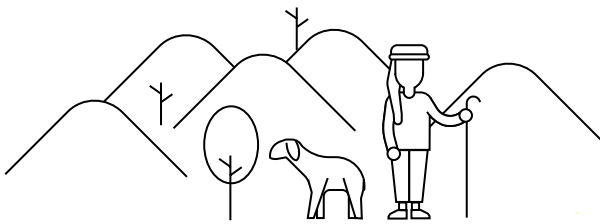


**RESTORING  
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# RESTORING THE FUTURE OF TRADITION

Community land  
management in Jordan



**Project name:**

Healthy Ecosystems for Rangeland Development (HERD)

**Partners:**

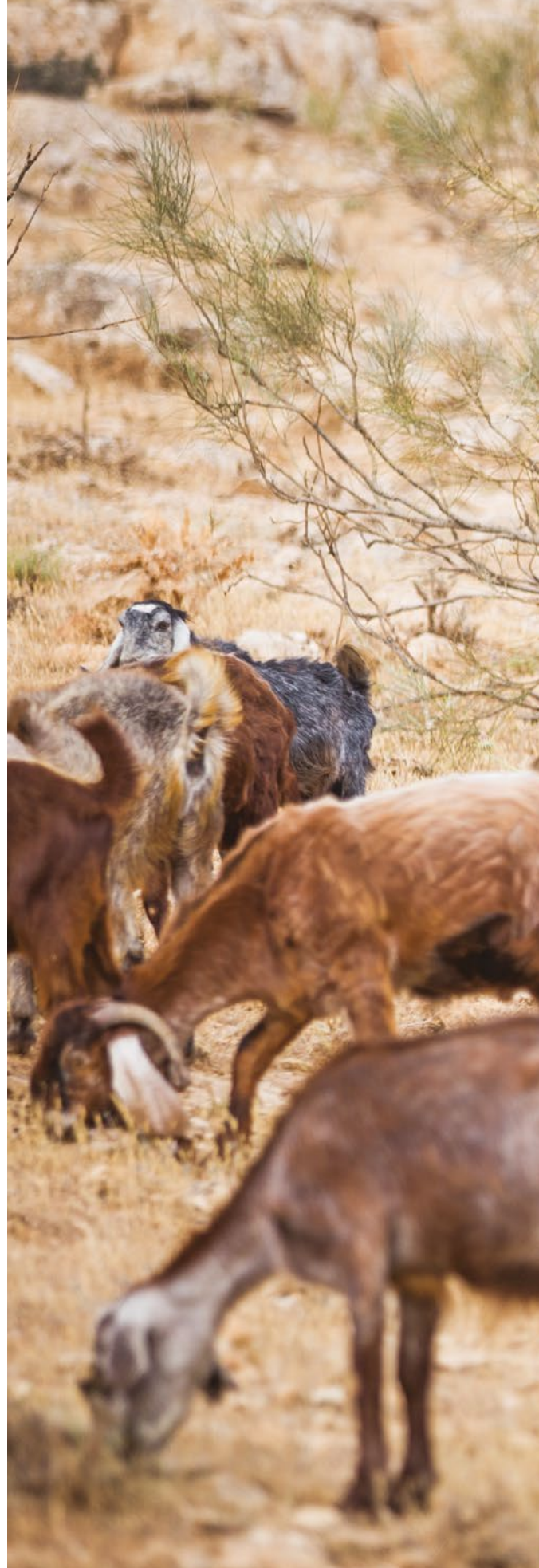
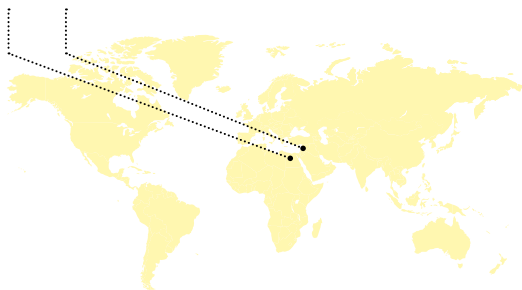
Global Environment Facility (GEF)  
UN Environment Programme (UNEP)  
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH  
International Union for Conservation of Nature (IUCN)  
Ministry of Agriculture (Jordan)  
Ministry of Environment (Jordan)  
Royal Botanic Garden  
The Hashemite Fund for Development of Jordan Badia

**Project funding:**

GEF Trust Fund: USD 3,515,982  
Co-financing: USD 12,227,000

**Countries of implementation:**

Egypt, Jordan





Khatmah thought the hima was lost forever. Decades ago the water in this dry rangeland surrounding her village in north-west Jordan had started to disappear, and it had become little more than a wasteland.

“I thought it was pointless trying to regenerate the hima,” Khatmah says, pouring sweet black tea for her guests.

Taken from the Arabic for ‘a protected area’, a hima is a piece of common land managed by the community. Hima have been passed down through the generations in areas of the Middle East and North Africa for over 1,400 years. But in the second half of the 20th century Jordan nationalized its rangelands and the hima system fell apart.

Overgrazing compounded problems of desertification and, as both water and pasture vanished, herding families like Khatmah’s were forced to sell their remaining livestock and find jobs elsewhere.

Khatmah found work in a textile factory in the city. But after returning home to care for her ailing mother, she saw an opportunity to help restore traditional livelihoods in the community as a member of the village’s hima association, which was established as part of an IUCN project aimed at reviving traditional institutions to achieve sustainable rangeland management.

Having gained rights over a 100 ha plot of degraded state-held land, the association set rules outlining access to the hima that would allow the rangeland to regenerate. Meanwhile, practical training helped the villagers to develop systems to manage

**“THIS KIND OF SUSTAINABLE RANGELAND MANAGEMENT IMPROVES LIFE FOR PASTORALISTS, BUT WE URGENTLY NEED MORE DECISION MAKERS, FUNDING INSTITUTIONS AND BUSINESSES TO REALIZE WHY IT’S INCREDIBLY IMPORTANT TO INVEST IN IT.”**

DR. SHAHIRA WEHBEH  
CHIEF OF NATURAL RESOURCES  
SUSTAINABILITY AND PARTNERSHIP  
LEAGUE OF ARAB STATES



**20 -25% OF THE WORLD'S  
DEGRADING LAND IS  
RANGELAND<sup>2</sup>**



use of the hima – from access to grazing, seeding, harvesting and patrolling.

As a woman, Khatmah was used to being sidelined in community meetings, but she soon became a leading voice in decision-making around the hima and its management.

“Now they listen to me,” she smiles. “They accept my ideas and come to help when I say the hima needs to be protected against illegal grazing.”

The association decided that pastoralists would only graze livestock in the autumn, while Khatmah and other women would harvest medicinal herbs from the rangeland in the spring.

After two years the hima had started to regenerate and the increased availability of pasture enabled herders to save money by buying less fodder. Khatmah and other

women in the community were taught how to process medicinal herbs into teabags, providing a much-needed income boost and proving the potential for generating new revenue streams from the land.

The success of the project has shown how traditional sustainable rangeland management systems can help communities understand threats to their land, and to work together to manage land use to tackle degradation and desertification head on – enabling damaged ecosystems to recover alongside local livelihoods.

Now, Khatmah dreams of seeing the hima system expanded across the rest of her local rangeland.

“After two years, the soil has become moist and regained life. Everything is bigger, better, fresher and smells better,” Khatmah says. “I want to see other villages doing the same.”

**In the foreground is the 100 ha that was restored under the management of the Bani Hashem Hima Association. In the background is degraded rangeland that will be brought under participatory community rangeland management under the HERD project.**



© Lara Nassar / IUCN



A circular yellow graphic containing a black line-art illustration of a shepherd with a staff and sheep, standing in a landscape with trees and hills. The illustration is simple and stylized.

**TARGET: 525,563 HA UNDER  
SUSTAINABLE RANGELAND  
MANAGEMENT ACROSS  
JORDAN AND EGYPT<sup>3</sup>**

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**“IF THE RANGELAND  
IS HEALTHY, IT WILL  
BE BOOMING FOR  
THE LOCAL PEOPLE  
AND WE CAN REALLY  
BENEFIT.”**

KHATMAH AL OMOUSH  
HIMA MEMBER, BANI HASHEM

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## HEALTHY ECOSYSTEMS FOR RANGELAND DEVELOPMENT

With some four billion people expected to be living in drylands by 2050, ensuring these ecosystems are healthy and productive is vital to the future.

