WOMEN-LED SOLUTIONS FOR DROUGHT RESILIENCE

United Nations
Convention to Combat Desertification

Food and Agriculture Organization of the United Nations

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United Nations Convention to Combat Desertification

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Acronyms

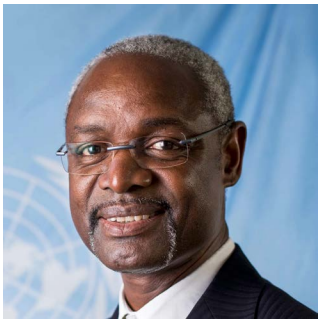
ABA	Asociación Bartolomé Aripaylla
APISEN	Association des apiculteurs du Sénégal
AR6	Sixth Assessment Report-IPCC
ASALs	Kenya's arid and semi-arid lands
COP	Conference of the Parties
CP	Child Projects under the GEF-funded Dryland Sustainable Landscapes Impact Program (DSL-IP)
CRIWMP	Climate Resilient Integrated Water Management Project
CSO	Civil society organisation
DSL IP	Dryland Sustainable Landscapes Impact Program
FAO	Food and Agriculture Organization of the United Nations
GACEM	Savings and Credit Groups for Women's Empowerment
GBC	Gender-based constraints
GBV	Gender-based violence
GEF	Global Environment Facility
GIGUP	Gender Equality Award for Productive Units
GM	Global Mechanism
HRCPDI	Helping Regional Communities Prepare for Drought Initiative
IFAD	International Fund for Agricultural Development
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
JICAHWA	Jie Community Animal Health Worker Association
MARAG	Maldhari Rural Action Group
NDC	Nationally determined contributions
NDP	National Drought Plans
NGO	Non-governmental organisation
S4HL	Stand for Her Land
SDGs	Sustainable development goals
SLM	Sustainable land management
STEM	Science, technology, engineering, and mathematics
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
WADA	Women's Association of Deir El Ahmar
WCL	Women Climate Leaders
WFP	World Food Programme
WOCAT	World Overview of Conservation Approaches and Technologies
WPLMC	Women's Pastureland Management Committee

PART 1
LINKAGES BETWEEN DROUGHT, GENDER INEQUALITIES AND WOMEN-LED SOLUTIONS

Photo : © GSA

Foreword

Most vulnerable and most resilient to drought? Women-led solutions for drought resilience and adaptation



Ibrahim Thiaw
Executive Secretary
United Nations Convention to Combat Desertification

Having been confronted with drought from an early age, I grew up watching my mother manage the meagre plant and animal resources that nature was so stingy with. Along with her fellow mothers, they measured the extent to which food, plants, fish and livestock were precious assets for maintaining families, or simply keeping them going.

And then came the drought in the Sahel in the early 1970s, which changed everything. Far from giving in, they took matters into their own hands, gradually taking the place of the men who had no choice but to leave the women behind to seek a better life in neighbouring towns. Although naturally more vulnerable than men, they showed unimaginable resilience, developing a spirit of survival not only for themselves, but above all to save us from the worst.

Over time, I came to realize that the heroism of our mothers in the Sahel, while exceptional, was not unique. This study proves that all over the world, the most 'vulnerable' women are in fact the most resilient. Is this a paradox or the expression of extraordinary courage, a motherly bravery?

Our ecosystems worldwide are increasingly under threat. Faced with a global climate crisis, communities in every corner of the world are currently grappling with unprecedented heat waves. The combination of climate change and human interventions is exacerbating drought, land erosion and degradation, hampering agricultural production and leaving the world in tatters, precipitating the most vulnerable communities to hunger if not starvation and poverty.

"Resolving gender inequalities is not only a matter of righting a wrong but also a significant opportunity to use previously underused and under-recognized abilities, knowledge, and talents."

UNCCD Executive Secretary Ibrahim Thiaw

These impacts are intensified by extreme weather events and underlying societal vulnerabilities. Women are naturally the most vulnerable: they are more susceptible to the impacts of drought and, also have less capacity to reduce drought risks and cope positively with them. Additionally, gender inequality is a risk multiplier: risks women and girls face are magnified when they intersect with one another. As a result of different aspects of their identity — age, disability status, ethnicity, migration status, socio-economic status — the risks women and girls face compound, further reducing their power or capacity to face challenges and often rendering women overlooked, unheard or under-valued. In the context of drought, risks are heightened by women's lack of land ownership and exclusion from related decision making processes, circumstances that leave them unable to draw on their firsthand experience working on and managing land to influence its management, protection or restoration, and making them more vulnerable to adverse impacts.

An intersectional approach – taking into consideration the interconnected nature of gender and social identities – is required to address the differing ways that drought affects people in vulnerable situations. Concerted efforts are needed to empower women and place them at the forefront of initiatives to combat drought and desertification and to engage them as leaders, alongside men, to influence and make decisions about land use and the best approaches to overcome drought and land degradation.

Women represent just under half of the world's population as well as nearly half of the world's agricultural workforce, producing 60–80% of the food grown in developing countries[1]. Despite their critical role, it is alarming to note that a mere one in five landowners is female.[2] Without land rights, and with women elected to lead just 12% of the 881 environment-related ministries at the national level worldwide,[3] women are not properly included at the table to help make decisions on land use and management. Lamentably, women's perspectives are not sufficiently integrated into decisions on measures to address the impacts of drought, desertification, and climate change.

The exclusion of a considerable portion of the world's population from these essential decision making processes is not without consequence. Rather, the exclusion of women – who have considerable firsthand experience managing and nurturing land – is a key element leading to catastrophic consequences. Up to 40% of the land on earth is currently deemed degraded.[4] And over 15% of disaster-related damages and losses worldwide are due to drought. These impacts are resulting in immense hardship, poverty and deprivation, for communities worldwide.

Ensuring women's empowerment for devising initiatives addressing land degradation, and achieving women's land rights, are intertwined and imperative. Research shows that women landowners and women politicians make decisions that prioritize land health and preservation.[5] Securing women's rights to land and actively engaging them in decisions on its restoration would not only support drought recovery, it would also help meet the nutritional needs of communities worldwide, staving off hunger and malnutrition, and advancing the world's objective towards gender equality.

This publication provides glimpses of pervasive land degradation, notably in dryland regions, and reveals the great value and ingenuity that women often bring to tackle drought, in favour of land restoration, sustainability, and gender equality. It features a compilation of case studies from around the world, showcasing initiatives and women's collectives that are helping close the gender gap in drought-prone locations and regions. Women leaders variously draw on ancestral knowledge, science-based technical solutions and also their daily experiences to apply innovative approaches for building resilience against drought.

These case studies demonstrate that women are truly catalysts for change in the fight against desertification. Acknowledging women's creative contributions to drought management is an essential first step, alongside ensuring women's land ownership and their participation in the development and implementation of policies that favour drought planning, preparedness, mitigation and response. Ensuring that women's perspectives are equally heard and integrated into all decisions and measures taken is vital to guarantee that these measures benefit all land users. Selected gender-responsive case studies and innovative, women-led practices are shared here to inspire stakeholders around the world, draw motivation from women leaders globally, for consideration in diverse communities.

The ingenuity and resourcefulness of women combatting drought around the world is boundless. Whether in the Africa's Sahel region, in Northern Kenya, in Iran, in Peru or in Morocco, women have proven their resilience and their ability to overcome the most inextricable conditions to keep their families thriving.

If this lesson in courage and self-sacrifice doesn't open our eyes and our wallets to investing in their resilience, what could motivate us?

1 UNCCD, 2023. "World leaders urged to prioritize women's land rights at the UN". 16 June 2023

2 Ibid.

3 United Nations, 2023. "Securing Women's Land Rights for Increased Gender Equality, Food Security and Economic Empowerment". UN Chronicle. 15 June 2023.

4 Ibid.

5 See, for example: UNCCD, 2023. "World leaders urged to prioritize women's land rights at the UN". 16 June 2023. See also: United Nations, 2023. "Securing Women's Land Rights for Increased Gender Equality, Food Security and Economic Empowerment". UN Chronicle. 15 June 2023.

EXECUTIVE SUMMARY

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Background

Droughts are the most far-reaching of all natural disasters and are increasingly impacting all regions of the world, accelerating land degradation at an alarming rate and, in turn, disrupting livelihoods and contributing to immeasurable hardship, poverty and deprivation. Recognising this, the United Nations Convention to Combat Desertification (UNCCD) is prioritising drought and its related impacts in awareness-raising efforts, including policy studies and publications, as well as its annual commemoration of World Day to Combat Desertification and Drought. Moreover, Decision 24 from UNCCD's 15th session of the Conference of the Parties (COP15), approved a "road map to guide and accelerate the implementation of the Gender Action Plan", promoting the development and sharing of gender-responsive and transformative approaches.

In response to this decision and acknowledging that women and girls are not only most affected by drought but also are demonstrating remarkable leadership in the face of droughts, developing innovative means to adapt to and better manage drought and to increase drought resilience within their communities, UNCCD launched a global call in early 2024 to identify women-led solutions towards drought resilience. In response, 87 promising practices were received, from which 35 practices were selected for publication. A Review Committee — comprised of selected colleagues from FAO, IUCN and UNCCD — took into consideration each of the promising practices received and analysed their relevance and their capacity to be replicated in drought resilience practices and programming worldwide.

The 35 promising practices highlighted in this report showcase the efforts of organisations and community members, particularly women leaders, in combating, mitigating and responding to drought and its deleterious impacts.

PHOTO: ©GACEM, WFP Guatemala

Although promising practices were anticipated from a diverse array of countries, they were only received from UNCCD Annexes I, II and III – Africa, Asia, and Latin America and the Caribbean. As a result, only these three regions are represented in this compilation. The practices are analysed in relation to five drivers of gender inequality:

1. inequitable control of, and access to, natural resources (including land);
2. a lack of, or limited access to, markets, capital, training, technical assistance, financial services, and technologies;
3. patriarchal, discriminatory, and violent norms and laws;
4. the gendered division of labour and the unequal social and economic organisation of care and;
5. the concentration of power and hierarchical relations in the public and private spheres.

Key lessons learned within the context of each of these drivers are provided alongside promising practices, offering insight into effective pathways forward. At the centre is the need to address the structural inequalities underlying each of the drivers, consider the multiple and intersecting forms of discrimination that women face, and move towards more proactive, risk-management approaches that build resilience to drought, rather than react to it in the aftermath of environmental hazards. Evident in land tenure, decision making power, and access to training, financial services, and technology, gender inequality prevents women from fully realising their potential in land management and renders them more susceptible to drought and its impacts. Yet, as the promising practices compiled in this report show, women are leading efforts globally to combat drought and preserve land, supporting communities and economies.

The promising practices are shared with the aim to inspire replication throughout UNCCD annexes, exemplifying ways to better adapt to and manage drought while building drought resilience, under the leadership of women. As summarised below and detailed in this study, women leaders as well as women's organisations, associations, and cooperatives are helping shift gender norms, support women's engagement in non-traditional roles and jobs, ensure caretaking responsibilities are more equitably distributed, and promote and support the representation and active integration of women in public policy and practice. Women are promoting and supporting equitable land tenure and land titles, women's access to common lands, and women's participation in training and access to credit, financial services, markets, and technology, with the aim to improve their knowledge and capacity to effectively manage land and lead revitalisation efforts.

PHOTO: ©GYF

Inequitable control and access to natural resources:

Fewer than 20 per cent of all landholders globally are women, hindering their ability to make decisions on how that land is used or managed, obstructing their access to loans and credit due to the absence of secure tenure and land titles for collateral, and limiting their access to extension services and training. Despite this, women perform 43 per cent of global agricultural labour, rendering their livelihoods highly susceptible to climate change and related environmental hazards, like drought. Young, low-income rural women are especially vulnerable.

Equitable land governance and **secure land tenure** can help address this inequality. A first step is at the **policy level** – supporting women's access and rights to land and recognising women as farmers, pastoralists, and forest managers to support their inclusion and active engagement in decision making spaces. Global campaigns, such as the **HerLand** and **Stand for Her Land (S4HL)** campaigns, are raising awareness of these issues, promoting women and girls' contributions to sustainable land management, and supporting land rights for women and girls worldwide, including through the integration of women's land rights in legislation and practice.

Country examples **Inequitable control and access to natural resources**

Despite these efforts, case studies from **Argentina**, **Bangladesh**, **Senegal** and **Uganda** show that, even where women are afforded legal land rights, their access to them may be hindered, necessitating additional measures to support their access. For example, in **Bangladesh**, where land is typically acquired through inheritance, leaving women with less access than men despite equality in property rights under the national constitution, S4HL is supporting civil society organisations (CSOs) to work alongside government agencies, to build political will in favour of women's land rights. To change inequality in behaviours and norms in **Senegal**, moreover, men are engaged as champions of rural women's land rights to help promote and inspire positive change. In **Argentina** and **Uganda**, local CSOs provide legal support, advice, and advocacy to enable women prevented access to their land to access their land rights.

Women-led cooperatives can also support women's use and control of land and sustain their livelihoods. In **Niger**, female members of the cooperative, CERNAFA, combine their resources in order to buy shared land and equipment. Each member contributes 10 per cent of her onion production to the cooperative and these onions are then sold during periods when costs are higher, using the profits to support members and their livelihoods through the purchase of seeds, acquisition of new plots, provision of equipment, and site maintenance.

A lack of, or limited access to, markets, capital, training, technical assistance, financial services, and technologies:

Women, especially marginalised groups of women, are less able to access new technology or credit and to invest in sustainable land management, rendering them more susceptible to climate shocks, including droughts. Where women are not recognised as landowners, farmers or value chain actors, moreover, they are often further excluded from extension services and training. Without the technology to ease their workload and the knowledge or skills to improve their effectiveness, they tend to work longer hours and rely on men or hired labour, lending to fewer crop yields and less income.

The most successful case studies intentionally support access to goods and services and reduce barriers to women's adaptive capacity in the face of drought and other climate change impacts. Women-led solutions support the retention of ancestral knowledge and traditional practices, water conservation and management, the strategic use of drought-resistant seeds and crops, innovative income-generating activities, alternatives to conventional or unsustainable soil management, recovery of drought-impacted soils, and leveraging of climate information services.

Country examples **A lack of, or limited access to, markets, capital, training, technical assistance, financial services, and technologies**

The case studies in **Australia**, **Iran**, **Nigeria**, and **Uganda** demonstrate the efforts of local organisations, women's groups, and women leaders in supporting women's access to vital information, knowledge and support. In **Nigeria**, information is disseminated via the radio, providing critical information and education to even the most remote and isolated communities. Local farmers, agricultural experts, and supply chain partners are invited to share their knowledge, expertise, and experience on the radio, promoting water conservation and improved irrigation technologies, and providing climate information services. This approach has proved effective, with nearly 40 per cent of women listeners trying at least one climate change adaptive practice as a result of the radio programme. In **Uganda**, women are equipped with the knowledge and skills to interpret and disseminate climate information and to provide their communities with localised weather forecasts, early warning alerts, and advisories on climate-smart agricultural practices and disaster preparedness measures. Farmers – particularly women – who receive this information make better informed decisions on crop planning, water management, and livelihood diversification. Also in Uganda, a weather update centre provides farmers with accurate, timely weather information to support their agricultural activities, while a mobile van equipped with a projector delivers training sessions to farmers in remote areas. In **Iran**, a female professor trains women on a technique that utilises mycorrhizal fungi to enhance soil quality and restore vegetation, thereby mitigating the adverse effects of drought and desertification. This not only builds the capacity of local women, it also engages and empowers them as local leaders of positive change in their communities and environment. In **Australia**, a nationwide mentoring programme builds resilience and leadership skills, with emphasis on women, in drought-prone areas, equipping women with the skills needed to support their communities.

The benefits of improved access to knowledge and information is evident in the innovative approaches women are using to address water shortages and other challenges facing their communities in **Guatemala**, **India**, **Peru** and **Venezuela**. In **Peru**, a group of pastoralist women are linking modern and traditional knowledge with academia, to address water shortages. Using an ecohydrological monitoring system, including 14 weather stations and 72 groundwater observation wells, the women monitor the groundwater level, to ensure year-round growth of vegetation and facilitate rapid response, where necessary, supporting alpacas and, in turn, pastoralists. Also in various communities of **Peru** and in **Venezuela**, rainwater is being stored to ensure uninterrupted access to water for both human and agricultural usage. Similarly, in **India**, a water management system is being used to address water scarcity issues in agricultural areas, by collecting and storing rainwater underground during monsoon periods and, then, accessing this water during dry periods, thereby ensuring continuous crop irrigation and supporting farm productivity, food security, and resilience. In **Guatemala**, women's savings and credit groups have been formed, and provide space for training, awareness-raising and education opportunities and enable women to build savings and apply it to their homes and communities. In addition, microinsurance protects agricultural and commercial activities from excess rain and drought.

Patriarchal, discriminatory, and violent norms and laws:

In most economies of the world, at least one law restricts women's economic equality, and not a single country in the world provides equal opportunity in employment for women. Although women play a critical role in the biodiversity of drylands and hold vital information to help mitigate and respond to drought, discriminatory norms and practices prevent women from actively engaging in decision making spaces and developing solutions. Certain groups of women and girls may face further discrimination, as a result of intersecting inequalities and context-specific factors, such as age, ethnicity, (dis)ability, location, socio-economic status, migration status, culture, and religion. Further, women and girls, particularly those who face marginalisation due to these and other factors, are among the most physically, economically, and socially vulnerable to climate-related disasters. Women, girls, and people who identify as part of the LGBTQI+[6] community also face heightened risk of violence, harassment, and trafficking within their homes, when collecting water, and in disaster settings, including droughts.

Country examples **Patriarchal, discriminatory, and violent norms and laws**

Albeit deeply entrenched and difficult to overcome, as we see in **Brazil**, **Costa Rica** and **Kyrgyzstan**, patriarchal, discriminatory, and violent norms and laws can be minimised. In **Brazil**, women use logbooks to track the produce they grow in their home gardens and tabulate the monthly monetary value of their activities, providing their families with evidence of their contributions to their households and enabling them to share their knowledge with other women through local women's groups, strengthening their individual capacity and building community. In **Kyrgyzstan**, a group of women is cultivating medicinal herbs on degraded lands, enabling women to be directly involved in reviving affected land while gaining a sustainable source of income. Supporting and integrating women in nontraditional employment is a strategic action, often led by women themselves. In **Costa Rica** and **Senegal**, women are shifting gender norms through their engagement in traditionally male-dominated domains, like firefighting and beekeeping.

Gendered division of labour and unequal social and economic organisation of care:

The survival of individuals, families, societies, and economies depends on care work[7]. Yet, women and girls are shouldering the bulk of this vital labour. When paid and unpaid work are combined, women work longer hours than men, with the gaps even wider in drylands and drought-prone areas. Globally, women and girls devote three times as much time on unpaid care and domestic work, in comparison to men and boys. Climate change and disasters, such as droughts, exacerbate women's and girls' already disproportionate responsibility for care and domestic work, further obstructing their access to paid work and other needs and rendering them more vulnerable to poverty and hardship. This has economic consequences not only for individual households; it also restricts the economies of countries.

Care work must be at the centre of any development model in favour of global sustainability. Actions must reduce women's workloads, adapt to their schedules and availability, and actively – and equitably – engage men in care responsibilities as well. Women's access to decision making and planning processes, as well as their right and access to ownership of land and other production assets, must also be facilitated. And, data must be collected to identify and address gender gaps.

6 LGBTQI+ stands for lesbian, gay, bisexual, transgender, queer, intersex, plus those who identify within the LGBTQI community but for whom "LGBTQI" does not accurately reflect their identity.

7 Care work encompasses hands-on care for people; the provision of necessary goods and services for people; caring for animals, plants, and common spaces on which households depend, domestic work; communal work, like childcare, which supports personal and household care.

Country examples **Gendered division of labour and unequal social and economic organisation of care**

Efforts in **Angola**, **Cambodia**, and internationally are helping render the division of labour and care work more equitable. Programming in **Angola** recognises that family diet and nutritional status impact women's participation in project activities, given that women are typically expected to care for ill family members. The critical need for indicators to measure national performance against gender targets is evident in **Cambodia**, the only country to identify actions with indicators to gauge its progress towards reducing women's unpaid care and domestic work. Given the gendered division of labour and unequal social and economic organisation of care hinder women's advancement, targeted measures in line with the 3R framework (recognise, reduce, and redistribute unpaid care work) integrated into initiatives to combat drought can help foster gender equality and enable responsibilities to be shared more equitably. The **Great Green Wall Initiative**, under UNCCD in alliance with UN Women, is helping make strides in this regard.

Concentration of power and hierarchical relations in the public and private spheres:

The concentration of power and hierarchical relations in the public and private spheres make it difficult for the voices, perspectives, and experiences of women to be heard and integrated into public policy and practice. Even at the Conference of Parties (COP), there is an evident dearth of women at the table. At the 15th COP, for example, women represented a mere 27 per cent of delegates and 46 of the 134 delegations had no women at all.

Country examples **Concentration of power and hierarchical relations in the public and private spheres**

Efforts are under way in favour of gender balance in decision making. The **Special Rapporteur Report** on human rights obligations relating to the enjoyment of a safe, clean, healthy, and sustainable environment further emphasises the need for the perspectives of women and girls to be integrated into climate and environmental decisions influencing the future of humanity. As we see in major financing mechanisms, like the **Green Climate Fund**, **Global Environment Facility (GEF), Global Mechanism**, and **Adaptation Fund**, the requirement to ensure women's participation in drought-related initiatives can help shift change in favour of all, supporting gender equality and improving drought management and response. Nonetheless, even where women are equally represented, measures must be in place to support their active inclusion and engagement and ensure their voices are heard. At a UNFCCC climate conference, for example, women were equally represented among registered delegates, but nevertheless men still spoke three-quarters of the time.

Measures must promote women's leadership, ensure women's equal participation in drought management, and shift norms, by enabling women to take on non-traditional roles and jobs and by empowering women through collectives and associations, where they can pool resources and increase their negotiating power. The benefits of engaging women as leaders of initiatives and as members of women's groups and cooperatives are evident in **Benin**, **Burkina Faso**, **Chile**, **China**, **Ethiopia**, and **Morocco**, where women are leading efforts to revitalise degraded land. In **Morocco**, female engineers are revitalising land and training other women to build their capacities in sustainable and regenerative agricultural techniques, helping improve food security while nurturing the land and empowering local communities. Likewise, in **China**, women are leading and being mobilised to reforest land and prevent further desertification, using traditional land management techniques like water conservancy, afforestation, and soil conservation, as well as through an innovative rotational grazing technique and rural cooperatives. In **Ethiopia**, reportedly one of the most gender-unequal countries in the world, women's cooperatives are helping combat hunger by restoring degraded land, diversifying their sources of income, and investing in milk processing equipment.

In **Chile**, a women-led, community-based group is bringing women together to identify solutions to the impacts of mega-drought, climate change, water scarcity, and soil degradation. Similarly in **Benin** and **Burkina Faso**, women cooperatives are supporting landscape regeneration and sustainable management.

Conclusions

As the case studies in this report reveal, women are actively leading countless efforts to manage and care for land. Therefore it is imperative that women be at the centre of decision making processes for the preservation, management, and revitalisation of land. At the same time, women are particularly susceptible to the impacts of drought and yet, have not had the opportunity to build their capacities to reduce drought risks or to effectively cope with them. When women are engaged through a participatory and gender-sensitive approach and when their knowledge and capacities are developed and employed, and when women are given a seat at the table and their voices heard alongside men, women demonstrate that they are influential agents of change. Women leaders and women-led organisations, associations, and cooperatives are leading efforts to revitalise and nurture land throughout the regions showcased in this study and beyond.

As illustrated in these promising practices, to be successful, drought management efforts must encompass measures to address one or more of the five structural nodes of gender equality. Providing the space for women to assume non-traditional roles and jobs, lead knowledge sharing and training sessions, and take part in collectives or associations where they can pool their resources and increase their negotiating power, helps shift norms, supports gender equality, preserves land, and builds community resilience. Combining local, Indigenous and scientific knowledge lends to more effective strategies in favour of land. For this reason, women must also benefit from equal access to vocational training, scientific study, and certification opportunities.

The promising practices compiled in Part 2 of this report can be adapted to diverse communities around the world, inspiring and facilitating future initiatives to help combat drought and land degradation. We have the human resources needed to mitigate and manage drought and within these human resources lie innovative solutions waiting to be developed. We simply need to tap into this significant potential. By building the capacity of all — with particular emphasis on women and other marginalised groups — we will be able to effectively reduce drought and its impacts, slow land degradation, reduce food insecurity and hunger, support diverse biodiversity, and simultaneously preserve world economies. Supporting women to lead these efforts to build drought resilience is vital, and is one of the most strategic investments we can make to ensure a vibrant future for people and our planet.

PHOTO: © JICAHWA

KEY FINDINGS

The key findings from this report are as follows:

- **Drought is one of the costliest and deadliest disasters on a global scale.** Worldwide, droughts cause over 15 per cent of disaster-related damages and losses, unleashing severe hardship for women and men in affected local communities.
- **Evidence to date indicates that, in general, women are more harshly impacted by drought than men.** The impacts of droughts, as slow onset extreme climate events, have intensified in recent years due to climate change trends and underlying societal vulnerabilities. As a result, risks vary across communities and societies and among people within those societies, depending on intersecting inequalities and context-specific factors, such as age, gender, ethnicity, (dis)ability, location, socio-economic status, migration status, culture, and religion.
- **Gender inequalities are socially constructed drivers of risk.** Therefore, efforts towards gender-responsive outcomes related to drought resilience and adaptation need to tackle the structural nature of the challenge and the multiple and intersecting forms of discrimination that women face.
- **Addressing women's land rights is imperative to combat desertification and drought.** Gender equality is not possible without securing women's rights to land. The lack of secure tenure limits women's decision making power regarding land use. It also reduces women's access to extension services and training, and it hinders women's access to finance as banks require collateral for loans and credit.
- **There is a wide body of evidence on effective approaches to strengthen women's rights to land and property.** According to the research, several of the case studies explore innovative options to enhance land tenure for women by supporting their access to common land, fostering collective access to resources, establishing legal aid clinics that strengthen women's property rights, and registering land titles for married couples.
- **Inspiring examples of women-led solutions that support drought resilience are found all over the world.** These include practices to manage and conserve water made scarce by drought, strategically use drought-resistant seeds and crops, develop adaptations through innovative income-generating activities, devise alternatives to unsustainable soil management for recovery of drought-impacted soils, and leverage climate information services.
- **Many of the most successful women-led approaches entail technical, science-based approaches and capacities.** Therefore, it is crucial that women have equal access to scientific training, study, and certification opportunities so that their full potential for contributing to the application of science to combat drought can be realised.
- **Ancestral knowledge and traditional practices held by women on drought adaptation techniques are immensely effective** and should be facilitated and exchanged for further development and wider application.
- **Drought and environmental degradation often increase women's and girls' unpaid care, domestic and communal work.** Therefore, there is an urgent need to adopt gender-responsive approaches and actions (i.e. recognise, reduce, and redistribute unpaid care work) in drought planning, drought preparedness and drought response, through National Drought Plans.
- **The most gender-transformative examples of women-led solutions for drought resilience involve women taking on nontraditional roles and jobs**, acting as multipliers of knowledge, leveraging weather-related climate information services, and working in groups, collectives, or associations to pool resources and increase negotiating power.
- **Ensuring women's equal and active participation in drought management is a first step in the right direction.** This includes women's participation and engagement in the development and implementation of policies regarding drought planning, preparedness, and response, to ensure that their perspectives are equally heard and integrated into all decisions taken. Additionally, the case studies reveal that establishing women's groups to act collectively has been recognised as a vital adaptation strategy.

DROUGHTS: A GLOBAL ECOLOGICAL AND SOCIO-ECONOMIC CHALLENGE

PHOTO: © Women's Association of Deir El Ahmar (WADA)

Drought is one of the major impediments to development. In many parts of the world, drought occurs against a backdrop of multiple crises – such as insecurity, conflicts and displacement – that compound and lead to a multi-causal humanitarian crisis.

The United Nations Convention to Combat Desertification (UNCCD) recognises that droughts are the most far-reaching disasters, causing short- and long-term economic and ecological losses and significant secondary and tertiary impacts. Over 15 per cent of disaster-related loss(es) and damage(s) are caused by drought.[8] Droughts account for 85.8 per cent of livestock losses and are the most lethal hazard to livestock.[9] As many communities depend on rain-fed agriculture, they are particularly susceptible to climate variability. The prolonged and frequent occurrence of drought presents significant challenges to agriculture, forestry, water resource management, urban planning, and food security.

Droughts are the most far-reaching disasters, causing over 15 per cent of disaster-related losses and 85.8 per cent of livestock losses, making them the most lethal hazard to livestock.

Droughts profoundly impact dryland ecosystems, which are "arid, semi-arid or dry sub-humid areas, in which the ratio of mean annual precipitation to mean annual potential evapotranspiration lies between 0.05 and 0.65. Areas with a ratio of less than 0.05 are considered hyper-arid deserts".[10]

Drylands cover 41 per cent of the earth's land surface and are found on all continents. These ecosystems include savannahs, woodlands, grasslands, semi-deserts, deserts, and one-third of the world's biodiversity hotspots. Most dryland ecosystems are grasslands and rangelands. Drylands are home to approximately 2 billion people and are characterised by rapid population growth and above-average poverty levels.[11] An estimated 200 million pastoralists raise livestock (e.g. cattle, sheep, goats, and camels) in drylands, which cover more than one-third of the earth's land, where no crops can grow.[12]

In addition, dryland ecosystems experience high levels of degradation. Factors contributing to dryland degradation include land conversion (to cropland), overexploitation, changing fire regimes, introduction of non-native plants, overexploitation of water, overharvesting of wild species, and long-term impacts of climate change.

According to the 2022 Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6), the impacts of droughts have intensified due to extreme events and underlying societal vulnerabilities. Anthropogenic climate change has increased the likelihood, severity, and societal effects of droughts (primarily agricultural and hydrological) in many regions. Between 1970 and 2019, drought-related disaster events worldwide caused billions of dollars in economic damages.[13]

Moreover, the IPCC AR6 recognises that the severity of climate change impacts will depend strongly on vulnerability, which is also dynamic and includes the sensitivity and adaptive capacity of affected human and ecological systems. As a result, risks vary across communities and societies and among people within those societies, depending, for example, on intersecting inequalities and context-specific factors, such as culture, gender, religion, ability, disability, or ethnicity.[14]

UNCCD's latest "Study on the differentiated impacts of desertification, land degradation and drought on women and men"[15] similarly reinforces the need for an intersectional approach that considers the interconnected nature of social identities, such as age, ethnicity, gender, and class, as they are overlapping and interdependent systems of experience, discrimination, and/or disadvantage.

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8 https://knowledge.unccd.int/topics/drought-reducing-impacts-and-building-resilience.

9 Ibid.

10 https://www.unccd.int/data-knowledge/unccd-terminology.

11 Davies, J., et al., 2016. Water in drylands: Adapting to scarcity through integrated management. Gland, Switzerland.

12 FAO, 2024. Policy Support and Governance Gateway. Available at: https://www.fao.org/policy-support/policy-themes/pastoralism/en/.

13 Intergovernmental Panel on Climate Change (IPCC), 2022. Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, et al. (eds.)]. Cambridge and New York: Cambridge University Press.

14 Idem, p. 145.

15 Aguilar, L., 2022. Study on the differentiated impacts of desertification, land degradation and drought on women and men. UNCCD. Germany. Available at: https://www.unccd.int/sites/default/files/2022-11/Gender%20study%20.pdf.

Rather than identity categories that are separate from one another and from points of marginalisation or privilege, intersectionality highlights how different facets of an individual's identity (e.g. gender and ethnicity) intersect and influence one another to create unique experiences and biases and, together, exacerbate marginalisation and vulnerability.

The above-mentioned study also acknowledges that women are more vulnerable to drought than men. This vulnerability is reflected along two dimensions: women are more susceptible to drought impacts and have less capacity to reduce drought risks and cope positively with them. Furthermore, droughts affect people in vulnerable situations within countries – including the poor, children, women, marginalised, Indigenous or other ethnic minorities – in different ways, and their vulnerability to droughts and land degradation depends on demography and social roles, among other aspects of identity.

Gender inequities act as a risk multiplier, with women being more vulnerable than men to drought-induced food insecurity, malnutrition, famine, water scarcity, and related risks.[16] Additionally, as recognised in the IPCC 2022 report, in vulnerable regions and countries, minimal resources and structures exist to support these groups when droughts occur, creating an additional affliction for these vulnerable groups.[17]

BOX 1 Definition of gender-responsive approach

A gender-responsive approach recognises and acknowledges gender norms and inequalities and responds to them by creating actions, policies, and initiatives to address women's and men's different needs, constraints, and opportunities. A gender-responsive approach ensures that women's and men's differential needs are addressed, that participation is equitable, and that benefits, resources, status, and rights are distributed equitably.

Source: Aguilar, L., 2022. Study on the differentiated impacts of desertification, land degradation and drought on women and men.

Photo: © Karen Bernard

In view of the above, this study, through the analysis of innovative gender-responsive and transformative approaches from communities throughout the world, aims to shed light on initiatives that are impacting the closing of gender gaps in drought-prone locations and regions so that these interventions may be duly valued, expanded, and replicated and potentially attract resources to scale up gender-responsive women-led actions.

In addition to being the most affected by drought, due to pervasive and structural gender inequalities, women are exercising leadership and resourcefulness in undertaking actions to adapt to drought and increase drought resilience in their communities. This document highlights illustrative examples of this leadership and creativity to balance the narrative detailing how women are impacted by drought.

In conclusion, women suffer disproportionately from the ravages of drought. However, at the same time, women have initiated and developed initiatives to better manage droughts. This publication aims to showcase women's initiatives in response to drought, as well as the approaches women take to prepare for and deal with droughts. In addition, it is to inspire policy makers and implementers, financial institutions, academia, the private sector, and civil society organisations (CSOs) to adopt gender-responsive approaches and actions in drought planning, preparedness, and response.

16 Ngigi, M.W., U. Mueller and R. Birner, 2017. Gender differences in climate change adaptation strategies and participation in group-based approaches: An Intra-household analysis from rural Kenya. Ecol. Econ., 138, 99–108, doi:10.1016/j.ecolecon.2017.03.019 and Musinguzi, L., et al., 2018. The role of gender in improving adaptation to climate change among small-scale fishers. Climate and Development, 10(6), 556–576, doi:10.1080/17565529.2017.1372262.

17 Intergovernmental Panel on Climate Change (IPCC), 2022. Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, et al. (eds.)]. Cambridge and New York : Cambridge University Press, p. 1197.

APPROACH TO IDENTIFYING AND ANALYSING WOMEN-LED SOLUTIONS TO DROUGHT

Photo: © Indigenous movement for peace advancement and conflict transformation (IMPACT)

UNCCD acknowledges that, to reduce societal vulnerability to droughts, the prevailing structures of reactive, post-hazard management approaches must be overcome and moved towards proactive, risk-management approaches that build resilience to drought at the local, national, and regional levels.

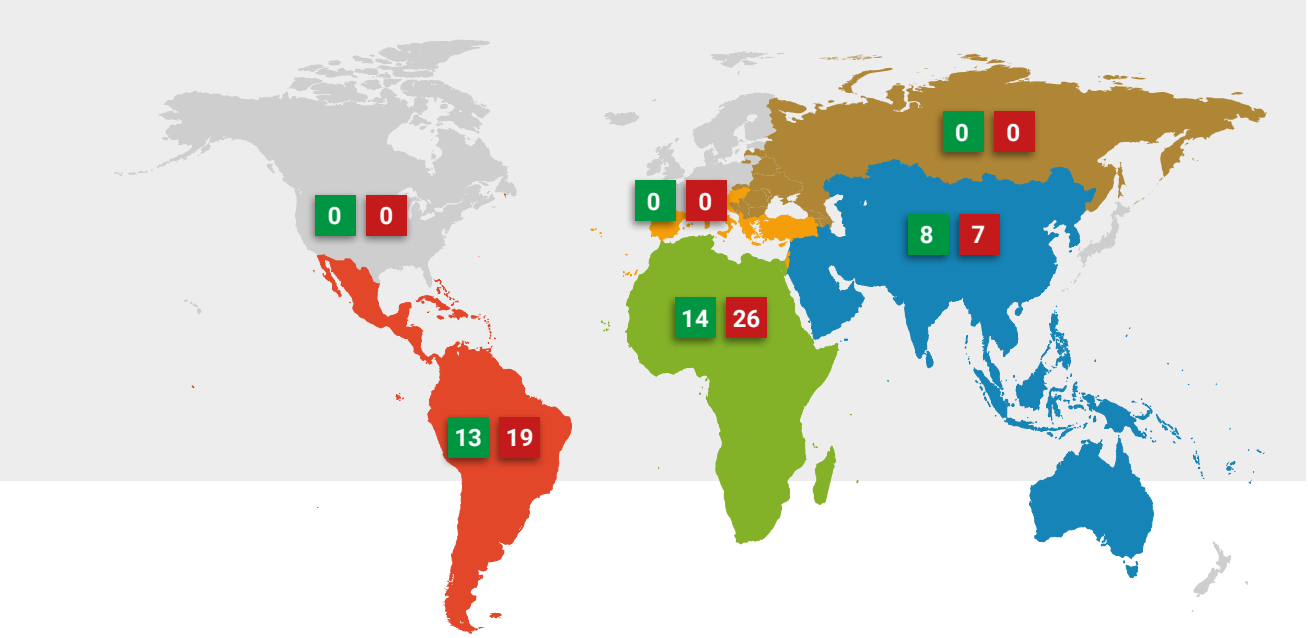
To strengthen the knowledge on gender and intersectional issues, UNCCD has produced several policy-relevant studies and publications to raise awareness and facilitate discourse on a new and transformative vision for land management policy, planning, governance, and practice at global and national scales. For example, together with UNCCD's knowledge partner, World Overview of Conservation Approaches and Technologies (WOCAT), a tool[18] for the assessment of gender-responsive sustainable land management (SLM) was co-developed and piloted in 15 countries, and the results were presented at the 15th session of the Conference of the Parties (COP15) where gender-responsive SLM profiles were identified.[19]

In this context, and in response to Decision 24/COP.15, which approved a "road map to guide and accelerate the implementation of the Gender Action Plan through gender-responsive and transformative approaches", the UNCCD Secretariat issued a call to identify examples of women's essential role in SLM in drought-prone locations and regions to give visibility to women-led initiatives that can be expanded, replicated, and scaled up.

A total of 87 case studies were received (Table 1). Of the total, 35 were selected for presentation in this report.[20]

TABLE 1 Case studies received by UNCCD annex countries

	ANNEX I Africa	ANNEX II Asia	ANNEX III Latin America and the Caribbean	ANNEX IV Northern Mediterranean	ANNEX V Central and Eastern Europe	NON-ANNEX countries	TOTAL	GRAND TOTAL RECEIVED
Accepted	14	8	13	0	0	0	35	87
Not selected	26	7	19	0	0	0	52	



The following pages present a detailed examination of the value, usefulness, and significance of the actions conducted throughout the case studies, which impact the structural causes of gender inequality while enhancing the resilience and adaptation capacity of all community members in drylands and drought-prone areas, despite their sex, age, class, ethnicity, and other identity factors.

18 https://www.unccd.int/news-stories/stories/unccd-and-wocat-collaborate-improve-slm-gender-responsiveness.

19 UNCCD, 2022. Group Profiles on Gender-responsive Sustainable Land Management (SLM) Technologies. Bonn, Germany: UNCCD. Available at: https://www.unccd.int/resources/publications/group-profiles-gender-responsive-sustainable-land-management-slm.

20 Criteria for not selecting 52 of the cases included incomplete information, elaborated as proposals for funding, project not implemented, and non-relevance to drought and drylands, among others.

CAUSES OF GENDER INEQUALITIES

The cascading crises of recent years, with their multiple dimensions and uneven recovery worldwide, have disproportionately affected women and girls, deepening the structural challenge of gender inequalities. These gender inequalities are manifested in five structural nodes:[21]

1. Inequitable control of, and access to, natural resources (including land) PP. 26
2. Lack of or limited access to markets, capital, training, technical assistance, financial services, and technologies PP. 33
3. Patriarchal, discriminatory, and violent norms and laws PP. 50
4. The gendered division of labour and the unequal social and economic organisation of care PP. 54
5. The concentration of power and hierarchical relations in the public and private spheres PP. 60

These nodes reinforce each other and generate complex structural barriers and discriminatory social norms that hinder and reduce the scope of policies and action for gender equality and women's empowerment. Moreover, these structural nodes are socially constructed drivers of risk and, accordingly, efforts to ensure more gender-responsive outcomes need to begin with the structural nature of the challenge.