Under the four-year, Global Environment Facility-funded Healthy Ecosystems for Rangeland Development project (HERD), the UN Environment Programme, IUCN and partners are bringing international experience and scientific expertise in ecosystem restoration to efforts to scale up proven approaches such as hima across half a million hectares in Jordan and Egypt.

After building community awareness of the livelihood and ecosystem service benefits of restoring degraded rangelands, HERD is applying the Participatory Rangeland Management Planning tool to build partnerships, facilitate the documentation of existing community rules, map priority areas for restoration and create local agreements around land use and access.

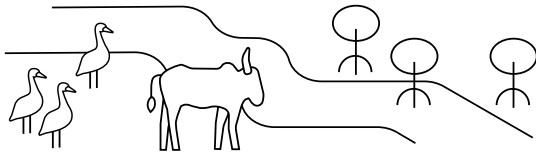
While communities are creating inclusive rangeland management plans that ensure farmers and pastoralists adopt good practices in rangeland restoration, the project is developing the institutional capacity across both countries to ensure that these plans are integrated into policy and backed by wider legislation.

The differences and similarities between dominant rangeland management strategies in Jordan and Egypt provide a strong opportunity for knowledge exchange, creating a basis for HERD to catalyze the scaling up of sustainable rangeland practices regionally and globally.



# RESTORING BALANCE TO THE TANA DELTA

Balancing climate, conflict  
and community in Kenya



**Project name:**

The Restoration Initiative, Kenya

**Partners for the global TRI programme:**

Global Environment Facility (GEF)  
UN Environment Programme (UNEP)  
Food and Agriculture Organization (FAO)  
International Union for Conservation of Nature (IUCN)

**Partners for the Kenya child project:**

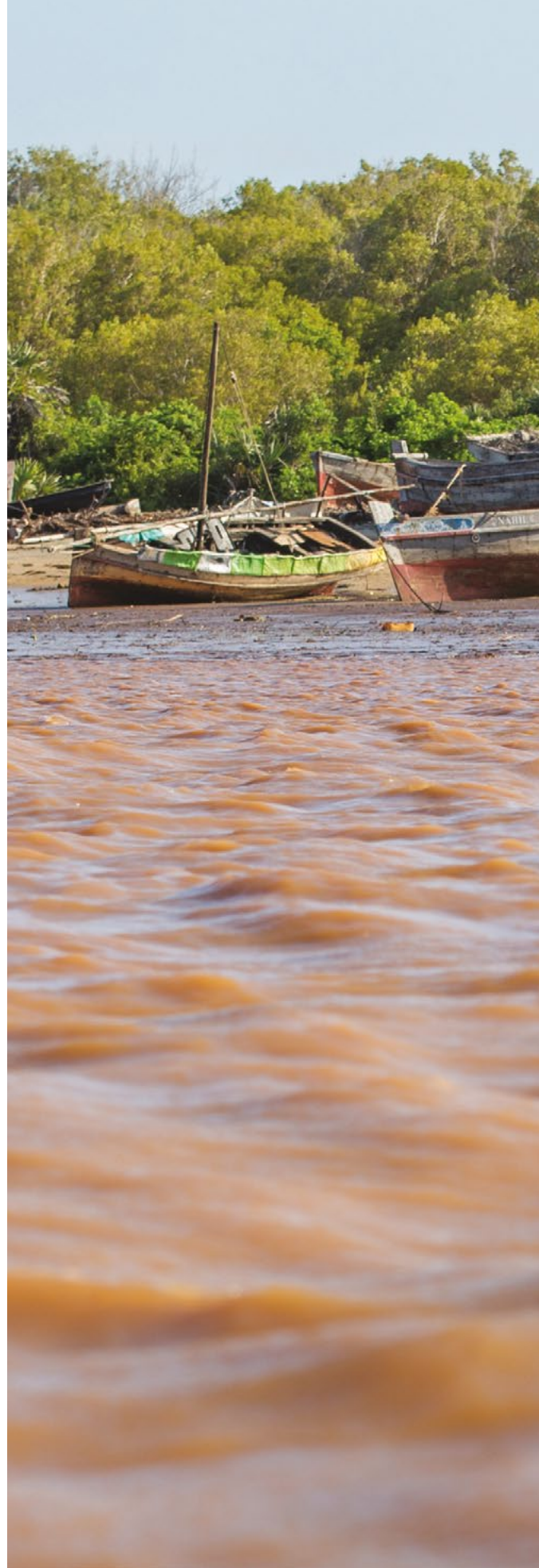
Global Environment Facility (GEF)  
UN Environment Programme (UNEP)  
Ministry of Environment and Forestry (Kenya)  
Nature Kenya  
Tana River and Lamu County Governments

**Project funding:**

GEF Trust Fund:  
Kenya - USD 3,345,413, | TRI global programme - USD 54,133,704  
Co-financing:  
Kenya - USD 36,526,667 | TRI global programme - USD 201,450,938

**Countries of implementation:**

The Restoration Initiative (TRI) unites 10 Asian and African countries with three GEF Agencies: Cameroon, Pakistan, Myanmar, Tanzania, Central African Republic, China, Sao Tome & Principe, Guinea Bissau, DRC, Kenya





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**“WHERE THERE ARE NO  
TREES, THE SUDDEN RAIN  
SWEEPS EVERYTHING AWAY.”**

ELEMA GODANA  
PASTORALIST, DIDE DARIDE

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Flowing in shades of green and brown to the horizon from the sinuous lines of Kenya's largest river as it approaches the sea, the Tana Delta is a paradise for wildlife.

Home to thousands of species of birds, mammals and freshwater fish, herds of elephant, buffalo, zebra and a variety of other wildlife that roam between Tsavo East National Park and the north-eastern rangelands, the delta has also long been home to generations of herders and farmers who depend on its rich soils to nourish their crops and livestock.

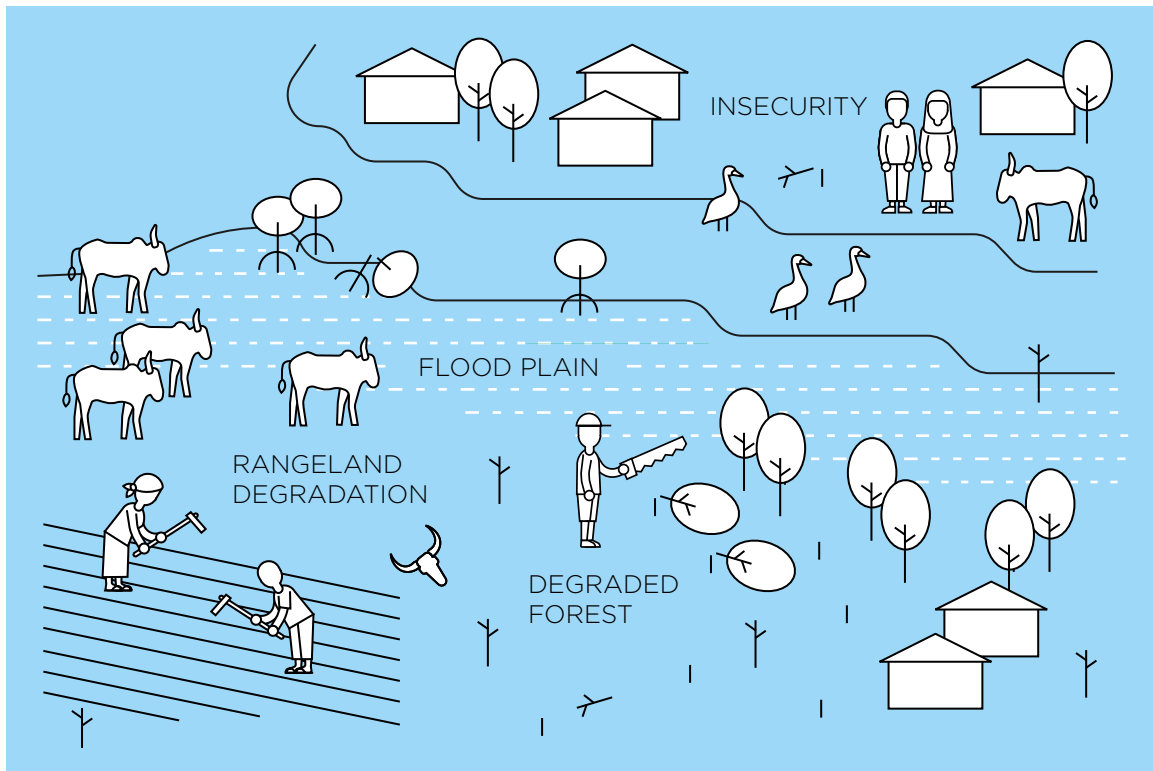
It should be an idyllic existence. But, population growth and climate change are putting pressure on the delta's 120,000 residents, sparking inter-ethnic conflict

and fierce competition within and between communities for access to an ecosystem already stretched beyond its limits.

Caught between deforestation, increasing drought and nomadic herders desperate to feed their cattle, villages like Dide Daride are bearing the brunt of the delta's advancing degradation.

"When I was younger, we had a full month's rain and the pastoralists moved away. Now it lasts a week and everyone leaves their cattle here," says 28-year-old Elema.

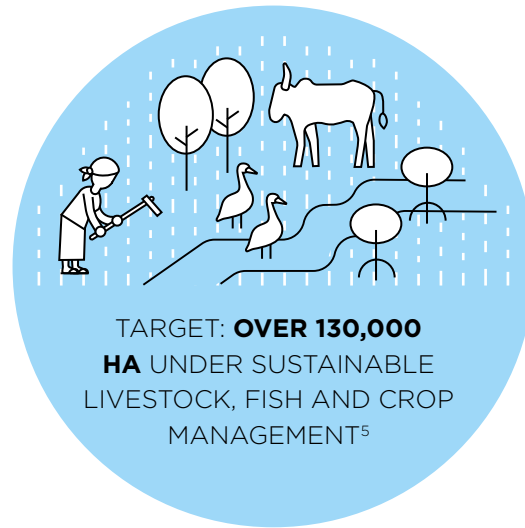
"The villagers collect dry wood, but the loggers take living trees. And where there are no trees, the sudden rain sweeps everything away."



Women are particularly impacted: “It’s worse for us. We walk eight kilometres to fetch water for the cows or sell milk, with no guarantee of customers,” says Elema’s elderly mother.

Dide Daride elder Omar lost 45 cattle over the last dry season due to a lack of pasture. “Before, the delta was full of water, and there was enough pasture. But now the delta is beginning to dry,” he says. “Sometimes there is no grass on the ground, the area is completely dry.”

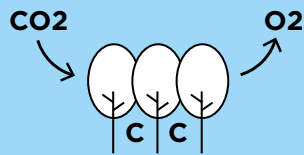
“We don’t have any bank, all we have is these cattle – so if we lose them, we have nothing.”



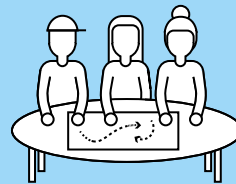




**1. VALUATION OF ECOSYSTEM SERVICES AND LAND DEGRADATION**



**2. PARTICIPATORY PLANNING AND CONSENSUS BUILDING**

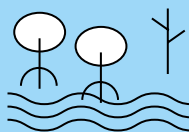


**THE TRI KENYA APPROACH**

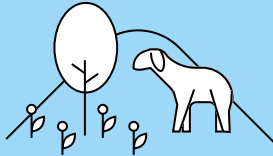
**3. DEVELOPING POLICY AND STRENGTHENING GOVERNANCE**



**4. USING ROAM TO PRIORITIZE RESTORATION OPTIONS IN DEGRADED LANDS**



**6. RESTORING THE BALANCE**



**5. TAKING ACTION FOR BIODIVERSITY AND LIVELIHOODS**



It's a familiar story here and with no coherent planning to manage land use there were regular conflicts, reaching a low point in 2012 when 286 people died in clashes between farmers and pastoralists, according to Omar.

"There have been clashes all over," Tana River County Governor Godhana Dhadho says. "Somehow, we have slowly drifted from environmental crisis to a disaster."

But by bringing communities and commercial interests together to decide on sustainable land use, The Restoration Initiative is working to defuse local tensions and rebalance the ecosystem.

Building on the Tana Delta Sustainable Land Use Plan created by villagers and local

authorities with Nature Kenya, the project is developing value chains and motivating private sector investment to secure local livelihoods, while advising on policies and strategies to sustainably manage the delta.

Already, community participation in land-use decisions is having an impact, with Nature Kenya having helped more than 100 villages to develop land-use plans and realize better management of natural resources, advocate for land restoration and conservation, and influence local government policy on land use.

"We have agreed who will use which area of land and how to better manage it," says Omar. "Now we have the knowledge to create awareness and bring people together. Now we can stay in peace."





**“NOW WE HAVE THE  
KNOWLEDGE TO CREATE  
AWARENESS AND BRING  
PEOPLE TOGETHER. NOW WE  
CAN STAY IN PEACE.”**

OMAR BOCHA  
VILLAGE ELDER, DIDE DARIDE

## THE RESTORATION INITIATIVE IN KENYA



Globally, increasing climate change impacts and migration, coupled with non-inclusive planning, are placing increasingly severe pressure on dwindling natural resources. This intensifying cycle has left many communities locked in a struggle for resources that is leading to conflict, impacting on biodiversity and negatively affecting livelihoods.

As part of The Restoration Initiative (TRI) global programme, this five-year Global Environment Facility-funded project – implemented in Kenya by the UN Environment Programme and Nature Kenya – takes a participatory approach to consulting and empowering communities to take the lead in planning and realizing the sustainable management of their environment and natural resources.

A key project feature is the Restoration Opportunity Assessment Methodology, or ROAM, employed in partnership with the World Resources Institute (WRI) to determine the most strategic interventions according to environmental and socio-economic priorities, guide activities on the ground and make the business case for landscape restoration.

In supporting the Bonn Challenge, the project also contributes to the UNEP-backed African Forest Landscape Restoration Initiative (AFR100), the UN Decade on Ecosystem Restoration and the Greening Kenya Campaign, an initiative aiming to plant 1.8 billion trees and achieve more than 10 per cent forest cover nationally by 2022.

By 2023, the project aims to have supported Tana Delta communities and authorities to have brought over 130,000 ha under sustainable livestock, fish and crop management, with an additional 10,000 ha under restoration, and 95,000 ha reserved for indigenous community conservation areas.

# BIRDSONG RETURNS TO THE HILLS OF BEMOLANGA

Fighting erosion in Madagascar



**Project name:**

Participatory Sustainable Land Management in the Grassland Plateaus of Western Madagascar

**Partners:**

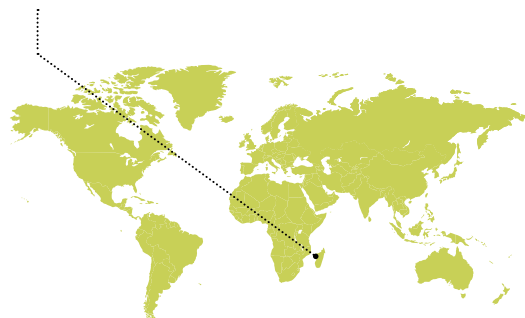
Global Environment Facility (GEF)  
UN Environment Programme (UNEP)  
National Association of Environmental Actions (ANAE)  
Ministry of Environment and Sustainable Development (Madagascar)

**Project funding:**

GEF Trust Fund: USD 1,548,931  
Co-financing: USD 5,354,800

**Countries of implementation:**

Madagascar



**BIRDSONG RETURNS TO THE HILLS  
OF BEMOLANGA**

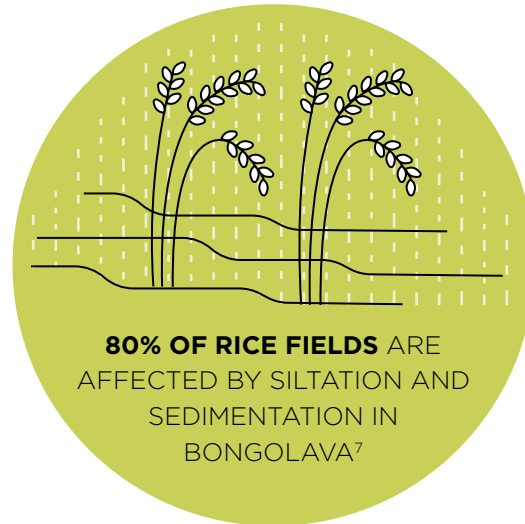
Fighting erosion in Madagascar



The hills surrounding Ahbohibary Kofay used to be filled with birdsong, says Lydia, who tends a small rice paddy outside the tiny village at the bottom of Bemolanga valley. That was until this area in Western Madagascar was laid to waste by fire in the early 1990s. The fire killed the trees and the birds fell silent.