BOX 2 Structural nodes and UNCCD Gender Action Plan

The structural nodes analysis used for this document aligns with the UNCCD's four Priorities for Action under the Gender Action Plan (2017), which calls for the following actions:

- Support the active participation of women in decisions regarding the design, planning, implementation, and evaluation of initiatives to implement UNCCD.
- Integrate women's economic empowerment into UNCCD implementation activities to eradicate women's extreme poverty.
- Strengthen women's land rights and access to resources.
- Enhance women's access to improved knowledge and technologies related to effective UNCCD implementation.

Along the same line, the IPCC AR6 highlights that the gender division of labour, systemic racism, and other intersectional social and structural inequities lead to heightened vulnerabilities and impacts for women, youth, and Indigenous peoples.[22]

Therefore, efforts towards gender-responsive outcomes related to drought resilience and adaptation need to tackle the structural nature of the challenge and the multiple and intersecting forms of discrimination that women face.

Photo: © Nuria Angeles Tapia / PNUD Perú / MINAM / PPD

21 Economic Commission for Latin America and the Caribbean (ECLAC), 2017. For the four identified by ECLAC, one of the nodes has been broken down to include: inequitable control of, and access to, natural resources (including land) and a lack of or limited access to markets, capital, training, technical assistance, financial services and technologies.

22 IPCC, 2022, pp. 55, 123, 126, 132, 656-657, 784, passim.

BOX 3 Examples of the challenges that structural nodes of gender inequality create in drought initiatives

The "Climate Resilient Integrated Water Management Project" (CRIWMP) is being implemented in the dry zone of **Sri Lanka**. The project is designed to bolster the resilience of smallholder farmers against climate variability and extreme weather events. The implementation of women-based, drought-related strategies in Sri Lanka faces several challenges. Firstly, women often encounter limited access to essential resources, such as land, seeds, and credit, crucial for sustainable farming practices, thus restricting their full participation and benefit from projects. Secondly, entrenched gender-based social norms and stereotypes restrict women's involvement in decision making processes related to land management and impede their access to training and capacity building opportunities. Thirdly, related to the latter, a lack of technical knowledge and skills presents a barrier for women in adopting drought-resilient farming systems, necessitating targeted capacity building programmes to ensure equal access to training and information. Additionally, limited access to markets poses challenges for women farmers in selling their produce due to transportation limitations, inadequate infrastructure, and market linkages. Lastly, the lack of financial support inhibits women's ability to invest in sustainable farming practices, underscoring the need for tailored financial services and microcredit schemes.

In the **Congo**, the programme, "Amkeni Wamama" is being implemented in the Ituri Province, a region affected by drought. The programme aims to strengthen the capacities of 80 women and girls of different categories in four villages (Bembey, Rwampara, Tokodo, and Mandro) to develop and implement innovative solutions for drought resilience. However, they acknowledge that their main challenges derive from various structural nodes of gender inequality:

- Women have difficulty accessing natural resources, such as land, water, and credit. They lack the equipment and technologies necessary to implement their innovative solutions. They face cultural and social obstacles (e.g. they do not have the right to inherit land).
- Women need training and information to strengthen their skills in leadership, land management, and advocacy.
- They need technical support to adapt technologies and practices to specific local contexts.
- Women are victims of gender-based violence (GBV) and discrimination, preventing them from fully participating in decision making and land management at both family and community levels.
- The programme is confronted by the challenge of mobilising financial resources for women's projects.
- Women champions experience only weak technical support for their initiatives.

Source: Case study submission, 2024.

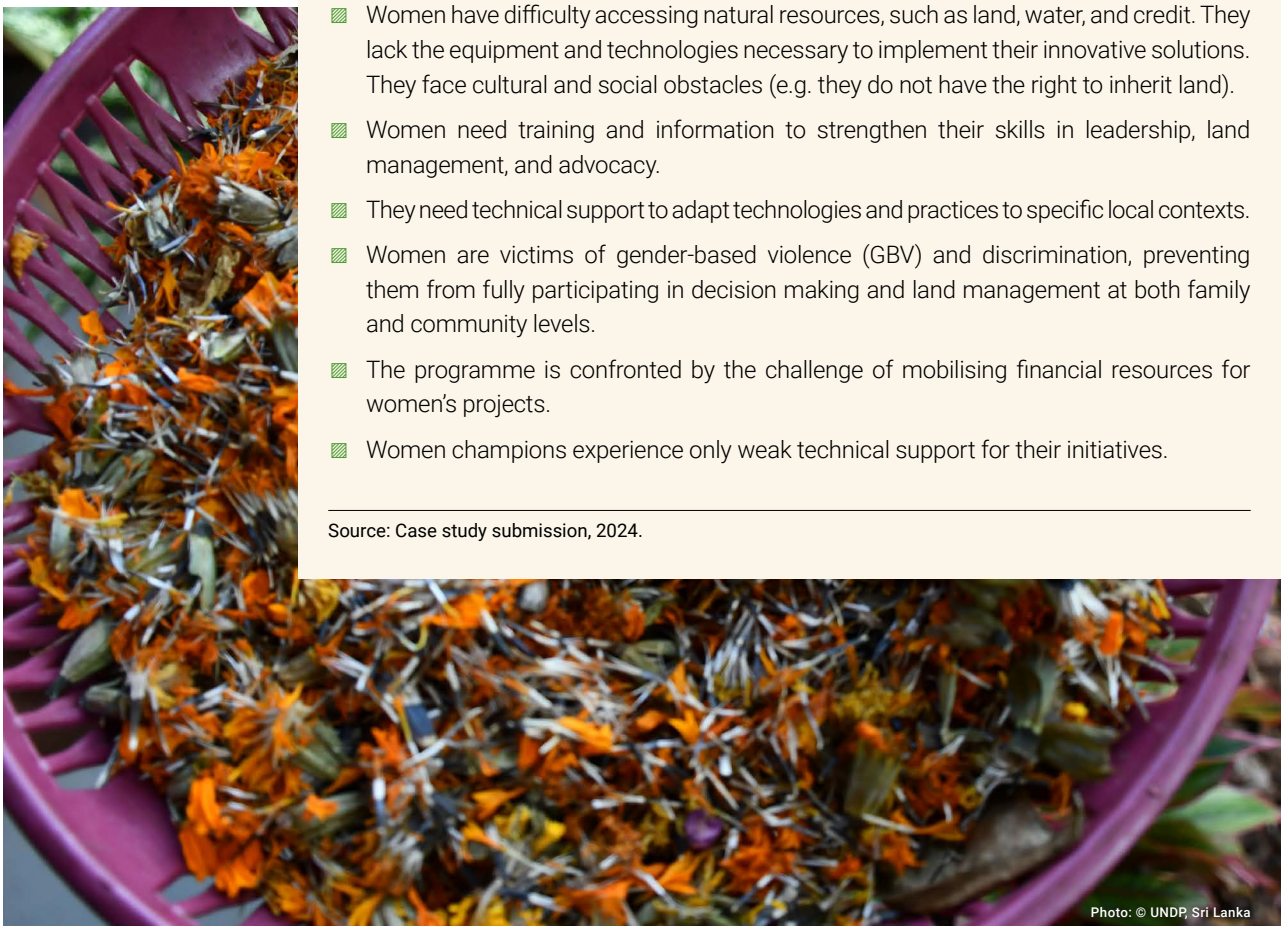


Photo: © UNDP, Sri Lanka

1. Inequitable control of, and access to, natural resources

Addressing women's land rights is imperative for any effort related to land degradation, desertification, and drought. Land remains the most fundamental asset for most women and men living in developing countries, and the Sustainable Development Goals (SDGs) acknowledge women's secure access to land as a central component of women's economic empowerment. Moreover, it is not possible to achieve gender equality without securing women's rights to land.

Regrettably, as pointed out in the latest Organisation for Economic Co-operation and Development (OECD) study[23]:

- Fewer than 20 per cent of all landholders globally are women.
- Only 44 countries accord women the same inheritance rights as men in law and practice, while 29 countries do not grant female surviving spouses and daughters the same rights to inherit land and non-land assets as their male equals.
- Disinheritance of the surviving spouse still occurs in 96 countries.
- Under customary, religious, or traditional laws and practices, women's rights to inherit their husband's property are denied in 102 countries.
- Property dispossession or grabbing of inheritance remains permitted in 103 countries.

Equitable land governance and secure land tenure are critical for investing in SLM, such as conserving and augmenting soil, terracing, planting trees, and establishing buffer zones. It is simple: without ownership and control over land, one cannot decide how that land is used or managed. The lack of secure tenure and land titles, which can be used as collateral, hinders women's access to loans and credit and limits their access to extension services and training. Additionally, it is important to recognise that, in some cases, women may be legally titled/characterised as owners but have little or no control over land use and management. Furthermore, the lack of recognition of women as farmers, pastoralists, and forest managers may lead to their exclusion from decision making spaces.

Along the same lines, the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6) is pathbreaking in recognising for the first time since the creation of its reports that:

- Women represent 43 per cent of the agricultural labour globally but only 15 per cent of farming landholders.[24]
- Climate change has direct negative impacts on women's livelihoods due to their unequal control over land and access to resources (e.g. land, credit) and because they are often the ones with the least formal protection.
- To address smallholder vulnerability to climate change impacts, additional policy support beyond agroecology will be needed. The support must be context-specific to address, for example: farmer capacity; limited political power to access land, water, seeds, and other vital natural resources; structural gender inequities; and policy and market structures that support large-scale monocultures.[25]
- Young, low-income rural women may be particularly marginalised and vulnerable due to systemic gender inequities in access to land, credit, employment, institutions, and other resources.[26]

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23 OECD, 2019. SIGI 2019 Global Report: Transforming Challenges into Opportunities, Social Institutions and Gender Index, OECD Publishing, Paris, https://doi.org/10.1787/bc56d212-en. quoted in Aguilar, L., 2022. UNCCD. Bonn. https://www.unccd.int/resources/publications/study-differentiated-impacts-desertification-land-degradation-and-drought, UNCCD. Bonn.

24 IPCC, 2022, p. 2700.

25 IPCC, 2022, p. 815.

26 IPCC, 2022, p. 820.

Promising and innovative practices to enhance the control of, and access to, land

UNCCD has been leading a prominent worldwide campaign to promote women's land rights since 2023 and continuing through 2024. As part of the **HerLand campaign**, women's land rights took centre stage on 17 June 2023 during the global observance of Desertification and Drought Day at the United Nations General Assembly. The campaign promotes successful examples of women and girls' contributions to SLM and mobilises support to advance land rights for women and girls worldwide.

As a critical element of the campaign, UNCCD Land Ambassador, President Halonen of Finland, has engaged female leaders worldwide to endorse the **Her Land. Her Rights Call to Action** – so far endorsed by more than 20 women leaders, including the former Presidents of Chile and Costa Rica, Prime Ministers of Estonia and Iceland, and the former Prime Minister of New Zealand. UNCCD Goodwill Ambassador, Inna Modja, has led the development of a digital-first exhibition on women, girls, and land (https://herland.global/) and has lent her voice to the #HerLand song composed by fellow UNCCD Goodwill Ambassador and Grammy-award-winning musician, Ricky Kej. The campaign is achieving extensive influence through high global visibility on social media, reaching more than 300 million viewers with the **#HerLand** hashtag on various social media platforms, including X, LinkedIn, Facebook, and Instagram.

Another robust global initiative concerning women's rights to land is the **Stand for Her Land (S4HL) campaign**. This global advocacy initiative is closing the implementation gap for women's land rights: the gulf between the strong standards in place to protect women's rights to land and their realisation in practice. S4HL seeks to build political will so that millions of women can exercise their transformational power of equitable rights to land, housing, property, and territory.

This campaign is based on evidence that secure land rights help women escape the cycle of poverty and improve their lives as well as those of their families and communities. The benefits of women's land rights multiply in crucial ways both at home — when women have secure land rights, spending on children's education and household nutrition goes up — and worldwide — women's land rights are vital to address the profoundly gendered issues of climate change, food security, and global health, and to achieve gender equality for all.[27]

27 https://stand4herland.org/about-the-campaign/

S4HL is built on collective action, linking global and local actors and empowering grassroots women leaders and men who are champions for gender justice to advocate for stronger women's land rights. National-level S4HL coalitions comprise local grassroots organisations, national CSOs, and other non-state actors working towards stronger women's land rights. Led by a coordinating organisation at the national level, these coalitions partner with and catalyse other key stakeholders, including government agencies and civil society, to realise women's land rights.[28] Some of the innovative actions led by S4HL include the following:

Bangladesh:[29] One in five Bangladeshi women fear they may lose their right to use the land they live on within the next five years. While the Bangladesh Constitution calls for equality regarding property rights, inheritance laws in Bangladesh are religion-based and remain inequitable. This denies most women the ability to gain land rights because most land in Bangladesh is acquired through inheritance. In cases where women do inherit land, they rarely receive their legal share and – while they are legally entitled to inherit – their share is still inequitable relative to men. S4HL Bangladesh works directly with women-driven CSOs to shift the social norms regarding who should own and control land. Alongside partner CSOs, coalition members engage with local government institutions to build political will for more robust women's land rights governance and encourage gender equity in public land distribution efforts.

Colombia:[30] Rarely do women in Colombia hold a documented and registered land title. Government officials tasked with land titling often remain unaware of, and seemingly unconcerned with, existing legal provisions protecting women's land rights. The gap between women's legal rights to land and the pervasive institutional indifference in practice is broad. Land rights are undergoing restitution and formalisation in Colombia's post-conflict setting – a window of opportunity that will not be open for long. S4HL Colombia empowers women-driven CSOs to work with government agencies to realise the gender-inclusive approach called for in the nation's Final Peace Agreement.

Senegal:[31] S4HL Senegal has created a unifying strategy to build political will and bridge the implementation gap between policy and practice around women's land rights. Coalition members in Senegal support efforts to change behaviours and norms, engage men as champions of rural women's land rights, include youth and other marginalised groups, and support local, regional, and national advocacy.

Similarly, at the global level, the most ambitious Global Environment Facility (GEF)-funded Dryland Sustainable Landscapes Impact Program (DSL-IP)[32] is led by the Food and Agriculture Organization of the United Nations (FAO) and implemented jointly with the International Union for Conservation of Nature (IUCN), the World Overview of Conservation Approaches and Technologies (WOCAT) and WeCaN.[33] The DSL-IP, which is being implemented in 11 countries across Africa and Asia with Child Projects (CP), acknowledges the need to enhance women's rights to land. In most of the countries under the CPs, women remain subject to discriminatory laws and practices that impede their right to inherit and access services and resources. When they have land and property rights, women often own smaller plots and less fertile lands than male landowners. Nevertheless, they restore, protect, cherish, nourish, and care for the land while caring for others.

28 Ibid.

29 https://stand4herland.org/country-coalition-bangladesh/

30 https://stand4herland.org/country-coalition-colombia/

31 https://stand4herland.org/country-coalition-senegal/

32 The DSL-IP goal is to *avoid, reduce, and reverse further degradation, desertification, and deforestation of land and ecosystems in drylands, through the sustainable management of production landscapes*. It aims to maximise the effectiveness, efficiency, and sustainability of GEF-7 investments in sustainable drylands management to achieve Land Degradation Neutrality (LDN).

33 WeCaN provides a space for women to connect, share best practices, and participate in training and knowledge sharing events, aiming to enhance their advocacy and gender mainstreaming skills, and ensure their voices are heard at local, regional, and global levels. Together, WeCan drive meaningful change and foster sustainable livelihoods for women in dryland areas, ensuring their contributions are recognised on a global scale.

Likewise, various case studies received under this call include actions being implemented to enhance women's control of land:

In **Niger**, left alone by their husbands who abandoned Niger's arid land in search of a better life in neighbouring coastal countries, women in the cooperative, CERNAFA (meaning 'cooperation' in the local language, Djerma) in the Tillaberi region of Niger have developed an innovative approach. Established in 2002, the group began with 52 members and today has 257. Each producer farms her own plot (an average area of 429 square metres), but the women who practice organic farming combine their resources to buy land and equipment. Every year, 10 per cent of each woman's onion production is remitted to the co-op to finance plans. They call it the 'onion contributions/membership'. The CERNAFA group stores the onions for several months to resell them during more favourable periods when prices are higher. Profits from selling onions are used to build up savings to acquire new plots, provide equipment to women, maintain the sites, and buy seeds.

In **Uganda**, the Jie Community Animal Health Worker Association (JICAHWA) has been working to ensure that women's rights to land and property are respected. Uganda's 1995 Constitution, Article 273 (1), and the Land Act (1998) prohibit discrimination against land ownership based on gender. However, despite these legal provisions, women – who comprise 50.47 per cent of the total population – own less than 20 per cent of the land.

Karamoja, a region in Uganda which, according to the 2014 census, covers a total landmass of 27,990 square kilometres, has a population of 1.2 million. The Karamojang people populate Karamoja. Their society's appearance resembles that of Maasai pastoralists who move their animals around harsh landscapes for grazing and water.

Regrettably, women in Karamoja experience intense marginalisation, especially related to limited access to land, which affects their productivity as smallholder farmers. Laws and policies that are being developed to govern rangeland management and ownership also lacks a systematic approach, resulting in many contradictory and inconsistent provisions. Over the years, the absence of a clear guide to rangeland management-related policy analysis and advocacy has greatly limited civil society and smallholder farmers' effective engagement in the policy development process.

Acknowledging the above, JICAHWA was formed by Jie community animal health workers in Kotido District to advocate for women's land and property rights, empower them, and ensure their rights are respected.

An example of their work is the case of Moding Janet, a 39-year-old woman from Entebbe who is a widow with two children. Her husband's relatives grabbed her land before she knew her ownership rights. After training at the JICAHWA office, with support from OXFAM Great Britain, the district community, Mercy Corps, and Uganda Women's Alliance Network, she was able to report the land dispute case to legal services at Kotido grade magistrate on the denial of her rights to her husband's properties. After winning the case, she was given 20 acres of land. (More information on this case study can be found in Part 2, p. 106.)

Likewise, in **Argentina**, in the driest region of the so-called 'impenetrable Chaco', in the San Feliciano area, Almirante Brown Department, province of Chaco, the Civil Association of Campesinos, 'El Jabalí Producers', has been supporting women to gain land ownership. Most women do not have property titles and, to carry out the corresponding procedures, must travel approximately 900 kilometres. This makes it very difficult to succeed in the procedures due to economic and logistical reasons, and it is not easy for women to be away from their homes, given the number of tasks and responsibilities they shoulder. (More information on this case study can be found in Part 2, p. 167.)

Beyond the case studies that led to this document, a series of additional pioneering practices, not necessarily related to drylands or drought-prone regions, are outlined below. These practices are carried out by UNCCD Parties, CSOs, international organisations, and donors to ensure more equitable land governance, tenure, and security. These practices could be examples of actions to undertake in drought initiatives.

Ethiopia: The land certification and registration process implemented in the early 2000s increased tenure security and boosted landowners' likelihood of investing in soil and water conservation measures by 20–30 per cent. As a result, landowners' income and agricultural outputs have increased. Furthermore, the process included women. Specifically, **land** certificates issued for spouses were required to contain the names of both spouses as joint holders and a federal regulation mandated both spouses' consent to sell land.[34]

Mexico: The Mexico – Reducing Emissions from Deforestation and Forest Degradation (MREDD+) project acknowledged that, when male relatives – especially husbands – migrate, women may be left without the authority to make meaningful adaptation and investment decisions concerning the land. Furthermore, socio-cultural behaviour factors associated with 'machismo' prevent men from transferring their land to their wives/partners. Therefore, the project proposed that the land be given to the women as a 90-year concession instead of transferring the property.[35]

Costa Rica: In recognition that its payment schemes for environmental services are linked to land ownership, FONAFIFO (Costa Rican Forest Fund) designed GIGUP (Gender Equality Award for Productive Units). GIGUP explores the drivers of inequality at the level of the productive unit, allowing the identification of the changes necessary to build a more just and equitable society (e.g. gender roles in the family; access, use, and control of resources, including land; distribution of power in the family; etc.). At the same time, it urges national and local governments, donors, commercial and development banks, and the private sector to promote investments and incentives that benefit the productive family units that win GIGUP. At the productive unit level, the benefits provided to the winners include access to financial resources, such as new private, government, or investment funds (decoupling the payment for environmental services from land tenure), and links between producers and consumers to promote fair and equitable trade.[36]

34 https://www.sciencedirect.com/science/article/abs/pii/S1462901118306713

35 https://genderandenvironment.org/m-redd-mainstreaming-gender-in-policies-and-laws-related-to-climate-change-and-redd-in-mexico-a-national-policy-level-initiative

36 https://www.cr.undp.org/content/costarica/es/home/presscenter/pressreleases/2020/anuncian-politica-y-galardon-para-promover-igualdad-de-genero-en.html

Photo: © Mariama Yero - Source Aïssa Kimba

Bangladesh, Burundi, Madagascar, and Nepal: The International Fund for Agricultural Development (IFAD)[37] has consistently promoted rural women's legal rights for over four decades.

In **Bangladesh**, the "Char Development and Settlement Project" (CDSP project) worked closely with authorities to register land titles for married couples in the wife's and husband's names, with equal ownership shares and the woman's name listed first. This ensures that the land will belong entirely to her if she is widowed, divorced, or abandoned.

In **Burundi**, where women's inheritance rights are often not respected, land disputes between neighbours and family members are now seen as a significant cause of the 12-year civil war that ended in 2005. The IFAD's "Women's Land Rights Project" builds community awareness of legal processes while providing legal advice and helping women fight their cases in court. A first step in the initiative is literacy classes so that women can read legal documents before signing them.[38]

In **Madagascar**, poor rural people had long been barred from owning the land they depended on for survival. In 2005, the Government of Madagascar introduced a land policy to improve land tenure security nationwide. One challenge was ensuring that land certificates were distributed equitably, including to the poorest and to women. Moreover, rural people often have no birth certificate or identity card, so they are barred from applying for a land certificate. Since 2006, 71 land offices have been established and over 3,100 land certificates have been issued. IFAD also supported government services in delivering identity papers to those who lack them.

In **Nepal**, IFAD recognised that poor people could contribute to regenerating degraded forests when they have secure land tenure. Since 1990, IFAD has aimed to raise incomes and improve ecological conditions. Groups of the poorest people in highland villages have obtained long-term leases to severely degraded forest areas. Through 40-year renewable leases, the project transferred small blocks of public forest land to groups of poor households. In turn, the households regenerate, manage, and protect the land. A study carried out in 2009 found that 69 per cent of the plots had been rehabilitated. Household income over the project period has increased by more than 70 per cent. Indigenous peoples and low-caste groups have benefited proportionally more than higher-caste households, underscoring the improvement in the lives of the target beneficiaries.

India, Liberia, and Tajikistan: The United States Agency for International Development (USAID)[39] has worked through multiple channels to address the complex issues around women's land rights. For example:

In partnership with PepsiCo in West Bengal, India aims to reach, benefit, and empower women in the potato value chain. By strengthening women farmers' land rights, access to technical agronomic training, and direct engagement with PepsiCo, women farmers have access to improved employment and entrepreneurial opportunities in the potato supply chain, increasing their income and economic resilience.

In **Liberia, 35 communities support community land protection processes**. USAID's socially inclusive Mobile Application to Secure Tenure (MAST) is used for boundary harmonisation so communities can address land conflicts and formally register customary land. Through an impact evaluation of the community land protection programme, USAID also provides evidence on how inclusive community land governance affects gender norms and women's decision making power.

In **Tajikistan**, a "Feed the Future" project supports land policy reforms and legal aid clinics that strengthen women's property rights and restructure farms to develop a robust market for land use rights.

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37 https://www.ifad.org/en/web/latest/-/story/supporting-rural-women-s-land-rights#:~:text=IFAD%20has%20long%20supported%20women%20in%20realizing%20their,–%20and%20with%20the%20woman's%20name%20listed%20firs

38 https://www.ifad.org/newsletter/pf/25_full.htm

39 Women's Land Rights and Women's Economic Empowerment (WEE) Activities. Available at: https://www.land-links.org/document/womens-land-rights-and-womens-economic-empowerment-wee-activities/.

Egypt: Notwithstanding that the Egyptian Civil Code affirms women's rights to own, inherit, and use their property, most women, especially in rural areas, are deprived of their legitimate economic rights, making them more vulnerable. The Badr Altawael Association for Local Population Development, with the support of the Euro-Mediterranean Women's Foundation, launched an advocacy campaign called *'I want my inheritance'*. The campaign aimed to promote women's rights to inheritance by raising the community's awareness and mobilising relevant local actors in Sohag. At the end of the advocacy campaign, 100 Christian and Muslim public figures and community leaders promoted women's rights to inheritance. In addition, 87 conflicts were settled amicably, 26 cases were referred to the courts, and 10 women obtained their inheritance (and they became role models encouraging other women to claim their rights). Importantly, 17 members of parliament representing Sohag Governorate also advocated in favour of a reform to the law to increase sanctions against those who deprive women of their inheritance rights.[40]

Lessons learned from women-led solutions

- Addressing women's land rights is imperative to combat desertification and drought. Gender equality is not possible without securing women's rights to land. Lacking secure tenure or lacking land titles that can be used as collateral hinders women's access to loans and credit and limits their access to extension services and training.
- Acknowledging, as the SDGs do, that secure access to land serves as a source of empowerment by increasing women's economic security and their control over household and land decisions, UNCCD has been leading the HerLand campaign, a prominent worldwide campaign to promote women's land rights. Similarly, the S4HL campaign is helping demonstrate that efforts in favour of women's land rights must not be mere aspirations but, rather, actions that place women's land rights in legislation and in practice.
- In addition to designing, implementing, or supporting policy advocacy initiatives to promote women's access to common lands, the case studies explore and implement innovative options to enhance land tenure for women – stimulating shared titling, supporting women's access to common lands, fostering collective access to resources (i.e. women's cooperatives) and supporting the availability of legal information and advice to communities in their languages and per their respective cultures (e.g. local law desks/offices).

40 Euro-Mediterranean Women's Foundation, 2017. *We Have the Floor: Mediterranean Civil Society Calls for Gender Equality to Become a Reality*. Available at: https://www.euromedwomen.foundation/pg/en/documents/view/7339/we-have-floor-mediterranean-civil-society-calls-for-gender-equality-to-become-reality.

Photo: © Women's Association of Deir El Ahmar (WADA)

2. Lack of or limited access to markets, capital, training, technical assistance, financial services, and technologies

Globally, women continue to face countless obstacles, stigmatisation, and stereotyping concerning access to goods and services. By way of illustration, due to gender bias, rural women are frequently less able to access new agricultural technology or credit and make investments for SLM, such as conserving and augmenting soil, terracing, planting trees, and establishing buffer zones.

This implies that women and other disadvantaged groups are more susceptible to climate shocks, such as droughts, due to their lack of asset diversification and limited access to resources to cope with and recover from the damages. In addition, women who do not legally own their land, or where customs and practices prevent their land ownership, are not recognised as farmers or value chain actors. As a result, they are excluded from access to extension services and inputs available to bona fide farmers, most of whom are men.

For instance, direct and indirect gender-related barriers limit women's adoption of SLM practices in drylands. Land tenure insecurity, land availability, education and literacy, gender norms and roles, access to information, agricultural inputs, extension services, and financing all play a role in women's access to SLM technologies. As a result, women tend to adopt SLM technologies at a rate that is typically lower and slower than men. Technology is not gender-neutral: a woman's decision to adopt or not a specific technology is influenced by the agricultural production system, cultural and social contexts, and affordability. Technology can reduce reliance on male or hired labour, reduce women's labour time, and potentially increase women's income and crop yields.

Likewise, the gendered division of labour, as well as gender norms and perceptions in many cultures, often limit women's access to training on drought-resistant crop varieties, irrigation technologies, and farming techniques. When droughts become full-fledged disasters, technology is critical to manage the risks. However, early warnings often do not reach women. In many countries, women have less access than men to climate forecasts, mainly because the means and ways of transmitting the information are often inappropriate for women (e.g. language barriers, written documents accessible solely to a literate audience, workshops outside the community, and meeting times that conflict with childcare and other household responsibilities). Women's lack of participation and involvement impacts their role in preparing effectively for droughts and, subsequently, responding to their impacts.

The following case studies prove that women's contributions to drought adaptation are more effective when they can access diverse goods and services.

Photo : ©ACEMAA

Making knowledge accessible

Nigeria: In the southern part of Akwa Ibom State, Nigeria, over 3 million small farmers, especially women, know little about the risks associated with droughts. As drought is the most fundamental challenge adversely affecting crops and livestock production in South Nigeria, however, farmers are keen to listen to advice on how to escape the severe impact of drought disasters.

Due to geography, social norms, and illiteracy, women farmers are isolated and excluded. They do not have the knowledge or information they need to improve their farming or sell their produce for a reasonable price, so they remain in poverty and are highly vulnerable to any crisis.

Food and Nutrition on Air (FANTA Radio) is an innovative use of traditional technology, disseminating up-to-date, relevant, and practical information to even the most remote and isolated communities. It achieves this by bringing local farmers, agricultural experts, and supply chain partners together to share their knowledge, experience, and expertise via the trusted medium of community radio. Run in partnership with XL FM, this project provides tools and training to women farmers in Nigeria to help them adapt to the increasingly severe effects of climate change in the region. The project promotes the conservation of water, improves the use of irrigation technologies, and strengthens climate information services. Also, the radio programmes contribute to reducing rural communities' vulnerability to food insecurity by adopting climate-smart practices. Broadcast to hundreds of thousands of farmers in the most remote locations in local languages, the climate change radio programme has reached approximately 200,000 women since its inception, and half of all listeners reported implementing the climate-smart practices they learned on the radio. Almost 40 per cent of women listeners reported trying at least one climate change adaptive practice because of the radio programme.

One of the rural broadcasters, Otobong Billie, goes door-to-door campaigning on sustainable agricultural practices. As a result of her efforts, a female crop farmer named Blessing Peter increased her income a few months after listening to the programme. The participatory, multistakeholder, and interactive radio programme content design process has enabled her to identify and incorporate key messages and advice on how to deal with drought and mitigate its potential impacts in weekly radio programmes. (More information on this case study can be found in Part 2, p. 111.)

Women leaders leveraging climate information services

Peru: Ten local pastoralist women in the native high-Andean pastoralist community of Chillca (Pitumarca district, Canchis province, Cusco region, Peru) are at the heart of connecting modern and traditional local knowledge with state-of-the-art academia, allowing rapid responses to the communities' water problems. The project follows a community/citizen-science approach which, in collaboration with the local non-governmental organisation (NGO), Association for the Conservation and Study of Andean-Amazonian Mountains (ACEMAA), and the National University of Saint Anthony the Abad in Cuzco (UNSAAC), enabled the installation of a high-resolution ecohydrological monitoring system containing 14 weather stations (for temperature and rainfall measurements) and a total of 72 groundwater observation wells (installed in *bofedales*, high-Andean wetlands/peatlands), and additionally three main v-notch weirs (for manual and automatic runoff measurements). The group of women monitor weekly the current state (depth) of the groundwater level in the *bofedales*, which is vital for the local pastoralist system (based almost exclusively on alpaca herding). Therefore, their conservation status is of crucial importance. *Bofedales* are so-called social-ecological systems: they are managed in a way that provides the pastoralist system with the necessary ecosystem services (principally fodder and water). High-Andean pastoralist communities have been managing *bofedales* for centuries, which is most visible through the practices of *bofedales* irrigation and/or extension, which depend on an extensive system of water channels. One of the key ecosystem services of *bofedales* is water regulation and retention;

they are generally filled up (saturated) during the rainy season (December–May) and then contribute significantly to base flow and water security in communities and populations (towns, cities) downriver during the dry season (June–November).

The Chillca pastoralist women's frequent manual measurement – through observation of groundwater wells in the *bofedales* – generates the required data baseline, which allows them to react early enough with necessary interventions (in this case, *bofedales* irrigation) to maintain the *bofedales* in conditions that guarantee the year-round growth of the vegetation, which serves as the primary fodder source for the alpacas.

Filomena Rojo Quispe, coordinator of the group of women pastoralist monitors in Chillca, is aware that when *bofedales* are not fully saturated at the end of the rainy season (May), there might be a lack of water resources in the middle or at the end of the dry season (August–November). Thus, monitoring *bofedales* groundwater levels constitutes an accurate early warning system against droughts.

Uganda: The Christine Akwero Foundation empowers women to become leaders in leveraging climate information services. The initiative is a multifaceted approach to enhance community resilience to climate change impacts, particularly in vulnerable rural areas. At its core, the project focuses on bridging the gender gap in accessing and utilising climate information while harnessing the leadership potential of women to drive effective climate action at the local level.

The initiative's central focus is providing climate information services tailored to the needs of specific communities. These services encompass a range of resources, including localised weather forecasts, early warning alerts for extreme weather events, such as droughts or floods, and advisories on climate-smart agricultural practices and disaster preparedness measures. By delivering timely and relevant information, the initiative enables farmers, particularly women, to make informed decisions regarding crop planning, water management, and livelihood diversification.

Women champions

Lacaa Jennifer is a climate scientist and researcher who specialises in climate change adaptation and resilience-building strategies in Uganda. She provides valuable scientific insights and technical support to community-based organisations and government agencies involved in SLM initiatives. She collaborates closely with local communities to co-produce climate information services tailored to their needs and priorities. Jennifer is also a passionate advocate for gender-responsive approaches to climate action, emphasising the importance of women's participation and leadership in adaptation planning and decision making processes.

Laker Jolly Grace is a seasoned farmer and community leader from a rural village in Northern Uganda, a drought-prone region. With decades of experience in sustainable agriculture and water management, Grace has become a respected figure in her community. She actively promotes climate-resilient farming practices, including crop diversification, rainwater harvesting, and soil conservation techniques. Grace's leadership extends beyond her farm, as she organises training workshops and demonstration plots to share her knowledge with other farmers. She is passionate about empowering women in agriculture and serves as a mentor to young women aspiring to enter the farming profession.

A key component is the empowerment of women leaders within rural communities. Women are often at the forefront of agricultural activities and household food security, yet frequently face barriers in accessing resources and decision making processes. By equipping women leaders with the knowledge and skills to interpret and disseminate climate information effectively, the initiative amplifies their role as agents of change in building climate resilience.

Capacity building workshops, training sessions, and knowledge sharing platforms strengthen women leaders' technical and leadership capacities. These activities enhance women's understanding of climate risks and adaptation strategies and foster networking and collaboration among women across different communities. The initiative promotes peer learning and collective action towards climate resilience by creating spaces for women to share experiences and best practices.

Crucially, the Christine Akwero Foundation adopts a participatory and gender-responsive approach, ensuring women's voices and priorities are central to decision making processes regarding drought and other concerns.

Women are actively designing, implementing, and monitoring early warning systems, adaptation projects, and community-based initiatives. The initiative fosters more sustainable and resilient livelihoods by empowering women with the knowledge and tools to understand climate risks and adapt agricultural practices accordingly. (More information on this case study can be found in Part 2, p. 84.)

Women employing new innovative technologies

Cuba: Women are major implementers of innovative technologies within the framework of two projects sponsored by the GEF Small Grants Programme of the United Nations Development Programme (UNDP) and the National Environment Fund in La Gloria community located in the Sierra de Cubitas municipality, Camaguey province, Cuba.

This community is located very close to the northern coast of Camaguey province, one of the 15 areas in Cuba identified as most vulnerable to climate change impacts. The community's producers have faced limitations to the sustainability of their agricultural production given, among other causes, the degradation and aridity of the soil, the tendency toward drought, poorly diversified agricultural production, insufficient availability of water, and the effects on water quality due to saline intrusion and degradation of the surrounding coastal and subcoastal forest.

The empowerment of women producers in the 10 project farms is evidenced in their active participation in the tasks associated with the integrated diagnosis of land resources in each site and equally in the selection and implementation of good management practices.

Rosa Espinosa Rojas experience and productive results in a greenhouse donated by the project and located on the patio of her home in the community stand out. The rapid assimilation of the nutrition technology for covered crops, transmitted by an expert from the provincial branch of the Soil Institute Branch and the collaboration of their family and friends, allowed this producer to begin to obtain high crop yields within a short time, with positive impacts on community food security and family income.

Another successful initiative led by a women producer was the cultivation of agroecological potatoes. Producer, Yoleidi Vázquez, demonstrated extraordinary effort rapidly adapting to the demanding technology of this crop in order to develop this type of potato for the first time in her community. Her farm, called El Alacrán, was one of two farms in the community to earn the National Recognition of Land Initiated in Sustainable Land Management. Drawing on a spirit for innovation and the capacity to develop specialised scientific-technological skills and services, Vázquez was able to obtain yields that exceeded those expected and reported favourable profits for her family while also making food available to the community.

Also notable for her experience as a producer is Elida Díaz Cárdenas who, together with her son, runs the Finca La Caridad La Deseada. This site also has the National Recognition of Land

Initiated in Sustainable Land Management. Enthusiastic about the challenges of agricultural innovation, she has embraced covered cultivation, biofertilisers, and crop diversification.

Along with men, women producers have been trained to direct, coordinate, and organise activities and participate in decision making within the framework of the innovative process. The new knowledge has allowed them to present their results at knowledge fairs and national workshops, in audiovisual materials, and through the exchange of best experiences with other producers in the community, the country, and southern countries. The initiative, innovative spirit, and knowledge accumulated by rural women have favoured the growing incorporation of approaches to gender equality, women's empowerment, SLM, climate change adaptation, disaster risk reduction, and ecosystem restoration.

At the same time, the female researchers and specialists who have directed and participated in the initiative as well as the producers accumulate valuable experience in research-development-innovation, teaching, and agricultural extension work. The satisfaction of participating in projects and initiatives that promote women's empowerment and self-reliance and the development of communications skills has allowed them to exchange and establish a productive dialogue of knowledge with producers and, in the same way, learn and enrich their cultural heritage. (More information on this case study can be found in Part 2, p. 157.)

Kenya: Kenya's arid and semi-arid lands (ASALs) make up over 80 per cent of the country's landmass. They are characterised by high variability in climate systems and available resources and increasing frequency and severity of droughts. In this context, the Indigenous Movement for Peace Advancement and Conflict Transformation (IMPACT) Kenya works with pastoralists in Isiolo, Samburu, Marsabit, and Laikipia counties.

IMPACT is leveraging existing women's groups in northern Kenya, allowing women to take the lead in tackling the climate crisis through an innovative rangeland restoration technique. The semi-circular bunds technique involves the women digging the bunds and reseeding the bare lands with perennial grass species, such as *Cencilirais cilirias* and *Eragrostis superba*. They also harvest the seeds in the seed banks constructed with locally available materials and sell the seeds and grass harvested to community members during the dry season. The women's groups involved in the project also carry out Indigenous tree planting as these trees have become extinct in the area due to deforestation. (More information on this case study can be found in Part 2, p. 102.)

Photo: © La Gloria, Cuba

The power of innovative knowledge

Iran: Dr. Tayebe Mesbahzadeh, an Associate Professor at the University of Tehran, is a beacon of change in Iran's arid landscapes, where the relentless forces of climate change exacerbate environmental degradation. Through her pioneering work, she has fought against desertification and championed women's empowerment in land management. Dr. Mesbahzadeh's efforts have transformed the narrative, enabling women to play significant roles in preserving their communities' vital resources.

The gradual decline in Lake Urmia's water levels has resulted in the emergence of salt deserts, saline soils, and dust storms, which significantly impact people's livelihoods, agriculture, infrastructure, and the overall environment. Furthermore, the broader issue of soil degradation in Iran's dry and semi-arid regions has been exacerbated, leading to increased wind erosion and dust storms.

To tackle these pressing challenges, Dr. Mesbahzadeh employs mycorrhizal fungi to enhance soil quality and facilitate vegetation establishment. This strategy is particularly well-suited to the harsh environmental conditions prevalent around Lake Urmia, including salinity, alkalinity, and limited moisture. The primary objectives include restoring vegetation, improving soil quality, and mitigating the adverse effects of drought and desertification. Additionally, community involvement is emphasised, ensuring that local knowledge and resources are leveraged effectively in project implementation. To date, Dr. Mesbahzadeh has trained more than 85 women on the technique involving mycorrhizal fungi and, currently, 52 of these women are working directly on the project that she leads.

This initiative presents a significant opportunity for women's empowerment and inclusion. Women often bear the brunt of environmental challenges and are key stakeholders in agriculture and household management. Therefore, they benefit from participation in SLM and ecological restoration activities when these involve them in decision making processes and provide them with training and resources.