“There was a forest here before,” she says, indicating the corrugated slopes spreading to the horizon beyond her family’s fields. “Because of the bush fire, now it’s like this. Birds can’t live without trees.”

Without the trees holding the soil together, the land at the top of the valley started to erode. Every time it rained, streams carved deeper scars into the landscape – gullies known locally as lavaka – sending red soil down the valley and silting up the villagers’ fields. The local spring dried up and Lydia’s rice harvest fell by almost a third, forcing her family of six to put less on their plate, and giving them less to sell. Struggling to pay her children’s school fees, Lydia was forced to take her eldest son out of school.



Lydia’s is a common story. In Madagascar’s Bongolava region 80 per cent of rice fields are affected by siltation and sedimentation. Slash-and-burn agriculture has reduced forest cover to less than six per cent, with native grasses fast springing up in the trees’ place. Herders regularly burn the grass to encourage new growth to feed their cattle, perpetuating the degradation of the soil.

**“THE PEOPLE WILL CONTINUE TO PLANT TREES BECAUSE THEY HAVE SEEN THE ADVANTAGES WITH THEIR OWN EYES.”**

JEAN BAPTISTE RANAIVOMANANA,  
SLMC TECHNICIAN









**Sedimentation resulting from hillside erosion has had a major impact on Bongolava's farmers, reducing yields by as much as a third. Reeds flourish on the sediment, carving into the space Lydia relies on for her rice crop. Now, with erosion barriers in place and trees planted on the surrounding slopes, the flow of sediment has slowed and yields are recovering.**



To address this problem Sustainable Land Management Committees (SLMCs) have been set up in seven communes, training Lydia and over 700 other community members on sustainable land management practices such as reforestation, digging erosion barriers and creating channels to prevent surface runoff, leading to the restoration of 30 ha of degraded land in Lydia's village and 105 ha across the region so far.

"Before the project, people thought the forest would never return, but now the soil has changed and started to become like before," Lydia says, indicating a nearby hillside bristling with young saplings and creased with barriers to prevent surface runoff.

The optimism is palpable, and spreading. The spring has started to trickle again, the lavaka have stopped expanding, and Lydia's paddy has stopped shrinking. Having seen the benefits of reforestation, landowners on neighbouring plots have even started planting their own saplings.




Having stabilized the hillsides, the next phase of the project will address soil degradation. By the end of the project over 5,600 farmers will have the skills to deploy sustainable farming techniques such as crop rotation and composting - restoring yields lost to decades of mono-cropping and other damaging practices across 2,500 ha. Based on past successes, the National Association of Environmental Actions estimates that crop yields will increase by approximately 40 per cent.

Sitting in her paddy field, Lydia's nostalgia for the forest is coloured with a growing sense of optimism. Her income is rebounding and she is looking forward to sending her son back to school.

On the surrounding slopes, the new growth echoes the change in the community's fortunes. As Lydia says, looking around her with a smile: "Now there are trees, the birds have come back again, little by little."



A woman with her hair in two braids, wearing a patterned short-sleeved shirt and a purple skirt, is working in a rice field. She is using a long-handled hoe to dig in the soil. The field is filled with young rice plants. In the background, there is a large green tree and a hillside covered in tall grass. The sky is overcast.

**“BEFORE THE  
PROJECT, PEOPLE  
NEVER THOUGHT  
THE BIRDS WOULD  
RETURN.”**

LYDIA MAMINIRINA  
RICE FARMER, BONGOLAVA

## PARTICIPATORY SUSTAINABLE LAND MANAGEMENT IN THE GRASSLAND PLATEAUS OF WESTERN MADAGASCAR

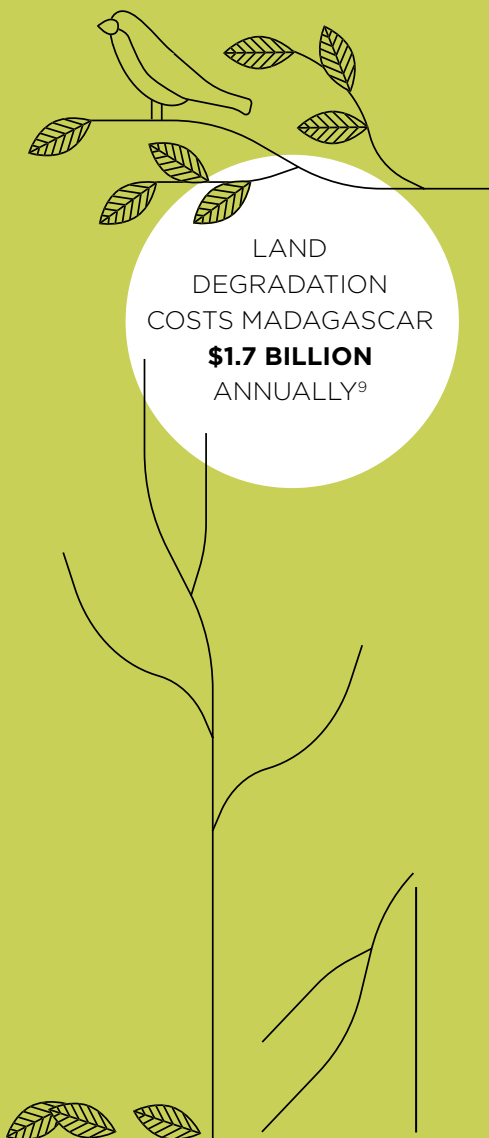
Land degradation costs Madagascar USD 1.7 billion annually, almost a quarter of the country's Gross Domestic Product.

Under a four-year Global Environment Facility-funded project, the UN Environment Programme is collaborating with the National Association of Environmental Actions and partners to bring new scientific and participatory approaches to tackling land degradation in this part of Madagascar.

The project aims to demonstrate how participatory sustainable land management can neutralize watershed degradation, restore ecosystem services, conserve biodiversity and improve agricultural productivity.

The restoration work is led by Sustainable Land Management Committees (SLMCs) which have been established across seven pilot communes. With the participation of local community members and government, SLMCs have been trained to identify and prioritize key areas for investment, create sustainable land management plans and implement and monitor sustainable land management practices on the ground. Local governments have made commitments to continue financing the SLMCs beyond the lifetime of the project.

With exchange visits between different communes and trainings on the approach planned, UNEP and partners aim to scale-up this innovative approach across all 19 communes in the Bongolava region, with the aim of bringing 8,500 ha under sustainable land management by 2021.



# A BETTER CUP FROM BUSH TO BREW

Sustainable tea  
production in Vietnam



**Project name:**

Mainstreaming Sustainable Management of Tea Production Landscapes

**Partners:**

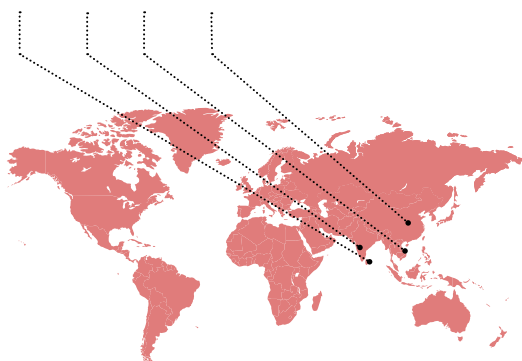
Global Environment Facility (GEF)  
UN Environment Programme (UNEP)  
Nghia Lo Tea Company  
Rainforest Alliance  
Rikolto (VECO)

**Project funding:**

GEF Trust Fund: USD 1,999,601  
Co-financing: USD 12,452,413

**Countries of implementation:**

Sri Lanka, India, Vietnam, China





For Thanh, the six annual tea harvests form the rhythm of family life, having raised her two children among the waist-high tea bushes that carpet the steamy slopes near her home in northern Vietnam's Yen Bai province.

Today, Thanh is proud of the thick, green leaves her tea bushes produce, stretching in straight rows across her two-hectare plantation.

But it wasn't always this way. Thanh has been growing tea for more than 25 years, but decades of poor soil management landed her in hot water. Her tea bushes turned into ragged stumps with thin, red leaves that failed international trading standards.

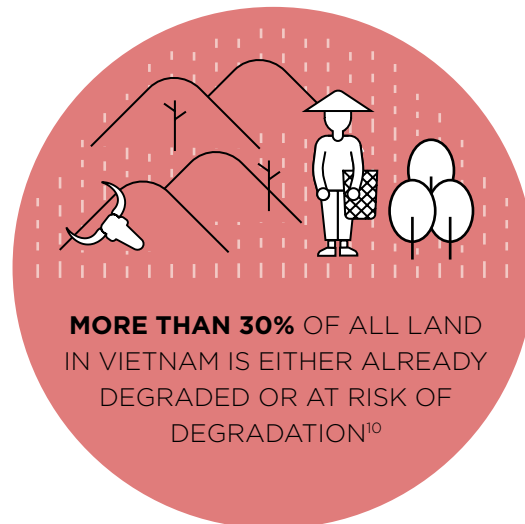
It's a pattern seen throughout the tea-growing highlands of Vietnam, a nation where more than 30 per cent of all land is either already degraded or at risk of degradation – much of it due to unsustainable farming practices like the overuse of chemical fertilizers.

In recent years, climate change has brought unpredictable, heavy downpours, flooding and landslides, while the overuse of agrochemicals has resulted in low-quality crops, poor yields, contamination of water supplies and a decline in the reputation of Vietnamese tea within the global export market.

“When the rain came, the topsoil – the fertile layer – just washed away. We were left with only rocks and stones; nothing could grow,” Thanh says.

**“I’VE LEARNT TO APPLY  
MULCH AND GROW  
HEDGES, SO THAT NATURAL  
ECOSYSTEMS CAN WORK  
AGAINST PESTS; WE ALSO  
INTERCROP TEA WITH  
LEGUMES, WHICH REPLENISH  
AND FIX THE NITROGEN INTO  
THE SOIL.”**

NGUYEN THI THANH  
TEA GROWER, YEN BAI









**Nghia Lo Tea Company where Thanh and other smallholders sell their tea. In previous years the factory struggled to get the quantity and quality of tea needed. Reducing chemical use and implementing sustainable farming practices like mulching to lock in moisture and provide soil nutrients have improved tea quality, increasing profits for both the factory and farmers.**



Farmers like Thanh had been using more and more agrochemicals in a futile attempt to fix the problems the chemicals themselves were causing; stripping away a complex natural web that provides fertilization, drainage and ground cover, while failing to treat most of the noxious weeds. The result? Expensive, sterile soil that washed away, crippling efforts to cultivate both tea and subsistence crops.

The scale of this land degradation challenge and its impact on tea farmers prompted the launch of the Sustainable Management of Tea Production Landscapes project, an initiative aimed at restoring soil health and boosting productivity around Asia. In Vietnam, training activities were organized through local enterprises, such as Nghia Lo Tea Company, to equip farmers with the tools to nurse their soil and tea bushes back to health.

For Thanh, the impact has been nothing short of revolutionary, with the new techniques helping to improve the quality and size of her crop and doubling the family income.

“We’ve stopped using herbicides completely,” she says, explaining how she now uses organic methods to control pests and boost the soil’s nutrients. “I’ve learnt to apply mulch and grow hedges so that natural ecosystems can work against pests; we also intercrop tea with legumes, which replenish and fix the nitrogen into the soil.”

Thanh and 23 others have gone on to train more than 3,000 farmers across the country’s tea-producing highlands, bringing over 1,500 ha under sustainable land management and boosting incomes by around 30 per cent.

Nguyen Dinh Vinh, the director of Nghia Lo Tea Company, the main buyer of Thanh’s tea, says that poor tea yields and quality are now a thing of the past in Yen Bai, allowing the company to increase sales and access new markets.

“Now, the company sells its products more easily, more buyers approach us to buy our tea and our tea is sold at higher prices,” Vinh enthuses.

From bush to brew, it’s a cup of success everyone is enjoying.

“This practice is not costly and productivity is high,” Thanh says with a grin. “Now, my tea bushes look healthy because they are getting what they need.”





## **SUSTAINABLE MANAGEMENT OF TEA PRODUCTION LANDSCAPES**



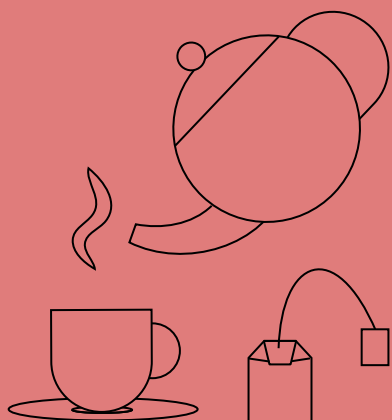
With global demand for tea growing at more than two per cent per year, the pressures on land for cultivation is increasing, just as the effects of climate change become ever-more extreme.

Under a four-year Global Environment Facility-funded project, the UN Environment Programme, the Rainforest Alliance and partners are empowering tea growers to mitigate and reverse land degradation across four of the world's major tea-producing nations – China, India, Sri Lanka and Vietnam.

Built on a foundation of farmers' traditional knowledge, the project has been training both smallholder farmers and large estate tea growers in sustainable farming and land management techniques, while catalyzing the tea industry and government to mainstream these practices in their business and operational policies.

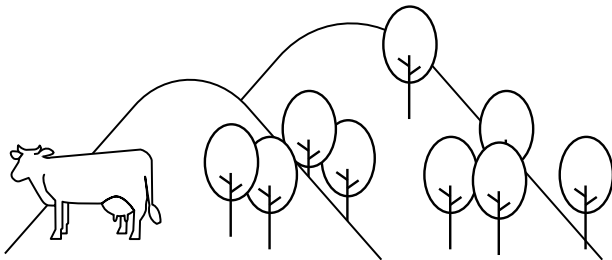
Using farmer field school and training-of-trainers methodologies, the project's focus on learning through experience is empowering growers to take ownership of land and soil issues.

Sustainable land management practices have so far been scaled up over more than 10,000 ha across the four countries, with reduced use of herbicides and pesticides improving soil health, stabilizing tea production and improving livelihoods for close to 28,000 tea farmers.



# FROM SLIM PICKINGS TO GREENER PASTURES

Ranching meets restoration in Ecuador

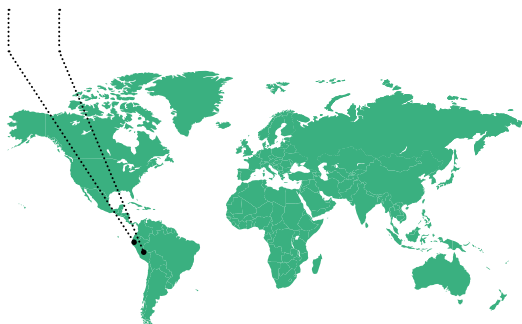


**Project name:**  
Multiplying Environmental and Carbon Benefits in High Andean Ecosystems

**Partners:**  
Global Environment Facility (GEF)  
UN Environment Programme (UNEP)  
Consortium for the Sustainable Development of the Andean EcoRegion (CONDESAN)  
Ministry of Environment (Ecuador)

**Project funding:**  
GEF Trust Fund: USD 4,796,364  
Co-financing: USD 18,299,114

**Countries of implementation:**  
Peru, Ecuador





Walking backwards, Georgina unspools a thick white ribbon in a rectangle about half the size of a soccer pitch, before planting fence posts into the thick grass and stringing up an electric fence in Ecuador's mountainous Pichincha province.

The fence in place, she ushers her 13 prized cows into the lush, green meadow – a now daily routine for the 46-year-old rancher.

She has only managed her pasture this way for eight months, but the improvement in the health of both her cattle and the grass they rely on has been profound since she began restricting grazing areas.

This is in contrast to less than a year ago, when the sparse, dry pasture had slashed her cattle's productivity, forcing the family to sell part of their herd and rent additional land to feed those that remained.

“We have had to make a lot of sacrifices. It shouldn't be this way,” she says, wiping away a tear as she recalls how the family struggled to pay her children's school and university fees.

But since replicating sustainable land management practices piloted by the Multiplying Environmental and Carbon Benefits in High Andean Ecosystems project, the family's situation has started to improve.

“We've seen an improvement in our pasture and we've learned the importance of looking at the whole ecosystem – maintaining the trees, and conserving the water,” Georgina says, showing off the rich pasture that now fills her fields.