Women often possess intimate knowledge of local plant species and ecosystems, and they are instrumental in implementing SLM practices that leverage the benefits of mycorrhizal fungi. Furthermore, women's involvement in SLM extends beyond practical activities to encompass economic and social dimensions of community development. Biofertilisers, such as mycorrhizal fungi, offer financial and environmental benefits compared to chemical fertilisers. Women can play critical roles in biofertiliser production and distribution, contributing to local economic development while promoting environmentally friendly agricultural practices.

In drought-prone regions with limited economic opportunities, such as the Lake Urmia region, biofertiliser production and distribution provide avenues for women's empowerment and income generation. Women can gain employment opportunities and generate additional household income by participating in production. Moreover, involving local women in training programmes related to SLM and biofertiliser production equips them with valuable skills and knowledge that can be applied in agricultural activities, thereby contributing to achievement of the SDGs.

Women's participation in drought management initiatives also fosters community engagement and ownership of environmental conservation efforts. By involving local communities, particularly women, in decision making processes and project implementation, drought management initiatives are more likely to succeed and have long-lasting impacts. Women's unique perspectives and experiences inform the development of tailored strategies that address the specific needs and challenges communities face in drought-prone regions. (More information on this case study can be found in Part 2, p. 134.)

The value of women's traditional knowledge[41]

Peru: In the central Andes of Peru, two sisters migrated from the countryside to the city to become agricultural engineers, a traditionally male career. Discriminated against because of their gender and origin, the Machaca Mendieta sisters did not give up. They completed their degrees and, when they returned to their community of Quispillaccta (in Chuschi District, Cangallo Province, Ayacucho Department) at 3,860 metres above sea level, the situation was dire. The Wayunka and Paqcha glaciers, vital water sources for those who live in this high Andean area, had melted. A great diversity of seeds had been lost, and the pastures for livestock feeding were dry due to the water deficiency. The community was experiencing severe food insecurity.

The Machaca Mendieta sisters understood that the situation signalled a deterioration in the critical relationship between the community and nature, in this case water. And, they recognised that the response would need to encompass the Andean notion of the interdependent relationship between community and nature. In the Andean world, knowledge is the set of practices, signs, secrets, attitudes, and values resulting from constant communication and relationships between people, nature, and deities. Instead of referring to water resource management, Andean communities speak of water nurturing, a concept that denotes the symbiotic relationship between the community and nature. From this cultural perspective, efforts are not only made to ensure there is never a lack of water, but that water is also loved and nurtured. Instead of simply applying what they had learned in school, they immersed themselves in the knowledge of their ancestors and enriched their relationship with nature, treating Mother Earth with affection, offering to her, singing to her, and taking care of her.

The Machaca Mendieta sisters underscored the importance of their agricultural engineering colleagues, whose knowledge had been influenced by Western culture, to understand and integrate this Andean concept into their work. After long conversations with the *yachaqs* (wise men), they founded the *Asociación Bartolomé Aripaylla* (ABA) as a nucleus of affirmation of Andean culture, dedicated to developing efforts to preserve ancient practices, such as planting and harvesting rainwater. Since 1994, they have worked hard to build reservoirs. Apacheta was the first lagoon constructed in 1995 and is the best known, permanently storing more than 70,000 cubic metres of water. As of September 2023, there were over 170 lagoons. Thousands of people, even beyond their province, gained access to water, with over 180 million cubic metres available for human and agricultural use.

In essence, the Machaca sisters had recuperated the traditional Andean appreciation for the value of water, the knowledge, customs, and technologies for caring for it, the wisdom behind nurturing nature, and the agricultural practices for working in symbiosis with it, and they strengthened the adaptive capacities of small farmer families to improve their contribution to better use and conserve water, in order to mitigate drought and support the local community. This is an innovative intercultural risk management approach to climate change and a women-led drought adaptation strategy. (More information on this case study can be found in Part 2, p. 165.)

Photo: © Asociación Bartolomé Aripaylla

41 This case study includes information from the following article in Latina Clima, 2024: https://latinclima.org/articulos/en-tiempos-de-cambio-climatico-indigenas-peruanos-siembran-y-cosechan-agua-de-lluvia-con#:~:text=Noticias-,En%20tiempos%20de%20cambio%20climático%2C%20indígenas%20peruanos%20siembran%20y%20cosechan,de%20lluvia%20con%20conocimiento%20ancestral&text=En%20los%20Andes%20centrales%20del,agrónoma%2C%20una%20carrera%20tradicionalmente%20masculina.

Capacity building and training programmes tailored to women

Sri Lanka: In the arid landscapes of Kurunegala, situated within Sri Lanka's dry zone, women emerge as central figures in SLM, embodying resilience, resourcefulness, and unwavering dedication. With women comprising slightly over half (51.5 per cent) of the region's population, their indispensable role in Kurunegala's agricultural and economic sectors is highlighted by figures showing their involvement in diverse livelihood activities. Despite constituting 34.3 per cent of the economically active population, women face entrenched challenges, including limited access to resources, technology, and market opportunities, exacerbated by prevailing gender norms and caregiving responsibilities. Yet, their contributions to food production and security, small-scale crop cultivation, livestock management, and the preservation of traditional knowledge remain significant, shaping the region's agricultural landscape and fostering resilience amidst environmental adversities.

Water scarcity looms large in Kurunegala, with figures revealing a stark reality of diminishing water resources and recurrent droughts. In this context, the "Climate Resilient Integrated Water Management Project" (CRIWMP), led by UNDP and supported by the Sri Lanka Red Cross Society, has implemented several initiatives aimed to enhance drought adaptation, specifically for women. Recognising women's unique vulnerabilities and roles in rural communities, the project has prioritised gender-sensitive approaches to address their needs effectively. One key initiative involves capacity building and training programmes tailored to women, focusing on enhancing their knowledge and skills in water management, sustainable agriculture, and climate-smart technologies. Through these programmes, women are empowered to play active roles in mitigating the impacts of drought on their households and communities.

A woman champion

Chamari is a passionate advocate for SLM and drought adaptation in the CRIWMP in Sri Lanka. With her unwavering dedication, she has become a champion in optimising water usage and ensuring sustainability in her community. Chamari's expertise lies in constructing small-scale reservoirs or tanks and supporting the widespread adoption of rainwater harvesting systems, which act as crucial water sources during droughts. Her innovative strategies, combined with traditional wisdom, have helped protect agricultural productivity and livelihoods from the impacts of water scarcity. Chamari's commitment to conservation and her role as a change agent make her an invaluable asset to the project.

Photo: © Sepali de Silva / UNDP Sri Lanka

Additionally, the project emphasises the participation of women in decision making processes related to water resource management and infrastructure development. Women's involvement in planning, implementing, and managing water projects ensures their voices are heard and contributes to more inclusive and sustainable solutions. Furthermore, the CRIWMP facilitates access to financial services and microcredit schemes specifically targeted at women, enabling them to invest in drought-resistant farming inputs, alternative livelihood ventures, and adaptive technologies. By promoting women's economic empowerment and resilience-building activities, the project aims to foster greater gender equality and sustainable development in drought-prone areas of the country. (More information on this case study can be found in Part 2, p. 130.)

South Africa: Under the GEF Small Grants Programme, implemented by UNDP, in South Africa, Biowatch completed a project in 2016 to support small-scale farmers in KwaZulu Natal province, one of the region's most severely affected by drought. The objective was to enhance the resilience of these farmers to climate change and water scarcity while providing more food and nutrition security, particularly for women. This was achieved through improved seed and food diversity and the application of local knowledge systems. Gender-sensitive training was provided, focusing on designing food plots, establishing seed plots, constructing swales to harvest water, improving soil fertility, and implementing the 'biodiversity wheel' methodology. This participatory methodology involves documenting the seed varieties cultivated and preserved in a community, practicing intercropping and crop rotation, and mapping eco-calendars.

The project worked with 250 farmers, of whom 93 per cent were women, in the five villages of northern KwaZulu Natal Province. The farmers were supported in establishing household seed banks, deepening their agroecological practice, conducting knowledge and seed exchanges, and undertaking farmer-to-farmer learning, seed fairs, and rituals. The project also supported the initiation of a monitoring system for agroecology farmers. Forty-eight farmers pledged to adhere to eight criteria and received certificates for that commitment. The requirements included preserving at least 14 traditional seed varieties, avoiding synthetic fertilisers and genetically modified organisms (GMOs), and harvesting greywater. Moreover, through partnerships with researchers from the Universities of KwaZulu Natal and Cape Town, the project engaged policy makers to advocate for policy change in the Plant Breeder's Rights Bill, supported by evidence from the farmers' fields. Remarkably, a few women from the project participated in parliamentary hearings and provided valuable inputs and perspectives.

Uganda: Droughts, erratic weather patterns, and environmental degradation threaten Uganda's agricultural productivity and food security, particularly in drought-prone areas. Women farmers may lack the resources and support needed to adapt to these climate-related challenges and to implement SLM practices effectively.

Women champions

Ukello Teddy's story exemplifies resilience and determination in the face of adversity. After a divorce in 2017, she became a single mother at 28 years old. Still, she found hope through training programmes offered by Youth for Life Tree Planting Ltd. Inspired by her success, over 35 young mothers in the Ogur Young Star group, where Teddy is actively involved, have embraced soybean farming to improve their lives.

Likewise, Winny Ocan Bunia, a 30-year-old mother of three, epitomises community leadership and agricultural innovation. As the Chairperson of the Obanga Twero Yahweh Church group, she leads a thriving community of 80 members, empowering 47 women and 33 men. Winny's dedication extends to cultivating soybeans across two acres, serving as the foundation for wider replication. Her entrepreneurial spirit led her to invest in a solar water pump for her mother, benefiting the wider village. This selflessness has earned her the trust and respect of her community, making her a pivotal figure in their savings and loan association. (More information on this case study can be found in Part 2, p. 96.)

The initiative, "Innovative and Effective Women-Led Solutions for Drought Resilience and Adaptation in Lira District", is a collaborative endeavour, led by the Global Youth Foundation renowned for its successful economic empowerment projects. With a keen understanding of agriculture's vital role in the livelihoods of Lira District's residents, particularly smallholder farmers, the initiative aims to tackle the array of challenges they face, emphasising women's empowerment in the agricultural sector.

Central to the initiative is the empowerment of women farmers, acknowledging their crucial role in agricultural production and household food security. Through targeted interventions, such as training programmes on cultivating drought-resistant crop varieties, women farmers are equipped with the necessary knowledge and skills to navigate climate variability and effectively mitigate the impacts of drought on crop yields.

In addition, the establishment of a weather update centre serves as a pivotal resource. It furnishes farmers with timely and accurate weather information essential for informed decision making in agricultural activities.

By enhancing access to weather forecasts, the initiative enables farmers to optimise planting schedules, irrigation practices, and other agricultural activities, thereby bolstering resilience to climate variability.

Innovative approaches to capacity building are also employed. A mobile van equipped with a projector delivers training sessions to farmers in remote areas. These sessions cover various topics, from sustainable farming practices to pest management and postharvest handling, empowering farmers with the knowledge and skills needed to enhance agricultural productivity and resilience.

Rural tourism: the Wada network of guesthouses

Lebanon: Deir El Ahmar boasts a rich historical tapestry in the Bekaa Valley's northeastern hemisphere amidst Lebanon's Eastern and Western Mountain ranges. Situated at an altitude of 1,000 metres above sea level, this town is strategically located 100 kilometres from Beirut and 45 kilometres from Zahle. Its proximity to iconic landmarks, such as Balbek and the Cedar Reserve in Bcharre, renders it a prime destination for tourism enthusiasts.

Deir El Ahmar has been a melting pot of diverse civilisations, including the Phoenicians, Greeks, and Romans, each leaving behind traces of their legacy. The town's illustrious past is evident in the remnants of these ancient civilisations. Deir El Ahmar stands proudly along the Roman road that once connected Baalbek to the legendary city of Byblos, located 70 kilometres away. Renowned for its rich biodiversity, fertile lands, and picturesque landscapes, Deir El Ahmar draws its lifeblood from the springs nestled in the nearby highlands of Ainata, El-Yammouneh, and Oyoun Orghosh.

However, the region grapples with unique climatic challenges, particularly during the summer, when dry conditions and water scarcity are prevalent. The presence of mountain ranges, notably the western mountain chain, impedes rainfall, exacerbating the shortage of water resources, particularly for agricultural endeavours. The onset of summer brings severe drought, posing significant obstacles to agricultural productivity.

In this context, through innovative approaches, the Women's Association of Deir El Ahmar (WADA) seeks to integrate tourism with sustainable agricultural practices, engaging women and youth in this sector. The initiative aims to change perceptions and uplift the community's self-image by highlighting the area's rich historical and natural heritage.

The network of guesthouses exemplifies the project's success in increasing family incomes and fostering dialogue between hosts and guests. Situated at the WADA Center, these guesthouses serve as launching points for three color-coded hiking trails, each offering opportunities to discover the region's natural, religious, and cultural wonders. They have created three trails: the Blue Trail emphasises religious tourism, the Red Trail agricultural, and the Green Trail natural and cultural attractions.

The construction of five bungalows for accommodation, family gardens, and green spaces reflects WADA's commitment to create inviting spaces in the drylands. Additionally, the community's production of medicinal plants underscores awareness of local biodiversity and opportunities for sustainable growth.

Equipped with solar panels and recycling facilities, the eco-friendly guesthouses embody WADA's dedication to promoting sustainable practices. As a result, the network of guesthouses not only boosts family incomes, it also fosters meaningful interactions between hosts and guests, contributing to the community's overall development. (More information on this case study can be found in Part 2, p. 137.)

Seeds for life

Various case studies highlight the importance of seed banks and ecosystem regeneration as women's adaptation strategies in the face of droughts.

Kenya: Women within the Amboseli landscape are in charge of grass seed banking. The seed banks they oversee serve as vital repositories of diverse grass species adapted to local climatic conditions, particularly drought. Women are at the forefront of preparing land, weeding, and harvesting, collecting, and storing seeds and hay, and then selling or preserving them for future use. Grass seed banks preserve biodiversity and facilitate ecosystem restoration by providing a ready source of seeds for re-vegetation and reseeding projects in degraded lands. Women's involvement in managing seed banks contributes to livelihood support, as access to drought-tolerant grass species enhances opportunities for sustainable livestock grazing, fodder production, and income generation. (More information about this case study can be found in Part 2, p. 73.)

Similarly, the Justdiggit organisation is committed to addressing the complex interplay of drought, livelihood sustainability, and ecosystem degradation in Kenya's ASALs. The predominant land use system in the ASALs revolves around pastoralism and extensive grazing, collectively accounting for 70 per cent of the national livestock herd. However, recurring droughts severely threaten the livelihoods of pastoral communities, exacerbating poverty and food insecurity. It is estimated that the drought period of 2008–2011 resulted in a loss of USD 8 billion in the livestock sector. The Justdiggit initiative centres around the establishment of grass seed bank enterprises that leverage women's traditional knowledge and expertise in ASALs to restore degraded rangelands and build community resilience.

A woman champion

Jackie Kemboi, affectionately known as the 'Justdiggit regreening queen' by local women, has emerged as a pivotal figure. With a deep-rooted understanding of the challenges faced by pastoral communities, Jackie has dedicated herself to training women in restoration initiatives, such as grass seed banks. Her expertise in grass seed cultivation techniques and harvesting methods has significantly enhanced the productivity and sustainability of these grass seed banks. Growing up in a pastoral community, Jackie witnessed firsthand the devastating impacts of drought on her village, igniting a passion to pursue professional knowledge to reverse desertification. Jackie was also inspired by her mother, a Farmer Managed Natural Regeneration (FMNR) champion, who mobilised her community to adapt SLM practices and, in so doing, inspired women to follow in her footsteps and engage in similar initiatives and leadership roles.

Photo: © Justdiggit

The grass seed banks established as part of Justdiggit's initiative are hubs for producing Indigenous grass seeds and pasture. The process begins with identifying and mobilising women's groups within target communities. These groups are provided with essential training and resources to establish and manage grass seed banks effectively. The grass seed banks transform degraded communal land into productive green grasslands, owned and managed exclusively by pastoral women's groups. All grass species planted are Indigenous and well adapted to the local environment, thus enhancing the resilience of pastures to climatic variability and extreme weather events while preserving native species for future generations.

The grass seed banks enterprise provides pastoralists with diverse and high-quality fodder options, enhancing livestock nutrition, resulting in higher milk yields, and increasing incomes for pastoral households. Additionally, the project fosters economic opportunities along the pasture and fodder value chains by supporting women's groups in packaging and marketing grass seeds. By establishing market linkages, pastoralists can access pasture and grass seed markets, thereby enhancing the economic viability of pastoral livelihoods. (More information on this case study can be found in Part 2, p. 108.)

India: In the vast and arid Kutch (Vagad) region of Western India, the Maldharis, traditional herding communities face formidable challenges due to drought and desertification. Renowned for their expertise in breeding animals, such as sheep, goats, cows, camels, and buffaloes, these resilient communities heavily rely on communal grazing areas for sustenance.

A woman champion

Devi Nagjibhai, a community leader whose contributions extend beyond her resilience and leadership qualities, possesses tremendous knowledge about grasses and biodiversity. Her expertise in these areas enriches the community's understanding of the land and strengthens their efforts to manage grazing lands sustainably. Nagjibhai's commitment to uphold regulations ensures the land is managed responsibly, safeguarding its biodiversity and long-term health. Her profound understanding of biodiversity further underscores her invaluable role in guiding conservation efforts within her community.

Photo: © Maldhari Rural Action Group (MARAG)

Initiatives conducted by organisations, like the Maldhari Rural Action Group (MARAG) and the Pastoral Women Alliance, seek to restore grazing areas to alleviate the burden on communal lands and reinstate women's pivotal roles. At the heart of these efforts lies the active involvement of pastoral women, who leverage their traditional knowledge to rejuvenate the lands surrounding their villages. Through their participation, these women significantly contribute to preserving their heritage and the environment, ensuring sustainable livelihoods for future generations.

The project focused on 10 villages, each with 10 acres of associated common pastureland, for a total of 100 acres. In each town, the Maldhari Rural Action Group formed a Women's Pastureland Management Committee (WPLMC) comprised of 10 Pastoral Women Alliance members. The WPLMCs engaged in land mapping and demarcation, soil testing, land clearing and levelling, grass seed selection, grass sowing, and general land maintenance and management. Women's actions impact grass diversity and quality, improve soil fertility, and increase groundwater levels. The project promoted traditional grasses, boosting livestock nutritional levels and increasing milk production. This model directly benefited 560 households engaged in livestock keeping, among others. Moreover, the regenerated pastureland is used for open and accessible grazing for livestock, which enhances milk production and generates income for women and their families. (More information on this case study can be found in Part 2, p. 125.)

Women's role in managing water systems

As would have been expected from the call to case studies that led to the development of this document, access, management, and conservation of water are central to various projects and, thus, the case studies. Some of them are outlined below.

India: Bhungroo is a revolutionary water management technology designed to address water scarcity issues in agricultural regions, particularly in Gujarat, India. By effectively managing water resources, Bhungroo enables smallholder farmers, especially women, to reclaim the value of their land.

At its core, Bhungroo functions as an underground rainwater harvesting system. It involves installing perforated pipes or wells into the ground, allowing rainwater to percolate and recharge underground aquifers during monsoon seasons. This stored water can then be accessed during dry periods, ensuring continuous crop irrigation despite erratic rainfall patterns and water scarcity.

One key component of Bhungroo's success is its community-driven approach. Women, often the primary agricultural workers in these regions, play a central role in implementing and managing Bhungroo systems. Through self-help groups and women-led initiatives, they collectively acquire and operate Bhungroo units, bypassing cultural barriers that might hinder male cooperation. This empowers women economically and strengthens their resilience to drought impacts.

In association with Bhungroo, the Women Climate Leaders (WCL) programme further amplifies the role of women in climate resilience efforts, identifying and training women from marginalised communities to become leaders in climate adaptation and mitigation strategies. These women receive training in sustainable agriculture, water management, and community organising, gaining the skills and knowledge to tackle climate-related challenges effectively.

Through the WCL programme, women farmers gain technical expertise and leadership skills, enabling them to drive positive change within their communities. They become catalysts for innovation, advocating for sustainable farming practices and climate-resilient technologies like Bhungroo. Additionally, they serve as role models, inspiring other women to take active roles in climate action and community development.

Women champions

Trupti Jain is a beacon of hope and change in sustainable agriculture and drought resilience. As a champion for marginalised communities, particularly women farmers in Gujarat, India, Jain's visionary leadership has transformed lives and landscapes. Her pioneering efforts in developing and promoting Bhungroo technology and her advocacy for women's empowerment have earned her widespread recognition. Through relentless dedication, Jain has empowered countless women to reclaim control over their livelihoods, land, and futures. Her commitment to social justice and environmental stewardship has improved agricultural productivity and resilience and sparked a broader movement for gender equality and climate action. Jain's work exemplifies the power of individual agency in driving meaningful and lasting change for vulnerable communities and our planet.

Under her leadership, Naireeta Services Private Limited (NSPL) has successfully installed over 5,000 units across 12 states of India and in Ghana, Vietnam, Rwanda, and Bangladesh. This widespread installation has benefited nearly 15,000 smallholder farmers and impacted approximately 160,000 rural individuals. Additionally, these efforts have saved 2,129 millilitres of water annually.

Photo: © Bhungroo

Overall, the Bhungroo and WCL programme represent a holistic approach to addressing water scarcity and drought impacts in agricultural communities. By empowering women as agents of change, these initiatives enhance farm productivity and food security and foster greater resilience and sustainability in the face of a range of environmental challenges. (More information on this case study can be found in Part 2, p. 120.)

Peru: *Cuchucho*, groundwater, and Quechua women. The Santa Rosa Association of Women Producers of Milk and its Derivatives is comprised of 32 women of Quechua origin and located in the Moquegache Japo Peasant Community in Lampa, Puno, Peru, in the Andes Mountains, north of Lake Titicaca, at an altitude of 4,000 metres above sea level. Months before the 2022–2023 drought, the association became interested in deepening the use of ancestral knowledge of native medicinal plants. With this objective in mind, women set out to domesticate a wild tuber – '*cuchucho*' (*Lilaeopsis macloviana*) – considered the key to longevity due to its antioxidant properties.

However, at the end of 2022, the rains never came and the rivers were practically dry, making it impossible to produce the *cuchucho*. This was when the association decided to take advantage of the last available option: groundwater. To guarantee the water supply and maintain their production, the women built 32 small family wells in their fields, with the aim to find the water table at a low cost. To do so, the women used the ancient method of radiesthesia, finding water only 2–4 metres deep. Taking advantage of the radiant sunshine, they later installed solar panels to extract water with a solar pump connected to a sprinkler irrigation system.

Local authorities recognised the success of their pilot experience, and the Provincial Municipality of Lampa initiated a USD 3.9 million public investment project for a water supply service, installing up to 350 wells with solar pumping to enhance community-level resilience. (More information on this case study can be found in Part 2, p. 146.)

Venezuela: Wayuu women guardians of water. The arid region of La Guajira is the ancestral territory of the Wayuu and Añú Indigenous people. As this community is confronted by one of the highest extreme poverty rates in the country, due to the recurrent and cumulative impacts of prolonged droughts, FAO set out to mitigate the negative impacts of drought on food security and agricultural livelihoods. FAO implemented the project, "Anticipating the Impacts of Agricultural Drought in Venezuela Guajira", to rehabilitate and put into operation a network of small infrastructure to collect, store, and manage water systems for human and livestock consumption.

Women have been particularly affected by drought conditions, and they are the ones who – in addition to directly facing the adverse effects of drought – are responsible for providing water for their homes. To find water, they are sometimes obligated to resort to extreme coping measures, such as walking several kilometres by foot each day, adding additional burden to their already substantial duties for home care and farming. Despite their efforts, most of the time, the water they find is contaminated, exposing them and their families to chronic illnesses and diseases.

Confronted by this challenging situation, women have acquired a predominant role in water management in their communities through a series of strategies developed to mitigate the effects of drought, including the following:

- The protection and administration of *jagüeye* water – a traditional water storage system for livestock consumption – includes the use of ecological structures (cacti) for fencing to limit the force of the wind. The rehabilitation of 20 *jagüeyes* also recovered a storage capacity of some 36,000 cubic metres of water, supporting a total herd of 15,146 heads of livestock (including cattle, sheep, goats, and pigs). These livestock constitute the main asset of vulnerable families in La Guajira, representing their principal form of savings.

- The promotion of efficient irrigation strategies for maximum water use, including various forms of water reuse, has been effective without compromising food production. Crescent structures have also been constructed on the ground to trap rainwater, protect it from strong winds, and maintain soil moisture. (More information on this case study can be found in Part 2, p. 162.)

Gender-inclusive climate resilient value chain

Value chain development is essential in development practice and thinking. However, gender equality dimensions remain often overlooked in value chain development interventions, with the risk of perpetuating existing gender inequalities and, in turn, undermining the efficiency of targeted value chains.

In its 2016 Gender-Sensitive Climate-Resilient Value Chain Framework, FAO introduced the concept of gender-based constraints (GBC) to highlight the importance of identifying and analysing the specific and additional constraints women face along value chains due to gender-based discrimination. GBCs undermine women's productive and entrepreneurial potential.

> *They are the reason why women are often unable to participate in and benefit from their participation in value chains on equal terms with men. Their identification is critical to ensure that value chain strategies and programs are designed to respond to men's and women's different roles and needs and contribute to level the playing field for women as value chain actors (e.g. as workers, as entrepreneurs, as members of producer organizations, etc.). Identifying GBCs is also critical from an economic perspective, as these constraints can negatively affect the economic performance of the value chain by generating market failures, reductions in the quantity and quality of production, and distortions in the labor market*. [42]

Relying on FAO's extensive knowledge and experience in value chains, one of the strategies shared by the majority of the 11 countries – CPs under the GEF-funded DSL-IP – is to demonstrate profitable best practices and models and encourage the support of gender-inclusive climate resilient chain development, based on the opportunities for resilient livelihoods of women and men, including the most vulnerable.

In Mongolia's CP, women and men from local communities benefit equally (with at least 50 per cent of the beneficiaries being women) from enhanced value chains, public-private partnerships, and access to finance to support sustainable grazing practices. The initiative has provided technical and business development support to herder groups/cooperatives to enhance their capacity for processing, marketing, and selling livestock products (e.g. cashmere and meat), ensuring direct financial benefits to women in the project landscapes.

42 FAO, 2016. Developing gender-sensitive value chains – A guiding framework. Rome.

Direct access to financial resources

Women insurance ambassadors: Since 2020, the World Food Programme (WFP) has led an initiative to comprehensively build resilience in rural communities that are vulnerable to food and nutritional insecurity resulting from climate crises. The initiative has worked within 60 communities in the dry corridor of **Guatemala** (Chiquimula, El Progreso, and Zacapa).

To strengthen and develop women's capabilities, the constitution of GACEM (Savings and Credit Groups for Women's Empowerment) was promoted as a platform for articulation and to expand their opportunities to access the resources and from which their capabilities could be extended. Organisational, administrative, and financial capacities facilitated the development of new critical thinking for investment, favouring the creation of profitable associative ventures in local markets and providing organised spaces for training and education on their rights, gender-sensitive nutrition, and the importance of women's participation, while progressively developing their leadership skills.

Currently, 120 GACEMs operate with over 2,000 female members. With their savings, women have led structural improvement investments in the community and their homes and established 65 associative ventures that support income diversification and strengthen community and family resilience. Additionally, the innovative design of microinsurance (or productive insurance), which covers excess rain and drought, has been considered and allowed to expand the protection to commercial activities beyond agricultural ones.

A woman champion

Edna Duarte, a 35-year-old mother, saw her dreams of being a teacher cut short by the few opportunities provided to women due to gender norms, biases, and stereotypes that still prevail in families and communities and which limit women's work in the home and prevent their education. She and her family have seen firsthand how droughts have affected their activities; Duarte was among the first women insured in 2022. After a brutal winter in 2022, Duarte and her family progressed as a result of the insurance and her ability to restart. She fuelled her food business with the insurance payment, allowing her to multiply her capital. Duarte has become an insurance ambassador in her community, sharing her experience and, together with the municipality, supporting the inclusion of additional beneficiaries on the catastrophic weather insurance programme for the 2023–2024 coverage cycle.

Photo: © GACEM / WFP Guatemala

Access to insurance and credit from the GACEM brings women closer to new methods of financing and protection, provides greater sustainability to their economic activities, and develops capacities for management and participation. In addition, women have gained financial and administrative skills. They have managed to see insurance and their savings and credits as complementary mechanisms that support their empowerment and strengthen their decision making and leadership skills and as an adaptation mechanism to cope with droughts. (More information on this case study can be found in Part 2, p. 173.)

Australia: The "Helping Regional Communities Prepare for Drought Initiative" (HRCPDI) is an AUD 29.6 million investment that offers an integrated package of support for communities to prepare for drought. It is delivered in partnership between the Foundation for Rural and Regional Renewal (FRRR) and the Australian Rural Leadership Foundation (ARLF).

The HRCPDI has funded a range of activities to support women in SLM practices and build drought resilience. Examples include the following:

- At least 16 projects focused on increasing leadership skills have been supported, and more than AUD 580,000 in grants have been awarded to activities across Australia, supporting women in drought-prone communities.
- Of the 250 participants in the National Mentoring Program under the HRCPDI, 159 have been women. This programme pairs a mentor with a mentee to build resilience and develop leadership capacity in drought-prone areas.

Lessons learned from women-led solutions

- Gender inequalities in access to markets, capital, training, technical assistance, financial services, and technologies are socially constructed, and they become drivers of risk. Therefore, efforts towards gender-responsive outcomes related to drought resilience and adaptation need to tackle the structural nature of the challenge and the multiple and intersecting forms of discrimination that women face.
- Projects and initiatives being executed to enhance communities' adaptation capacity to droughts, with financial resources from major environmental-related financing mechanisms (e.g. GEF), have the obligation/mandate to close gender gaps generated by the structural nodes of gender inequality.
- The most successful case studies have intentionally impacted access to goods and services and the underlying socio-economic and political barriers that limit women's adaptive capacity in the face of drought and other manifestations of climate change.
- Inspiring examples of women-led solutions to drought resilience are found all over the world in practices ranging from managing and conserving water made scarce by drought, strategically using drought-resistant seeds and crops, developing adaptations focused on innovative income-generating activities, devising alternatives to conventional soil management or alternatives to unsustainable soil management or the recovery of drought-impacted soils, and leveraging of climate information services.
- Ancestral knowledge held by women on drought adaptation techniques is immensely effective and should be documented, disseminated, and replicated for broader application in pertinent contexts.

Photo: © GACEM / WFP Guatemala

3. Patriarchal, discriminatory, and violent norms and laws

According to the World Bank, in 2020, 90 per cent of 143 economies had at least one law restricting women's economic equality. By 2024, women enjoyed just two-thirds of the legal rights that men do, although countries, on average, have established fewer than 40 per cent of the systems needed for full implementation of these rights. Not a single country provides equal opportunity in employment for women – not even the wealthiest economies.[43]

Regrettably, **patriarchal, discriminatory, and violent cultural patterns and the predominance of the culture of privilege** that persist worldwide are also manifested in drylands. However, women have been the custodians of biodiversity and possess specific and valuable knowledge that could provide sustainable solutions to droughts, even while patriarchal cultural patterns tend to exclude and ignore this knowledge, especially in the case of rural and Indigenous women.

In addition, as pointed out in the IPCC AR6:[44]

- *Structural inequalities play out at an individual level to create gendered experiences of violence. Violent conflict is experienced differently by men and women because of gender norms that already exist in society and shape vulnerabilities. For example, conflict deepens gendered vulnerabilities to climate change related to unequal access to land and livelihood opportunities. Motivations for inter-group violence may be influenced by constructions of masculinity, for example, the responsibility to secure their family's survival or pay dowries, and gendered roles may incentivise young men to protest or to join non-state armed groups during periods of adverse climate.*
- *Extreme weather, such as drought, is associated with increased violence against women, girls, and vulnerable groups. During and after extreme weather events, women, girls, and LGBTQI people are at increased risk of domestic violence, harassment, sexual violence, and trafficking. For example, early marriage is used as a coping strategy for managing the effects of extreme weather events, and women are exposed to increased risk of harassment and sexual assault as scarcity and gender-based roles cause them to walk longer distances to fetch water and fuel. Within the household, violent backlash or heightened tensions may arise from changing gender norms as men migrate to find work in post-disaster settings and men's use of negative coping mechanisms, such as alcoholism, when unable to meet norms of providing for the household.*

Faced with these structural nodes of inequality and a scenario that threatens the sustainability of life itself, a key challenge is to ensure that drought response actions generate the conditions necessary for equality and that women, in particular, are actively engaged in the quest for solutions and in the processes for responding to this global challenge.

Brazil: The "Ser-tão Mulher" Project aimed to empower rural women, notably those who run family production units in Sertão of Alagoas, Northeast.

Sexist colonial legacy may be a generic issue, but it nevertheless persists today, especially around Sertão of the Alagoas Region. Men play the leading role, deciding what to plant, how to plant and how to take care of it, and how to sell and apply profits from agriculture, even if crop yields are small. Women occupy a secondary position in terms of participation in aspects, such as economic dealings, production or trade activities, bank account management, technological training, and top positions in agricultural associations and cooperatives. Their widely accepted domestic role reaffirms and legitimises the oppression of women, keeping them submissive in the rural family and invisible in the decision making process. Domestic chores also overload them, as these are perceived to be light tasks. This prevailing oppression negatively influenced activities at the beginning of the Ser-tão Mulher Project, causing family tensions, preventing women from fully exercising business management, and discouraging and limiting rural female youth.

Because of this social system, initially, women had difficulty understanding the benefits of cultivating agroforestry systems based on new technologies, such as solar energy and drip irrigation. At the same time, this method alienated men who were unaware of the innovative technologies.

43 World Bank, 2024. Women, Business and the Law 2024. Washington, DC. USA.

44 IPCC, 2022, p. 1088.

Although women are considered the cornerstone of their families, they have little political representation to seek community improvements from public investments. Associated with sexism, women's lack of organisational and management know-how delayed the project's progress. However, this limitation was eventually overcome by employing a methodology in favour of rural women's empowerment.

Maria Clara da Silva dos Santos, 61, is a woman champion under this project. An Indigenous woman, farmer, and mother of seven children, she is best known as Dona Maria do Barraco. She has always been a source of inspiration and leadership for community-based groups due to her commitment to human rights defence and feminist empowerment. Likewise, Maria Gomes de Barros dos Santos, a farmer and mother of three children, has advocated staunchly for social rights and opportunities for rural youth, demonstrating her commitment to agroecology and her exceptional mobilising power. Always concerned about educational processes, she has moved the community to search for knowledge and reduce illiteracy. (More information on this case study can be found in Part 2, p. 160.)

Example: Plots against violence

In Kyrgyzstan's remote mountain drought-prone area, a visionary group of women has launched a groundbreaking project to cultivate medicinal herbs on degraded lands. This endeavour is designed to rejuvenate the affected lands and provide participating women with a sustainable source of income. Leveraging the region's rich biodiversity, the project selects medicinal herbs renowned for their healing properties and well-suited to the local environment.

Strategically implementing herb cultivation in small plots near homes serves a dual purpose. It facilitates land restoration while addressing a significant societal concern – the risk of GBV associated with patriarchal norms against women working outside their homes. (More information on this case study can be found in Part 2, p. 140.)

Likewise, in Brazil, the "Agroecological Logbook" (see p. 150 for more) initiative facilitates women's group discussions on their knowledge about agricultural practices and about their (often unseen) contribution to the health and well-being of the family and community. In addition, women discuss their position in the family, community, and society. They discuss policies and legislative frameworks that need to change to support their activities, and they engage with local, state, and federal policy makers about improving policies for land use, climate adaptation, and drought.

This structural node includes the discriminatory gender norms and laws shrouded in impunity under which gender-based violence (GBV) occurs. In this respect, it is worthwhile to note the pioneering work conducted by the International Union for the Conservation of Nature (IUCN)[45] and their GBV-ENV Center.[46] The increased risk of GBV linked to water collection and management activities is of vital importance for drylands and drought-prone regions:

- Women experience increased risks, exposure, and vulnerability to violent attacks, sexual assault, rape, and harassment when collecting water. These risks are augmented when water resources are far away or located in remote areas. A key consideration is that gendered divisions of labour mean that women and girls undertake the vast majority of water collection worldwide.
- Reduced water access due to drought, environmental degradation, and rising prices amplify existing patterns that contribute to GBV, such as household and community stress and tensions that can increase domestic violence.
- Traditional gender norms around water collection can also reinforce and perpetuate GBV when those roles are challenged. In many countries in which it is typical for wives or children to collect the water, men who participate in water collection face gender-based harassment from community members. This has a negative impact on men as well as women in the household, as embarrassment can result in increased domestic violence.[47]

45 Castañeda Camey, I., Sabater, L., Owren, C., et al., 2020. Gender-based GBV and environment linkages: The violence of inequality. Wen, J. (ed.). IUCN. Gland, Switzerland.

46 https://genderandenvironment.org/agent-gbv-env/

47 Castañeda Camey, I., Sabater, L., Owren, C., et al., 2021. Gender-based violence and environment linkages: summary for policy makers. Wen, J. (ed.). IUCN. Gland, Switzerland.

Additionally, as recognised by the Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy, and sustainable environment in some countries:

> *the climate crisis contributes to economic violence through wife inheritance (after a husband dies, his brother or other male family members 'inherits' the widow and her family's property), inheritance renouncement and other means of disinheriting women and girls. Climate-related disasters such as droughts also are contributing to a rise in 'witch' killings, which target women and girls and may serve as cover for land and property grabbing.*[48]

Also under this node, one strategic action that projects and women are conducting to overcome patriarchal and discriminatory cultural norms is supporting and integrating women in nontraditional careers/jobs/roles. Some activities include vocational training programmes, apprenticeships, or combinations of the two. This type of action offers a unique opportunity to modify perceptions, cultural norms, and structural barriers that prevent women from entering distinct fields that impact drought adaptation solutions. Case studies from Costa Rica and Senegal illustrate these efforts.

Brigadier women put out forest fires and, at the same time, machismo: The Lomas Barbudal Biological Reserve in San Ramón de Bagaces in **Costa Rica** is one of the world's last remnants of dry tropical forests which, on occasion, are affected by drought. The administrator of the park, Priscilla Carbonell Ramírez, protects 2,646 hectares as administrator, park ranger, and firefighter and leads a team of four people.

Ramírez has over two decades of firefighting experience. Her career as a forest firefighter and park ranger began when she was just 15 years old, while camping in Barra Honda National Park in Nicoya where she discovered her interest in firefighting.

Years later, Ramírez found a path for her interest through a Bachelor's degree in Management and Protection of Natural Resources and a Master's degree in Natural Resources Management, and by volunteering with the National System of Conservation Areas (SINAC) since 2005. In 2018, she became an official of the SINAC and, since 2021, she has been the administrator of the Lomas Barbudal Biological Reserve.

Ramírez is trained on effective water management, controlled burns, and more to tackle forest fires. Over the course of her career, Ramírez has seen changes in fire management techniques. Knowing how to confront fire effectively requires more than mere familiarity with tools or the use of safety equipment. Ramírez knows how to detect and neutralise a fire depending on the trees it affects. Her experience also allows her to understand that team communication, coordination and collaboration, and trust and safety are each vital in an emergency, as well as individual commitment, empathy, and mental and physical strength. To maintain good physical condition, Ramírez lifts weights and practices karate and boxing.

Ramírez' leadership role has motivated her to encourage other women to engage in protecting forests, a field that men have otherwise largely occupied. Ramírez highlights that she has seen an increasing presence of female firefighters over the years and points out the importance of continuing to develop training and leadership that includes women in this profession to dispel the false belief that their participation is limited in the field.

"If we look at the statistics, we can see how the number of women forest firefighters throughout the country is growing, and how many of our fellow forest firefighters have stopped thinking that women's role is only in the kitchen."

Beyond Costa Rica, Ramírez volunteers with the SOS Wild Fire Association, supporting forest fire control and inspiring others through training on operational issues and tool maintenance in diverse Latin American countries (including Ecuador, Bolivia, and Peru, among others). (More information on this case study can be found in Part 2, p. 148.)

48 United Nations, 2023. Women, girls and the right to a clean, healthy and sustainable environment. Human Rights Council Fifty-second session. Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment, David R. Boyd. General Assembly. A/HRC/52/33.

Association of Beekeepers of the Ziguinchor region for Senegal (APISEN): In Senegal, beekeeping is traditionally practiced by men due to the aggressiveness of bees, the physical demands (e.g. tree-climbing), and the timing of harvesting (mainly at night). As a consequence, women have been systematically excluded from production to occupy a secondary role in the processing of hive products. However, in the Ziguinchor region of Senegal, the "Burru-Yambi: The Queens of Bees" project promotes women's increased involvement in the beekeeping sector as a means to become self-reliant and resilient to drought through the diversification of their income.

The project is experimenting with the adoption of new strategies that involve women in training and governance structures in the Association of Beekeepers of the Ziguinchor region for Senegal (APISEN) for modern and eco-responsible beekeeping while ensuring that men become allies of these strategies. This entails a transition towards modern beekeeping through a more pronounced gender approach – actively engaging women in beekeeping at all stages of production, processing, and marketing. (More information on this case study can be found in Part 2, p. 79.)

Lessons learned from women-led solutions

- Many of the most successful women-led approaches involve technical science-based techniques; therefore, it is crucial for women to have equal access to scientific training, study, and certification opportunities so that they can realise their full potential to contribute to the application of science in combatting drought.
- Supporting and integrating women in nontraditional careers/jobs/roles is a strategic action that initiatives and women themselves are undertaking to overcome patriarchal and discriminatory cultural norms. Some activities include vocational training programmes, apprenticeships, or a combination of the two. This type of action offers a unique opportunity to modify perceptions, cultural norms, and structural barriers that prevent women from entering fields involved in drought adaptation solutions.
- Extreme weather, such as drought, is associated with increased violence against women, girls, and vulnerable groups. During and after extreme weather events, women and girls are at increased risk of domestic violence, harassment, sexual violence, and trafficking. Therefore, various case studies in this document include strategies to address this issue.

Photo: © APISEN

4. The gendered division of labour and unequal social and economic organisation of care[49]

Care work is any labour that involves caring for others, caring for the planet, and caring for oneself, all of which are premised on the existence of basic conditions and the availability of time as well as goods, resources, and services.[50] Care work ensures the complex and life-sustaining web on which our very existence depends; without it, individuals, families, societies, and economies would be unable to survive and thrive. Care work as a public good is fundamental for well-being and essential for a vibrant, sustainable economy with a productive labour force.

BOX 4 Definition of unpaid care work

Unpaid care work includes direct and indirect care for people and living environments. It encompasses direct care, indirect care, environmental care, and domestic and communal work that take place in the household or the broader community:

- *Direct care* refers to hands-on care for people, including children, older people, people with disabilities, and able-bodied adults.
- *Indirect care* refers to the provisioning of necessary goods and services for people.
- *Environmental care* includes activities outside the household necessary for provisioning and subsistence, such as caring for animals, plants, and common spaces on which households depend. This paper comprises environmental care in its definition and references 'unpaid care, domestic and communal work'.
- *Domestic work refers to* cooking, preparing food, cleaning, washing clothes, and collecting water and fuel.
- *Communal work* is collective work that supports personal or household care, such as community kitchens or cooperative childcare.

Sources: MacGregor, Arora-Jonsson and Cohen, 2022; UN Women, 2022b.

The centrality of care to sustainable development and its relevance to gender equality are widely recognised by nations and communities, including as a target under SDG 5 on gender equality and the empowerment of all women and girls: SDG 5.4 "Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate". Yet, around the world, women and girls shoulder a disproportionate share of care work that is *unpaid, unrecognised and undervalued*.

The global care crisis is aggravated and intensified by environmental degradation, the global climate emergency, and especially hydrometeorological events like droughts. Its impacts are more acute for people with scarce resources and low incomes, especially in rural areas of the Global South.[51] Climate change and disasters, such as droughts, exacerbate women's and girls' disproportionate responsibility for unpaid care and domestic work. Globally, they already spend three times as much time on this work, on average, as men and boys.[52] Moreover, time-use surveys worldwide reveal that, when paid and unpaid work are combined, women work longer hours than men.[53]

The gaps are even wider for women and girls living in drylands and drought-prone areas, who are responsible for managing resources and services for daily household consumption; their workload can vary in areas with limited access to regular essential services, such as energy, water, and sanitation. For example, in the Arab States, which has the highest female-to-male ratio of time spent on unpaid care work, women spend on average 17–34 hours per week on unpaid care work, whereas men spend no more than 1–5 hours.[54]

To achieve a fair organisation of care, the link between caring for people and caring for the planet needs to be addressed and conceptualised at different scales: national, regional, and global.

49 This section is based on the author's document: Aguilar, L., 2023. The Climate-Care Nexus: Addressing the linkages between climate change and women's and girls' unpaid care, domestic and communal work. UN Women Working Paper, New York, USA.

50 Aguilar, L., 2023. The Climate-Care Nexus: Addressing the linkages between climate change and women's and girls' unpaid care, domestic and communal work. UN Women Working Paper, New York, USA.

51 MacGregor, S., Arora-Jonsson, S. and Cohen, M., 2022. Caring in a changing climate: Centering care work in climate action. Oxfam Research Backgrounder. Oxfam.

52 International Labour Organization (ILO), 2018. Care work and care jobs for the future of decent work. International Labour Office. Geneva.

53 UN Women, 2022a. "Transformative Approaches to Recognize, Reduce, and Redistribute Unpaid Care Work in Women's Economic Empowerment Programming (3R Programme). Interim Report (1 April 2021 – 31 March 2022)". New York.

54 UN Women, 2022b. A toolkit on paid and unpaid care work: from 3Rs to 5Rs. New York.

In doing so, it is necessary to understand the systematic linkages between the environment and care. It is evident that the provision of care requires the existence of the material bases that sustain life. In turn, the planet's sustainability requires a development model that places care at the centre of its priorities, recognising the interdependence between people and the environment and the multiple interdependencies between economic, social, human, and environmental dimensions.[55]

Within this context, the notion of a 'care society' emerges. A care society includes caring for people and the planet from a gender and human rights-based perspective. A care society is a society to be shaped collectively and multidimensionally to overcome the structural challenges of gender inequality and place the care of people and the planet at the heart of sustainable development.

A care society is a compelling alternative to the prevailing development model, which fails to consider and value activities essential for sustaining life and consequently reproduces gender, socio-economic, ethnic and territorial inequalities and causes social, economic and environmental harm and damage.[56]

To operationalise the notion of a care society, the interrelationship between caring for people and caring for the planet must be understood through two entry points:

- Climate change and its hydrometeorological effects, including drought and environmental degradation, increase women's and girls' unpaid care, domestic and communal work.
- Gender-responsive action toward drought adaptation and a low-carbon, climate-resilient economy offers opportunities to achieve the 3R framework: recognise, reduce, and redistribute unpaid care work.

Within this context, for the first time, the IPCC AR6 contains significant references to care work and water:

- Recognition that *"climate-induced water scarcity and supply disruptions disproportionately impact women and girls. The necessity of water collection takes away time from income-generating activities, childcare, and education".*[57]
- Concern that: *consumption of larger volumes of water is essential for healthy women during pregnancy, lactation, and caregiving, which increases the amount of water that has to be fetched. Fetching of water is associated with increased risk of sexual abuse, demand for sexual favours at controlled water collection points, physical injuries (e.g. musculoskeletal or from animal attacks), domestic violence for not completing daily water-related domestic tasks, and poorer maternal and child health.*[58]

The IPCC AR6 also recognises the impact of cascading crises on women's and girls' unpaid care and domestic work, which spirals in the absence of public services and infrastructure:

> *Compound disasters have arisen due to either the co-occurrence of drought, storms or floods and COVID-19. COVID-19 acts as a stress multiplier for women and girls in charge of water collection and minorities and disabled people who are not engaged in water management. Across the world, existing inequalities deepened due to lockdowns, which further limited access to clean water and education for women and girls, and reinstated gendered responsibilities of child, elderly and sick care, which had been previously externalized.*[59]

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55 Celiberti, L., ed., 2019. Las bases materiales que sostienen la vida. Perspectivas ecofeministas. Cotidiano Mujer, Dafnias, Articulación Feminista Marcosur. Montevideo.

56 Economic Commission for Latin America and the Caribbean (ECLAC), 2022. The care society: a horizon for sustainable recovery with gender equality (LC/CRM.15/3). Santiago.

57 IPCC, 2022, Chapter 4, pp. 586–587.

58 Idem, p. 587.

59 Idem, p. 628.

The IPCC AR6 reiterates that the gendered division of labour, systemic racism, and other social and structural inequities lead to heightened vulnerabilities and impacts for women, youth, and Indigenous peoples.[60] Similarly, austerity measures that reduce public services mean greater unpaid care and domestic workloads for women and girls.[61]

Despite the above, policies, plans, initiatives, and adaptation efforts related to drought are only beginning to touch on this issue. Drought resilience and adaptation efforts need a better understanding of the linkages between droughts and women's and girls' unpaid care, domestic, and communal work, and actions related to reducing and redistributing unpaid care work.

Emerging efforts to address women's and girls' unpaid care, domestic and communal work

In 2021, the UNCCD commissioned a study on the differentiated impacts of desertification, land degradation, and drought on women and men.[62] The document states that care work, whether paid or unpaid, formal or informal, must be recognised, reduced, and redistributed. The study acknowledges that the linkages between care work and drought have yet to be extensively analysed.

The study reviewed data on the inclusion of gender issues in National Drought Plans (NDPs). Nine NDPs developed by Parties to the UNCCD are at the forefront regarding care work and drought.[63]

Afghanistan: The NDP reports that women and girls had to travel farther from home to collect water and cooking fuel, thus exposing themselves to possible harm. Overall, 61 per cent of households indicated that women's workload had increased due to drought. Nearly half of all households – 46 per cent – reported that drought had increased tensions within the family, which could result in higher rates of GBV in these households.

Bolivia: The NDP states that Bolivian women's contribution to the reproductive, productive, and management fields at both community and political levels is comparable to, and sometimes more significant than, that of men. Paradoxically, women's roles in these areas are not recognised socially, and various customary norms and practices have contributed to maintaining unequal and unfair gender relations.

Central African Republic: The NDP describes women's experience and understanding of drought as closely linked to their roles in the household. Women are primarily responsible for the family's daily survival in urban or rural areas, even during natural disasters. It is the duty and responsibility of women to supply the household with water and food, either by purchase for some women residing in large urban centres or by collection and production for rural women and female small farmers who perceive drought through its effects on the household.

Côte d'Ivoire: The NDP explains that women often bear additional workloads during extreme weather events due to the roles and responsibilities they are expected to assume in caring for the family. In contrast, men bear additional duties due to their economic role in the family.

Grenada: The stakeholder consultations during the preparation of the NDP revealed that women and girls have been severely affected by droughts. For example, they miss work to take care of children when schools are closed due to a lack of water, arrive late for work or need to leave work early to cope with water shortages, experience compromised personal hygiene, and sometimes lose sleep to collect water from emergency tanks or late at night when water pressure improves. At the same time, they shoulder greater responsibility for taking care of sick family members, which is typically perceived as their responsibility.

60 IPCC, 2022, pp. 55, 123, 126, 132, 656–657, 784, passim.

61 Idem, Chapter 18, p. 2701.

62 Aguilar, L., 2022. Study on the differentiated impacts of desertification, land degradation and drought on women and men. UNCCD. Germany. https://www.unccd.int/sites/default/files/2022-11/Gender%20study%20.pdf

63 NDP country excerpts have been edited for comprehension and clarity.

Honduras: The NDP states that care work, despite not being economically remunerated, demands more time and dedication, making it difficult for women who provide care to participate in community processes. Therefore, implemented actions must reduce women's workloads, adapt to their availability, and be inclusive; that is, men must participate actively in care responsibilities to obtain positive results. It is essential to recognise the differences in power relations between women and men in planning processes, especially in rural areas.

Turkmenistan: The NDP notes that rural women spend more than six times as much time as men on housekeeping; women also work slightly more than men on household plots of land.

Venezuela: Although there are still no official indicators on the use of time and the distribution of care responsibilities between genders, the NDP notes that the responsibility for care work – especially childcare – tends to fall on women, the elderly, and people with permanent or temporary disabilities. These responsibilities make women more vulnerable to poverty as a consequence of drought, while also making some 39 per cent of the country's families more vulnerable.

Vietnam: The NDP proposes that structural gender challenges, unequal gender relations, and power dynamics, including the lack of ownership of land and other production assets, unequal division of labour, and inequitable decision making, must be addressed as they inhibit women's access to adaptation technologies and practices.

It is worthwhile to acknowledge a relatively new topic: the links between gender-differentiated impacts of droughts and **the psychological burden on women.** Two NDPs – Venezuela and the Central African Republic – mention this phenomenon of women having a socially constructed moral obligation – 'the mother's duty' – to feed their children and husbands. When they cannot exercise this role due to drought, this pressure can lead to depression and suicide in some cases.

In recognising care issues, the CPs of three of the 11 countries – Angola, Kazakhstan, and Zambia – under the GEF-funded DSL-IP, reference the social and economic organisation of care. For example, **Angola** recognises that nutritional deficiencies in the family diet are another element that causes several health issues and consequently can affect the participation of women in project activities since women take care of family members experiencing health problems.

Likewise, the CRIWMP project in **Sri Lanka** acknowledges that, in rural farming communities, women confront formidable challenges arising from drought. Compounding these challenges is the reality that women often serve as primary caretakers for children and the elderly. In times of crisis, they disproportionately bear the brunt of employment losses, compelled to stay at home without adequate government support, navigating increasingly dire circumstances alone. Moreover, the burden of unpaid care and domestic work, including the arduous task of water collection, amplifies during periods of drought. (More information on this case study can be found in Part 2, p. 130.)

Photo: © UNDP, Sri Lanka

In the African region, the **Sahara and Sahel Observatory** implemented the project, "Strengthening Drought Resilience for Smallholder Farmers and Pastoralists in the IGAD Region (Djibouti, Kenya, Sudan, and Uganda)", with financial support from the Adaptation Fund. The project's overall objective is to increase the resilience of smallholder farmers and pastoralists to climate change risks, mainly those related to drought, by establishing appropriate early warning systems and implementing drought adaptation actions in the Intergovernmental Authority on Development (IGAD) in Eastern Africa.

The project's gender assessment identifies the gendered challenges of droughts and climate change risks, underlining the need for an intersectional approach, as it recognises that women, children, the elderly, and youth remain the most physically, economically, and socially vulnerable to climate-related disasters. Additionally, it states that "the vulnerabilities stem from traditional norms and beliefs, and stereotypes that have hitherto limited women's ownership and control of livelihood resources, restricted their movement and increased their burden with many domestic gender roles".

The project has set out to meet the following objectives, among others:

- Foster participation throughout the project by using inclusive language, establishing meeting schedules that recognise women's care work, setting up care services for women and children, etc.
- Encourage project partners to hold gender-sensitive consultations and assessments to address capacity building. For example, separate focus group discussions should be conducted for women and men, allowing women's views to be better captured without being overshadowed by men.
- Ensure that gender issues were discussed at the project's inception and during consultation and work planning meetings, such as the design of activities to encourage women's full participation and engagement.

Likewise, in an effort to move from recognition to redistribution and reduction related to care, the **Great Green Wall Initiative**[64] addresses inequalities in the distribution of unpaid care work and the significant impact on enabling women to take paid jobs, including in the green economy. In this respect, they call on stakeholders to strengthen the institutional capacities of actors (government, development partners, women's associations, private sector, etc.), and to invest in the development of care services and infrastructure and in the implementation of policies that recognise, reduce and redistribute unpaid care work and advocate balancing women's and men's responsibilities for care.

One of the most advanced efforts in linking care and the environment comes from **Cambodia**. Of all of the worldwide nationally determined contributions (NDC) documents under the **United Nations Framework Convention on Climate Change (UNFCCC)**, Cambodia is the only country that has identified actions with indicators to measure the reduction of women's unpaid care and domestic work. The NDC states that gender-disaggregated data is a priority in the health sector, especially in understanding the different impacts of air- and vector-borne diseases on women and men. This is of particular significance to women, who often carry the responsibility for household care, including medical care for the family, and it can play an important role in championing behavioural patterns that may improve health and hygiene and reduce the spread of disease.

Cambodia is the only country that has identified actions with indicators to measure the reduction of women's unpaid care and domestic work.

64 UN Women-UNCCD. 2024. Technical Briefs Burkina Faso and Senegal.

Lessons learned from women-led solutions

- Various case studies show that vulnerabilities to droughts stem from traditional norms, beliefs, and stereotypes that limit women's ownership and control of livelihood resources, restrict their movement, and increase their burden with domestic roles.
- Drought and environmental degradation often increase women's and girls' unpaid care, domestic and communal work. Gender-responsive action toward drought adaptation and a low-carbon, climate-resilient economy offers opportunities to implement the 3R framework: recognise, reduce, and redistribute unpaid care work.
- Nine of the most recent NDPs developed by Parties to the UNCCD are at the forefront of recognising how care work interlinks with drought. Cambodia's NDC takes a step forward by identifying actions with indicators to measure the reduction of women's unpaid care and domestic work.
- When developing and implementing on-the-ground initiatives to combat drought, it is important to ensure that the 3R framework (recognise, reduce, and redistribute unpaid care work) is included. UNCCD, in alliance with UN Women, has been advancing on this front with groundbreaking briefs under the Great Green Wall Initiative.

5. The concentration of power and hierarchical relations in the public and private spheres

The UNCCD stresses the importance of ensuring the full participation of women and men at all levels in programmes to combat desertification and mitigate the effects of drought. It calls for the effective participation of both women and men at local, national, and regional levels in policy planning, decision making, implementation, and review of national action programmes.

Similarly, all major financing mechanisms (e.g. Green Climate Fund, GEF, Global Mechanism, Adaptation Fund) supporting drought-related initiatives incorporate the requirement to ensure women's participation in their project approval guidelines. This has led to 100 per cent of these project portfolios being associated with drought and drylands, with concrete actions to ensure and enhance women's participation. Likewise, all of the case studies received as part of the call to produce this study include activities in this respect.

Based on the above, this node of gender inequality is where there is a tacit agreement on the need to influence and impact the concentration of power and hierarchical relations in the public and private spheres. The cause is clearly stated in the Special Rapporteur Report on human rights obligations relating to the enjoyment of a safe, clean, healthy, and sustainable environment.[65]

> Discrimination prevents many women and girls from having a say in the critical climate and environmental decisions that will determine humanity's future. Women are excluded from law-making and policymaking, planning, monitoring, and governance related to land, forests, fisheries, food systems, chemicals, climate, energy, freshwater, and water and sanitation services.

For example, according to the latest monitoring report of gender parity levels across the Convention at the COP15, 134 Parties to UNCCD attended, with a total of 789 delegates: 577 were men; and 213 were women. This amounts to 73 per cent men and 27 per cent women, which is significantly unbalanced, albeit a slight improvement from COP14 (79 per cent men, 21 per cent women). It should also be noted that, at COP15, 46 of the 134 delegations had no women, while 12 had no men.[66] With COP16 approaching in December 2024 with the aim to achieve significant decisions to advance combatting drought, if the gender imbalance among delegates is not improved, there will be a missed opportunity to account for the perspectives, experiences, and knowledge of women in the Parties and ascertain the best, most inclusive approaches against drought.

Although the representation and participation of women in decision making processes have a powerful impact on policies and programmes, their participation needs to be meaningful and effective. For instance, even when women were equally represented among registered delegates at one of the UNFCCC climate conferences, men spoke for three-quarters of the time.[67]

As the case studies received for this research recognise, women are active agents of change when engaged in a participatory, transparent, and gender-inclusive manner and when given the opportunity to develop adequate knowledge and capacity about the various elements related to drought-related initiatives. This enables them to raise their voices, concerns, and ideas and engage meaningfully and effectively.

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65 United Nations, 2023. Women, girls and the right to a clean, healthy and sustainable environment. Human Rights Council Fifty-second session. Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment, David R. Boyd. General Assembly. A/HRC/52/33.

66 Bernard, K., 2024. Monitoring of gender parity levels across the Convention. UNCCD. Germany.

67 https://unfccc.int/news/overrepresentation-of-men-in-un-climate-process-persists

The above is especially relevant for women in science, technology, engineering, and mathematics (STEM) careers, which are often referred to as the jobs of the future, driving innovation, social well-being, inclusive growth, and sustainable development. Case studies on drought and drylands from Peru, China, Iran, and Morocco show how a diverse and talented STEM workforce prevents biases in these fields, giving women equal opportunities to pursue and thrive in STEM careers and helping narrow the gender gap.

The power of women in science, technology, engineering, and mathematics (STEM)

Equal participation and leadership of women and girls in STEM has never been more imperative. As the world struggles with climate change, hydrometeorological disasters such as drought, environmental degradation, biodiversity loss, and other critical issues, addressing women's underrepresentation in STEM could bolster technological growth and innovation and provide role models and mentors for women of all ages, especially younger generations.

Morocco: Sand To Green is a private company dedicated to agroforestry technology that is designed to rehabilitate arid lands into useful orchards. The company's technology includes deploying endemic agroforestry plantations and using solar desalination and carbon offset mechanisms for fruit and biofuel plantations irrigated by seawater desalination. This enables customers to have sustainable and healthy plantations for food products.

In Morocco, Wissal Ben Moussa and Doha Zahid, two female engineers at Sand To Green, are transforming arid areas into fertile agricultural land. Wissal Ben Moussa, co-founder and Chief Scientist Officer of Sand To Green, is an emblematic figure in the field of agroecology. As an agricultural engineer, enriched by a deep passion for the regeneration of drylands, she has unique expertise in creating agroforestry designs in arid zones based on her experience developing an experimental plantation, the Nzaha estate in the south of Morocco, on which she has worked since 2018. Her knowledge of the challenges and ecosystems of sowing regions plays a key role in developing innovative solutions for improving soil biodiversity and resilience, and she has a strategic vision and commitment to share regenerative farming methods with local communities. As head of Research and Development Project Manager at Sand To Green, Doha Zahid brings innovations to life, drawing on her schooling and experience in Senegal. An agricultural engineer by training, she specialises in revitalising degraded ecosystems, supporting Sand To Green's efforts to regenerate land and improve the living conditions of local communities.

Moussa and Zahid played a vital role in the oasis regeneration project, where they trained around 20 women from the Tiskmoudine Oasis community on sustainable and regenerative agriculture techniques. This project perfectly illustrates Sand To Green's vision to create agricultural systems that feed people while respecting the earth. Moussa and Zahid's work is not limited to physically transforming landscapes; it extends to training and empowering local communities, creating a lasting impact beyond the growth of plantations. (More information on this case study can be found in Part 2, p. 114.)

Peru: In the central Andes of Peru, the Machaca Mendieta sisters[68] migrated from Huamanga, the capital of the department of Ayacucho (central mountains of Peru, 566 kilometres from Lima), as teenagers to obtain degrees as agricultural engineers, a traditionally male career. At the university, they were discriminated against because of their sex and ethnic origin.

Their father had requested permission from the community to be away for five years to accompany his daughters while they pursued their university education, with the promise that they would return to Quispillaccta. He sold his cattle, hoping all of his children would study at the university.

Their town, Unión Potrero in the Quispillaccta community (3,860 metres above sea level, in the district of Chuschi, province of Cangallo, department of Ayacucho) was revitalised after

68 This case study builds off the article in Latina Clima, 2024. https://latinclima.org/articulos/en-tiempos-de-cambio-climatico-indigenas-peruanos-siembran-y-cosechan-agua-de-lluvia-con#:~:text=Noticias-,En%20tiempos%20de%20cambio%20climático%2C%20indígenas%20peruanos%20siembran%20y%20cosechan,de%20lluvia%20con%20conocimiento%20ancestral&text=En%20los%20Andes%20centrales%20del,agrónoma%2C%20una%20carrera%20tradicionalmente%20masculina.

being attacked and occupied in the 1980s by the terrorist group, Sendero Luminoso. The sisters were the first to return to the community at the end of the 1980s and were received with respect for returning as professionals. However, some doubted their abilities due to their gender or assumed they had returned after being unable to find jobs in the city.

In 1991, Marcela and Magdalena founded the ABA as a means to honour and sustain Andean culture. Through ABA, they sought to preserve ancient practices, such as planting and harvesting rainwater. Comprised of Quechua-speaking professionals, ABA's approach to rural development is based on interculturality and respect for nature, distinguishing them from other NGOs in the Andes.

Instead of referring to water resource management, they refer to water nurturing, an Andean concept that denotes the harmonious relationship between the community and nature. According to this concept, the community protects the water – loving and nurturing it as their ancestors once did – and there is never a lack of water, as it is cultivated and protected. "You must never stop talking to water. You must give it much love", highlights Magdalena.

Women champions

Marcela Machaca Mendieta was awarded the prestigious Sacha Prize in 2021 and honoured by the Lima Chamber of Commerce in 2024 for her outstanding contribution to Peru's development. Today, she is immersed in a new challenge: expanding the innovative initiative, "Sowing and harvesting rainwater" (SCALL), to new horizons, reaching territories, such as Costa Rica and Guatemala in Central America.

Magdalena Machaca Mendieta was also awarded the Sacha Prize in 2021 and recognised by the College of Engineers of Peru-based, Ayacucho, for her tireless work for water. In 2024, she was also honoured by the Lima Chamber of Commerce. Currently, she leads a project to scale up the initiative, "Sowing and harvesting rainwater", expanding it into new districts, together with young people trained by ABA Ayacucho as SCALL Community Extensionists, and implementing projects aimed at stimulating economic entrepreneurship and community tourism.

Photo: ©Magdalena Machaca Mendieta

Other parts of Latin America are learning from Ayacucho's experience with water conservation in drought-affected landscapes. The Machaca sisters have already built reservoirs in Guanacaste, a region northwest of Costa Rica that regularly suffers droughts. Guatemala is also interested in learning from them. (More information on this case study can be found in Part 2, p. 165).

China: The Mayuanzi Village, Anbian Town, along the southern edge of Mu Us Desert – a disaster-prone region engulfed by severe sandstorms and salt deserts with a particularly harsh natural environment – is the home of Wang Zhilan. In 1998, she took the lead in interplanting corn and pumpkins with plastic-film mulching in 100 mu (6.6 hectares) of newly contracted farmland, earning her the first award of 'champion of scientific farming'.

Zhilan began introducing and promoting economic forest varieties in 2006. Since then, she has introduced over 120 economic forest varieties and 75 varieties of green plants, flowering, and woody plants from eight provinces and autonomous regions. The area of her nursery base has reached 1,000 mu (67 hectares), and more than 300 varieties have been cultivated. Various grafting techniques have been summarised and popularised, and more than 6,500 mu (434 hectares) of trees have been grafted and improved for returning farmland to forests and afforestation in barren hills.

Zhilan is the general manager of Ronglan Desert Governance Company in Dingbian, a company that has established 11 demonstration bases as a leading firm of agriculture industrialisation in Yulin City, including an agricultural high-tech promotion and demonstration base in Yangling Demonstration Zone and a Green Project Demonstration Base in Commemoration of International Women's Day. The company has been recognised as an exemplary organisation in popularising science, benefiting farmers, and improving people's livelihoods. In recent years, Zhilan has been engaged in the cultivation, demonstration, and popularisation of tree species best suited for desertification restoration and control, making new contributions to desertification governance. (More information on this case study can be found in Part 2, p. 128.)

Over the past 15 years, the China Green Foundation's "Million Forest" project has actively mobilised women. Sečen Gerel, a herder from Huitu Gaole Gaqaa in Alxa Left Banner, in Inner Mongolia, China, has played an important role in innovative afforestation and nurturing protection since 2019. Gerel has inherited and developed many traditional land management techniques, including water conservancy projects, afforestation, and soil conservation.

In 2019, she began researching the effects of different plants on soil improvement and experimented with planting tree species that can survive in harsh conditions. Her family's sandy land has become an experimental field, planting the drought-resistant and environmentally suitable seedling, *Hedysarum scopariums*. Gerel's practice is not just about planting trees; it is also an exploration of ecological balance. After three years of growing *Hedysarum scopariums* in forests, Gerel discovered that sheep enjoy its leaves and seeds immensely. After multiple observations, Gerel and the Million Forest project team innovated the *Hedysarum scoparium* rotational grazing technique.

Gerel holds an essential position in community organisation and decision making. Her deeds have inspired the surrounding pastoralists. To support the development of the community, Gerel established rural cooperatives, sharing innovative desert control techniques and experiences, mobilising multiple pastoralists in the community to participate in desertification prevention and control, and collectively restoring 20,000 mu (1,334 hectares) of land. From seedling selection to planting and maintenance, Gerel spreads knowledge through field demonstrations and word of mouth, aiding community desert governance and ecological improvement. Additionally, she actively seeks social welfare funds through the Million Forest initiative, providing afforestation funds to economically disadvantaged pastoralists and promoting resource pooling and integration from multiple stakeholders. With the aim to educate, she also disseminates information and experiences on desertification prevention through social media platforms and shares the ecological changes in her hometown with a broader audience concerned about desertification. (More information on this case study can be found in Part 2, p. 123.)

Photo: © Ronglan

Promising practices for women's empowerment and equal engagement in public and private spheres

Establishing women's groups to act collectively has been recognised as an adaptation strategy. Women members rely on each other's strengths to overcome individual weaknesses (e.g. literate members of the group support those who cannot read or write, women with math skills keep financial records, associates with public speaking skills talk in public gatherings, etc.) and work collaboratively to identify solutions to the challenges they face.

Some illustrative cases are provided below:

Women as leaders of high-impact movements: The Tejido/Red project follows up on the Environment and Ecology Forum held in San Andrés Huaxpaltepec, Oaxaca, **Mexico**, in April 2022. At the Forum, a resolution was issued to convene meeting spaces for dialogue among different actors of the Río de Arena on environmental challenges and community restoration efforts.

This initiative provides the tools, mainly to rural representatives and community authorities, to strengthen the internal regulations of communities and ejidos[69], as well as community agreements to care for the watershed. For this process, articulation between communities is relevant since it allows the exchange of experiences regarding successes and failures in the territory's planning and management.

A woman champion

Julia Herrera Bustos, a member of the Afro-Mexican people, is a woman environmental leader whose outstanding achievements include being a member of the Cooperation of Peoples in Defense of the Verde River (COPUDEVER), where the construction of a dam was intended, which would lead to the privatisation of the water resource, leaving the communities of the lower basin of the Verde River without this fundamental resource for life. (More information on this case study can be found in Part 2, p. 171.)

During the meetings and workshops, participants reflected on ecological issues from a gender perspective. They insisted on integrating women to understand their perspectives and incorporate them into the community analysis. The meetings between women allowed them to collectively and creatively express their viewpoints, making visible the challenges that Indigenous, Afro-Mexican, and mestizo women face. Further, the need to continue strengthening women's political participation in decision making and to recognise the fundamental role of women as caregivers and defenders of the territory was recognised.

Tapping the untapped potential: Organised women's groups are critical partners in Ethiopia's fight against hunger. The near-constant threat of severe drought has made Ethiopia one of the harshest climates in the world for farming. With 85 per cent of the population of Ethiopia living in rural areas and agriculture comprising 75 per cent of the workforce, it may seem puzzling that Ethiopia is ranked one of the least food-secure countries globally. Unfortunately, women's contributions to agriculture go primarily unnoticed and are overshadowed in a highly patriarchal society. Ranked one of the world's most gender-unequal countries in UNDP's 2019 Human Development Report, Ethiopia struggles to harness the power of women, who comprise 30 per cent of the agricultural workforce, as they are culturally disadvantaged in access to land tenure, productive capital, and decision making. To cope with this challenge, the "Ethiopia Environmental Protection Authority – Climate Change Adaptation Project" has been supporting SLM and the economic progress of women's groups.

A women's dairy cooperative, Demekistu, is restoring degraded land, diversifying its income, and securing a resilient food future. The dairy group was formed to target impoverished, rural women without land access. Thirty-five women in the Doba district were selected to create the dairy group, participating in a series of capacity building training sessions to build new skills and ensure their success. In response to the positive results of this new initiative, the women's local administration offered the use of a degraded hillside to establish a cut-and-carry fodder system to support the women with feeding their cows. In turn, the women

69 An Ejido, or communal property, is an area of communal land mainly used for agriculture. Community members farm designated plots and collectively maintain communal holdings.

are restoring the land by planting multiple plant species and have already seen improvement to the once struggling slope.

This group is not stopping at dairy production. With enough savings and momentum, they have diversified their entrepreneurship to include vegetable production and are now growing potatoes, onions, and tomatoes on rented land adjacent to their community. The women are also eager to invest in milk processing equipment to make butter and cheese as well. (More information on this case study can be found in Part 2, p. 91.)

The power of collective action: Nerquihue (a commune of Lolol in the province of Colchagua, Libertador Bernardo O'Higgins region) is located in the central area of **Chile** in the dry interior. Characterised by a subhumid Mediterranean-type climate, this area has been affected by a prolonged drought – a mega-drought – over the past 13 years.

The community-based group, *La Unidad Peumayen de Nerquihue*, led by women, was formed to find solutions to the impacts of the mega-drought, climate change and associated water scarcity and soil degradation. The group collaborates with institutions by creating networks and its members join initiatives to acquire knowledge, understand the causes of identified problems, and design and implement solutions. The group presented a territorial-scale initiative to the GEF Sustainable Mediterranean Communities project, securing technical and financial support to design and implement actions for solutions based on nature, sustainable management, and care of their territory.

This initiative made it possible to strengthen community work. It required designing an intervention strategy at the landscape scale, for which it was necessary to work together and seek training. This highlighted the commitment mainly of women who, with technical support, defined a work plan that facilitated their participation.

Lorena Droguette, the group's president, leads the actions for the benefit of the community. A mother of three daughters and one son, she is firmly committed to caring for the environment, understanding that it is the basis for development. She constantly seeks knowledge and skills through training, with the aim to support her neighbours, and she teaches others to do the same. Recognised by several institutions for her knowledge, experience, commitment, and responsibility, Droguette seeks to empower the women in her community and to believe in their capacity to make a difference. She is also an entrepreneur and has promoted fair trade initiatives. (More information on this case study can be found in Part 2, p. 154.)

Organised women in Shea Parklands: Launched in 2020, the Action for Shea Parklands (ASP) initiative seeks to restore 4 million hectares of shea parklands across the Sahel through three main technical interventions: GROW (i.e. increase the number and diversity of parkland trees); PROTECT (improve tree management and parkland governance); and PROMOTE (advocate for parkland restoration). At the community level, women leverage group structures, such as their shea cooperatives, to better preserve and manage shea parklands. For example, 40 women cooperatives in **Burkina Faso** successfully obtained land to plant and regenerate shea trees. Similarly, more than 50 women cooperatives successfully implemented local by-laws in **Benin** to ensure landscape regeneration and sustainable management and to ban harmful practices, such as tree removal for charcoal or livestock-eating shea-regenerated seedlings.

Félicité Yameogo, a Burkinabe woman known as "*Maman Karité*", is a women champion who has dedicated most of her life to women's empowerment through her engagement in the shea industry in Burkina Faso and beyond. In Koudougou, Burkina Faso, Yameogo works with a network of more than 10,000 women shea collectors and butter processors. She is also the founder of New Karikis, a small- and medium-sized enterprise (SME) that produces handcrafted shea butter for export. She raises awareness around the role of the shea trees in local communities through training and capacity building and is key in engaging rural women in activities and initiatives that protect and restore the parklands, especially creating shea tree nurseries. Yameogo is a strong advocate who encourages the Government of Burkina Faso to fight against deforestation practices while promoting agroforestry at the community level. (More information on this case study can be found in Part 2, p. 98.)

Representation in decision making forums

One of the outcomes of the project, "Enhance community, local and national-level urban climate change resilience to water scarcity, caused by floods and droughts in Rawalpindi and Nowshera, **Pakistan**", implemented by the United Nations Human Settlements Programme (UN-Habitat) with support from the Adaptation Fund, is to strengthen national level capacity to guide or direct development at the city level, considering climate change and disaster risks and impacts, especially water scarcity caused by floods and droughts.

Some measures adopted to improve gender equality within the project include assigning a gender focal point in each, executing entity and coordination mechanisms. Under these mechanisms, the Women's Development Department of Punjab and Khyber Pakhtunkhwa sits on the Project Steering Committee and is responsible for highlighting and overseeing gender-related considerations throughout the project. The Project Manager is also expected to hold a bilateral meeting with the Women's Department in Punjab and Khyber Pakhtunkhwa at least once every six months.

Lessons learned from women-led solutions

- The UNCCD stresses the importance of ensuring the full participation of women and men at all levels in programmes to combat desertification and mitigate the effects of drought. It calls for the effective participation of both women and men at local, national, and regional levels in policy planning, decision making, implementation, and the review of national action programmes.
- Promoting strong women's leadership, recognising the contributions and values of its members, and building long-term partnerships are key to the successful development model of a women's association.
- Ensuring women's equal participation in drought management is a first step in the right direction. However, case studies reveal that establishing women's groups to act collectively has been recognised as a vital adaptation strategy.
- The most gender-transformative examples of women-led solutions for drought resilience involve women taking on non-traditional roles and jobs, women acting as multipliers of knowledge, women leveraging climate information services, and women working in collectives or associations to pool resources and increase negotiating power.

Photo: © WADA

CONCLUSIONS

If there were only one smart investment that countries could make to adapt to droughts, it would be to enhance gender equality and the empowerment of women and girls. However, it must be understood that promoting gender equality and the empowerment of women and girls goes far beyond just 'allowing women to sit at the table'. Even though ensuring women's equal participation in drought management is a first step in the right direction, all of the most successful women-led approaches entail addressing one or more of the structural nodes of gender inequality.

The scientific community (e.g. IPCC AR6) has now widely acknowledged that inequalities are socially constructed drivers of risk and that efforts toward gender-responsive outcomes related to drought resilience and adaptation need to tackle the structural nature of the challenge and the multiple and intersecting forms of discrimination that women face.

Many gender-transformative examples of women-led solutions for drought resilience involve women taking on non-traditional roles and jobs, women acting as multipliers of knowledge, women leveraging climate information services, and women working in collectives or associations to pool resources and increase negotiating power.

Likewise, numerous of the most successful women-led approaches combine local, Indigenous and scientific knowledge. Therefore, it is crucial that women have equal access to vocational training, scientific study and certification opportunities so that their full potential for contributing to drought resilience and adaptation to drought can be realised.

No country is immune to drought and its impacts on food, water, and energy security, forced migration, and natural resource conflicts. Regrettably, no amount of human planning, preparation, or scientific research can completely avoid their impacts. However, preventing social catastrophes is within our collective human capacity.

The onus is on all of us to unlock the potential of half of the world's population. Disregarding the potential of half of the world's population is not merely illogical, even absurd, it is unproductive in economic terms and dangerous in the face of climate change. With women providing millions of diverse strategies for adapting to droughts, dismissing this wealth of capability would constitute a monumental oversight in our collective pursuit of addressing climate and land challenges – a misstep that we simply cannot afford.