Set amidst a mosaic of farmland and cloud forest, Georgina's ranch is one of many areas



**“WE’VE SEEN AN  
IMPROVEMENT IN OUR  
PASTURE AND WE’VE  
LEARNED THE IMPORTANCE  
OF LOOKING AT THE WHOLE  
ECOSYSTEM – MAINTAINING  
THE TREES, AND  
CONSERVING THE WATER.”**

GEORGINA RUALES VACA  
CATTLE RANCHER, PICHINCHA







**“THERE WAS NO INFORMATION ABOUT THESE ECOSYSTEMS BEFORE. WE CAN’T DO ENVIRONMENTAL CONSERVATION IF WE DON’T KNOW THE VALUE OF THESE ECOSYSTEMS. NOW THE PEOPLE THAT LIVE IN THIS TERRITORY CAN RECOGNIZE THE POTENTIAL OF THIS FOREST.”**

NINA DUARTE  
FORESTRY ENGINEER  
IMAYMANA FOUNDATION

MONITORING AT NINE SITES ACROSS PICHINCHA PROVINCE REVEAL THE AMOUNT OF CARBON STORED IN THE FOREST <sup>13</sup>

SITE	TOTAL CARBON (TONNES)
Mashpi Lodge	209
Mashpi Shungo	135.8
Intillacta	148.4
Sacha Urco	176.7
Rio Bravo	103.7
Bellavista	116.2
El Cedral	177
Verdecocha	148.5
Yanacocha	116.8



in the Tropical Andes suffering from a long history of unsustainable farming practices, extensive cattle grazing, soil erosion, water contamination and deforestation.

Running 4,100 km down the north-western edge of South America, the Tropical Andean mountains harbour extraordinary biological diversity, provide crucial ecosystem services and are an important, yet fragile store of carbon.

Through the project, Georgina was introduced to Juan Carlos, whose cattle farm operated as a research and pilot site to demonstrate how sustainable land management can improve productivity, avoid deforestation, restore degraded soils and reduce pressure on nearby water sources.

As part of the pilot project, Juan Carlos has experimented with an improved rotational grazing system, fertilized his pasture with manure and organic fertilizer from a biogas unit, restored a degraded area of pasture with native trees, and installed a new livestock watering system – stopping his cattle trampling through riparian forest to get to natural water sources.

“The quality of the topsoil has improved, it’s much deeper than before and the colour has changed from a light brown to a darker colour,” Juan Carlos says, massaging a handful of moist black earth in his palm. “The grass is much thicker and richer in colour too.”



These sustainable land management practices also increase soil carbon storage, with Juan Carlos able to sequester an additional 16.74 tonnes of CO2 equivalent per hectare every four years – more than three years’ worth of emissions from an average passenger vehicle.

Juan Carlos is quick to point out that sustainable land management has done more than help increase production – with each of his cattle doubling their daily milk yield – but has also reduced pressure on the surrounding environment, enabling him to designate areas for restoration and allowing wildlife to return by increasing landscape connectivity.

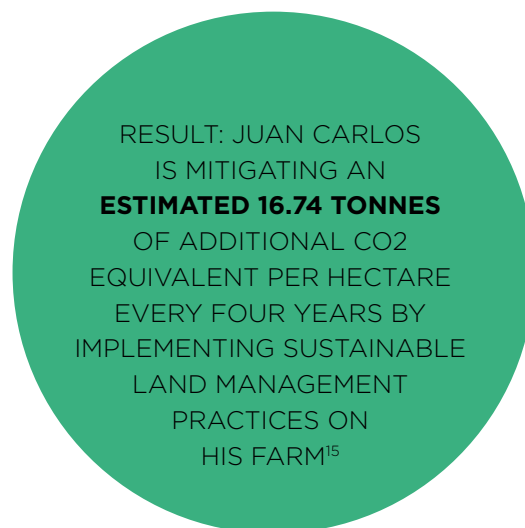
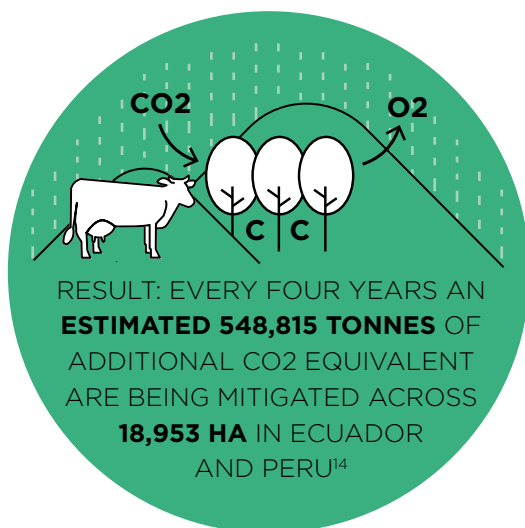
Georgina’s husband was one of 50 farmers in Pichincha who started replicating these innovative methods after joining in learning visits organized across the province.

“We were skeptical at first, but my husband was amazed at what Juan Carlos was doing – how green and healthy the grass was – we’ve never seen anything like it,” Georgina says.

With proven, replicable practices in place, the next step has been to integrate these practices into policy – working with local authorities to feed lessons learned from the project into national policies such as Ecuador’s National Restoration Plan.

Having seen the benefits himself, Juan Carlos is excited about the potential for even more farmers to take up the new techniques he has been a part of sharing.

“With this knowledge, instead of degrading farms, cutting down trees and extracting resources from the forest, farmers can implement more sustainable practices and improve productivity.”



**Juan Carlos sprays his pasture with biol – an organic fertilizer that he collects from a biogas unit that was installed as part of the pilot project. The biogas unit not only provides green energy and biol, but also helps to manage farm waste that previously contributed to soil erosion and water contamination.**



## **CARBON BENEFITS PROJECT**

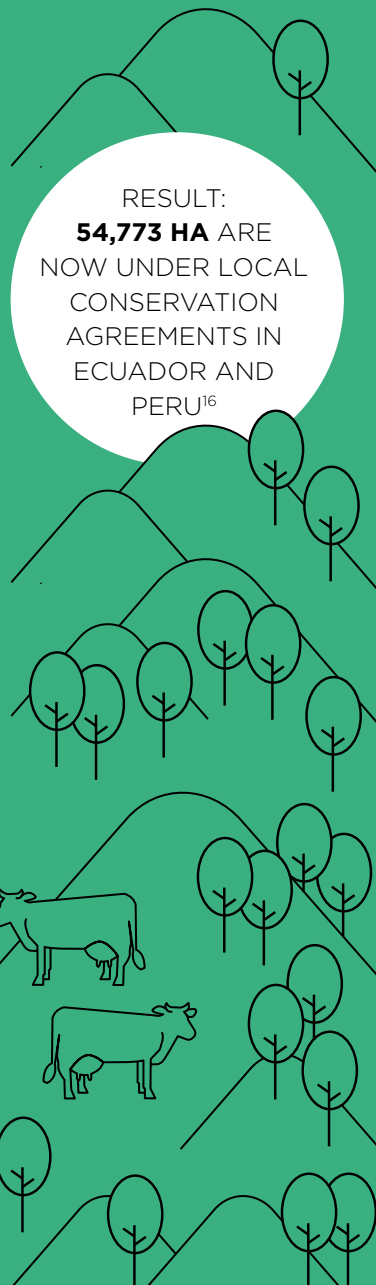
Sustainable land management practices such as those Juan Carlos is applying not only play a role in restoring ecosystem health and boosting productivity, but also contribute to climate change mitigation efforts by sequestering additional carbon in soils and biomass.

The Carbon Benefits Project provides tools for agriculture, forestry and land management projects to estimate the impacts of their activities on climate change.

These tools, developed by Colorado State University under a UN Environment Programme-led project backed by the Global Environment Facility, were used to analyze the carbon benefits of sustainable land management practices implemented across pilot sites in Ecuador and Peru. The carbon benefits were estimated across almost 19,000 ha where sustainable land management practices were implemented, with results showing that over half a million tonnes of CO<sub>2</sub> are now being mitigated every four years.



## MULTIPLYING ENVIRONMENTAL AND CARBON BENEFITS IN THE HIGH ANDEAN MOUNTAINS



The combined degradation pressures of extensive cattle grazing, agricultural expansion and frequent fires have long threatened the fragile ecosystems of the High Andes.

Under a four-year Global Environment Facility-backed project, the UN Environment Programme, CONDESAN and partners have been working in five diverse intervention sites across Ecuador and Peru to pilot a range of sustainable land management, sustainable forest management and restoration practices.

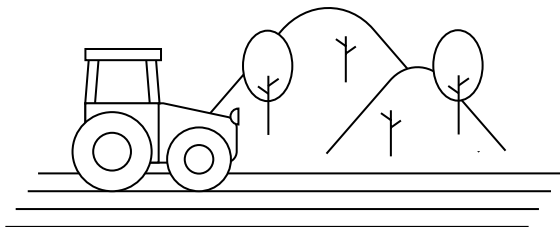
To demonstrate the value of these ecosystems, data on biodiversity and carbon stocks have been collected at different elevations across the five sites, producing valuable information to inform policy, land-use planning tools and carbon compensation programmes.