Photo: © Karen Bernard

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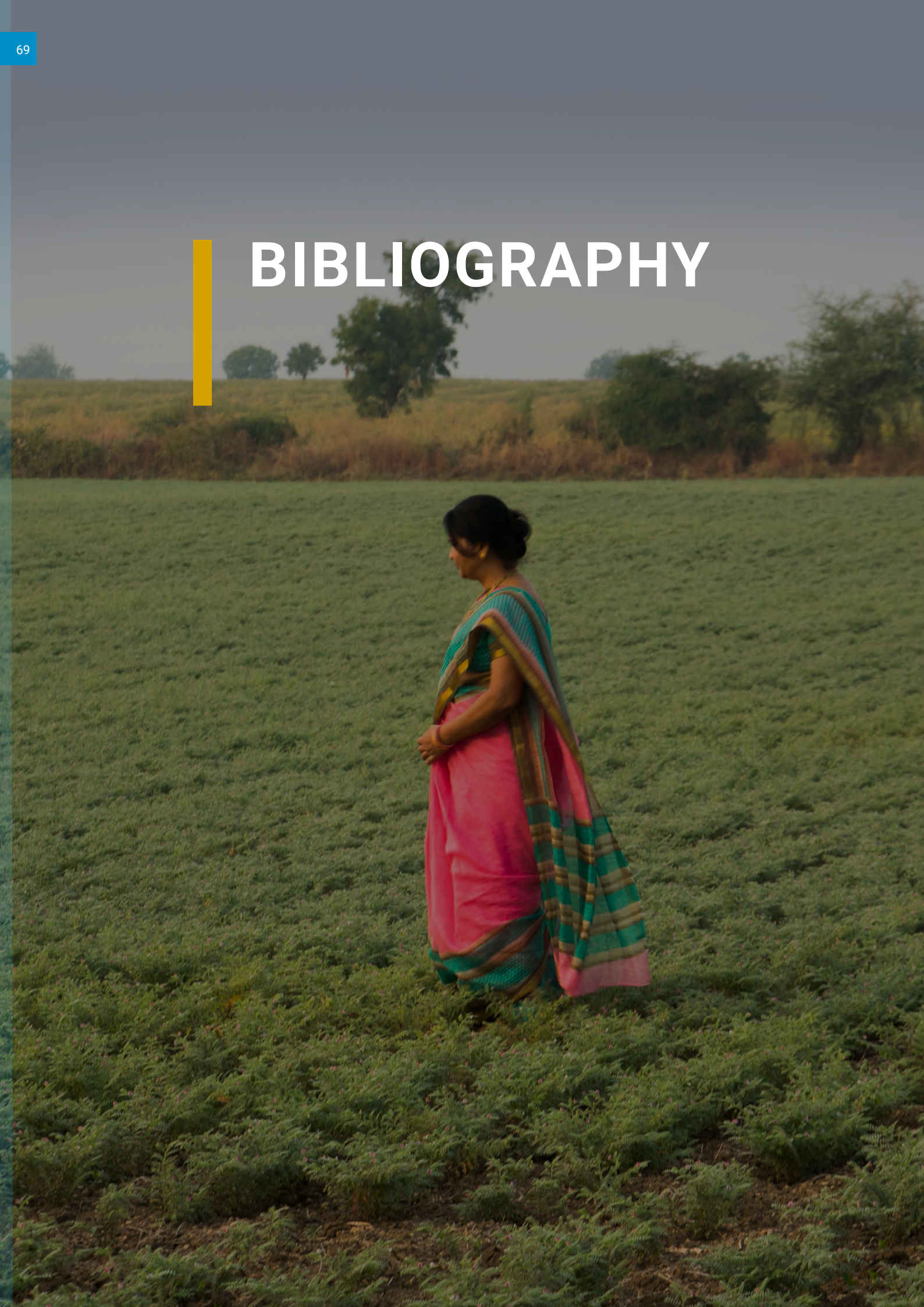

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PART 2
PROMISING PRACTICES

PART 2

AFRICA

Photo: © GSA

Grass seed banks offer women economic empowerment: **Amboseli Ecosystem Trust**

The Amboseli landscape in Kajiado County is inhabited by the Maasai Community, spanning seven group ranches totalling over 1.5 million acres. Situated within climate zone IV, characterised as arid and semi-arid, the region receives an average annual rainfall of 350–500 millimetres, mainly due to its position in the rain shadow of Mt. Kilimanjaro and the Chyulu Hills. This ecological setting favours pastoralism and wildlife conservation.

The area is highly susceptible to climate hazards, particularly droughts, which have become more frequent and severe, endangering biodiversity and livelihoods. The devastating 2020–2022 drought resulted in significant livestock losses, exceeding 70 per cent in some areas.

Women in this region bear the brunt of climate change impacts due to limited access to resources, education, economic opportunities, and household decision making power entrenched by cultural norms. This exacerbates existing gender inequalities, necessitating efforts to enhance women's adaptive capacity. Grass seed banking emerges as a climate-resilient livelihood option adopted by women, highlighting the importance of breaking barriers, empowering women, and ensuring their central role in decision making and resource control to bolster resilience.

Initiative overview

Grass seed banks are a landscape restoration initiative on a piece of land set aside for the preservation and propagation of native grass species. This restoration method involves small parts of communal land used to produce grass and grass seeds. This initiative often requires preparing, reseeding, harvesting, storing, selling, and distributing seeds of various grass species for use in habitat restoration, erosion control, landscaping, and other environmental projects. This initiative has been implemented to improve economic opportunities for local communities while restoring degraded landscapes.

Grass seed banks play a pivotal role in improving women's livelihoods by providing them with opportunities for economic empowerment. When women sell the grass seeds harvested from these banks, they generate income that significantly impacts their financial situation. Selling the harvest generates a source of income that helps to pay for school fees, healthcare, and family support or, in some cases, cattle and sheep. It also serves as an alternative livelihood, which supports the empowerment and independence of the Maasai women.

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Kenya

Women's involvement

Women within the Amboseli landscape play a key role in the sustainable management of land. Grass seed banking is a community-driven initiative where the women carry out planting, weeding, and harvesting. The harvested grass seeds are sold for other re-greening projects, thus earning the women an income.

Purpose: Grass seed banks serve as repositories of diverse grass species adapted to local climatic conditions, particularly drought. Grass seed banks preserve biodiversity and facilitate ecosystem restoration efforts by providing a source of seeds for re-vegetation and reseeding projects in degraded lands. Women's involvement in managing seed banks contributes to livelihood support, as access to drought-tolerant grass species enhances opportunities for sustainable livestock grazing, fodder production, and income generation within communities. Through their leadership in seed bank initiatives, women play a central role in promoting climate resilience and sustainable land management (SLM) practices in an otherwise drought-affected environment.

Technical interventions: Women use technical interventions, like soil bunds, trenches, and stone lines to serve as effective measures for soil and water conservation, helping to mitigate drought impacts by reducing soil erosion, improving water infiltration, and conserving moisture within the soil profile. Women play critical roles in planning and implementing these interventions, coordinating community labour, and monitoring their effectiveness over time. Through their involvement in technical interventions, women enhance soil fertility, protect agricultural land from degradation, and promote resilience in the face of recurring droughts, safeguarding the community's livelihoods and well-being.

Livelihood diversification: In response to changing environmental conditions, women diversify their livelihoods beyond agriculture. This may involve income-generating activities, such as beekeeping, handicraft production, or ecotourism ventures, which contribute to SLM while providing alternative sources of income during droughts.

Women champions

Moombi Ene Kitosisio is the chairwoman of the Tudumunye (Rise up) Women group. She is a traditional Maasai woman and a mother of eight children, all of whom – including her six girls – are attending formal education, the highest having completed high school.

Having no formal education, her livelihood revolves around livestock keeping. Due to recurrent drought caused by the effects of climate change coupled with living in an arid and semi-arid environment, she works with a group of 26 pastoral women to derive economic benefits from grass seed banking, a pure nature-based strategy to mitigate and adapt to the impacts of climate change.

Yiapoyo Ene Kilowu is the chairwoman of the Osiram women's group on the Mbirikani group ranch. She is a traditional Maasai woman with no formal education and a mother of six children, of whom only the youngest son obtained formal education through the university level. Due to the effects of climate change, the drought of 2009 decimated livestock in Amboseli. In response, a group of 36 pastoral women came together to showcase their culture to tourists through dances and the sale of traditional beadwork jewellery. With support from the Amboseli Ecosystem Trust, they were introduced to grass seed banking as a nature-based solution to enhance ecosystem and community resilience.

Mbachacha Ene Keteko is the chairwoman of the Osiligi (Hope) women's group on the Kuku group ranch. She is a traditional Maasai woman with no formal education and a mother of seven children, some of whom have completed high school. Living in the dry village of Moilo, there are limited livelihood alternatives to livestock keeping, which has led 10 women to embark on grass seed banking as a nature-based strategy to address the effects of climate change.

Kenya

Challenges

Human-wildlife conflict: One of the primary challenges faced in maintaining the integrity of the grass seed bank is the persistent issue of human-wildlife conflict. This conflict arises when wildlife species intrude upon or damage the fences surrounding the seed bank, destroying matured grass seeds and consuming the grass. The consequences of such conflicts can be multifaceted. First, the physical damage to the fence compromises its ability to secure the grass seed bank, rendering it vulnerable to further intrusions by wildlife and livestock and potential theft by humans. Second, direct grass consumption by wildlife depletes the valuable resource intended for conservation efforts and disrupts the ecosystem balance, impacting local biodiversity and potentially leading to habitat degradation.

Threat of drought: Another significant challenge women who work in grass seed banks face is the threat of drought. The success of grass seed banks heavily relies on adequate rainfall for the germination and growth of the grass seeds. However, during periods of drought, precipitation levels decrease, leading to conditions that inhibit seed germination and hinder grass growth. This poses a direct obstacle to the efforts of women involved in seed bank initiatives, as their ability to harvest and sell grass seeds becomes severely constrained.

Empowering women to manage drought-prone lands: **Amkeni Wamama**

Ituri Province is one of the regions affected by drought, with devastating impacts on local populations, particularly women and children. The effects of global warming are evident on the population and the environment, particularly the rise in temperature with intense heat, climatic disruptions increasing food crises, and reduced quality of water for diverse uses in the community. This project aims to strengthen the capacities of 80 women and girls in four villages (Bembey, Rwampara, Tokodo, and Mandro) to develop and implement innovative solutions for drought resilience, improve women's access to the resources and technologies needed to cope with drought, and promote women's participation in decision making on climate change.

Initiative overview

The project is structured around three main axes:

1. Support for local initiatives: The project supports local initiatives led by women and girls that contribute to drought resilience.
2. Capacity building: The project provides training and workshops to women and girls to strengthen their skills in agroforestry, soil conservation techniques, drought-resistant crops, and environmental protection, enabling them to develop and implement innovative solutions for drought resilience.
3. Women's empowerment: The project promotes gender equality and the active engagement of women in decision making in diverse spaces.

Beneficiaries will be supported in planting at least 50 trees per beneficiary in each village. They will be mobilised to make space profitable as a result of agroforestry and crops. The trees will help improve the air quality in the community and serve as a means of empowerment. Corn, beans, and soy will be used to feed their households and encourage financial autonomy. The beneficiaries will design and build improved stoves that they can also resell to meet the various needs of their families; these are stoves that use reduced amounts of fuel, which is beneficial for air quality and environmental health. This project aims to contribute to SDGs 13 (climate action) and 15 (life on land).

Women's involvement

In Ituri Province, women play a crucial role in managing drought-prone lands. They are often the first to experience the impacts of drought and have developed unique knowledge and practices to cope. In the agricultural sector, women represent most of the workforce and play an essential role in the family economy and the country. Women collect and transport water for domestic consumption, garden irrigation, and livestock farming. They manage water resources sustainably and equitably, and are adopting water conservation techniques, like rainwater harvesting and drip irrigation.

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As women are responsible for agriculture and food processing in the home, they are responsible for changes, such as cultivating drought-resistant crop varieties using sustainable techniques. They diversify food sources to guarantee family food security, plant legumes to fertilise the soil, trees, and shrubs to combat erosion and desertification, use improved stoves to reduce excessive firewood consumption, and apply soil conservation techniques, such as mulching and crop rotation, to protect biodiversity and natural resources.

In household waste management, biodegradable waste is preserved and used to fertilise fields, and nondegradable substances are disposed of sustainably. Waste is recycled and transformed. Women also plant fruit trees and lawns to combat erosion and maintain the soil.

Women raise awareness in communities about the dangers of drought and provide information and education on SLM practices. They educate children on the importance of environmental protection, reforestation, and agroforestry to improve fertility and diversify food sources. Further, they take on leadership roles in local organisations and development initiatives, contribute to the research and development of sustainable solutions to drought, and mobilise funds to organise meetings and community awareness on women's roles in environmental protection. Women are key actors in managing drought-prone lands. Their contribution is essential to strengthen community resilience to climate change and guarantee a sustainable future.

Women champions

At the community level:

- Local women leaders have proven experience in natural resource management and community mobilisation (women from religious faiths, women from local women's associations).
- Innovative farmers develop sustainable and drought-resistant agricultural techniques.
- Mothers and educators raise awareness among families and communities about the dangers of drought and encourage environmental conservation practices.
- Artisans and entrepreneurs use local natural resources to create artisanal products and generate income for their families, drawing on the extensive knowledge of local women on the use of medicinal plants to combat the effects of drought.
- Women living with disabilities are often the most vulnerable to the impacts of drought, and their inclusion is essential for inclusive and sustainable projects.
- Displaced people, unmarried mothers, community leaders, Indigenous peoples (Pygmies), as well as other stakeholders intervene in this area.

On a national level:

- Experts on the environment and climate change bring their scientific and technical expertise to the project.
- Women leaders of CSOs advocate for women's rights and environmental protection.
- Women politicians (members of parliament, senators, etc.) contribute to the development and implementation of sustainable development policies.
- Researchers and academics carry out research on innovative solutions to drought.

At the regional level:

- Representatives of regional organisations facilitate collaboration and the sharing of experiences between women in the region.
- Researchers and academics carry out research on innovative solutions to drought.
- Communicators raise public awareness of the problem of drought and the importance of women's participation in addressing it.

Challenges

Hindered access to essential resources, equipment, and training: Women have difficulty accessing natural resources, like land, water, and financial credit. They lack the equipment and technologies necessary to implement their innovative solutions, and face cultural and social obstacles (e.g. lack of right to inheritance). Support is needed to mobilise financial resources for women's projects and to provide women with necessary training and information to strengthen their leadership and land management skills and gain technical support to be able to adapt technologies and practices to their specific local contexts.

GBV and discrimination: Women face risks of GBV and discrimination, preventing them from fully participating in decision making and land management at both family and community levels.

Strengthening honey production and processing through the engagement of 'The Queens of Bees': **Promoting women in beekeeping – APISEN**

In Senegal, men traditionally practice beekeeping due to the aggressiveness of bees, the physical labour involved, and the timing of honey harvesting (at night). As a consequence, women have been systematically excluded from production to occupy a secondary role in the processing of hive products. Given their involvement in household management, women require support to move towards more inclusive socio-economic development to guarantee the resilience and empowerment of households through income-generating activities.

Phase 2 of the "Burru-Yambi: The Queens of Bees" project is intended to promote the involvement and emergence of women in the beekeeping sector and to capitalise on, and respond to, the needs identified in the previous phase. Concerning the need for income-generating activities, the aim is to capitalise on women's knowledge and strengthen it through training and to initiate the purchase of new equipment for the honey processing unit to optimise tools and increase productivity and sales. Concerning the need for technical, organisational, and communication support, staff from the Association of Beekeepers of the Ziguinchor region for Senegal (APISEN) will provide training to beneficiaries. The needs of women will be further supported through assistance to APISEN and the beneficiary network that will be created. The initiative's sustainable approach is based on raising awareness of the need to consume local, healthy, quality products.

Initiative overview

APISEN, created in 2015, aims to support the beekeeping industry's development in the Ziguinchor region, with the aim to protect the environment and modernise beekeeping practices. The association's objectives include creating sustainable, local activities involving everyone, based on solidarity, and fighting poverty by and for women. As a result of phase 1 of the Burru-Yambi: Queens of Bees project, the women of Niaguiss now have a honey production and processing unit. The current project aims to develop and optimise this unit further, as it is no longer generating sufficient income to ensure a viable economic situation. This production and processing unit, managed by women of all backgrounds from the commune of Niaguiss, is an initiative working towards the empowerment of these women, through the knowledge they possess, training and support to help them in their activities, and an environmentally friendly approach: values that are central to APISEN.

The project aims to empower women through economic and financial self-sufficiency via two main spheres: strengthening honey production and processing activities; and training.

Strengthening honey production and processing: To strengthen the honey production and processing unit, new equipment will be obtained and staff will participate in training on the use of this new equipment, to improve the control of processes. This, in turn, will improve production and processing methods, making the production processes faster, more efficient, and more consistent with producing

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healthy, high-quality goods as part of a sustainable society and raising consumer awareness of local, organic, and quality consumption.

Training: The training component will promote women's social economy and meet their needs for accompaniment, skills acquisition, and knowledge consolidation. Women will benefit from management training on value creation, distribution, and finance, as well as from marketing and communications training to build their knowledge of sales and communications techniques. In addition to building the capacity and knowledge of women participants, these trainings will also enable them to come together to meet other beneficiaries, exchange ideas, and provide each other with moral support.

Women's involvement

Gender equality represents a significant objective for this project. A country's economic growth accelerates with women's full participation in the workforce and full and equal participation in activities aimed at improving food security, reducing poverty, and activating sustainable development. Without gender equality and women's economic and social empowerment, achieving all of APISEN's objectives would be impossible. Gender equality is a fundamental human right; promoting it is essential in all areas. Through the project, the professional opportunity for women in Casamance results in visibility, empowerment, responsibility, and equal participation alongside men in all areas of life. The specific objective is to contribute to fully exercising women's social rights to ensure decent living conditions conducive to full citizenship.

The resilience and drought adaptation dimensions of the project should be taken into account. APISEN's activities are based on initiatives in line with the pillars of sustainable development, and the production and processing of honey carried out within the unit helps to combat food waste with a zero-waste trend by processing raw materials for a longer lifespan, thus limiting the disposal of spoiled or surplus materials.

As for innovative and effective solutions led by women, these will result in women's and girls' empowerment through the income they receive from the activities they set up. They can pass on their knowledge and organise themselves into groups with other women to diversify the activities and products they offer. Several results are expected: use of management skills; creation of income-generating activities; use of marketing and communications skills; increase in unit productivity and therefore sales; improvement in product quality; expertise in production and processing procedures; and innovation in honey production and processing methods. Several indicators, both qualitative and quantitative, are also proposed.

Women champions

Project beneficiaries are 200 female members of APISEN and their associated households (counting on average five additional people), and the surrounding community (family/neighbourhood) of each direct beneficiary. The target groups are the association, its members with the production and processing unit and, in particular, those who will be trained to provide training, women, households surrounding the unit, and the direct beneficiaries. It is also important to note that women beekeepers who are members of APISEN lobbied the association's executive office to implement phase 2 of the project. They were, therefore, consulted to identify their needs, capacities, and vulnerabilities. They took part in the reflection process leading to phase 2 of the project and actively contributed to defining the results and expectations of phase 2. Aware of the positive externalities that phase 2 of the project could generate, they defined the strategies and joint action plan so that phase 2 of the project succeeds. Thus, even if beekeeping is at the forefront of phase 2 of the project, other women's activities (e.g. oyster farming) will be integrated indirectly. Phase 2 of the project plans to set up a consultation and monitoring committee in which women beekeepers who are members of APISEN will be integrated.

Senegal

Challenges

Experimental nature of the project: This project is a social innovation that is intended, above all, to be experimental. The project aims to experiment with the adoption of new strategies that involve women in APISEN's training and governance structures for modern and eco-responsible beekeeping while ensuring that men become allies of these strategies. Therefore, phase 2 of the project involves transitioning from traditional to modern beekeeping by integrating a strong gender perspective. The innovation lies in the approach and the process to actively engage and represent women in beekeeping.

Willingness: The project relies upon the will and determination of women to learn about modern eco-responsible beekeeping and become autonomous and resilient, despite the stereotypes that generate resistance and obstacles for women to practice beekeeping.

Consideration of women's schedules: Raising awareness remains the appropriate mechanism to achieve a more inclusive, eco-responsible modern beekeeping that integrates gender in its development as a sector. It must consider women's cultural calendar and religious and cultural ceremonies to succeed.

Flowering period: Beekeeping, in its development, must take into account the flowering period of plant species to be profitable. An incorrect calculation or failure to control this flowering period lends to an unproductive beekeeping campaign. Therefore, any delay in action is not permitted in beekeeping. All interventions or activities should be planned and carried out at the appropriate time.

Supporting women's incomes through market gardening during the dry season and reinvesting in a women's group: **Association Kandili**

Association Kandili hosts podcast episodes on change makers in West Africa's food and climate change sectors. Kandili aims to voice innovative and effective initiatives led by women to address drought, loss of biodiversity, agroecology, and food issues in Niger.

The women of the CERNAFA group, who are driven by firm solidarity, obtained land thanks to an ingenious strategy of 'onion contributions/membership' to develop their market gardening activities for sale and family nutritional needs. Their production is free of chemical fertilisers and pesticides, demonstrating remarkable community resilience, water resource management, consideration of biodiversity for agriculture, and a capacity to adapt to drought despite highly arid conditions.

Initiative overview

In 2002, the CERNAFA women's group was established by the women of Djoga with the main aim to offer all women in the community an income opportunity through market gardening during the dry season. Their business involves growing lettuce, onion, cabbage, and other vegetables to meet the nutritional needs of their households and to earn an income. Initially, they developed a first market garden site equipped with wells and fencing to secure the site, covering approximately 350 square metres per woman. Twelve years later, in 2014, the group experienced significant expansion, counting 247 women across four sites totalling approximately 19 hectares.

Women's involvement

The women of the CERNAFA group stand out for effectively mobilising resources and reinvesting them to benefit the market gardening community. Each woman member contributes to savings at each harvest by depositing 10 per cent of her onion production. During onion season, the bag's value is estimated at FCFA 10,000 (EUR 15.25). The CERNAFA group stores the onions for several months to resell them during more favourable periods when prices are higher, reaching around FCFA 40,000 (EUR 60.99) per bag.

Within the group, the women responsible for marketing sell onions at the Torodi market or are contacted directly by resellers. In 2014, the women estimated that they stored the equivalent of 100 bags of onions, with a loss of around 20 per cent and a sale of 80 bags, thus generating a substantial income to reinvest in the expansion of the market gardening community. Profits from the sale of onions are used to provide equipment to women, maintain the sites, buy seeds, build an onion storage facility, and build savings to acquire new plots.

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Niger

Challenges

Storage capacity: In the agricultural sector, more extensive capacity storage facilities are lacking to accommodate increased harvests and mitigate losses ranging from 10–90 per cent due to inadequate storage technologies.

International market: Local producers need help competing with larger international players, like the Netherlands and Burkina Faso, in the onion market.

Risk of attacks: Production is hindered by the risk of attacks in certain regions, leading to declines in output.

Training and knowledge sharing opportunities: Addressing these challenges requires additional training and knowledge sharing initiatives with neighbouring villages to enhance agricultural resilience and competitiveness.

Bridging the gender gap in accessing and utilising climate information while harnessing women's leadership potential to drive climate action: **Christine Akwero Foundation Uganda**

Recognising the disproportionate impact of climate change on women and their critical role in agricultural and rural communities, the Christine Akwero Foundation Uganda initiative aims to empower women leaders in leveraging climate information services. Women in many parts of the world are primary caregivers, responsible for household food security, and heavily involved in agricultural activities. However, they frequently face significant barriers in accessing resources, information, and decision making platforms due to socio-cultural norms and systemic inequalities.

In many regions, climate change exacerbates existing challenges, such as erratic weather patterns, prolonged droughts, and increased frequency of extreme weather events. These changes directly affect agricultural productivity, water availability, and food security, further marginalising vulnerable populations, particularly women and smallholder farmers.

Recognising these challenges, the initiative seeks to address the gender gap in accessing and utilising climate information services. Climate information services provide timely and localised weather forecasts, early warning alerts, and advisories tailored to the needs of specific communities. By equipping women leaders with access to these services and building their capacities to interpret and disseminate climate information effectively, the initiative aims to enhance the resilience of rural communities, particularly in the face of climate-related disasters, such as droughts.

Women leaders play a pivotal role in this initiative as they often serve as key communicators and decision makers within their communities. The initiative fosters more sustainable and resilient livelihoods by empowering women with the knowledge and tools to understand climate risks and adapt agricultural practices accordingly.

Initiative overview

The initiative to empower women leaders through the utilisation of climate information services is a multifaceted approach to enhancing community resilience to climate change impacts, particularly in vulnerable rural areas. At its core, the initiative focuses on bridging the gender gap in accessing and utilising climate information while harnessing women's leadership potential to drive effective climate action at the local level.

Central to the initiative is providing climate information services tailored to the needs of specific communities. These services encompass a range of resources, including localised weather forecasts, early warning alerts for extreme weather events, such as droughts or floods, and advisories on climate-smart agricultural practices and disaster preparedness measures. By delivering timely and relevant information, the initiative enables farmers, particularly women, to make informed decisions regarding crop planning, water management, and livelihood diversification.

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A vital component of the initiative is empowering women leaders within rural communities, recognising their pivotal role in agricultural activities and household food security. Despite their importance, women often encounter obstacles in accessing resources and participating in decision making processes. The initiative aims to equip women leaders with the necessary skills to effectively interpret and disseminate climate information through capacity building workshops, training sessions, and knowledge sharing platforms. By strengthening their technical and leadership capacities, these activities amplify women's roles as agents of change in building climate resilience. Additionally, by fostering networking and collaboration among women across different communities, the initiative creates spaces for sharing experiences and best practices. This peer learning approach promotes collective action towards climate resilience, ultimately enhancing the initiative's overall impact.

Crucially, the initiative adopts a participatory and gender-responsive approach, ensuring women's voices and priorities are central to decision making processes. Women are actively involved in designing, implementing, and monitoring early warning systems, adaptation projects, and community-based initiatives. This enhances the relevance and effectiveness of climate interventions and contributes to advancing gender equality and social inclusion.

Women's involvement

In drought-prone locations and regions, women play essential roles in SLM, contributing significantly to agricultural production, food security, and community resilience. Their roles are multifaceted and often intersect with various aspects of natural resource management, livelihood strategies, and adaptation to climate change. Several key roles played by women in SLM in such areas include the following:

- Agricultural production and crop diversity: Women are often responsible for crop cultivation and management, especially in smallholder farming systems prevalent in many drought-prone regions. They engage in diverse agricultural activities, including planting, weeding, harvesting, and seed saving. Women frequently prioritise crop diversity, selecting and preserving traditional varieties resilient to drought conditions. By cultivating various crops, women contribute to biodiversity conservation, soil fertility enhancement, and resilience against climate variability.
- Water management and irrigation: Water scarcity is a significant challenge for agricultural production in drought-prone areas. Women are typically responsible for water collection, management, and utilisation in households and farms. They often develop innovative water-saving techniques, such as drip irrigation, mulching, and rainwater harvesting to mitigate the impacts of drought on crop yields. Women's knowledge of local water sources, traditional water management practices, and Indigenous irrigation systems is crucial for optimising water use efficiency and sustaining agricultural productivity in water-stressed environments.
- Soil conservation and agroforestry: Women play key roles in soil conservation and agroforestry practices, which are vital for maintaining soil health, preventing erosion, and enhancing land productivity. They are involved in terracing, contour ploughing, and tree planting to mitigate soil degradation and improve soil moisture retention. Agroforestry systems, which integrate trees with crops and livestock, provide multiple benefits, such as shade, nutrient cycling, and carbon sequestration. Women often lead the establishment and management of agroforestry plots, contributing to biodiversity conservation and climate change mitigation efforts.
- Livestock management and pastoralism: In many drought-prone regions, pastoralism is a common livelihood strategy, with women actively involved in livestock rearing, herding, and animal healthcare. Women possess traditional knowledge of rangeland management, mobility patterns, and drought coping strategies essential for sustaining pastoral livelihoods. They play critical roles in conserving rangeland ecosystems, ensuring the sustainable use of grazing resources, and maintaining livestock resilience amidst drought-induced forage scarcity and water stress.
- Community-based natural resource management: Women often participate in community-based natural resource management initiatives aimed at conserving biodiversity, restoring degraded landscapes, and mitigating the impacts of climate change. They engage in reforestation, watershed protection, and community-based conservation projects, contributing to ecosystem resilience and livelihood diversification. Women's involvement in community decision making processes and environmental governance structures is essential for ensuring the equitable distribution of benefits and the inclusion of marginalised groups in SLM efforts.

- Seed preservation and traditional knowledge: Women are custodians of traditional knowledge related to seed selection, preservation, and crop management practices passed down through generations. They play crucial roles in maintaining seed diversity, conserving landraces adapted to local agroecological conditions, and preserving genetic resources for future generations. Women's seed networks and community seed banks serve as repositories of resilience against drought and other environmental stresses, safeguarding agricultural biodiversity and food sovereignty.
- Climate information dissemination and disaster preparedness: Women often serve as information brokers and knowledge disseminators within their communities, relaying weather forecasts, early warning alerts, and adaptation strategies to farmers and households. They are key in raising awareness about climate change impacts, promoting disaster preparedness measures, and facilitating community resilience-building initiatives. Women's leadership in climate-related education, communication, and capacity building activities strengthens local adaptive capacity and fosters collective responses to drought and other climate-related hazards.

Women champions

Laker Jolly Grace is a seasoned farmer and community leader from a rural village in Northern Uganda, a drought-prone region. With decades of experience in sustainable agriculture and water management, Jolly has become a respected figure in her community. She actively promotes climate-resilient farming practices, including crop diversification, rainwater harvesting, and soil conservation techniques. Jolly's leadership extends beyond her farm, as she organises training workshops and demonstration plots to share her knowledge with other farmers. She is passionate about empowering women in agriculture and serves as a mentor to young women aspiring to enter the farming profession.

Akwero Christine is a dynamic entrepreneur and environmental activist based in Northern Uganda where droughts pose significant challenges to agriculture and livelihoods. Recognising the importance of SLM, Christine founded a women's community-based organisation focused on organic farming and agroforestry. Under her leadership, the organisation has implemented innovative projects, such as community nurseries, reforestation initiatives, and sustainable agricultural production. Christine is a strong advocate for women's rights and environmental stewardship, and she actively engages with policy makers to promote policies that support smallholder farmers and conservation efforts.

Lacaa Jennifer is a climate scientist and researcher who specialises in climate change adaptation and resilience-building strategies. Jennifer provides valuable scientific insights and technical support to community-based organisations and government agencies involved in SLM initiatives. Through her work, she collaborates closely with local communities to co-produce climate information services tailored to their needs and priorities. Jennifer is also a passionate advocate for gender-responsive approaches to climate action, emphasising the importance of women's participation and leadership in adaptation planning and decision making processes.

Aringo Monica is a community organiser, a schoolteacher, and an Indigenous leader representing marginalised populations in Northern Uganda, which is prone to water scarcity. Drawing on traditional ecological knowledge and Indigenous practices, Monica advocates for the preservation of ancestral lands, biodiversity conservation, and the safeguarding of cultural heritage. She leads community-led initiatives to restore degraded landscapes, revive traditional farming methods, and promote sustainable livelihoods based on Indigenous values of reciprocity and stewardship. Monica's advocacy efforts have led to greater recognition of Indigenous rights and inclusion in natural resource management policies and programmes at the regional level.

Challenges

Despite their valuable contributions, women champions in SLM face various challenges and encounter gaps that hinder their effective efforts to address environmental and social issues. Some of these challenges include:

Limited access to resources: Women often have less access to land, credit, inputs, and technologies than men, restricting their ability to implement SLM practices. Limited access to resources exacerbates gender disparities in agricultural productivity and perpetuates cycles of poverty and vulnerability, particularly in drought-prone regions where resource constraints are heightened.

Social and cultural norms: Deep-rooted gender norms and stereotypes often restrict women's participation in decision making processes and leadership roles within their communities. Patriarchal attitudes may undermine women's credibility and authority as champions of SLM, leading to marginalisation and exclusion from key decision making forums and resource allocation mechanisms.

Lack of technical skills and training: Women champions may face barriers in accessing formal education and technical training opportunities, limiting their capacity to adopt and implement innovative land management practices. Inadequate technical skills and knowledge gaps related to climate-smart agriculture, water management, and agroecology hinder women's effectiveness in addressing environmental challenges and adapting to changing climatic conditions.

Limited access to markets and value chains: Women farmers often encounter challenges accessing markets, obtaining fair prices for their produce, and participating in value-added activities along agricultural value chains. Structural barriers, such as market discrimination, a lack of market information, and inadequate market infrastructure, constrain women's economic opportunities and undermine the sustainability of their land management practices.

Institutional and policy constraints: Weak institutional support, ineffective policies, and inadequate enforcement mechanisms hinder the integration of gender considerations into land management policies and programmes. Women champions may face bureaucratic hurdles, legal barriers, and institutional biases that impede their ability to influence policy decisions, access public resources, and advocate for gender-responsive approaches to SLM.

Training women leaders to develop and run an agroecological farm and nursery: **Association Diaoule D'Abord**

In the heart of the Senegalese savannah, the Commune of Diaoulé is deeply impacted by the challenges imposed by climate change. Increasingly severe drought is depleting the land and threatening agricultural land, jeopardising the food security of communities. In this challenging context, the women of Diaoulé, guardians of the land and pillars of the local economy, have chosen to take the lead in transforming adversity into opportunity.

The agroecological farm and nursery adapted to climate change is a locally driven adaptation project, with the fight against desertification as its driving force. Women are the architects of a greener future. By adopting agroecological practices, they are helping create a sustainable agricultural system that respects natural cycles and enhances biodiversity. The women's nursery is the project's centre, a biodiversity cradle producing drought-resistant plants. These carefully selected varieties are then transplanted to the revegetation areas and forest gardens, forming a robust ecosystem capable of withstanding the vagaries of the climate. Water is managed sparingly, using solar drainage and drip irrigation techniques to limit water stress on crops.

The women receive training in agroecology, water management, and sustainable production. These skills enable them to successfully manage the farm and become agents of change in their communities. Therefore, the agroecological farm and nursery project is more than a response to drought; it is a sustainable development model highlighting women's crucial role in the fight against desertification.

Initiative overview

The "Agroecological Farm and Nursery Adapted to Climate Change" initiative, in the commune of Diaoulé, Senegal, is a bold and innovative response to the harmful effects of climate change, particularly the droughts that affect this region. Central to this solution is the emancipation of women, who are both the driving force and the beneficiaries of this project.

The objectives of this initiative are manifold. It aims to promote sustainable agricultural practices essential for resilience in climate fluctuations. The agroecological farm adopts a holistic approach, integrating soil conservation techniques (e.g. minimum tillage, mulching, and organic compost use) with water management strategies (e.g. energy-saving solar irrigation systems and water retention practices). These methods aim to increase soil fertility, save water, and maximise crop yields despite challenging conditions.

The nursery, central to the project, is a critical innovation that catalyses change. It is a propagation centre for native and drought-resistant plants, which are then used to reforest farmland and restore degraded ecosystems. This improves crop resilience to water stress and contributes to the region's biodiversity and environmental health.

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The women of Diaoulé are the real pioneers of this initiative. They receive technical and managerial training that equips them to run and develop the farm and nursery. This enables them to become agro-ecological entrepreneurs capable of generating income while acting as guardians of their environment. By placing them at the forefront, the project strengthens their ability to manage natural resource sustainably. It promotes gender equality and female empowerment in a region where women are traditionally the breadwinners.

The initiative builds on the synergy between tradition and innovation, integrating ancestral agricultural knowledge with new environmentally sound techniques to create a production system that is both environmentally friendly and economically viable. With a strong emphasis on training and skills development, the project aims to create a sustainable model that can be replicated in other communities facing similar challenges.

Women's involvement

The women of the Diaoulé community have played a crucial role in the community's greening process, particularly in promoting agroecology and women-led nurseries, which are innovative solutions for resilience and adaptation to drought. Women's involvement in these initiatives is a matter of equity and representation and an effective strategy for natural resource management and climate change mitigation.

The enthusiasm and tenacity that the women bring to this work has enhanced the dissemination of agroecological knowledge and techniques. Through training sessions and workshops, women share their experiences and skills, strengthening their capacity to manage land sustainably and adapt to climate variability.

The strategies and approaches that the women use have contributed to environmental safeguarding. Women have adopted farming methods that maintain and improve soil health, such as composting, crop rotation, and agroforestry. These techniques enrich the soil, increase water retention capacity, and minimise the need for costly and potentially polluting chemical inputs, resulting in greater land productivity and resilience to extreme weather events.

Women also initiated a forest park project, which aims to regulate climatic conditions and address significant environmental challenges, including sustainable forest management. The project has enabled local communities to adopt resilience strategies to combat environmental degradation and the adverse effects of climate change.

The women of Diaoulé have also established nurseries, demonstrating expertise in selecting appropriate species and managing young plants, a crucial measure in ensuring the survival and growth of plants in challenging conditions.

There are five village nurseries, one already established at the agroecological farm, with a capacity of 100,000 plants, and four others with a capacity of 50,000 plants each, totalling 300,000 plants per year. Reforestation sites will be defined and delineated in each of the 10 selected villages, along with the village chief and the President of the Communal Environment Commission. Prerequisites including making water available through solar pumps, fencing the site with wire mesh, and training male and female nursery workers.

The project will benefit all 10 target villages. Ultimately, over 200 farmers will directly benefit from the project, along with more than 5,000 residents in the 10 target villages and neighbouring areas. The community benefits include the creation of hybrid forest gardens within agricultural farms to restore vegetation cover and enhance local biodiversity, diversification of smallholder farmers' income sources through the sale of non-timber forest products, promotion of ecological corridors to enhance ecosystem resilience, and sustainable natural resource management to adapt to climate change. The project plans to reforest 100 hectares and protect 200 hectares per village annually for five years, totalling 1,500 hectares reforested over the project's duration.

Women champions

Ndeye Khady Ndiaye, a local inspiration with a passion for agroecology, has transformed her ancestral knowledge into innovative practices. She leads a model farm where she integrates water-saving techniques and soil conservation. Through her leadership, she has created a community nursery that provides drought-resistant plants to local farmers, enhancing food security and economic independence in her community. Her collaborative approach has not only improved local resilience, it has also caught the attention of national policy makers, who seek to replicate her resource management model.

Maimouna Faye, a visionary in the field of permaculture, has demonstrated how a small agroecological farm can have a significant impact. She developed a solar-powered drip irrigation system, drastically reducing water consumption. She organises workshops to train other women, empowering them to become agents of change in the fight against drought. Her commitment to sustainability and innovation has made her a prominent figure in regional forums on sustainable agriculture.

Ndeye Sene is in charge of finances derived from reforestation. She has established a Village Savings and Credit Association, enabling women to cultivate and sell vegetable plants while preserving biodiversity. Her work has strengthened environmental resilience and fostered a sense of belonging and pride among the women in the community, who are now seen as guardians of their natural and cultural heritage.

Each of these women illustrates the positive impact that female leadership can have on resilience and adaptation to environmental challenges, such as drought, at various levels of society.

Challenges

The agroecological farm and nursery projects, led by women, emerge as promising solutions to strengthen resilience and adaptation to drought conditions. However, the women leaders face numerous challenges and gaps that are crucial to recognise and address.

Lack of access to resources: Women, in general, have less access to land, financing, training, and agricultural technologies than men. This imbalance limits their ability to establish and expand agroecological projects. Land constraints may prevent women from implementing sustainable practices on a large scale, reducing the potential impact of their efforts.

Recognition and valorisation of their work: Although women-led projects can be very effective, they often need more visibility and institutional support. This is presumably because, as a marginalised group, they go unseen. Recognising their crucial role in combatting the effects of climate change is necessary for these projects to gain the political and social support that could accelerate their impact.

More specific agroecology training: Women need access to education or training to help them apply the best agroecological practices. Without this, their ability to innovate and improve their methods may be hindered and, without it, optimising water use, conserving biodiversity, and increasing productivity sustainably becomes difficult.

Workload: Women often manage both household and agricultural responsibilities, which can limit the time and energy they have to devote to their agroecological projects.

Yet, in the face of these challenges, agroecological farm and nursery projects led by women demonstrate enormous potential. When women are supported and empowered, they can become powerful agents of change, promoting sustainable agricultural practices that benefit both the environment and their community. By investing in gender equality, training, and access to resources, these projects can become models of sustainable development and resilience.

Ethiopia

Supporting women in watershed conservation and integrative farming: **Organised Women's Group Building their Resilience Capacity**

Over 85 per cent of Ethiopia's communities' livelihoods rely on rain-fed agriculture and are highly vulnerable to the impacts of climate change. With increasing rainfall variability, ecological degradation, higher frequency of extreme rain, temperature spikes, and frequent floods combined with prolonged droughts, about 8.2 million people are already considered 'chronically' food insecure. Of that number, 65 per cent are women. Women dwelling in marginal areas and pastoral communities are especially vulnerable to this problem. This project aspires to organise rural women's groups from pastoral and marginal communities on participatory land use management to practice integrative farming systems on farmland areas and ecosystem restoration activities on communal land with an integrated landscape management approach.

Rural women are more affected by drought than men because they rely on natural resources for energy sources and water accessibility, are more responsible for feeding their families, and have reduced capacity to move due to childcare. This project is planned to organise a rural women's group of 40–50 members on watershed conservation and integrative farming around their home gardens to improve their economic and social capacity, ecosystem services for the area, political decisions, and empowerment on the land tenure system. They have weekly meetings organised by a self-help group to benefit economically and develop their social assets. There are also efforts to link them with local microfinance institutions to obtain credit services.

Initiative overview

Gursum District lies in the Oromia state of Ethiopia, approximately 600 kilometres east of the capital, and shares a border with the Ethio-Somali regional state. The area's agroecology is characterised by Kola and Woyna Dega, posing significant challenges, especially for pastoral communities and smallholder farmers, due to frequent droughts. Women, in particular, are vulnerable to the adverse effects on their livelihoods caused by these conditions.

To address this challenge, the adoption of a dual approach is proposed focusing on SLM and the economic advancement of women's groups. Firstly, we implement on-farm conservation and development work through an integrated farming system approach. This approach combines various agricultural activities, such as crop cultivation, livestock rearing, fishery, and apiculture, on the same farm. By diversifying activities, farms become more resilient, less vulnerable to volatility, and contribute positively to ecological restoration.

Secondly, we concentrate on communal land areas at watershed and landscape levels, engaging in ecosystem restoration activities. The goal is to restore degraded land to functional ecosystems by enhancing biodiversity, ecological niche, water capacity potential, soil fertility, and biomass increment. Activities include soil and water conservation, silvopastoral practices, agri-silvoculture, rotational grazing, area closure, tree planting, and integrated water harvesting management.