To scale-up these scientifically validated practices, the project has supported government institutions in Ecuador and Peru to start integrating and replicating sustainable land and forest management, and restoration practices at multiple levels, ranging from national incentives to local conservation and livelihood improvements.

Through these efforts, 54,773 ha are now under local conservation and sustainable management agreements across Ecuador and Peru, restoring the High Andean ecosystem while improving livelihoods for rural families.

# SMART SOLUTIONS TO A CHANGING CLIMATE

Restoring fortune to the  
fields of Georgia



**Project name:**

Applying Landscape and Sustainable Land Management for Mitigating Land Degradation and Contributing to Poverty Reduction in Rural Areas

**Partners:**

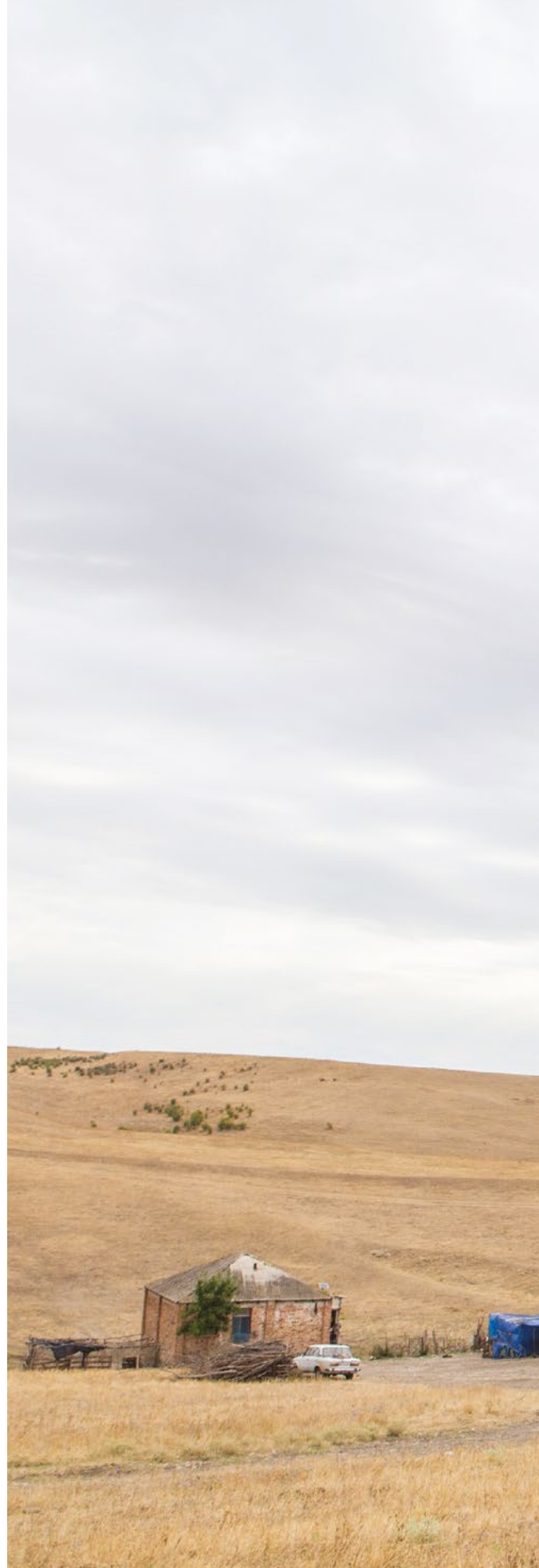
Global Environment Facility (GEF)  
UN Environment Programme (UNEP)  
Dedoplistskaro Municipality  
Ministry of Environmental Protection and Agriculture (Georgia)  
Regional Environment Centre for the Caucasus (REC Caucasus)

**Project funding:**

GEF Trust Fund: USD 1,011,215  
Co-financing: USD 3,652,968

**Countries of implementation:**

Georgia







Sometimes referred to as 'the bread basket of Georgia', Dedoplistskaro's fertile soils have provided a living for generations of farmers. But today, periods of drought, compounded by strong, dry winds that erode fields and scatter seeds, are hitting local communities hard.

Ex-soldier Valeri and his family have tried to laugh off the region's warming weather. "Maybe we should bring camels here and make a tourist centre," the 40-year-old quips with a smile.

But Georgia's changing climate is no longer something to joke about for Dedoplistskaro's farmers.

"The rainfall is less, there was no snow at all this year," Valeri says. "Temperatures have increased, it was 18 degrees in January – it's normally below freezing. There are more crop diseases and less water, we used to be able to get a lot of water from our well but now we can only get a couple of buckets."

Now, after 20 years working the land, Valeri has seen his harvest fall from up to 6 tonnes per hectare to just 1.8 tonnes in bad years. Before these intensifying impacts of climate change, crop rotation and sunflower cultivation helped rejuvenate the soil and safeguard against consecutive poor harvests.

"They [sunflowers] worked well, but the lack of water caused fungal diseases, sometimes destroying a large part of the crop," says Valeri, who saw his sunflower harvest fall from 2.5 to 0.5 tonnes per hectare, before walking away from the crop.

With maize and soya also failing, the father of two – like many farmers in his village –



**“THERE ARE MORE  
CROP DISEASES AND  
LESS WATER.”**

VALERI KHASAIA  
FARMER, DEDOPLISTSKARO



began to question the sustainability of his once comfortable way of life for the first time.

Recognizing the need for local farmers to find ways of adapting to their changing environment, UN Environment Programme, REC Caucasus and partners have opened the way to a range of solutions for Valeri and other farmers in three particularly vulnerable municipalities of Georgia.

As one of 21 farmers to attend a series of trainings under a pilot project in his municipality, for Valeri this meant learning about sustainable land management practices, particularly reduced fertilizer use and effective tiling to lock in soil moisture. But the key feature of training was the introduction of a particular variety of pea selected by the project as a drought-resistant rotational crop suitable for local conditions – with dramatic results.

“The peas we planted had a real impact. They enriched the soil, prevented pests and reduced weeds. I’m very happy,” says Valeri, who has seen his wheat harvest jump by a quarter, despite slashing his use of fertilizer nearly in half.

Valeri’s success has inspired his friend Guram and numerous other farmers to also

reap the benefits of growing these peas. “I’m very optimistic about growing peas, they enrich the soil,” says 74-year-old Guram.

This initiative has also delivered significant economic benefits, with the farmers seeing annual returns of as much as USD 4,700 per hectare from the new, low-maintenance crop – a welcome change to barely breaking even on past rotational crops.

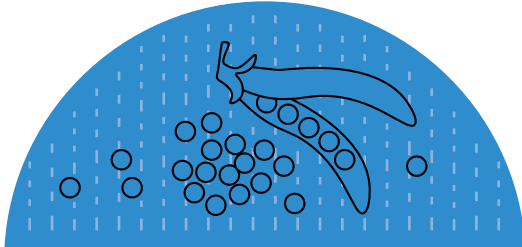
With the area under sustainable land management more than doubling after just one year and ever more farms in the pilot communities taking up the approaches advocated by the project, Georgia’s farmers may soon have reason to look on the bright side again.

“After other farms saw that my yield from the plot where pea had been sowed was better even though there had been drought, a lot of them became interested,” Valeri says.

“The plants are beautiful, the results are good and it enriches the soil. Everyone is satisfied!”