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These initiatives aim to build climate resilience, promote livelihood development, and play a crucial role in ecological conservation. By implementing climate-smart agriculture, agroforestry, improved water management, and other sustainable practices, the impacts of droughts can be mitigated and degraded lands restored, ensuring a more sustainable future for Gursum District.

Women's involvement

The role of women in SLM is crucial in East Africa, particularly in Ethiopia. Women play a significant role in managing agricultural land (including irrigation areas, water harvesting, farmland, and settlements) and communal land (e.g. forest land, wetlands, and grasslands). SLM involves utilising land and water resources, including soil, animals, and plants, to produce goods, meeting human needs while ensuring the long-term productivity of these resources and maintaining their environmental functions. In this project, women operate various SLM activities, including soil and water conservation, water harvesting technology, irrigation development, agroforestry, silvopastoralism, landscape ecological restoration, integrated soil health and fertility management, and participatory land use management.

Women champions

Ferdahusa, a 35-year-old mother of three residing in Degahale village, Gursum woreda, Oromia regional state, Ethiopia, is one of the beneficiaries of the "Integrated Landscape Management and Food Security" project. Formerly reliant on selling local tea and coffee, Ferdahusa faced financial hardship, exacerbated by her lack of farmland and dependence on low-income activities. However, by introducing the project's gender-based socio-economic strategies and objectives, Ferdahusa seized the opportunity to engage in alternative income-generating activities. Joining the community gender team, she ventured into small-scale agriculture, renting 0.5 hectares of farmland in the Fafen River valley and initially focusing on onion production. With support from the project, including technical guidance and inputs like a solar water pump and seeds, Ferdahusa expanded her agricultural endeavours, eventually renting additional land and diversifying her produce to include vegetables. Within months, her income saw a remarkable increase, enabling her to construct a new residential house valued at ETB 830,000 and open a vegetable seed distribution shop. Additionally, she accumulated over ETB 900,000 in savings. Ferdahusa's transformation underscores the project's impact in empowering women and enhancing livelihoods in rural communities like hers.

Demak Situ Cooperative is a dairy farming group that uplifts impoverished rural women without land access. The cooperative cares for 11 Borana dairy cows through comprehensive training and ongoing support, contributing to livestock prosperity and land restoration. Diversifying their ventures, the cooperative cultivates vegetables and plans to invest in milk processing equipment, showcasing the transformative power of women's entrepreneurship in Ethiopia's agricultural landscape.

Challenges

In many sub-Saharan African countries, women face limitations in various aspects of life, including the economy, social sphere, environment, and political decision making, due to traditional perspectives, cultural norms, and other beliefs. Rural women, in particular, often encounter barriers preventing them from fully participating in economic activities, accessing social assets, and benefiting equally from environmental resources compared to men. Several critical barriers hinder the engagement of local communities, especially in drought-prone areas, in environmental conservation and economic development:

Limited knowledge and resources: Women in rural areas often lack access to modern education, resulting in a limited understanding of resource management, leadership roles, and political decision making. Additionally, they face challenges in accessing land for investment, as men at household and community levels predominantly control economic resources.

Land tenure issues: Local governments do not always recognise women's land access rights equally with men's, which can hinder their involvement in watershed management or conservation efforts.

Ethiopia

Policy gaps in gender mainstreaming: In many countries, there is a lack of proper policies and advocacy to support women's land accessibility rights and economic empowerment, leading to unclear land tenure rights for women.

Gender division of labour: Societal norms dictate specific roles for men and women, affecting the distribution of work and opportunities, with women often relegated to less valued or unpaid tasks.

Gender disparities: Women are often vulnerable to gender inequality, sexual harassment, discrimination, and abuse, further limiting their participation and opportunities.

Systemic discrimination: Policies and practices embedded within systems can systematically exclude women and minorities, requiring affirmative measures to address and rectify these inequities.

Addressing these barriers requires comprehensive efforts to promote gender equality, including policy reforms, educational initiatives, and community engagement to challenge traditional gender norms and ensure equal opportunities for women in all spheres of life.

Promising practices

AFRICA

Uganda

Empowering women farmers at the forefront of resilience-building and leveraging their leadership and expertise in agriculture: **Global Youth Foundation**

The initiative, "Innovative and Effective Women-Led Solutions for Drought Resilience and Adaptation in Lira District", responds to the region's complex agricultural and socio-economic context. Smallholder farmers, especially women, face numerous challenges like limited access to quality seeds, pest pressures, market constraints, and erratic weather patterns. Recognising the pivotal role of agriculture in the community's livelihoods, the Global Youth Foundation applies its experience in economic empowerment projects to address these challenges.

The initiative adopts a holistic approach, focusing on empowering women farmers. It aims to build resilience through targeted interventions by training them on drought-resistant crop varieties, establishing a weather update centre for informed decision making, and providing capacity building sessions via a mobile van. Additionally, it addresses water scarcity challenges by installing hand-dug wells to enhance crop production.

By putting women at the forefront of resilience-building efforts and leveraging their leadership and expertise, the initiative tackles immediate challenges and contributes to long-term resilience in the agricultural sector. This multifaceted approach reflects a commitment to sustainable solutions tailored to the community's specific needs.

Initiative overview

The initiative, in partnership with the Global Youth Foundation, addresses the pressing challenges that smallholder farmers face in the region. Recognising the significance of agriculture in the local economy and the vulnerabilities exacerbated by factors, like limited access to quality seeds, pest pressures, and erratic weather patterns, the initiative prioritises women's empowerment in the agricultural sector.

Maize, soya beans, and simsim are identified as critical cash crops, underscoring the need to fortify resilience strategies to safeguard livelihoods. Through targeted interventions, including training programmes on cultivating drought-resistant crop varieties, women farmers are equipped with essential skills to mitigate the impacts of climate variability on crop yields.

Coupled with this, the establishment of a weather update centre will offer farmers timely and accurate weather information crucial for informed decision making. Farmers can enhance their resilience to climate variability by optimising planting schedules and irrigation practices.

Innovative capacity building methods, such as utilising a mobile van equipped with a projector for training sessions, ensure accessibility for farmers in remote areas. These sessions cover diverse topics, from sustainable farming practices to postharvest handling, bolstering agricultural productivity and resilience.

The installation of hand-dug wells addresses the pressing need for improved water access, particularly during drought-induced water scarcity. By providing reliable water sources, the initiative further enhances farmers' ability to withstand the challenges posed by climate variability.

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The initiative adopts a comprehensive approach to empower women farmers and build resilience within the agricultural sector, promoting sustainable livelihoods and adaptation to environmental challenges in Lira District.

Women's involvement

Women play indispensable roles in SLM in drought-prone areas like Lira. Their contributions span various aspects of agricultural production, natural resource management, and community resilience, shaping the region's sustainability and adaptation strategies. Several essential roles played by women in SLM include the following:

- Agricultural production: Women are often the primary actors in agricultural production, responsible for planting, weeding, harvesting, and postharvest handling. In Lira District, women contribute significantly to cash crop cultivation and management. Their knowledge of local farming techniques, seed selection, and crop diversification strategies is invaluable for sustainable land use and food security in droughts.
- Seed preservation and diversity: Women are custodians of traditional seed preservation and diversity knowledge. In many households, women save and exchange seeds from one season to another, maintaining diverse varieties adapted to local conditions. This practice enhances resilience to climate variability, as diverse crops have different tolerances to drought and other stresses. Women often select and propagate seeds based on their resilience and productivity, contributing to preserving Indigenous crop varieties.
- Water management: Water management is crucial for agricultural productivity and ecosystem health in drought-prone regions. Women are responsible for water-related activities, such as fetching water from wells or boreholes, irrigating crops, and managing small-scale water storage systems like ponds or tanks. Their knowledge of local water sources, traditional irrigation methods, and efficient water use practices is essential for optimising water resources and mitigating the impacts of droughts on agricultural production.
- Soil conservation and agroforestry: Women play vital roles in soil conservation and agroforestry practices, which are integral to SLM. Through mulching, intercropping, and agroforestry, women help maintain soil fertility, prevent erosion, and improve soil health. Additionally, women often plant and manage trees on farms and communal lands, contributing to biodiversity conservation, carbon sequestration, and ecosystem services.
- Community organisation and mobilisation: Women actively participate in community-based organisations, cooperatives, and self-help groups focused on SLM and agricultural development. They play critical roles in mobilising community members, organising training sessions, and advocating for policies that support sustainable agriculture and natural resource management. Women's groups also serve as platforms for knowledge sharing, innovation, and collective action, facilitating the adoption of SLM practices at the grassroots level.
- Indigenous knowledge and innovation: Women possess valuable Indigenous knowledge and innovative solutions for coping with drought and environmental stressors. Their intimate understanding of local ecosystems, weather patterns, and plant-animal interactions informs adaptive strategies, such as crop diversification, mixed cropping systems, and traditional drought-resistant crops. By integrating traditional knowledge with modern technologies and practices, women contribute to the development of context-specific and SLM approaches.
- Livelihood diversification: In response to climate variability and market uncertainties, women often use diversified livelihood strategies beyond agriculture. This may include small-scale entrepreneurship, livestock rearing, non-farm income generation, and natural resource-based enterprises like beekeeping or handicraft production. Diversified livelihoods enhance household resilience to droughts by reducing dependency on rain-fed agriculture and providing alternative sources of income.

Overall, women's roles in SLM in drought-prone areas are diverse, essential, and often under-recognised. By harnessing their knowledge, skills, and agency, women contribute significantly to building resilience, conserving natural resources, and promoting sustainable development in this region and others. Empowering women and ensuring their meaningful participation in decision making processes is crucial for achieving SLM and resilience to climate change.

Women champions

Winny Ocan Bunia, a 30-year-old mother of three, epitomises district community leadership and agricultural innovation. As the Chairperson of the Obanga Twero Yahweh Church group, she leads a thriving community of over 80 members, empowering 47 women and 33 men. Winny's dedication extends to cultivating soybeans across two acres, serving as a foundation for duplication. She has invested in a solar water pump for her mother, which benefits the entire village. This selflessness has earned her the trust and respect of her community, making her a pivotal figure in their savings and loan association group.

Akullo Semmy, a mother of seven, whose journey with the Global Youth Foundation showcases the transformative power of agricultural knowledge and empowerment, joined the group in 2017 during training on postharvest handling and harnessed the potential of soybeans to change her family's life. Through her cultivation efforts, she funded her daughter's training and acquired a tailoring machine, unlocking opportunities for her daughter's future. Soybeans became a vital income source for Semmy, enabling her to support over 10 persons with disabilities within her community, fostering inclusivity and self-reliance.

Akello Teddy exemplifies resilience and determination in the face of adversity. In 2017, at the age of 28, she became a single mother following a divorce. Despite her challenges, she found hope through training programmes by Youth For Life Tree Planting Ltd. Inspired by her success, over 35 young mothers in the Ogur Young Star group, where Teddy is actively involved, have embraced soybean farming to improve their lives. Now employed as a cleaner with Global Youth Foundation, agriculture remains Teddy's passion and source of hope as she aims to secure a better future for her children by saving for a plot of land.

Akello Pulkeria, an influential figure in Te-keo Village and Chairperson of the Apit Peda Group, demonstrates remarkable progress and community leadership. At 65, her dedication and efforts have resulted in progress in soybean farming, facilitated by Youth For Life Tree Planting Ltd. As a result of this initiative, Pulkeria has built a permanent house, purchased a cow, and used soybean earnings to pay for her child's education. Her leadership and the cooperation of the Apit Peda Group are transforming lives and livelihoods in Okwanamara Parish, showcasing the impact of community-driven initiatives on rural development.

Challenges

Despite the notable successes and impactful contributions of the women champions in the project, several challenges and gaps persist, hindering the full realisation of their potential and the sustainability of the initiatives:

Limited access to resources: Many women face barriers to accessing essential resources, such as land, credit, inputs, and technology, which are critical for agricultural productivity and economic empowerment. Without secure land tenure or access to credit, women may struggle to expand their agricultural activities or invest in sustainable practices.

Gender-based discrimination: Gender inequalities and discriminatory social norms often limit women's decision making power, control over assets, and participation in leadership roles within community-based organisations. This undermines their ability to engage fully and benefit from agricultural development initiatives.

Inadequate training and extension services: Despite training provided by organisations, like the Global Youth Foundation and Youth For Life Tree Planting Ltd, continuous capacity building and extension services tailored to women farmers' specific needs and challenges remain necessary. A lack of access to relevant information and technical assistance can impede the adoption of improved practices and technologies.

Climate change and environmental degradation: Droughts, erratic weather patterns, and environmental degradation threaten agricultural productivity and food security, particularly in drought-prone areas like Lira District. Women farmers may lack the resources and support to adapt to these climate-related challenges and to effectively implement SLM practices.

Limited market access and value addition: Despite efforts in agricultural production, women often face challenges in accessing markets, obtaining fair prices for their produce, and adding value to their agricultural products. Limited market linkages, inadequate transportation infrastructure, and a lack of processing and storage facilities constrain women's ability to capture greater value from their agricultural activities.

Addressing these challenges requires a multi-faceted approach that addresses structural barriers, promotes gender equality, strengthens institutional support, and enhances women's access to resources, knowledge, and markets by addressing these gaps and building upon the successes of women champions.

Restoring shea parklands across the Sahel, under the leadership of women: **Global Shea Alliance (GSA)**

Shea trees grow naturally on nearly 275 million hectares in traditional farming systems in 21 countries across the Great Green Wall. They are the dominant species of a parkland agroforestry system in which trees are scattered across smallholder farms, fallows, and community forests. This ecosystem provides multiple functions, including a source of livelihood for 16 million women and their families, a carbon storage mechanism that stores 1.5 million tonnes of carbon annually, and a mitigator of drought impacts through increased soil infiltrability.

Shea communities are also disproportionately affected by climate change impacts. For example, between 1991 and 2009, Burkina Faso suffered from three major droughts impacting 96,000 people. In Togo, the shea zone has seen the highest increase in temperature in the country, around 0.31°C per decade.

At the same time, the shea ecosystem is at risk. The Global Shea Alliance (GSA) estimates that about 8 million shea trees are lost yearly due to a lack of regeneration linked to reduced fallow systems and tree removals for commercial agriculture, charcoal production, and mining purposes. Few actions have been undertaken to correct this situation. Shea parklands are perceived as producing women's crops and are often excluded from tree and forest protection laws. As a result, local economies, security, and drought resistance are negatively impacted while, at the same time, placing at risk the ability of the shea industry to meet global demand. Women face the brunt of this impact, as shea income represents up to 32 per cent of the household cash and is invested in their agricultural production. They also have to travel longer distances to collect shea and fuelwood.

Initiative overview

Launched in 2020, the "Action for Shea Parklands" (ASP) initiative seeks to restore 4 million hectares of shea parklands across the Sahel through three main technical interventions: GROW (increase the number and diversity of parkland trees); PROTECT (improve tree management and parkland governance); and PROMOTE (advocate for parkland restoration).

The first component, GROW, is implemented through tree-growing initiatives that include direct seeding, setting up a network of community-based nurseries for seedling production and planting, and training local communities in assisted natural regeneration. In addition, the GSA has developed and scaled up a shea agroforestry farming model to increase and showcase the benefits for farmers to maintain diverse trees on their farms. The second component, PROTECT, is implemented through parkland management training to promote best practices to ensure healthy trees, such as bush fire management or parasite control, as well as through the establishment of community by-laws. These community by-laws provide a space for multistakeholder dialogue, in which women cooperatives, livestock herders, charcoal producers, traditional authorities, and others agree on parkland exploitation rules and restoration plans to ensure that all benefit from healthier shea parklands.

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The third component, PROMOTE, seeks to foster behaviour change in communities around tree removal and to advocate for local and national policy change. This component relies heavily on participatory measures, such as local advocacy or participatory radio shows.

A key innovation of the ASP initiative is its design and implementation through multistakeholder engagement and public-private partnership between private sector companies, women cooperatives, local communities, and governments. Women shea collectors are leading the implementation and recently called for action to provide more support on the initiative through the Abuja Declaration.

All technical processes, from shea agroforestry farming to community nursery establishment or grafting techniques, have been piloted and validated four years into the programme. In addition, 901,211 shea and native trees have been planted, and 18,666 hectares have been protected through partnerships with the private sector, cooperatives, and donors. Engagement with local communities is also starting to bear fruit, with more than 300,000 people impacted by a ban on shea tree-cutting in the Gonja Kingdom in Ghana.

Women's involvement

Women are integral to the SLM of shea parklands in the Sahel region, playing multifaceted roles that contribute significantly to ecosystem restoration and economic development.

Women constitute a substantial portion of the agricultural workforce in the Sahel, typically farming smaller, remote, and less fertile plots compared to men. While their lack of land ownership limits direct investment in soil restoration, their crop choices contribute to reversing land degradation. Women often cultivate a diverse range of crops, including legumes and vegetables, for household consumption, which enriches soil nutrient content, carbon, and moisture. For instance, in Mali, women cultivate up to 60–70 per cent of the diverse crop varieties grown in the country, showcasing their significant agricultural contributions.

Women play a pivotal role in the sustainable management of shea parklands by directly demonstrating its economic benefits. Traditionally responsible for collecting, processing, and utilising non-timber forest products, like shea, women generate substantial income from these activities. The annual income from shea production alone amounts to over USD 200 million in producing communities, providing vital cash during lean seasons when other income sources are limited.

Additionally, women serve as advocates and knowledge transmitters within their households and communities, promoting SLM practices. For example, in Nigeria, the GSA developed a sustainable shea farming agroforestry model that involved 1,500 women producers and farmers. Within two years, 63 per cent replicated the model on their farms and 93 per cent shared climate-smart practices with community members. Women leverage group structures, like shea cooperatives, at the community level to preserve and manage shea parklands effectively. For instance, women cooperatives in Burkina Faso secured land for shea tree planting. At the same time, those in Benin implemented local by-laws to ensure landscape regeneration and sustainable management, prohibiting harmful practices like tree removal for charcoal or livestock grazing on shea seedlings.

Women champions

Amanpulie Yakubu was born in Kunkwa, in the Yagaba Kubori District of the Northeast Region of Ghana. Although she has no formal education, Yakubu was able to create a network that supports her agenda of women and youth empowerment in her area. She is currently the chairperson of the Amachaab Cooperative Society in Kunkwa, leading a group of 600 shea-picking and processing women to restore degraded shea parklands through the management of a large tree nursery, transplanting shea and native species, and campaigning against bush fire.

Khadija Hassan is the secretary of the ASUMALI shea women cooperative in Tufa, Niger state, Nigeria, which piloted the shea agroforestry farming model. She led the cascade of training for other women in her cooperative on climate-resilient farming and farm practices. She mobilised other women in the community and surrounding villages for training and dissemination of learning on the model. She has become an advocate for shea parkland restoration in her community, where she speaks against bush fires and cutting shea trees, as well as at national and international conferences. She has been involved in shea nut picking and processing for the last 15 years.

Sadia Neindow, a 48-year-old woman from the Latagim community in Yendi Municipality in Ghana, embodies resilience and dedication. Despite her responsibilities as a wife and mother of eight, Neindow plays a central role in the local ecosystem through her work in the community tree nursery established by the "Ghana Shea Landscape Emission Reductions Project" (GSLERP). Overseeing the process of raising tree seedlings, planting trees, and safeguarding tree shrubs, Neindow's efforts contribute significantly to environmental conservation in her community. Her dedicated approach to tasks, such as Assisted Natural Regeneration activities and creating fire breaks, ensures the survival of the local greenery. Her dedication extends to sustainable living, as she and other women in her community have learned to construct energy-efficient cook stoves, reducing fuel consumption and environmental impact. Beyond her contributions to the tree nursery, Neindow's commitment to sustainable living extends to her small-scale farming endeavours. She applies sound agronomic practices, maximising yield while minimising environmental impact. Moreover, Neindow's entrepreneurial spirit shines through her engagement in picking shea nuts for sale.

Mamatou Djaffo, born in 1956 in Benin, has four children and more than three decades of experience in the shea industry. Djaffo has organised training sessions for women in the shea industry, focusing on best practices for collecting, processing, and storing shea kernels. She has also provided guidance on good practices for shea butter production, semi-manufactured processing of soap, and shea butter-based ointments. Djaffo is the President of the *Fédération Nationale des Productrices d'amandes et de beurre de Karité du Bénin* (Bénin), a federation representing over 70,000 women shea collectors and butter processors. In 2023, as part of their engagement to protect and restore the Shea parklands, women from FNPK planted 600,000 shea trees through direct seedlings. Djaffo has been an executive committee member of the GSA since November 2018 and currently chairs the organisation as the President of the Executive Committee.

Félicité Yameogo, a Burkinabe woman known as 'Maman Karité', has dedicated most of her life to women's empowerment through her engagement in the shea industry in Burkina Faso and beyond. In Koudougou (Burkina Faso), Yameogo works with a network of more than 10,000 women shea collectors and butter processors. She is also the founder of New Karikis, a small- and medium-sized enterprise (SME) that produces handcrafted shea butter for export. She raises awareness around the role of the shea trees in local communities through training and capacity building, and is key in engaging rural women in activities and initiatives that protect and restore the parklands, especially creating shea tree nurseries. Yameogo is a strong advocate who encourages Burkina Faso's government to fight against deforestation practices while promoting agroforestry at the community level. Yameogo's engagement has enabled her to travel across various African countries and the United States, pledging further action in favour of women's empowerment through the shea sector.

Sanou Fatimata is a shea collector and butter processor from the Association Song Taab Yalgre (ASY), a cooperative of more than 3,000 women in Burkina Faso. In addition to shea activities, the association grows moringa, baobab, fonio, and vegetables to increase women's income while improving the living conditions of women, young people, and vulnerable groups. Although she is in her early forties, Fatimata has been involved in cooperative activities for over 30 years and sees herself as the segue between two generations.

Challenges

While implementing the Action for Shea Parklands initiatives, the GSA encountered challenges related to the enabling environment and gender dimensions.

Enabling environment: The deteriorating security situation in the Sahel was the most significant challenge, making it difficult to restore remote land. To address this challenge, the GSA focused its restoration activities on land closer to villages and on which shea cooperatives were already active, either through farming or non-timber forest product collection activities.

Gender dimensions: Obstacles include a lack of land ownership and a lack of right to conduct tree planting activities as these are often associated with a claim of ownership on specific land, as well as time poverty due to care duties, and the prioritisation of the women's husbands' farms over their own. The GSA addressed this challenge through extensive community engagement and a group empowerment model that does not conflict with existing community social structures. With this model, every woman in the community is empowered, value chains are developed, and market linkage activities are conducted. This model, thus, enables the community to see that the community as a whole, not just individuals, benefits from sustainable shea parkland management.

Leveraging women's groups to lead conservation initiatives in arid and semi-arid lands: **Indigenous movement for peace advancement and conflict transformation (IMPACT)**

Kenya's arid and semi-arid lands (ASALs) comprise over 80 per cent of the Kenyan landmass and are characterised by high variability in climate systems and available resources. The impact of climate change on these already vulnerable ecosystems is an increase in the frequency and severity of droughts. The ASALs of Northern Kenya display many of the characteristics of remote rural areas caught in chronic poverty traps, facing multiple and interlocking forms of disadvantage. Isolation, insecurity, weak economic integration, limited political leverage, and the challenging nature of climate change combine to produce high levels of risk and vulnerability. In the last 100 years, Kenya has experienced over 28 significant droughts, four of them within the previous 10 years.

Pastoralism is the dominant economy in the targeted counties of Isiolo, Samburu, Marsabit, and Laikipia. Approximately 80 per cent of about 2 million people in these counties derive livelihoods from livestock-related enterprises. The poverty index is 73.6 per cent in Northern Kenya, according to the 2013 Kenya Population Analysis Situation Report. Northern Kenya has faced marginalisation over the years through poor infrastructure, high illiteracy levels, and limited access to digital technology. This has contributed to the inability of young people to fully pursue or achieve their aspirations and fully exploit their talents.

This region has been characterised by frequent conflicts over natural resources, retrogressive cultures that undermine girls' and women's rights, and patriarchal societal norms. There is also a lack of implementation by government bodies of pastoralist-friendly policies that promote livelihoods and counter gender bias with respect to women's empowerment and youth. Due to the arid and semi-arid features, communities are highly mobile, searching for pasture and water. Children often accompany the livestock, which denies them access to education.

Initiative overview

The organisation endeavours to realise its mission by promoting effective leadership, fostering environmentally sustainable practices through training and entrepreneurship, facilitating exchange visits for exposure, amplifying women's voices, dismantling patriarchal norms, and advancing gender equality. Lobbying and advocacy efforts are also employed to secure equitable resource sharing and enhance women's participation in leadership roles. Additionally, the organisation aims to diversify livelihood options to mitigate the impacts of climate change on household economies and alleviate poverty by promoting savings and alternative sources of income. It seeks to foster cohesion and support networks to empower individuals to cope with the challenging effects of climate change in the semi-arid regions of northern Kenya.

Recognising women as custodians of land who possess profound knowledge of environmental management, the organisation champions women-led conservation initiatives at the grassroots level in ASALs. Leveraging existing women's groups in northern Kenya, the initiative empowers women to combat the climate crisis through innovative rangeland restoration techniques, such as earth smiles

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or semi-circular bunds. This approach involves digging bunds and reseeding barren lands with perennial grass species, like *Cencilirais cilirias* and *Eragrostis superba*. Women then harvest seeds stored in locally constructed seed banks and sell them to community members during dry seasons. Furthermore, women's groups engage in Indigenous tree planting to combat deforestation, recognising the cultural significance of trees like the olive tree in ceremonial practices. Encouraging household-level vegetable cultivation using locally available materials further promotes nutrition among households. Through these multifaceted efforts, the organisation empowers women to be key agents of environmental conservation and sustainable livelihoods in northern Kenya.

Women's involvement

The essential role played by women in the initiative is re-greening the earth using semi-circular bunds. Semi-circular bunds rehabilitate degraded, denuded, and hardened land for crop growing, grazing, or forestry. The women are involved in this simple innovation to restore their ecosystem, enabling them to be part of transformative changes in the community, when their contributions to nature-based solutions and natural resource management may otherwise go overlooked.

As the first contact of children, women are agents of socialisation. They create songs and dances with conservation best practices in local languages to enlighten the pastoral communities on the benefits of holistic management of rangelands (e.g. education on how women preserve and maintain trees, such as Reteti and Olgaboli, and conveying their significance to children). These trees remain untouched, as they serve as locations for women's prayers during the dry season.

Women involved in these projects also interfaced with one another, as in the case of women's groups from Opiroi village and the Twala Tenebo cultural women's group. The groups shared their knowledge on grass seed harvesting and grass banks, forging bonds as they exchanged stories, techniques, and challenges. Armed with newfound knowledge and strengthened networks, the Opiroi women returned home as catalysts for sustainable practices, advocates for gender equality, and guardians of their rangelands.

The women will also serve as custodians of the land through the IMPACT land programme, which has been underway for several years, on community land ownership under the Community Land Act 2016, a Kenya law on land ownership at the community level. The women will be involved in dialogues over their inclusion in decision making processes on land use and the management of natural resources. By requiring women to be represented on the Community Land Management Committees (CLMCs), the Act enables women's needs, ideas, and thoughts to influence land management. The same has also informed the development of grazing/land use plans. They have become active participants in curbing activities that expose them to climate vulnerabilities caused by cutting trees for charcoal use and harvesting sand.

Women are contributing to rebuilding household economies in the face of drought and conflict through complementary livelihood options, like poultry farming. Poultry farming is an alternative source of livelihood amidst drought and conflict in Samburu County, which has faced six consecutive drought seasons. The effects manifest as displacement of families, scarcity of water resources, hunger, insecurity, and conflict. The traditional way of life, pastoralism, is under threat.

Despite these challenges, women have stepped up, embracing poultry farming for their livelihood. Amidst limitations, such as low production, disease control, and a lack of information on farm management, women have taken the initiative to adapt to the situation. The project will be crucial in enabling these women to provide extensive training through a collaborative effort between county livestock and veterinary extension agents, village-based consultants, and input corporations.

Women will also pursue beekeeping, be trained to brand their products and take advantage of technological advancements by creating marketing strategies through digital mediums to sell their honey products. They will be provided with mobile phones and tablets as tools to enhance marketing. The equipment will be eco-friendly as it will utilise solar energy for charging. The proceeds from honey sales will be used to open a small emergency fund to purchase food items, pay school fees for their children, and purchase sanitary products. This is distinct from current practice that often leaves women dependent on donor aid during a crisis and will instead be readily available.

Women champions

Rosemary Nenini is a 40-year-old Maasai woman leader who manages the Twala Cultural and Manyatta women's group in Ilpolei. She and other like-minded women formed this group, the Twala Tenebo Women Cultural Center, located in Il Polei, Laikipia North, a sub-county. 'Twala' is a Maasai word meaning a bell. 'Tenebo' means coming together.

In 2007, the 'bell rang' as a symbol of calling the Maasai women to action for empowerment and capacity building. They joined hands and established a cultural centre together. The centre works to empower women to be self-reliant and create employment opportunities while still preserving the rich cultural and historical heritage of the local Maasai people. The women have overseen the management and local running of the centre who strive to preserve their cultural heritage while rejecting aspects that are less beneficial to all, such as female genital mutilation, denial of children's education, and early marriage. In addition, the centre provides eco-tourism facilities, Maasai cultural experiences, and accommodation in modern eco-manyattas made from bricks and cement. The Manyatta is also a resource centre where groups can come together to share ideas and information. Through their activities, the women make profits that go directly to the community and are utilised for poverty reduction and sustainable development, with 10 per cent supporting girls' education through the Maasai Girls' Education and Empowerment Today programme (MEET).

Jane Sarioyo is the founder of the Naatum women's group, in the Mukogodo Division, Mukogodo westward, and continues to oversee it. Started in 2006, the group has a total of 35 members and is registered as a self-help group. As a women-led, community-based institution whose mission is to build resilient households that adapt to climate change for natural resource management and alternative livelihood options, the group was formed to inspire and help uplift and improve the lives of women, in part through savings, and to promote their children's education.

Elizabeth Nasipa is the chairwoman of the Namaiyana women's group. Her passion for impacting women's lives led her to establish the Ramayana women's group with other like-minded women in Arjiju Village, Laikipia North Sub-County. The Arjiju Namayiana Cultural Organization is a non-governmental, non-political, and non-partisan community-based organisation. Its primary goal is to empower women by fostering sustainable livelihoods to alleviate poverty. The group's objectives include: unite the Arjiju community to enrich cultural values; promote integrated natural resource-based enterprises; advance gender equity and self-reliance through information sharing for women and youth; establish a networking platform for individuals and organisations to share and complement resources; economically empower women through sustainable natural resource management; and participate in discussions for the overall development of the locality.

Challenges

Challenges in ASAL communities include unequal power distribution, limited representation in decision making, low self-esteem among women, and weak market linkages.

Patriarchal norms: Men typically hold power over resources and decision making due to patriarchal norms, leading to women facing domestic abuse and stigma when they engage in empowerment activities. Despite their presence on land management committees, women lack meaningful representation. Collaborating with women-led CSOs, the initiative aims to advocate for quality representation and appeal stakeholders to recognise and help respond to their needs.

Low self-esteem: Low self-esteem hinders women from expressing themselves and seizing opportunities. Continuous support and training through exchange programmes will bolster their confidence.

Weak market linkages: Weak market linkages hinder economic activities. Women face delays and difficulties accessing markets for products (e.g. honey, grass seeds). Strengthening market connections will alleviate this, ensuring women can sell their goods without hassle.

Addressing these challenges requires empowering women with skills, resources, and representation in decision making processes, ultimately fostering gender equality and sustainable development in ASAL communities.

Promoting gender equality, supporting sustainable agricultural development and rural livelihoods, and raising awareness of related governance systems: **Jie Community Animal Health Worker Association (JICAHWA)**

Despite legal provisions in Uganda's Constitution prohibiting gender discrimination, women constitute 50.47 per cent of the population and, yet, own less than 20 per cent of the land. Karamoja, covering 27,990 square kilometres with a population of 1.2 million as of the 2014 census, consists of Kotido, Kaabong, Abim, Karenga, Moroto, Napak, Nakapaipit, Nabilatuk, and Amudat, inhabited by the Karamojang. Similar to Maasai pastoralists, they move their animals across challenging terrain to graze and access water. The project, supporting advocacy on women's land and property rights, aims to empower women, ensuring their rights to land and property are respected for effective and sustainable human development.

The Jie Community Animal Health Worker Association (JICAHWA), an association formed by Jie community animal health workers in Kotido District, operates in 19 sub-counties of Kotido District. Registered as a community-based organisation in the Kotido District local government and affiliated with Karamoja NGO Forum and National NGO Board, JICAHWA is a COMPACSO, National NGO Forum, and TUNADO member. Collaborating with various entities, including the local district government, the Food and Agriculture Organization of the United Nations (FAO), Oxfam, Mercy Corps, CARITAS, private sector foundations, and Woord En Daad, JICAHWA prioritises marginalised agropastoralist and minority communities, aiming to enhance livelihoods and promote rights among pastoralist and minority groups through holistic humanitarian responses and community development initiatives.

Initiative overview

Women in Karamoja continue to experience strong marginalisation, especially in the economic spheres. The optimal contribution of women and other marginalised groups to the country's development is also hampered by unemployment, low skill levels, limited opportunities, vulnerability, and limited access to markets and productive assets like land and seeds. This is also compounded by the lack of regulatory framework to oversee the management of rangelands. Limited access to land by women in the Karamoja region affects smallholder farmers' productivity by decreasing services for duty-bearers. Developing laws and policies to govern rangeland management and ownership lacks a systematic approach, resulting in many contradictory and inconsistent provisions. The absence of a clear guide to rangeland management-related policy analysis and advocacy over the years has greatly limited civil society and smallholder farmers' effective engagement in policy development processes. This has resulted in ad hoc engagements and made it difficult for civil society in Karamoja. To achieve inclusive food and nutrition security and access to land by women, informed dialogue with duty bearers is necessary.

Through this initiative, communities and their leaders will be equipped with knowledge and understanding of the general governance systems and government structures to be best positioned to address the identified issues with the correct entity in government. This will enable them to influence planning and budgeting.

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Women's involvement

The international development community acknowledges agriculture as a critical driver of growth and poverty reduction, particularly in countries where it is the primary occupation of the poor. Rural women play vital roles worldwide in agricultural and rural economies, managing households and pursuing diverse livelihood strategies. Despite their essential contributions, women in Karamoja face significant constraints in accessing productive resources, hindering their performance in agriculture and the rural economy. Efforts to promote agricultural development, economic growth, and food security can be enhanced by leveraging women's contributions and addressing these constraints. JICAHWA, thus, prioritises women as the primary target group in all of its programmes.

These programmes empower women and youth to access productive resources, such as land and capital, for production. Special attention is also given to people with disabilities, recognising their knowledge, skills, and qualifications and providing equal opportunities for their active participation. Their specific needs are identified through community consultations and addressed at various levels of decision making.

Women actively participate in community participatory planning meetings on rangeland management, and they advocate for land rights, governance, and networking. They also participate in activities, like planting trees, conserving soil and water, and diversifying livelihood options, such as apiculture, vegetable growing, and livestock rearing.

Thematic sessions in dialogues cover critical aspects of rangeland management and land policy, including strengthening the enabling environment for rangeland resource management, enhancing sustainable production and productivity, and building community resilience to mitigate and adapt to shocks. Topics include land tenure, conflict resolution mechanisms, capacity building, research for rangeland development, and resilience-building strategies.

Through these initiatives, JICAHWA aims to empower women, promote gender equality, and contribute to sustainable agricultural development and rural livelihoods in Karamoja and beyond.

Women champions

Moding Janet, a widow with two children in the Entebbe area, lost land to her husband's relatives before she was even aware of her rights of ownership. Following the training on GBV at the JICAHWA office, with support from OXFAM Great Britain, the community-level district, Mercy Corps and Uganda Alliance Network for women, Janet reported the land dispute case to legal services and, after winning, was given 20 acres of land that she uses to cultivate and the proceeds from which she applies to her children's education.

Munyes Rose Marry Lochaim, a young woman with two children, became pregnant in 2018 and dropped out of school. She joined Kitogo Akitare Agro, a school for pastoral farmers, and was elected group secretary. There, she received support from JICAHWA and gained skills training on gender mainstreaming, governance, and women's land rights. JICAHWA linked her to FIDA Uganda, where she opened a case on GBV and child neglect. As a result, her husband gave her 15 acres of land for crop production and two acres for settlement, as well as a pair of oxen and 12 female goats. She now feels proud to promote women's property rights.

Aero Ketty has been a District Councillor representing women and persons with disabilities in Kotido for 10 years. During her terms of office, she supported 30 women who experienced land-related issues, especially widows and persons with disabilities. Her advocacy arose from training she received in 2014 from JICAHWA, with support from OXFAM GB, on the prevention of GBV. Understanding that people were being further marginalised due to limited access to information and cultural norms that discriminate against women and other groups from having property, she set out to use her position to make a difference in the lives of others.

Okure Marria, a resident of Lomodit Village in Lokithelakebu, was forcefully married at the age of 16 years. In 2013, she joined a women's group supported by JICAHWA. She obtained a loan worth UGX 200,000 through this group, which she used to start a local brewing business. This business helped sustain her household's food needs. Today, she owns a personal farm spanning 10 acres and has a plot acquired from the centre, which she has developed, and she continues to advocate actively for women's property rights.

Challenges

Insecurity: Insecurity in Karamoja has contributed to the region's underdevelopment, resulting in food shortages. This insecurity stems from a lack of rangeland management, limited information on land, and the non-implementation of land policies and ordinances. These factors have contributed to land grabbing, over-utilisation of natural resources, and land degradation. Deforestation, driven by commercialised charcoal burning and mining, exacerbates the situation.

Lack of rangeland structure: There is a lack of rangeland structure, including communal land associations and area land committees, at various administrative levels. This exacerbates conflicts over land use and causes issues with practical land management.

Unreliable rainfall: The uncertain rainfall patterns, influenced by tree-cutting, further compound the challenges faced by Karamoja. With only one rainy season per year, agricultural production is significantly impacted.

Interrupted women's cultivation: Land conflicts with other districts disrupt women's cultivation efforts, limiting the region's food supply. The lack of access to finances also hinders the establishment of commercial farming ventures in the green belt of Karamoja.

Further, the entrenched cultural norms and practices that discriminate against women prevent them from controlling and owning productive assets. This further marginalises women and contributes to the region's food insecurity.

Engaging pastoral women in landscape restoration enterprises to tackle drought resilience and land degradation: **JUSTDIGGIT**

In Kenya, ASALs cover a significant portion of the country, hosting 36 per cent of the population. Pastoralism and extensive grazing represent the predominant land use system in the ASALs, collectively accounting for 70 per cent of the national livestock herd. Livestock rearing is a fundamental source of income in these regions, constituting a significant portion of household livelihoods. However, recurring droughts severely threaten the livelihoods of pastoral communities, exacerbating poverty and food insecurity. It is estimated that the drought period of 2008–2011 resulted in a loss of USD 8 billion in the livestock sector. The escalating frequency and intensity of droughts in the region exacerbate the vulnerability of pastoralists, necessitating urgent and impactful interventions to address their needs, foster sustained development, and enhance drought resilience in ASALs. Additionally, given the heavy reliance of pastoralist livelihoods on livestock and related products, it is vital to address challenges related to pasture production and market access to reverse trends of increasing poverty, reduce food insecurity and malnutrition among women and children, and foster resilience within these communities.

Recognising these pressing challenges, Justdiggit is committed to address the complex interplay of drought, livelihood sustainability, and ecosystem degradation in Kenya's ASALs. Through collaborative efforts with pastoral communities and local partners, Justdiggit implements regreening initiatives to restore degraded rangeland ecosystems. Leveraging nature-based solutions, Justdiggit emphasises traditional, scalable, and easily applicable landscape restoration techniques. These initiatives contribute to improving soil, water, and food security and enhance biodiversity and overall quality of life by reintroducing vegetation on a significant scale.

Initiative overview

This initiative aims to tackle drought resilience and land degradation by involving pastoral women in landscape restoration enterprises. Grass seed bank enterprises form the core of the approach, utilising women's traditional knowledge in ASALs to restore degraded rangelands and enhance community resilience.

Justdiggit starts by identifying and mobilising women's groups and, then, they provide women with the training and resources needed to establish and manage grass seed banks. These banks transform degraded communal land into productive green grasslands, exclusively owned and managed by pastoral women's groups. Indigenous grass species are planted to boost pasture resilience to climate variability and preserve native biodiversity. Pastoralists access diverse fodder options through grass seed banks, improving livestock nutrition, milk yields, and household incomes. Women's groups are further supported to package and market grass seeds, creating economic opportunities along the value chain and linking pastoralists to markets.