**Farmers in Dedoplistskaro frequently burn off crop stubble in the belief it will reduce fungal diseases and increase productivity. However, in the long term it degrades the land, removing nutrients and killing off bacterial and fungal populations critical for soil fertility. Fires often spread beyond the fields to damage natural growth and windbreaks.**



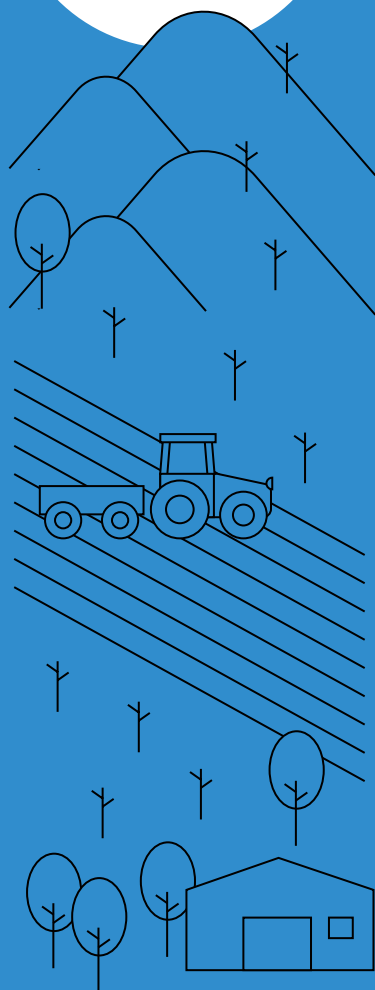


RESULT: FARMERS PARTICIPATING  
IN THE PILOT PROJECT IN  
DEDOPLISTSKARO HAVE  
GAINED AVERAGE REVENUES  
OF **USD 4,100 - 4,700 PER  
HECTARE**<sup>17</sup>



## APPLYING LANDSCAPE AND SUSTAINABLE LAND MANAGEMENT FOR MITIGATING LAND DEGRADATION AND CONTRIBUTING TO POVERTY REDUCTION IN RURAL AREAS

**ONE-THIRD**  
OF GEORGIA'S  
AGRICULTURAL  
LAND IS  
DEGRADED<sup>18</sup>



Drought, coupled with poor land management, soil degradation and wind erosion have left one-third of Georgia's agricultural land degraded, with many agriculture-dependent communities facing falling yields and increasing livelihood pressures.

This three-year Global Environment Facility-backed initiative led by the UN Environment Programme is working with REC Caucasus and partners across three municipalities to ensure the resilience of local agricultural livelihoods.

Key project interventions – focused on piloting crop rotation, windbreaks and pasture management – have positioned beneficiaries to meet current and future climate challenges and champion sustainable land management practices within their communities.

To help safeguard these gains, the project is also working with policy-makers to strengthen governance structures, helping government agencies reach consensus around sustainable land management draft legislation and using project field results to inform the development of key national policies on pasture management, windbreaks and soil protection.

To contribute to the global knowledge base and ensure lessons learnt benefit other initiatives, the project's methodology and sustainable land management practices have been archived online through the World Overview of Conservation Approaches and Technologies ([www.wocat.net](http://www.wocat.net)).







# ABOUT THE UN ENVIRONMENT PROGRAMME



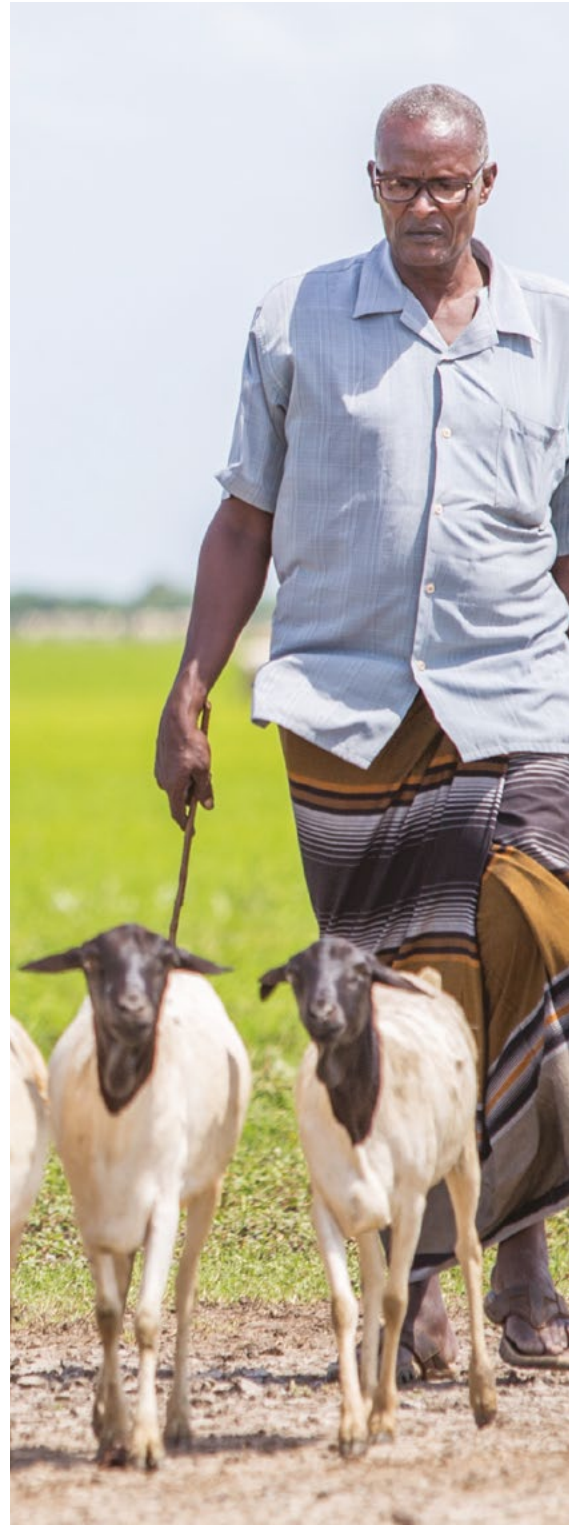
The United Nations Environment Programme is the leading global environmental authority that sets the global environmental agenda, promotes the coherent implementation of the environmental dimension of sustainable development within the United Nations system, and serves as an authoritative advocate for the global environment. Our mission is to provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations.



# ABOUT THE GLOBAL ENVIRONMENT FACILITY



The Global Environment Facility was established on the eve of the 1992 Rio Earth Summit to help tackle our planet's most pressing environmental problems. Since then, the GEF has provided over USD 18.1 billion in grants and mobilized an additional USD 94.2 billion in co-financing for more than 4,500 projects in 170 countries. Today, the Global Environment Facility is an international partnership of 183 countries, international institutions, civil society organizations and the private sector that addresses global environmental issues.



# ACKNOWLEDGEMENTS




We would like to recognize the many partners that we have collaborated with and that have contributed to the projects and programmes featured in this publication.

Project	Country	Partners
<b>Applying Landscape and Sustainable Land Management for Mitigating Land Degradation and Contributing to Poverty Reduction in Rural Areas</b>	Georgia	Akhmeta Municipality Dedoplistskaro Municipality Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH European Union Gardabani Municipality Green Alternative Ministry of Environmental Protection and Agriculture Regional Environment Centre for the Caucasus United Nations Development Programme
<b>Carbon Benefits Project</b>	Global	Colorado State University Bureau of Agriculture, Bahir Dar, Ethiopia Consortium for the Sustainable Development of the Andean EcoRegion Kenya Agriculture and Livestock Research Organization Land Potential Knowledge System The World Bank The University of Bern United Nations Development Program
<b>Healthy Ecosystems for Rangeland Development</b>	Jordan	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH Ministry of Environment Ministry of Agriculture Royal Botanic Garden The Hashemite Fund for Development of Jordan Badia
	Egypt	Centre for Environment and Development for the Arab Region and Europe Desert Research Centre Ministry of Environment and Ministry of Agriculture
	Global or Regional	International Union for Conservation of Nature - Regional Office of West Asia League of Arab States

<b>Mainstreaming Sustainable Management of Tea Production Landscapes</b>	Vietnam	Kien Thuan Tea Cooperative Nghia Lo Tea Company Rikolto (VECO) Tam Duong JSC Thai Nguyen Plant Protection Department Vietnam Tea Association
	India	Trustea
	Sri Lanka	Kahawatte PLC Maskeliya PLC Tea Smallholders Factories Limited
	China	Baoshan City tea office Lincang City tea office Tea Office Cangyuan County Wengdu Local Government
	Global or Regional	Ethical Tea Partnership Dutch Sustainable Trade Initiative Finlays Kirin Holdings Company Unilever Rainforest Alliance
<b>Multiplying Environmental and Carbon Benefits in High Andean Ecosystems</b>	Ecuador	Consortium for the Sustainable Development of the Andean EcoRegion Ministry of Environment
	Peru	Consortium for the Sustainable Development of the Andean EcoRegion Ministry of Environment
<b>Participatory Sustainable Land Management in Grassland Plateaus of Western Madagascar</b>	Madagascar	National Association of Environmental Actions Ministry of Environment and Sustainable Development
<b>The Restoration Initiative, Kenya: Enhancing Integrated Natural Resource Management to Arrest and Reverse Current Trends in Biodiversity Loss and Land Degradation for Increased Ecosystem Services in the Tana Delta</b>	Kenya	Nature Kenya Tana River County Government Lamu County Government Ministry of Environment and Forestry World Resources Institute

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