Beyond restoration, this initiative fosters social and environmental transformation by empowering women as environmental stewards and agents of change. It provides them with alternative income sources, amplifies their voices in decision making, and promotes gender equity and social inclusion.

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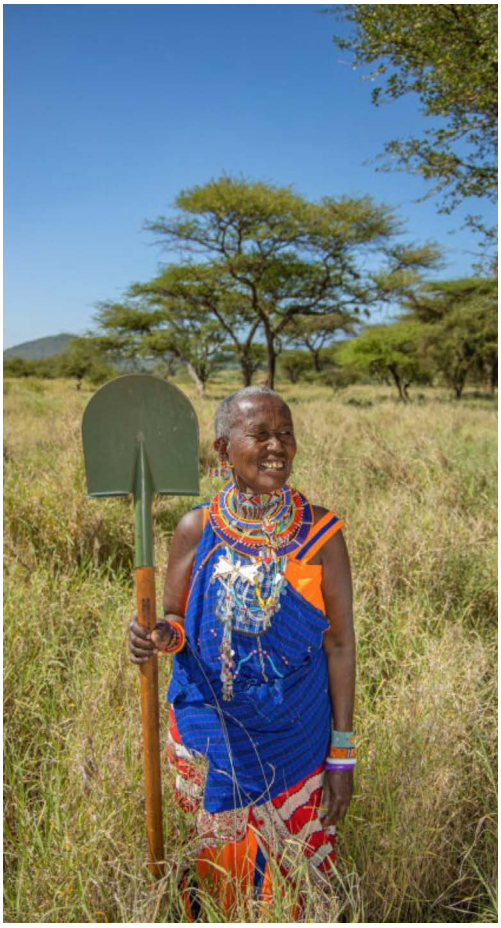
This collaborative approach helps address the multifaceted challenges of ASALs, aiming for a resilient and sustainable future for these communities and beyond.

Women's involvement

In Kenya's rangelands, particularly within pastoral communities, women play vital roles in SLM, shaping the resilience and sustainability of these ecosystems. As caretakers of natural resources, women are deeply involved in managing land, water, and vegetation. They oversee grazing patterns, water sources, and fodder availability, ensuring the sustainable use of resources even in the face of recurring droughts. Women's intimate knowledge of the land passed down through generations guides their decision making processes and enables them to adapt traditional practices to changing environmental conditions.



Pastoral women also play instrumental roles in landscape restoration efforts. Through initiatives, like establishing and managing grass seed banks and other restoration interventions, they contribute to reversing degraded rangelands and creating green corridors. Engaging in activities, such as grass seed collection, cultivation, and planting, they actively participate in re-greening communal lands. They are also keen on undertaking Pastoral Managed Natural Regeneration (PMNR) to increase the forest cover in these regions. By restoring vegetation cover and enhancing soil health, they mitigate erosion, promote groundwater recharge, and improve habitat quality for both wildlife and livestock.

Furthermore, women serve as guardians of biodiversity, preserving and promoting the diversity of plant and animal species within their ecosystems. They cultivate and conserve Indigenous seed varieties and protect endangered plant species, contributing to the resilience of local ecosystems. Women's knowledge of traditional ecological practices and entrepreneurial spirit drives innovation in SLM. In recent years, women-led enterprises have emerged, focusing on activities such as eco-tourism, value-added agro-processing, and grass seed and fodder production. These initiatives generate income and promote environmental conservation and economic diversification within pastoral communities.

Women champions

Jackie Kemboi, affectionately known as the 'Justdiggit regreening queen' by local women, has emerged as a pivotal figure in the Justdiggit project. With a deep-rooted understanding of the challenges faced by pastoral communities, Jackie has dedicated herself to training women in restoration initiatives, like grass seed banks. Her expertise in grass seed cultivation techniques and harvesting methods has significantly enhanced the productivity and sustainability of these grass seed banks. Growing up in a pastoral community, Jackie witnessed firsthand the devastating impacts of drought on her village, igniting a passion to pursue professional knowledge to reverse desertification. Jackie was also inspired by her mother, a Farmer Managed Natural Regeneration (FMNR) champion, who mobilised her community to adapt SLM practices and, in so doing, inspired women to follow in her footsteps and engage in similar initiatives and leadership roles.

Lolngojin Dorcas, a Samburu woman working with the Northern Rangeland Trust, a local partner for Justdiggit, is another champion within the Justdiggit project. Witnessing the dire consequences of drought on women in her community, Dorcas was spurred to action. She observed livestock losses due to inadequate

pasture and water, compelling women to embark on tiring journeys searching for pasture for their animals. In response, Dorcas has dedicated herself to sensitising and raising awareness among Samburu women about the importance of forming pasture groups. Through these groups, women cultivate grass seeds, secure pasture for their young, and milk livestock, mitigating drought impacts and fostering community resilience. Dorcas' advocacy and leadership exemplify the power of grassroots initiatives in addressing pressing environmental challenges and empowering women to enact positive change within their communities.

Mary Nkao, a Maasai woman residing in the Southern Rift Landscape, represents a beacon of resilience and leadership in this project. Despite numerous challenges, including recurrent droughts and land degradation, Nkao has steadfastly committed to SLM. Drawing upon her intimate knowledge of the local landscape and traditional practices, Nkao has played a vital role in actively mobilising women in her community to participate in restoration efforts. Nkao has mentored and advocated for sustainable grazing management and conservation practices as a seasoned agro-pastoralist and respected community elder.

Her hands-on approach and unwavering dedication have inspired women of all ages to embrace environmentally sustainable livelihoods and actively contribute to regenerating degraded rangelands. Nkao's invaluable contributions exemplify the transformative impact that local women can have in fostering environmental stewardship and building resilient communities.

Challenges

Climate variability and extreme weather: Climate variability and extreme weather events pose significant challenges to pastoral communities and rangeland restoration efforts, affecting grass seed germination, pasture growth, and ecosystem stability. Adapting strategies to climate change impacts requires innovative solutions and adaptive management.

Gender norms and barriers: Traditional gender norms and socio-cultural barriers within pastoral communities hinder women's participation in SLM. Addressing gender disparities involves promoting women's empowerment, challenging gender roles, and fostering inclusive decision making.

Insufficient awareness: Insufficient awareness and dissemination of knowledge about SLM practices hinder community engagement. Investing in community education and knowledge sharing platforms is vital to mobilise collective action.

Sustainable financing: Despite support from partners and donors, securing sustainable financing for projects remains a persistent challenge. Sustainable funding is essential to scale up activities, reach more communities, and ensure project success. Developing innovative financing mechanisms, forming strategic partnerships, and advocating for increased investment in SLM are crucial strategies to sustain efforts in the long term.

Using radio to reach women and other marginalised communities and raise awareness of climate-smart practices: **Radio FANTASEE**

Agriculture employs over half of Nigeria's workforce, crucial for rural livelihoods, with small-scale farming predominant. In Akwa Ibom State, particularly in the Uyo Local Government Area, over 3 million small farmers, especially women, lack education on climate change risks and the food and economic insecurity that coincide with these risks. The result has been environmental degradation, a deepening of poverty, and accelerated food insecurity. Cut off from crucial information systems, women farmers are unable to boost their agricultural yields or their incomes. Radio is widely available, affordable, and not constrained by illiteracy. Within this context, this project broadcasts for 30 minutes weekly on local radio stations during evening prime time. It features recorded interviews with residents experiencing a climate change impact, who describe how climate change has adversely affected their lives. Subsequent interviews with other residents, local projects, and businesses provide ecologically sound solutions and adaptations to the challenge described, and an expert confirms the solution proposed.

Radio FANTASEE – the Food and Nutrition on Air for Social and Economic Empowerment – strengthens smallholder farmers' climate risk management capacity in Nigeria and motivates them to develop Indigenous micro-climate risk management techniques to secure their livelihood. Listeners are encouraged to contact the radio, and their questions are answered immediately. Accessibility to the platform is increased by sharing additional information through SMS messaging, targeting those who have contacted the radio, mapping the feedback received online, and providing podcasts for downloading.

Initiative overview

Smallholder farming communities in Nigeria face significant challenges, including deforestation, degraded land, and declining productivity due to intensive cultivation, climate change, and poor agricultural practices. Women farmers, in particular, are marginalised and lack access to necessary knowledge and information, perpetuating their poverty and vulnerability. Southern Nigeria experiences low agricultural productivity, impacting the livelihoods of millions reliant on agriculture. This low productivity leads to reduced incomes, increased vulnerability to shocks, and food insecurity. Current crop yields are 30 per cent below their potential due to underinvestment in inputs and information barriers.

Food and Nutrition on Air (FANTA Radio), a project in partnership with XL FM, addresses these issues using community radio to disseminate practical information to remote communities. Through interviews with local farmers, experts, and supply chain partners, the programme shares knowledge on climate-smart practices, water conservation, irrigation technologies, and climate information services. The project has reached approximately 200,000 women, half of whom have implemented climate-smart practices which they learned from the radio. Nearly 40 per cent of women listeners reported trying at least one climate change adaptive practice as a result of the programme, highlighting its effectiveness in promoting resilience and reducing vulnerability to food insecurity in rural communities.

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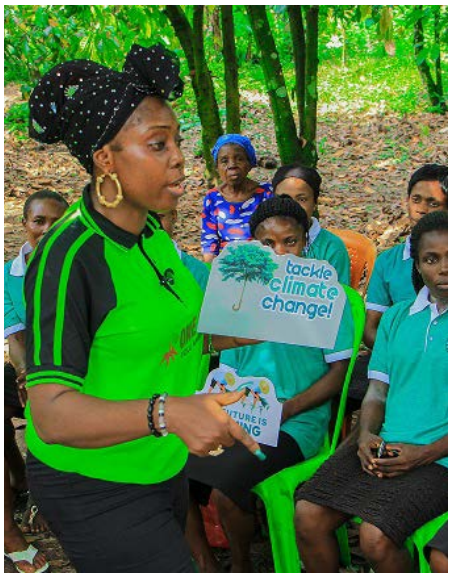
Nigeria

Women's involvement

Women, especially in traditional societies, are significantly affected by biodiversity loss. At the same time, women can be agents of change, leading biodiversity protection, conservation, and sustainable farming efforts. The role of these women is to advocate for women's land rights in the fight against desertification and drought through drama, songs, and performances at a local storytelling hub (Ekoñ Ñke), providing educational information and contemporary farming practices to rural farmers. The content is oriented mainly around topics, such as slash-and-burn agriculture, small farm development, farm safety, storage facilities, female empowerment, youth in agriculture, public health issues, land tenure and land access, micro-credit, market access, soil management, water and sanitation, wetlands management, and environmental conservation. The jingles, radio scripts, and drama performances are developed with community input and broadcast through public radio stations with reach to rural communities.

Through the project, sensitisation meetings are organised at the local level to foster support for women's empowerment and strengthen and establish the listener's clubs/groups as committees at the village level to take leadership in the project's implementation. Women benefit from skills development in tree planting, fish farming, business management, and the establishment of Esusu. Banana and plantain farming are promoted as a form of agroforestry, an alternative income-generating activity. Efficient and low-cost Indigenous technologies, such as percolation ponds and pitcher irrigation, have been revived, rendering water sources more reliable and improving the livelihoods of Indigenous women and their communities. As drought is the most fundamental challenge that adversely affects crops and livestock production in South Nigeria, farmers are keen to listen to advice on how to escape its severe impacts.



Women champions

Otobong Billie, a mother of two children and one of the rural broadcasters in the community, conducts door-to-door campaigns on sustainable agricultural practices.

Uduak Udonyah, a seasoned organic farmer and an information scientist for Ecological Agriculture, started farming with her mother. Having farmed conventionally for two years, Uduak found that synthetic fertiliser was not helping her soil and that the farm struggled to return a profit. She now advocates for women farmers to grow their foods organically.

Rebecca Solomon Effiong, a farmer and a women leader in Ebo Itumbonuso, is passionate about sustainable farming. A mother of five children, Effiong leads the Ekoñ Ñke hub with over 20 women in the village and operates a two-acre ranch in Annanamong on land that has been in the family for four generations. Effiong credits the radio interview, which broadcast her experiences over several sessions, with helping her grow her business and feed her children.

Alice Bacany's radio programme on drought-related topics enhanced her knowledge of improved coping and adaptation mechanisms to drought.

Mercy Anyenekpon, a widow, has a five-acre cocoa farm. According to her, the radio programme enhanced her knowledge on caring for the cocoa business that her husband left for her and their children.

Blessing Peter saw an increase in income within a few months of listening to the programme. The participatory, multistakeholder, and interactive radio programme content design has enabled her to identify and incorporate key messages and advice on dealing with drought and mitigating its potential impacts in weekly radio programmes.

Dr. Ekaette Udoh is part of the team that visits the women occasionally and lectures female farmers on the importance of nutrition.

Challenges

Low levels of traditional literacy: Because literacy levels vary between sites and communities, the Radio FANTASEE project must be adapted to different users' needs and levels.

Lack of telecommunications infrastructure: Radio FANTASEE targets rural areas that are hard to reach in person and hard to support technologically. Messages sent to rural areas do not consistently reach community members due to limited information and communications technology infrastructure.

Cultural influence: Although the project strives to provide opportunities that will increase women's participation, cultural influences that restrict women from speaking in public present a challenge for journalists. Many women have refused to share their experiences and practices on the radio, and some complain of restrictions imposed by their husbands on their group participation. In response, gender awareness is raised on the radio programme.

Active engagement: Active engagement is needed at the community level to ensure community radio partners are linked to the appropriate resources for their programming content. As many of the women in the community have not had adequate access to resources, education, or training, a local resource person was trained to facilitate access to resources and keep the project on course.

Funding: Funding is always a challenge, not to mention the difficulties of creating an adequate flow of resources and following the procedures, by-laws, and regulations.

Limited resources for area coverage: Documenting Indigenous knowledge and cultural practices requires travel to rural areas to interview farmers and to record local poems, songs, and practices. Due to limited resources, however, journalists are not able to access remote areas.

Intermittent electricity affected programme transmission: Radio stations without electric power generators experience power shortages and, thus, interruptions in broadcasting.

Transforming arid zones into fertile farmland: **Sand To Green**

Every year, desertification increases by around 13 million hectares. Local populations are increasingly forced into rural exodus because they are unable to make a living from their land, which has been rendered arid by desertification. As the world's population continues to increase, the proportion of arable land needed to feed this ever-growing population is decreasing. An estimated 593 million hectares of arable land will be needed by 2050. The continued practice of deforestation for agricultural purposes is unsustainable.

Climate change is further exacerbating the fragility of drylands, requiring greater resilience and the implementation of adaptation solutions for both individuals and communities. Conventional solutions are losing their effectiveness in the face of these challenges.

This paradox is particularly pronounced in arid regions, the most vulnerable to climate change, where migratory flows are highest, with rural exodus reaching 90 per cent. Importantly, these arid zones are home to around 2 billion people, many of whom belong to the world's poorest communities. These people are the first to suffer the adverse effects. In addition, the solution targets a second group: those whose food security is threatened in expanding arid zones. By introducing agriculture adapted to these challenging environments, we aim to solve the food-related problems these beneficiaries face. This ambitious initiative aims to cultivate 10,000 hectares by the end of 2030.

Initiative overview

For the past seven years, Sand To Green has been working in southern Morocco to develop resilient agricultural plantations inspired by oases, which are the most basic agroforestry systems. These systems combine the cultivation of trees and vegetation to encourage symbiosis between species. The trees provide shade and a barrier against strong winds, while the plants protect the trees from disease and improve soil structure.

The Nzaha estate's cradle of project experiments acts as an open-air laboratory, and staff tests new combinations of species endemic to arid zones daily. The initiative aims to determine the best selections for customers, enabling them to regenerate soil while developing profitable agriculture.

Users are offered the possibility of setting up these advanced agroforestry systems to create or replace conventional agricultural systems (with the project agroforestry software available to them). This tool brings together knowledge acquired during the various field experiments:

- Participants can design complex agroforestry systems, providing all of the data needed to model large-scale plantations. This includes economic, financial, and impact analysis, drawing on the team's experience in Morocco to define a specific design that accounts for agronomic and economic expectations.

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- Participants can ensure daily monitoring of the plantation from both agronomic and economic angles through precise analysis, combining satellite imagery, field sensors, and human observation by Sand To Green employees. This ensures the resilience and profitability of the plantations and their consistency with the Sand To Green methodology, enabling carbon credits to be issued and certified, and supplementing farmers' incomes.

The project also provides a process for sustainable access to water, combining desalination and brine recycling. This establishes agricultural plots that are at least as profitable as conventional plots while generating a triple impact: environmental, social, and economic.

It is estimated that at least one job is created for every four hectares and one project manager for every 20 hectares. In turn, the latter can train local populations in arid zone management, offering profitability at least equal to that of a monoculture plantation without dependence on the severe climatic disturbances of these zones.

Women's involvement

At Sand To Green, Wissal Ben Moussa and Doha Zahid embody the innovative heart of its mission: to transform arid zones into fertile farmland. Moussa, as co-founder and Chief Scientist Officer, leads scientific research, ensuring that the approach to agroforestry is both innovative and scientifically sound. Her agroecology expertise guides fruit tree integration into farming systems, enhancing biodiversity and soil resilience. Under her direction, the projects have explored innovative lines of research, such as soil health and the recycling of brine, a waste product of desalination, needed to irrigate agricultural systems.

As head of research and development at Sand To Green, Zahid brings its innovations to fruition. With her expertise in agronomic engineering, her work enables projects to effectively revitalise land and enrich soil health. She is instrumental in setting up the processes that will allow the development of cutting-edge techniques in research and development (R&D) projects, firmly anchoring the mission in sustainable and regenerative agriculture principles.

Moussa and Zahid also played a key role in Sand To Green's oasis regeneration project, where they trained 20 women from the Tiskmoudine Oasis community in sustainable and regenerative farming techniques. This project perfectly illustrates the vision of the Sand To Green projects: to create agricultural systems that feed people while respecting the earth. Their work at Sand To Green is not limited to the physical transformation of landscapes; it extends to the training and empowerment of local communities, creating a lasting impact that goes far beyond the growth of plantations.

Women champions

Wissal Ben Moussa, co-founder and Chief Scientist Officer of Sand To Green, is a leading figure in agroecology. Her background as an agricultural engineer, enriched by a deep passion for the regeneration of arid lands, has been the driving force behind her work. She has unique expertise in creating agroforestry designs in arid zones as a result of an experimental plantation being developed in the Nzaha estate in southern Morocco, on which she has been working since 2018. Her knowledge of the issues and ecosystems of semi-arid regions plays a decisive role in developing innovative solutions for improving biodiversity and soil resilience. Her strategic vision and commitment to share regenerative farming methods with local communities guide Sand To Green towards achieving its environmental and social objectives.

Doha Zahid, Research and Development (R&D) Project Manager, brings her technical expertise from her training and experience in agroecology in Senegal to the project. An agricultural engineer by training, she specialises in implementing innovative projects focused on revitalising degraded ecosystems. Her hands-on approach and commitment to sustainable agriculture are crucial to the success of Sand To Green's projects, making a significant contribution to land regeneration and improving the living conditions of local communities.

Challenges

Two significant challenges are emerging: the recycling of brine, the waste product of desalination, and the continual updating of the database of endemic species and traditional agricultural practices in the territories being explored. These issues are crucial to Sand To Green's mission of adapting local agriculture to climate change rather than imposing a single agricultural model.

Recycling brine: Recycling the brine from desalination represents a considerable technical and environmental challenge. Brine, highly concentrated in salt and other minerals, can harm terrestrial and aquatic ecosystems if not properly managed. Sand To Green's approach aims to transform this waste into a resource through innovative technologies to recover salts and minerals for agricultural or industrial use. However, developing these technologies is complex and requires significant investment in research and development. The variability of brine composition, depending on the seawater source and desalination process, adds further complexity to its recovery.

Updating the database: Expanding project activities into new territories involves the constant challenge of updating the database of endemic species and traditional agricultural practices. Each territory has a unique ecosystem and agricultural know-how adapted to climatic conditions and soil. The mission's success depends on Sand To Green's ability to integrate this local knowledge into the design of its agroforestry systems. This involves working closely with local communities, researchers, and agroforestry practitioners to collect, validate, and integrate this data into project software.

These challenges underline the importance of continuous innovation and collaboration with a multitude of players in environmental technology, agroecology, and natural resource management. By overcoming these obstacles, Sand To Green aims to offer solutions that mitigate the effects of climate disruption on agriculture and promote a transition towards more sustainable and resilient farming practices.

ASIA

Photo: © China Green Foundationl

Australia

Supporting women to lead sustainable land management and drought resilience: **Future Drought Fund, Department of Agriculture, Fisheries and Forestry**

Drought is an enduring feature of the Australian landscape that is predicted to become more frequent and severe as the climate continues to change. The Future Drought Fund recognises that drought has significant economic, social, and environmental impacts, and often these factors are interconnected. The "Helping Regional Communities Prepare for Drought Initiative" (HRCPDI) aims to build resilience in relation to the social impacts of drought. Significant evidence suggests that social capital is beneficial in adapting to drought and the impacts of a changing climate. People in agriculture-dependent communities with higher social resilience will have access to more resourcing, knowledge, and a broader network when drought occurs.

Building a sense of community is critical in preparing and responding to drought, as events that bring people together decrease social isolation and increase the capacity to cope. Events and community spaces also provide an environment for locals to gather with others who have similar lived experiences. Ensuring these spaces and routines are well established early is important in supporting a community when drought hits.

Initiative overview

The HRCPDI is an AUD 29.6 million investment that offers an integrated package of support for drought-preparing communities. It will be delivered until June 2025, in partnership between the Foundation for Rural and Regional Renewal (FRRR) and the Australian Rural Leadership Foundation (ARLF).

The HRCPDI consists of five programme elements:

1. Community Impact Program: Targeting 35 regions nationally, up to AUD 500,000 will be granted to one lead organisation per region. The lead organisation will partner with other local organisations and community members through a co-design process to create local projects.
2. Small Network Grants: Grants of up to AUD 50,000 will support community organisations to build stronger connections and networks.
3. National Mentoring Program: The 12-month learning programme connects mentors to individuals who want to contribute to their community's drought resilience.
4. National Learning Network: This network connects individuals and organisations participating in the HRCPDI or previous foundational year programmes, enabling them to continue learning from each other and sharing experiences in building drought preparedness. The network will consist of alumni from other programmes for Future Drought Fund communities. It uses a Facebook group as a base to connect with members.
5. National Expertise Pool: This online platform allows community organisations to access specialist expertise to activate drought resilience activities. Experts with specific skills advertise through the platform, and grantees can access it.

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https://www.agriculture.gov.au/agriculture-land/farm-food-drought/drought/future-drought-fund/helping-regional-communities-prepare-for-drought-initiative

Australia

Women's involvement

The HRCPDI has funded a raft of activities to support women in SLM practices and build drought resilience.

Examples include:

- At least 16 projects have been supported, and over AUD 580,000 in grants have been allocated to activities across Australia, supporting women in drought-prone communities with a focus on increasing leadership skills.
- Of the 250 participants in the National Mentoring Program under the HRCPDI, 159 have been women. This programme pairs a mentor with a mentee to build resilience and develop leadership capacity in drought-prone areas.

Women champions

HRCPDI has supported the work and ongoing capacity building of women leaders via its grant systems, including projects like "Mallee Sustainable Farming", which is creating a network of confident, capable rural female leaders through personal development and leadership training opportunities.

Challenges

Current challenges and gaps in the HRCPDI are broad. Evaluation of the HRCPDI is currently underway and will provide insight into challenges and gaps concerning the focus of this report.

Tackling water scarcity under the leadership of women: **Bhungroo initiative**

The Bhungroo initiative is a pioneering solution that emerged in response to the challenges of water scarcity faced by rural communities, particularly in arid regions like Gujarat, India. There is a pressing need to address water security issues in these areas, where erratic rainfall patterns and depleting groundwater levels have led to severe water stress, affecting agricultural productivity and livelihoods.

Developed by the Biplabketan Paul of Naireeta Services, Bhungroo embodies a sustainable approach to water management that leverages traditional wisdom with modern technology. 'Bhungroo' refers to a traditional Gujarati water storage vessel, symbolising the fusion of Indigenous knowledge with innovative solutions.

The initiative traces back to the early 2000s when the founders of Naireeta Services recognised the urgent need to tackle water scarcity in rural communities. They observed that, despite the challenges, farmers in these regions often possessed valuable traditional knowledge of water conservation techniques.

The initiative involves the construction of underground reservoirs, or Bhungroos. Designed to prevent water evaporation and contamination, these large straw structures capture and store rainwater during the monsoon season, ensuring a sustainable water supply for irrigation throughout the year. Additionally, Bhungroo recharges groundwater aquifers, contributing to the overall replenishment of the water table.

The Bhungroo initiative has garnered significant attention and acclaim for its effectiveness in transforming water-scarce regions into productive agricultural hubs. By providing farmers with access to reliable water sources, Bhungroo has enhanced agricultural yields and empowered rural communities, reducing their dependency on erratic rainfall and costly irrigation methods.

Initiative overview

Bhungroo, a groundbreaking water management technology, tackles water scarcity issues in agricultural regions, particularly in Gujarat, India. Smallholder farmers, especially women, can reclaim their land's value by efficiently managing water resources. Bhungroo serves as an underground rainwater harvesting system, utilising perforated pipes or wells to recharge underground aquifers during monsoons. This stored water ensures continuous irrigation during dry periods, mitigating the impact of erratic rainfall patterns and water scarcity on crops.

A key factor in Bhungroo's success is its community-driven approach, with women at the forefront. Women, often primary agricultural workers, lead the implementation and management of Bhungroo systems through self-help groups and initiatives. This empowers them economically and enhances their resilience to climate change, bypassing cultural barriers that might impede male cooperation.

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The Women Climate Leaders (WCL) Program, associated with Bhungroo, further enhances women's role in climate resilience. It trains women from marginalised communities to become leaders in climate adaptation and mitigation. Women gain expertise in sustainable agriculture, water management, and community organising, enabling them to address climate-related challenges effectively.

Women farmers with technical and leadership skills from the WCL Program drive positive change within their communities. They advocate for sustainable farming practices and climate-resilient technologies, like Bhungroo, and serve as role models for others. Bhungroo and the WCL Program offer a holistic approach to water scarcity and climate change in agriculture. By empowering women as agents of change, these initiatives enhance agricultural productivity, food security, and community resilience in the face of environmental challenges.

Women's involvement

In Gujarat, India, smallholder women farmers face complex challenges stemming from cultural norms and environmental adversities. Gender inequalities, exacerbated by social hierarchies favouring men, leave women vulnerable to domestic abuse and financial dependency due to a lack of land titles. Climate change and water mismanagement further compound their struggles, leading to shorter growing seasons, soil degradation, and forced migration during monsoons and arid summers.

The absence of land titles restricts women's access to credit and agricultural resources, trapping them in poverty cycles and pushing them toward urban migration or bonded labour. Bhungroo technology emerges as a solution, empowering women to reclaim their land's value through self-help groups and microcredit experiences. Trupti Jain, a local leader, negotiates water rights for women in exchange for Bhungroo units, recognising the vital link between water access and land value.

Bhungroo brings transformative benefits, including tripled incomes, diversified crops, uninterrupted education for children, and newfound self-reliance for women. This empowerment transcends individual lives, reshaping community dynamics by fostering solidarity among women and reducing incidents of domestic violence. A movement of 'Innovation for Dignity', Bhungroo demonstrates women's pivotal role as agents of change in addressing systemic inequities and embracing innovative solutions for community development and resilience.

Women champions

Trupti Jain, a champion for marginalised communities, particularly women farmers in Gujarat, India, Jain's visionary leadership has transformed lives and landscapes. Her pioneering efforts in developing and promoting Bhungroo technology and her advocacy for women's empowerment have earned her widespread recognition. Through relentless dedication, Jain has empowered countless women to reclaim control over their livelihoods, land, and futures. Her commitment to social justice and environmental stewardship has improved agricultural productivity and resilience and sparked a broader movement for gender equality and climate action. Under her leadership, Naireeta Services Private Limited successfully installed over 5,000 units across 12 states of India, as well as in Ghana, Vietnam, Rwanda, and Bangladesh, directly benefiting nearly 15,000 smallholder farmers, positively impacting approximately 160,000 rural individuals, and saving 2,129 millilitres of water annually.

Anjuben Parmar, a pioneering grassroots worker for over three decades, is dedicated to advancing women's livelihood restoration programmes. She plays a crucial role in forming self-help groups at the village level, having established 956 women's self-help groups to date. She has conducted 112 training programmes benefiting 1,200 women, covering areas such as natural resource management, kitchen gardening, and various livelihood generation activities, including sewing, embroidery, animal husbandry, soap making, 'Rakhadi' making, and imitation jewellery making. She is instrumental in raising awareness among women farmers about the Bhungroo system at the grassroots level and has been a catalyst in securing ownership rights for women. Her efforts have facilitated access to government schemes for local communities. Additionally, she has been associated with the Bhungroo programme as a beneficiary for the past four years.

Challenges

Despite significant progress in empowering women farmers through initiatives, like Bhungroo and the Women Climate Leaders program, challenges persist, hindering sustainable agricultural practices and gender equality in Gujarat, India.

Access to resources: Access to resources remains a significant barrier for women farmers. While Bhungroo addresses water scarcity, many women farmers lack land, credit, and agricultural inputs. Land ownership, mainly male-held, hampers women's benefit from productivity enhancements. Limited credit access exacerbates this, hindering investment in climate-resilient practices.

Gender disparities: Gender disparities persist in decision making and resource allocation. Cultural norms confine women to subordinate roles, sidelining their voices in agricultural policies and programmes.

Tailored extension services and technical support: Tailored extension services and technical support for women farmers are lacking. Bhungroo's success depends on training, but women, mainly from marginalised communities, face barriers like mobility constraints and illiteracy.

Project sustainability and scalability: The sustainability and scalability of initiatives, like Bhungroo, hinge on institutional support and long-term funding. Despite their potential, sustained investment from governments and stakeholders is crucial for lasting impact.

Mobilising women in favour of land restoration and desert control: **China Green Foundation**

Sečen Gerel and her family have long resided in areas severely affected by desertification. Around 2010, she underwent two surgeries due to illness, exacerbating the financial strain on her already impoverished family. Faced with the dual pressures of family poverty and survival, Gerel and her husband, Mongh Nasan, persevered and diligently sought a way out. With the support of the "Million Forest" project, they were able to shift their own situation and inspire others.

Initiative overview

Gerel and her husband joined the non-profit initiative, Million Forest, in 2019, focusing on restoring degraded sandy land by planting Hedysarum scoparium. The planted area exceeded 15,000 mu (approximately 2,471 acres). Leveraging local knowledge on desert control, she selects differently sized seedlings and adapts them to the natural conditions of sand dunes, planting small seedlings in low-lying areas and larger ones on sand ridges. Gerel transformed a household oil gun into a water-flushing tool for finding water sources, drilling wells, and laying pipelines in the desert. The survival rate of her planted Hedysarum scoparium exceeds 90 per cent, far surpassing the national afforestation standard of 70 per cent. After six years of hard work, the sandy land restored by Gerel's family can now sustain seasonal grazing, providing continuous benefits. Furthermore, she actively engages in services, such as desert ecological tourism, as a desert tour guide.

Women's involvement

Over the past 15 years, the Million Forest project of the China Green Foundation has actively mobilised women, represented by Gerel, to become a core force in desert control. Gerel has played a leading role in local ecological restoration, afforestation knowledge dissemination, technological innovation, and sand industry development in her six years of desert control work.

Firstly, she plays a pivotal role in agricultural production. Agriculture is often the main driver of economic development in arid areas and, through Gerel's efforts and wisdom on desert control, her family's livelihood is ensured. During the afforestation season, Gerel organises nearby pastoralists to carry out afforestation work, such as picking seedlings, planting, and watering.

Secondly, she plays an important role in innovative afforestation and nurturing protection. Gerel has inherited and developed many traditional land management techniques, including water conservancy projects, afforestation, and soil conservation. In 2019, she began researching the effects of different plants on soil improvement and experimented with planting tree species that can survive in harsh conditions. Her family's sandy land has become an experimental field, planting drought-resistant and environmentally suitable seedlings of Hedysarum scoparium. Gerel's practice is not just about planting trees but a study of ecological balance. After three years of the Hedysarum scoparium growing into

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forests, Gerel discovered that sheep greatly enjoy the leaves and seeds of the Hedysarum scoparium. After multiple observations, Gerel and the Million Forest project team developed the Hedysarum scoparium rotational grazing technique.

Thirdly, she holds an essential position in community organisation and decision making. Gerel's efforts have inspired the surrounding pastoralists, although many attempted to emulate her practices with little success. To support the development of the community, Gerel actively established rural cooperatives, sharing innovative desert control techniques and experiences, mobilising pastoralists in the community to participate in desertification prevention and control, and collectively restoring 20,000 mu of land. From seedling selection to planting and maintenance, Gerel demonstrates and spreads knowledge through field demonstrations and word of mouth, aiding community desert governance and ecological improvement. Additionally, she actively seeks social welfare funds from the Million Forest project, providing afforestation funds to economically disadvantaged pastoralists and promoting resource pooling and integration from multiple stakeholders. Through social media platforms, moreover, she disseminates information and experiences on desertification prevention and introduces the ecological changes in her hometown to a broader audience concerned about desertification.

Women champions

Sečen Gerel, a herder from Huitu Gaole Gaqaa in Alxa Left Banner, Inner Mongolia, China, was born in June 1970. In Mongolian, 'Sečen' means wisdom, while 'Gerel' signifies brightness. In 2019, she became a collaborating herder in the Million Forest public welfare initiative. She has achieved significant results in desertification prevention and local desert tourism development through her participation in the project.

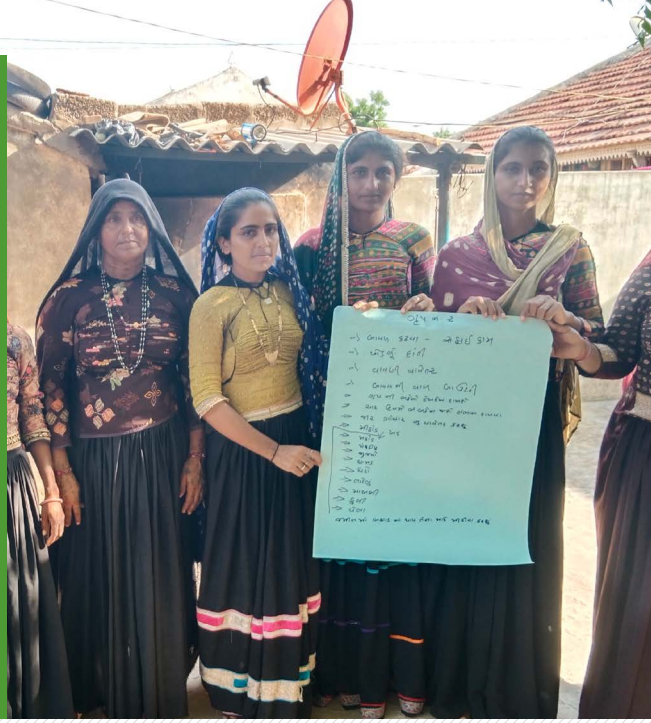
Challenges

Improving infrastructure to alleviate drought: The Million Forest project has continuously improved infrastructure and enhanced technologies through years of development. Water-saving planting techniques, photovoltaic irrigation, and other methods have effectively alleviated drought issues in project areas, with women playing a key role.

Empowering farmers through training: To address issues, such as the lack of specialised planting techniques among collaborating forestation professionals, training activities on Hedysarum scoparium planting skills and rotational grazing techniques have been organised. Outstanding women herders are selected and trained to share practical knowledge and skills.

Adapting to local conditions: Adhering to the principle of 'appropriate trees for appropriate land', the Million Forest project has implemented windbreak and sand fixation seedling planting in multiple locations. It continuously repeats and updates its approaches based on the actual conditions of project areas and changes in national policies. It has established a new ecological protection public welfare model that integrates "public institutions + donor partners + local governments + local cooperatives + herders and farmers", achieving multiple benefits, such as ecological/environmental protection, increased income for rural families, rural economic development, and diversified employment opportunities for women.

Restoring and regenerating pasturelands under the leadership of women's committees: **Maldhari Rural Action Group (MARAG) Pastoral Women Alliance**



In the arid Kutch (Vagad) region of Western India, Maldharis, traditional herding communities, face challenges resulting from drought and desertification. Women in these communities play vital roles, possessing valuable knowledge about animal care and grazing land management. Despite government mandates for grazing land allocation, pastoralists struggle due to a lack of awareness and unproductive grazing areas, often leading to migration in search of suitable grounds.

Annual migrations lasting eight to 10 months are common as pastoralists seek food and water for their livestock. These communities, crucial for preserving nature and local economies, often go unnoticed by broader society but exhibit resilience in safeguarding their way of life.

Organisations, like the Maldhari Rural Action Group (MARAG) and the Pastoral Women Alliance, raise awareness and empower young individuals to advocate for their rights. Initiatives to restore grazing areas involve pastoral women leveraging their traditional knowledge to rejuvenate lands and ensure sustainable livelihoods for future generations. Through these efforts, women contribute significantly to preserving their heritage and the environment.

Initiative overview

The initial project focused on 10 villages, each with 10 acres of associated common pastureland, lending to a total of 100 acres. This project offered local solutions to restore and regenerate the pasturelands and their ecology. Regenerated pastureland was used for open and free grazing for livestock, which enhanced milk production and generated income for women and their families.

MARAG formed a Women's Pastureland Management Committee (WPLMC) in each village, consisting of 10 Pastoral Women Alliance members. Each WPLMC managed 10 acres of these common grazing lands in their respective villages. WPLMCs engaged in land mapping and demarcation, soil testing, land clearing and levelling, grass seed selection, grass sowing, and land maintenance and management.

The WPLMCs set the rules and regulations for land management. They jointly decided to use 5–10 acres in each village gaucher (hill town) to develop traditional grasses for small ruminants, 2.5 acres as fodder for big cattle, and 2.5 acres to build drought-tolerant species. The WPLMCs documented the regulation and use of pastureland and management responsibilities.

The following processes were employed for pastureland regeneration:

1. Silvopasture practice
2. Land treatment and afforestation
3. Reintroduction of traditional grass seeds

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4. Tapping of Indigenous pastoral knowledge for grass development and breed conservation
5. Forming and strengthening of Women Pasture Land Management Committees (WPLMC) at the village level for project sustainability
6. Use of technology by, and capacity building of, the WPLMC (e.g. Global Positioning System [GPS] tools for land measurement, mobile application use to determine land fertility and water catchment, etc.)

Livestock rearing generally involves trampling, grazing, browsing, and converting edible feed and organic waste into useful dung and urine. If managed sustainably, livestock rearing supports the sustainable management of land, especially in rainfed areas, by improving soil health, mitigating desertification, and protecting the local ecosystem against invasive species.

The MARAG regeneration project diversified and improved the quality of grasses, improved soil fertility, and increased the groundwater level. The project promoted traditional grasses, boosting the nutrition of livestock and increasing milk production. This model directly benefited 560 households engaged in livestock keeping, among others.

Women's involvement

The project was driven by the expertise and determination of Maldhari women, who recognised the urgency of reviving their relationship with the pastureland to secure their traditional roles and identities as well as a positive future for themselves and their children. Understanding that the depletion of pasturelands threatened their livelihoods and dignity, these women aspired to restore biodiversity and traditional sources of livelihood through their knowledge and abilities. By forming WPLMCs, with support from MARAG, they took leadership roles in managing the restoration of 100 acres of pastureland across 10 villages, empowering themselves to challenge patriarchal dominance by mainstreaming their participation in economic activities.

The steps they took to regenerate grazing lands are outlined below:

- Village-level meetings: The Alliance initiated village-level meetings to facilitate discussions on grassland regeneration. These meetings provided a platform for community members, particularly pastoral women, to voice their concerns and ideas regarding land degradation and potential solutions.
- Formation of village-level committees: To spearhead grassland regeneration efforts, the Alliance formed village-level committees composed of local women leaders. These committees were focal points for coordinating activities and mobilising community support for the initiative.
- Establishment of rules and regulations: The committees established rules and regulations governing their operations, including criteria for committee membership, meeting schedules, and record-keeping procedures. Clear guidelines were set to ensure transparency and accountability in decision making processes.
- Identification of land for regeneration: Working closely with community members and local authorities, the committees identified suitable land parcels within each village for grassland regeneration. Factors, such as soil fertility, water availability, and accessibility, were considered in the selection process.
- Dialogue with government authorities: Recognising the need for legal recognition and support, the Alliance engaged in dialogue with government authorities to secure leases for the identified land parcels. These negotiations aimed to grant the women-led committees a five-year lease to manage and regenerate the designated grazing lands.
- Technical training: To equip committee members with the necessary skills and knowledge, the Alliance conducted training sessions on technical aspects of grassland management. Using mobile applications, participants learned to identify catchment areas, assess soil fertility, and select optimal seeding locations.
- Land preparation: Armed with newfound knowledge and expertise, the committees undertook land preparation activities, including levelling and clearing vegetation. These efforts aimed to create suitable conditions for seed sowing and to promote optimal grassland regeneration.

Women champions

Jivu Rabari, a resilient leader even in the face of adversity, is committed to ensuring that women have the opportunity to lead in caring for grazing lands. Rabari's leadership not only brings communities of women together, it also showcases the power of collective action. Rabari is a skilled multitasker who works with the gram panchayat to secure land under the women's committee. Her strength and ability to mobilise women for this cause exemplify her as a true asset to the community.

Devi Nagjibhai has made contributions that extend beyond her resilience and leadership qualities. She possesses tremendous knowledge on grasses and biodiversity, expertise that enriches the community's understanding of the land and strengthens their efforts to sustainably manage grazing lands. Nagjibhai's commitment to uphold the rules and regulations ensures the land is managed responsibly, safeguarding its biodiversity and long-term health. Her profound understanding of biodiversity further underscores her invaluable role in guiding conservation efforts within the community.

Pabi Makvana, a remarkable community leader, possesses strong leadership qualities and a powerful voice. Her ability to unite people and ensure everyone's voices are heard makes her an influential figure in the community. Her determination and inclusive approach have garnered support for projects aimed at benefiting the community as a whole. Makvana's leadership is instrumental in advancing gender equality and SLM in her community.

Challenges

The effort to empower women in managing grazing lands faces significant challenges due to patriarchal norms and power dynamics within the community.

Resistance and bias due to patriarchal norms: Resistance from male community members towards accepting women's leadership roles is a significant challenge. Patriarchy, where men typically hold more power, makes it hard for women to take charge or have their voices heard. Within each community, there is a hierarchy whereby some people have more power and influence. This can make it difficult for women, especially those from marginalised groups, to assert themselves and take leadership roles. Sometimes, women may hesitate to take on leadership roles because of societal expectations and fears of judgment from others. They might worry about what others will think if they speak up or make decisions. Women also face challenges when communicating with local government authorities to secure land for the committee, as government officials (who are typically male) may not consider women capable of effectively managing communal land. This bias undermines women's efforts to assert their rights and contribute to SLM practices.

Scarcity of water resources: Water scarcity affects the productivity of grazing lands. Without enough water, it is tough for the land to support healthy grass for the animals.

In summary, patriarchal norms, power dynamics within the community, interference from men and water scarcity pose significant challenges to empowering women in managing grazing lands. Overcoming these challenges will require addressing deep-seated gender inequalities and promoting inclusive decision making processes that respect the autonomy and agency of all community members.

China

Supporting desertification management through agricultural industrialisation: **Ronglan Desert Governance**

Wang Zhilan grew up in Mayuanzi Village, Anbian Town, along the southern edge of the Mu Us Desert. This disaster region is engulfed by severe sandstorms, salt deserts, and a particularly harsh natural environment. In 1999, when the state started to encourage ecological improvement and land contracted for rehabilitation by individual households, Wang Zhilan had 130,000 mu[1] of contracted barren hills and wasteland for afforestation. Following management, the vegetation coverage exceeded 73 per cent, and the ecological environment greatly improved. For more than 20 years, she has never given up her belief in environmental development, actively improving the portfolio of tree species in desertification control areas and, at the same time, enhancing the protection and economic benefits of local ecological forests, thus transforming ecological shelter forests into ecological economic forests.

Initiative overview

In 1998, Wang Zhilan took the lead in interplanting corn and pumpkins with plastic-film mulching in 100 mu of newly contracted farmland, which won her the first award of 'champion of scientific farming'. In 2006, she began introducing and promoting economic forest varieties and, since then, has introduced more than 120 economic forest varieties and 75 varieties of green, flowering, and woody plants from eight provinces and autonomous regions. The area of her nursery base has reached 1,000 mu, and more than 300 varieties have been cultivated, with clear demonstration effects. Various grafting techniques have been summarised and popularised, and more than 6,500 mu of trees have been grafted and improved to return farmland to forests and afforestation in barren hills.

To date, Zhilan's company has established 11 demonstration bases, establishing itself as a leading firm in agricultural industrialisation in Yulin City. These include an agricultural high-tech promotion and demonstration base in the Yangling Demonstration Zone and a Green Project Demonstration Base in Commemoration of International Women's Day. The company has garnered recognition for promoting science, benefiting farmers, and improving livelihoods. In recent years, Zhilan has focused on cultivating, demonstrating, and popularising tree species most suitable for desertification restoration and control. This effort has resulted in significant contributions to desertification management.

Women's involvement

In 1999, Zhilan started large-scale governance of contracted land with desertification and established the Ronglan Desert Governance Company in Dingbian County. At this time, she was in charge of 10,440 mu of contracted barren hills in the village. In two years, she planted 5,000 mu of Astragalus surgeons and Korshinsk pea shrub, more than 190,000 kernel-apricot and Armeniaca sibirica, and more than 70,000 Salix matsudana Koidz, and she repaired eight kilometres of road for water collection and made

1 1 mu equals .06 hectare.

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160,000 rabbit-proof fences. The contracted area was comprehensively managed, and the ecological environment significantly improved.

By 2009, Zhilan had completed the management of the contracted area, meeting the standards of ecological improvement. While continuously expanding the contracted area and improving the quality of management, she leveraged the grass resources produced by land management to set up processing plants for feed pellets from grass, rabbit breeding farms, rabbit meat processing plants, and breeding farms for sheep improvement. These efforts have transformed resources through ecological management and increased income while providing more than 2,000 breeding rabbits and sheep to more than a dozen farmers.

In 2009, the Farmers' Professional and Technical Association was established, and nine technical workshops were held, providing more than 2,800 training opportunities for major village officials in the entire city and core technical workers in towns and villages throughout the county.

In recent years, Zhilan introduced more than 300 kinds of high-quality nursery stock of economic plants, flowering and woody plants, and green plants. She also grafted and improved the plant varieties to return farmland to forests in more than 6,500 mu of land. This has already consolidated achievements in returning marginal farmland to forests and improved economic benefits. She also changed ecological shelter forests into ecological economic forests, benefiting over 2,000 households that had returned their farmland to forests.

Women champions

Wang Zhilan, a villager in Gaozhaizi Village, Haotan Town, Dingbian County, Shaanxi Province, is now the general manager of Ronglan Desert Governance Company in Dingbian County, Shaanxi Province. Zhilan has won 70 awards, including the National Greening Medal, the Top Ten Women Greening Champions in China, National Model Worker of Sand Prevention and Control, and Outstanding Contributor to the Construction of the Three North Shelterbelts awarded at the 30th Anniversary of the Shelterbelts.

Challenges

Wang Zhilan faced numerous challenges in the long-term management of contracted land afflicted by desertification. However, her unwavering belief in environmental safeguarding and commitment to land have inspired her to persevere. The collective land she contracted from the production team is dedicated to afforestation efforts on barren hills, with reduced subsidies for seedlings per unit of land. As a result, she covered additional expenses, such as site preparation, planting labour, watering, management, tending, and replanting, often in response to drought disasters. To sustain her efforts, Zhilan sold her rural and urban properties and farms and sought financial assistance from banks and relatives to fulfil the management contract for 130,000 mu of land and bring it up to standard. As her land management efforts required a significant supply of seedlings, she established her nursery and cultivated seedlings. Today, the nursery has expanded to over 1,000 mu, offering over 300 varieties of seedlings. Additionally, surplus seedlings of flowering and woody plants are distributed to surrounding areas.

Building the resilience of smallholder farmers against climate variability and extreme weather events: **The Climate Resilient Integrated Water Management Project (CRIWMP)**

Photo: © Sepali de Silva / UNDP Sri Lanka

Desertification and drought represent pressing global concerns stemming from a complex blend of natural phenomena and human activities. The vulnerability to these challenges is notably heightened across Asia, where vast expanses of land and dense populations converge. This is more evident than in Sri Lanka, where the expansive dry zone, covering 70 per cent of the land, faces acute water scarcity and land degradation threats. The consequences ripple across diverse ecosystems, imperilling agriculture, water resources, and overall environmental equilibrium. Within Asia, Sri Lanka emerges as a focal point, mainly due to the vulnerability of its dry zone. Here, sustainable ecosystems and the population's welfare are under significant threat. Compounding this issue is the nuanced role of gender, where women find themselves disproportionately burdened. The arduous task of collecting water falls primarily on them, often entailing perilous journeys and constraining their engagement in other activities. The erratic rainfall patterns, detrimental to rain-fed agriculture, exacerbate economic instability, particularly for women in Sri Lanka's dry zone.

To address this nexus of challenges – desertification, drought, and gender inequality – the "Climate Resilient Integrated Water Management Project" (CRIWMP) has been implemented in the dry zone of Sri Lanka. Spanning a duration of seven years (2017–2024), this project is designed to bolster the resilience of smallholder farmers in the dry zone against climate variability and extreme weather events. CRIWMP targets impoverished and vulnerable households within three critical river basins: Malwathu; Mi; and Yan. These basins, coursing through the northern expanse of the dry zone, are particularly susceptible to climatic issues. They also harbour a dense network of village irrigation systems and cascade systems, upon which the livelihoods of the region's poor and vulnerable farming communities hinge. Furthermore, they face a pronounced lack of safe drinking water, amplifying the risk of kidney disease among the local populace. By building the resilience of smallholder farmers and addressing the intricate interplay of environmental and social factors, CRIWMP embodies a vital step towards sustainable development and safeguarding the well-being of vulnerable communities in the dry zone.

Initiative overview

Women, constituting slightly over half (51.5 per cent) of Sri Lanka's population, play a pivotal role in the agricultural and economic sectors. Their contributions are vast, particularly in food production and security, minor crop cultivation, livestock management, and the preservation of traditional knowledge. Despite representing 34.3 per cent of the economically active population, women encounter obstacles, such as limited access to natural resources, markets, financial services, and technology. Traditional gender roles and care responsibilities further compound their challenges.

While strides have been made to empower these women economically, there remains a pressing need for comprehensive recognition and support of their contributions. In Sri Lanka's rural farming communities, women confront formidable challenges from drought and climate change.

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Predominantly reliant on agriculture for their livelihoods, these women grapple with increasingly erratic weather patterns and extreme conditions, notably droughts, which disrupt harvests and escalate farming complexities. The global decline in fertiliser supply further exacerbates their plight, posing a severe threat to food production. Additionally, land ownership remains elusive for many women, with climate change exacerbating existing difficulties.

It is also worth noting that the burden of unpaid care and domestic work, including the arduous task of water collection, amplifies during periods of drought. Compounding these challenges is the reality that women often serve as primary caretakers for children and the elderly. In times of crisis, they disproportionately bear the brunt of employment losses, compelled to stay at home without adequate government support, navigating increasingly dire circumstances alone. Recognising the pivotal role of women in SLM, initiatives led by women assume paramount importance, particularly in drought-prone regions.

The collaborative efforts of UNCCD and FAO highlight innovative women-led projects, showcasing their vital contributions to SLM. These initiatives range from irrigation systems, like India's underground rainwater storage project to renewable energy use, such as solar-powered field irrigation in Benin. They promote SLM and enhance resilience to drought at local, national, and regional levels. Empowering women and harnessing their unique insights fosters sustainable practices to mitigate drought impacts and promote long-term environmental stability. Despite displacement, livelihood loss, and malnutrition, women play crucial leadership roles in drought response and recovery efforts, necessitating gender-specific agricultural projects to enhance their resilience. Coupled with governmental support for credit access and clear land tenure policies, these initiatives can significantly bolster women's capacity to withstand drought. Adopting gender-responsive approaches in drought policy making is essential to harness women's pivotal role in drought risk management, ensuring their survival and contributing to community resilience.

Women's involvement

In the arid landscapes of Kurunegala, situated within Sri Lanka's dry zone, women emerge as central figures in SLM, embodying resilience, resourcefulness, and unwavering dedication. With women comprising slightly over half (51.5 per cent) of the region's population, their indispensable role in Kurunegala's agricultural and economic sectors is highlighted by figures indicating their involvement in various livelihood activities. Despite constituting 34.3 per cent of the economically active population, women face entrenched challenges, including limited access to resources, technology, and market opportunities, exacerbated by prevailing gender norms and caregiving responsibilities. Yet, their contributions to food production and security, minor crop cultivation, livestock management, and the preservation of traditional knowledge remain significant, shaping the region's agricultural landscape and fostering resilience amidst environmental adversities.

Water scarcity looms large in Kurunegala, with figures revealing a stark reality of diminishing water resources and recurrent droughts. In response, women lead conservation efforts, leveraging traditional wisdom and innovative strategies to optimise water usage and ensure sustainability. Data showcases the construction of small-scale reservoirs, or tanks, and the widespread adoption of rainwater harvesting systems, demonstrating women's pivotal role in safeguarding against the impacts of drought on agricultural productivity and livelihoods.

Women in Kurunegala champion agroecological farming practices, emphasising biodiversity and climate resilience in agricultural systems. Figures highlight their active participation in crop diversification initiatives and adoption of natural pest management techniques, illustrating their commitment to reduce reliance on chemical inputs and enhance ecosystem health. Over 70 per cent of rural women are engaged in agricultural activities, underscoring their integral role in driving sustainable agricultural practices and promoting resilience to environmental challenges.

Beyond their contributions as farmers and stewards of natural resources, women in Kurunegala assume leadership roles within their communities, serving as educators, advocates, and change agents. Data reveals their involvement in women's self-help groups and agricultural cooperatives, facilitating knowledge exchange and empowering marginalised stakeholders. Notably, figures depict a growing trend of women's representation in local governance structures, with women comprising 25 per cent of local government representatives in Kurunegala district, indicative of their increasing influence in decision making processes and policy formulation related to SLM.

The significance of women's contributions to SLM in Kurunegala transcends local boundaries, reverberating across regional and global contexts. Figures underscore the tangible impacts of their efforts, with studies showing a positive correlation between women's empowerment and agricultural productivity, highlighting the critical role of gender equality in fostering sustainable development. As Kurunegala navigates the complexities of climate change and environmental degradation, its women's resilience, ingenuity, and unwavering commitment serve as a beacon of hope, illuminating a pathway towards a more sustainable, inclusive, and resilient future for all.

The CRIWMP prioritises women's drought adaptation in rural areas through tailored capacity building and training programmes in water management, sustainable agriculture, and climate-smart technologies. Women engage in decision making, access financial services, and invest in drought-resistant farming, promoting gender equality and sustainable development. In Kurunegala District, Sri Lanka, the CRIWMP supports small-scale farmers through Climate Smart Agriculture, addressing climate challenges and promoting productivity while reducing greenhouse gas emissions. Notably, the project introduces drought-resilient farming systems, like crop diversification, including hot chili pepper varieties known as Kochchior Nay Miris, meeting market demand and adapting to the changing climate with minimal inputs.

Women champions

R.H.M. Pushpa Ranjanee is a prosperous farmer turned entrepreneur through hot chili pepper cultivation. With support from the project, she received 100 plants and training in 2021 and successfully sold eight kilogrammes of fruit pods, earning LKR 4,800. Recognising the demand for chili pepper seeds and saplings, she and her daughter joined Facebook groups of chili pepper cultivators and started selling saplings. To date, they have sold around 2,750 saplings and are raising saplings in response to 500 orders, resulting in a successful business venture and income.

Chamari is a passionate advocate for SLM and drought adaptation in the CRIWMP in Sri Lanka. With her unwavering dedication, she has become a champion in optimising water usage and ensuring sustainability in her community. Chamari's expertise lies in constructing small-scale reservoirs (tanks), which act as crucial water sources during droughts. Her innovative strategies, combined with traditional wisdom, have helped protect agricultural productivity and livelihoods from the impacts of water scarcity. Chamari's commitment to conservation and her role as a change agent make her an invaluable asset to the project. These examples showcase the ongoing process of developing climate-smart farmers and entrepreneurs in the region, leading to improved economic, social, and environmental coherence within farming communities.

Challenges

The implementation of women-driven strategies to drought is not without challenges in Sri Lanka.

Limited access to essential resources: Women often encounter limited access to essential resources, such as land, seeds, and credit, which are crucial for sustainable farming practices, thus restricting their full participation and benefit from projects like the CRIWMP.

Gendered social norms and biases: Entrenched gender-based social norms and stereotypes restrict women's involvement in decision making processes related to land management and impede their access to training and capacity building opportunities.

Limited training opportunities: Women do not have the opportunities to develop the technical knowledge and skills needed to adopt drought-resilient farming systems. As a result, targeted capacity building programmes are necessary to ensure equal access to training and information.

Limited market access: Limited market access poses challenges for women farmers in selling their produce due to transportation limitations, inadequate infrastructure, and market linkages.

Water scarcity and irrigation challenges: Efficient irrigation methods crucial for drought-resilient farming are hindered by limited water, inadequate infrastructure, and unequal distribution.

Lack of financial support: A lack of financial support inhibits women's ability to invest in sustainable farming practices, underscoring the need for tailored financial services and microcredit schemes.

Addressing these challenges requires a comprehensive approach that promotes gender equality, provides targeted capacity building programmes, improves access to resources and markets, and ensures inclusive decision making processes. By empowering women in drought-resilient farming systems, initiatives like the CRIWMP, can pave the way for a more sustainable and resilient future for Sri Lanka's agriculture sector.

Restoring vegetation, improving soil quality, and mitigating the adverse effects of drought and desertification: **Mycorrhizal Fungi to Enhance Soil Quality**

This initiative addresses the multifaceted challenges arising from the drying of Lake Urmia in Iran through a comprehensive approach centred on ecological restoration and SLM. The gradual decline in the lake's water levels has resulted in the emergence of salt deserts, saline soils, and dust storms, significantly impacting people's livelihoods, agriculture, infrastructure, and the overall environment. The broader issue of soil degradation in Iran's dry and semi-arid regions has been exacerbated, leading to increased wind erosion and dust storms.

To tackle these pressing challenges, the initiative uses mycorrhizal fungi to enhance soil quality and facilitate vegetation establishment. This strategy is particularly well-suited to the harsh environmental conditions prevalent around Lake Urmia, including salinity, alkalinity, and limited moisture. The primary objectives are to restore vegetation, improve soil quality, and mitigate the adverse effects of drought and desertification. Community involvement is emphasised, ensuring local knowledge and resources are leveraged effectively in project implementation.

Aligned with key SDGs, such as poverty reduction, zero hunger, and climate action, the initiative aims to foster sustainability and resilience in the affected dry and semi-arid regions. It seeks to promote long-term environmental stability and socio-economic development by employing innovative methods and engaging local communities.

This initiative presents a significant opportunity for women's empowerment and inclusion. Women, who often bear the brunt of environmental challenges and are key stakeholders in agriculture and household management, benefit from participation in activities related to SLM and environmental restoration, and related decision making processes, training and resources.

Initiative overview

The initiative aims to explore the symbiotic relationship between mycorrhizal fungi and various plant species, particularly in environments subjected to normal conditions and water and salinity stress. The study focuses on three regions: Qaradagh, Tag, and Gaz, where mycorrhizal contamination levels vary.

The research methodology involves confirming the presence of mycorrhizal fungi among the selected plant species in the mentioned regions. Subsequently, the effects of mycorrhizal fungi on plant species are investigated under different conditions, including standard, stress-free, water-stress, and salinity-stress conditions. The parameters analysed include root and shoot characteristics, such as dry weight, surface area, volume, and length.

Using statistical analysis software, the research findings indicate significant effects of mycorrhizal fungi on plant characteristics. For instance, under normal conditions, the presence of mycorrhizal fungi

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leads to notable enhancements in root and shoot attributes across all studied species. The inoculation of mycorrhizal fungi demonstrates a substantial increase in plant growth and root colonisation under water and salt stress conditions compared to non-inoculated treatments.

The results also suggest that mycorrhizal fungi reduce soil erosion and loss, possibly by creating a vast network of hyphae and secreting glomalin, a glycoprotein substance known to improve soil structure. Additionally, mycorrhizal fungi are attributed to plants enhancing nutrient absorption, leading to improved photosynthesis and overall growth.

The findings support that mycorrhizal fungi can positively influence plant performance and productivity, particularly in challenging environments characterised by water and salinity stresses. By understanding and leveraging the symbiotic relationship between mycorrhizal fungi and plants, there is potential to enhance agricultural practices, improve soil health, and increase crop yields, which could have significant implications for sustainable land and soil management.

Women's involvement

In drought-prone regions, where wind erosion poses significant threats to soil and environmental health, women are pivotal in implementing SLM practices. They combat wind erosion, promote vegetation growth, and ensure long-term environmental sustainability. Wind erosion, a major contributor to soil degradation, involves the transmission of suspended particles, leading to dust storms. Women, deeply rooted in agriculture and household management, play essential roles in addressing wind erosion and its adverse effects. Establishing vegetation stabilises areas susceptible to erosion, with the symbiotic relationship between plants and mycorrhizal fungi offering promising solutions. With local plant and ecosystem knowledge, women implement sustainable practices leveraging mycorrhizal fungi benefits.

Women's involvement extends to the economic and social dimensions of community development. Biofertilisers, like mycorrhizal fungi, offer financial and environmental benefits, with women crucial in production and distribution. In regions with limited economic opportunities, biofertiliser production provides avenues for women's empowerment and income generation. Participation in training programmes equips women with valuable skills for SLM, contributing to SDGs.

Their participation fosters community engagement and ownership of environmental conservation efforts. Involving local communities, especially women, in decision making processes enhances project success and long-lasting impacts. Women's unique perspectives inform tailored strategies addressing community needs and challenges.

Women are indispensable in SLM in drought-prone regions. From on-the-ground practices to biofertiliser production, they mitigate environmental degradation, promote vegetation growth, and foster economic development. Women's involvement enhances environmental sustainability while empowering them economically and socially, contributing to overall community resilience and well-being.

Women champions

Through her pioneering work, Dr. Tayebe Mesbahzadeh, an Associate Professor at the University of Tehran, has fought against desertification and championed the cause of women's empowerment in land management. Dr. Mesbahzadeh's efforts have transformed the narrative, enabling women to play significant roles in preserving the vital resources of their communities. Her leadership exemplifies a commitment to both environmental sustainability and gender equality, making her a true champion for the empowerment of women in Iran's dryland regions.

Challenges

Gender inequality: Despite progress, entrenched societal norms and gender biases continue to limit women's participation and leadership opportunities in environmental initiatives and decision making processes.

Limited resources: Adequate funding and resources for research, education, and implementation of SLM practices are often lacking, hindering the scale and impact of Dr. Mesbahzadeh's work.

Policy gaps: Inconsistent or inadequate policies and regulations related to land management and gender equality may impede progress and hinder the sustainability of initiatives to empower women and mitigate desertification.

Access to education and training: Many women in rural and arid regions lack access to quality education and training opportunities, limiting their ability to actively participate in efforts to address environmental challenges.

Climate change impacts: The increasing severity and unpredictability of climate change exacerbate existing environmental challenges, making it even more difficult to implement effective solutions and adapt to changing conditions.

Addressing these challenges requires concerted efforts from multiple stakeholders, including governments, non-governmental organisations (NGOs), academia, and local communities, to create an enabling environment for sustainable development and gender equality in Iran's dryland regions.

Fostering sustainable land management and rural development alongside intra-community dialogue: **Women's Association of Deir El Ahmar (WADA)**

The non-profit NGO, the Women's Association of Deir El Ahmar (WADA), is a shining example of sustainable rural development and intra-community dialogue in Deir el Ahmar, Lebanon. WADA is deeply committed to transforming Deir El Ahmar into a model of sustainable rural development, achieved through collaborative efforts with local and international partners. The WADA Center was established as a dedicated space for fostering sustainable rural development and empowering women and local communities.

Deir El Ahmar boasts a rich historical tapestry. Situated at an altitude of 1,000 metres above sea level, this town is strategically positioned 100 kilometres from Beirut and 45 kilometres from Zahle. Its proximity to iconic landmarks, such as Balbek and the Cedar Reserve in Bcharre, renders it a prime destination for tourism enthusiasts. Renowned for its rich biodiversity, fertile lands, and picturesque landscapes, Deir El Ahmar draws its lifeblood from the springs nestled in the nearby highlands of Ainata, El-Yammouneh, and Oyoun Orghosh.

However, the region grapples with unique climatic challenges, particularly during the summertime, characterised by dry conditions and water scarcity. The presence of mountain ranges, notably the western mountain chain, impedes rainfall, exacerbating the shortage of water resources, particularly for agricultural endeavours. The onset of summer brings severe drought, posing significant obstacles to agricultural productivity. The resilient local populace has long borne the brunt of these climatic adversities, prompting WADA to devise strategies to mitigate these challenges and bolster community resilience. Central to our efforts is the empowerment of rural women, whose indispensable role in driving local development initiatives cannot be overstated.

Initiative overview

Dunia Khoury spearheaded an initiative calling upon women in the region to come together and establish a NGO dedicated to supporting the local community. Upon her arrival, she observed the area's abundant potential, despite being drylands, with its proximity to archaeological sites and sustainable agricultural practices. However, it became evident that effective land management was lacking, impeding progress in the region.

Supported by the Ministry of Social Affairs, the group began by constructing fences and laying the groundwork for infrastructure with an initial funding of USD 30,000. The WADA Center gradually expanded, equipped with essential resources. Additionally, collaborations were forged with agriculture and environment ministries to further initiatives.

The collaboration of WADA with the Ministry of Agriculture extended to projects focusing on reforestation and smart irrigation systems for improved water management. Recognising the significance of trees in drylands, like Deir El Ahmar, the role in mitigating climate change is key. The community advocated for tree planting alongside implementation of drip irrigation systems. Effective water management proved pivotal for the well-being of the community.

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The project has several key elements, as outlined below.

- Rural experience: A hub for connection, WADA provides a dedicated space for sustainable rural development and women's empowerment. WADA is dedicated to promoting the sustainable production of local goods in Deir El Ahmar and supporting its manufacturing and marketing processes. Through capacity building initiatives, such as training workshops, the association empowers business-minded women in the community with the knowledge and skills necessary to produce these local goods. Led by local women who prepare goods seasonally and without preservatives, these workshops focus on preserving the culinary traditions of Deir El Ahmar.
- Rural tourism: Through Wada network of guesthouses, WADA initiated training sessions for women's guesthouse owners to enhance visitor experiences while engaging youth groups as tour guides to accompany tourists exploring the village's natural, historic, and religious sites. Initially focusing on women's economic empowerment in tourism and agri-food sectors, WADA recognised their expertise despite limited formal education, and enhanced their knowledge of sustainable agriculture for social and economic benefits. Based at the WADA Center, the guesthouse network is a starting point for three color-coded hiking trails, emphasising religious, agricultural, and natural/cultural attractions. By integrating innovative tourism and sustainable agriculture, WADA aims to engage women and youth, shifting community perceptions and enhancing self-image. Eco-friendly practices, including solar panels and recycling facilities, underscore WADA's commitment to sustainability, fostering income growth and meaningful community interactions. Through initiatives, like constructing bungalows and cultivating medicinal plants, WADA promotes biodiversity awareness and sustainable development in the drylands, creating welcoming spaces while nurturing environmental stewardship.

Women's involvement

The primary objectives of the organisation are to enhance the capacity of women in sustainable agricultural food production and leverage the potential for local development, ensuring food security and alleviating poverty. Strategies were devised to promote sustainable agricultural production and income growth, carefully considering environmental preservation. Capacity building initiatives were undertaken to: provide women farmers better access to improved products, services, and knowledge; bolster the entrepreneurial skills of women and the community on product marketing and rural and historical tourism; and foster sustainability in agriculture by developing and promoting environmentally friendly practices, technologies, and services, focusing on local products such as jams, syrups, vinegars, pickles, distillations (homemade ark, orange blossom, etc.), herbal teas, etc. All plants are grown organically and harvested by local farmers from Deir El Ahmar.

Concurrently, efforts were made to enhance rural tourism through training sessions for women and communities, enabling them to serve as local hospitality guides and open their homes as guesthouses. Collaboration with the Ministry of Agriculture involved projects for reforestation and smart irrigation systems to manage water resources more effectively, particularly under drip irrigation systems, given the crucial role of water management in the drylands and in the community. Community engagement in vineyards was also initiated, with an eco-friendly wine producer focused on improving wine production. Training sessions for producers were conducted at the WADA Center, with sustainable vineyard agriculture supported in the dryland areas surrounding the centre. Simultaneously, a Vineyard Trail was designed, capitalising on the presence of a Bacchus Temple near the community. Women received training on enhancing and marketing local food while preserving local traditions and heritage. This project exemplifies the pivotal role of integrating agro-food and tourism into women's economic empowerment strategies as part of rural development initiatives in the drylands.

Through targeted training programmes, women are empowered with the skills and knowledge needed to thrive in agro-food, rural tourism, and the community's sustainable development. These initiatives have resulted in tangible transformations, with women transitioning from solely housewives to entrepreneurs and business owners. With newfound confidence and capabilities, women are expanding their businesses, selling their products, and even opening their homes as guesthouses to welcome visitors.

In addition, the WADA community understands the significance of financial literacy and savings. By organising training sessions on financial management, women can enhance their income and seize new opportunities for economic growth. In addition to economic empowerment, WADA staunchly advocates for SLM and tourism. Recognising the untapped potential of agro-tourism in rural areas, the WADA community spearheads initiatives that seamlessly integrate agriculture, tourism, and women's empowerment.

Women champions

With a deep conviction in the power of unity, Khoury emphasises the transformative impact of women supporting each other: "Together, women can drive meaningful change, not only in their own lives but also in their communities." Driven by this belief, Khoury spearheaded the establishment of a Rural Community Center, a hub for training, awareness sessions, and community gatherings. This centre serves as a platform specifically for local women to participate in capacity building, workshops, training, the sharing of knowledge, skills, and experiences, fostering a sense of belonging and empowerment among community members. One of the critical elements is collaboration at different levels – from local to international. Leveraging partnerships with ministries, research centres, and universities, Khoury is committed to enhance agricultural practices, introduce innovative products, and promote sustainable tourism and archaeological rural development.

Challenges

At the beginning of the project, new ideas presented initial hurdles. However, the community overcame these obstacles through concerted group efforts by collaborating and supporting each other. Similarly, through negotiations and through its focus on land conservation and sustainability, particularly sustainable agriculture and rural tourism, WADA successfully secured approximately 10,000 square metres of land for the project, a source of pride for the organisation and the municipality. Nonetheless, some challenges remain, as outlined below.

Computer access and digital literacy: Increased computer access within the community is paramount, especially to facilitate agro-food, rural tourism, and community tourism training. Despite the training centre, the ongoing requirement for digital literacy persists within the community. While smartphones are accessible, they offer limited informational capabilities. Utilising technology to disseminate information and training materials has become indispensable for acquiring essential knowledge and skills.

Renewable energy: In line with its commitment to sustainability, WADA is exploring renewable energy options for the centre, including solar energy for electricity. These initiatives align with the broader goal of raising awareness and promoting environmentally friendly practices within the community. Through pilot projects and strategic partnerships, the aim is to encourage wider adoption of sustainable technologies and practices.

WADA's advocacy endeavours in international forums, such as the UNCCD, aim to advance gender-sensitive action plans and amplify the voices of CSOs. Collaborative initiatives include partnering with the Lebanese University to study regional pastoralist communities. This effort aims to enhance the quality of dairy products and explore the role of local plants in supporting pastoralism. The innovative approach integrates rural tourism with pastoralism, introducing tourism as a potential economic driver for pastoralist communities.

Restoring fragile mountain ecosystems and empowering women economically: **Rural Development Public Fund**

In the remote mountainous landscape of Kyrgyzstan, rural women are leading an initiative that addresses the dual challenges of environmental degradation and economic hardship. Often from vulnerable groups, these women face isolation and limited economic opportunities aggravated by the harsh mountain terrain and the impacts of climate change. In response to these adversities, these visionary women have initiated a project to cultivate medicinal herbs on degraded lands.

This innovative approach not only contributes to the restoration of fragile mountain ecosystems, it also empowers women economically. The initiative addresses the intersectionality of these women's challenges, incorporating SLM practices to reclaim degraded areas and foster biodiversity conservation. This cultivation takes place in small plots near homes, providing women farmers the ability to work close to home and reducing the risk of GBV associated with traditional patriarchal attitudes. Despite these positive aspects, challenges such as illegal herb exports and destructive practices threaten the initiative's success. The project aligns with international agreements (e.g. Convention on Biodiversity, Nagoya Protocol), emphasising the need for a regulated system to reduce illegal exports and preserve local biodiversity.

The vulnerability of these women in remote mountain areas underscores the urgency of recognising and supporting initiatives like theirs. Beyond environmental restoration, the project envisions improved well-being, increased food security, and strengthened entrepreneurial skills. By harnessing local social entrepreneurship and ensuring the equitable sharing of benefits, this initiative serves as a beacon for sustainable prosperity, offering a model that can be replicated for women's empowerment in similar contexts worldwide.

Initiative overview

At the core of this initiative lies a profound commitment to environmental restoration, economic empowerment, and the well-being of communities grappling with the challenges of Kyrgyzstan's remote mountain areas. These landscapes are home to vulnerable populations enduring limited economic opportunities, environmental degradation, and the adverse effects of climate change. Within these challenging circumstances, a visionary group of women has launched a groundbreaking project to cultivate medicinal herbs on degraded lands. This endeavour is designed both to rejuvenate the compromised lands and to provide a sustainable source of income for the participating women. Leveraging the region's biodiversity, the project selects medicinal herbs renowned for their healing properties and well-suited to the local environment.

Strategically implementing herb cultivation in small plots near homes serves a dual purpose. It facilitates land restoration while addressing a significant societal concern – the risk of GBV associated with traditional patriarchal norms against women working outside their homes. As primary caretakers of their families, these women play a pivotal role in the initiative's success. Engaging in SLM practices, they actively reclaim degraded areas, foster biodiversity, and mitigate the impacts of climate change.

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The harvested herbs undergo meticulous processing before reaching local markets, ensuring a steady income for the women and promoting the traditional medicinal heritage of the region. Beyond economic benefits, the initiative elevates the status of these women within their communities, recognising and valuing their expertise in SLM and herbal cultivation. The project initiates a ripple effect through knowledge sharing and skill-building initiatives, fostering a sense of community empowerment and environmental stewardship. It emerges as a beacon of hope in Kyrgyzstan's remote mountain areas, showcasing that sustainable practices can yield positive economic and ecological outcomes.

Women's involvement

Women's essential roles in SLM are transformative and multifaceted in the drought-prone regions that define our landscape. These women, often the backbone of their communities, navigate the intricate challenges of recurring droughts with resilience, innovation, and a profound connection to the land.

- Stewardship of natural resources: Women's stewardship of natural resources lies at the heart of their roles in SLM. Deeply embedded in the local ecosystem, women actively preserve and restore drought-affected lands. From reforestation initiatives to soil conservation projects, their hands-on involvement ensures implementation of sustainable practices that contribute to the long-term health of land.
- Diversification of livelihoods: Recognising the vulnerability of traditional livelihoods to drought, women lead initiatives to diversify economic activities. Small-scale agriculture, aquaculture, and sustainable forestry are championed by women, contributing to their economic empowerment while also ensuring food security and financial stability for the entire community.
- Community-based adaptation strategies: In response to the unique challenges posed by drought, women develop and implement community-based adaptation strategies: innovative water harvesting techniques; climate-resilient crop varieties; and sustainable grazing practices. Women-led community groups serve as hubs for knowledge exchange, ensuring that adaptive practices are shared and implemented effectively.
- Water management and conservation: Effective water management and conservation are paramount in regions susceptible to water scarcity. Women play a pivotal role in initiatives related to the construction of rainwater harvesting systems, maintenance of communal wells, and community education on efficient water use. Their involvement in managing water resources is essential for the community's resilience to drought.
- Education and capacity building: Empowering women is closely tied to education and capacity building. Women lead efforts to enhance the community's understanding of SLM practices. Through workshops, training programmes, and awareness campaigns, they equip community members with the knowledge and skills to adapt to changing environmental conditions.
- Preserving biodiversity: The biodiversity of the region is under constant threat due to drought and other environmental stressors. Women have emerged as champions of biodiversity preservation, participating in seed banks, native plant cultivation, and wildlife conservation initiatives. Their efforts contribute both to ecological resilience and to the cultural richness of the community.
- Advocacy for gender-inclusive policies: Women are implementing on-the-ground solutions and advocating for gender-inclusive policies at local and regional levels. Their voices are crucial in shaping policies that recognise and address the unique challenges faced by women in SLM. This advocacy extends to securing access to resources, land rights, and representation in decision making processes.
- Social and cultural cohesion: Beyond their tangible contributions, women play a vital role in fostering social and cultural cohesion. Women-led community networks provide a support system that strengthens the fabric of society. Through shared experiences, women enhance resilience, encourage innovation, and inspire collective action in the face of drought-related challenges.

Women champions

Gulnur Chodronova is a dynamic community leader and a driving force behind the SLM project. With a deep connection to the land and a keen understanding of local ecosystems, she has spearheaded reforestation efforts and introduced water conservation measures in the community. Her ability to mobilise and inspire community members has resulted in successful implementation of adaptive practices, making her a true champion at the grassroots level.

Kyrgyzstan

Gulmira Bektemirova is a local district-level advocate for SLM who tirelessly works to bridge local initiatives with broader policy frameworks. As a vocal proponent of gender-inclusive policies, she has played a pivotal role in influencing strategies for drought resilience. Bektemirova's advocacy for women's rights in land management has elevated the project to the national level, ensuring that the voices of vulnerable women in drought-prone regions are heard at the highest levels.

Sonungul Zhyltyrova stands out as an innovator in sustainable agriculture and economic diversification. Her groundbreaking work – introducing climate-resilient crop varieties and establishing small-scale enterprises – has transformed local economies and become a model for neighbouring communities. Zhyltyrova's collaborative approach has created a network of regional champions, fostering a culture of knowledge exchange and shared success in combatting drought.

Begay Murzalieva is a cultural and community cohesion advocate whose role extends beyond the tangible impacts of the project. Recognising the importance of preserving local traditions amidst environmental changes, she has initiated programmes that celebrate Indigenous knowledge and cultural practices. Her efforts ensure the community remains connected to its heritage, fostering a sense of pride and unity while collectively navigating the challenges posed by drought.

Zhanar Algozhoeva, a capacity building and education leader, has been instrumental in empowering community members with the knowledge and skills needed for SLM. Through workshops, training sessions, and awareness campaigns, Zhanar Algozhoeva has elevated the community's environmental literacy level. Her commitment to education ensures that the community is equipped to adapt to evolving environmental conditions, making her an essential champion in building resilience at the grassroots level.

Challenges

Despite the progress made in the SLM project led by women in drought-prone regions of Kyrgyzstan, several challenges have emerged that require attention and strategic solutions.

Limited access to resources: Limited access to resources, including land and water rights, is a persistent challenge. Many women face barriers in securing ownership or tenure over their cultivated lands, hindering their ability to implement long-term sustainable practices. Addressing this issue requires advocating for gender-inclusive land policies and securing legal rights that empower women as land stewards.

Limited infrastructure and technological support: In remote mountain areas, the lack of adequate infrastructure and technological support hampers implementation of advanced SLM practices. Limited access to modern farming equipment, irrigation systems, and climate-resilient seeds hinders the scalability of initiatives. Bridging this technological gap requires strategic partnerships, investments, and knowledge transfer.

Socio-cultural barriers: Deep-rooted socio-cultural norms often restrict women's participation in decision making processes and access to education. Overcoming these barriers requires targeted awareness campaigns and community engagement initiatives to shift cultural perceptions and empower women as leaders in SLM.

Market access and value chain integration: Connecting women-led initiatives to broader markets remains a significant challenge. Establishing effective market linkages and integrating these initiatives into value chains is essential for the project's economic sustainability. Addressing this challenge involves creating market-oriented strategies, enhancing product quality, and fostering partnerships with local businesses and markets.

Limited education and skills gaps: Continuous education programmes would empower women with the knowledge and skills to address evolving challenges.

PART 2

LATIN AMERICA AND THE CARIBBEAN

Photo: ©Nuria Angeles Tapia / PNUD Perú

Bridging traditional knowledge and modern academia to support ecohydrological monitoring: **Association for the Conservation and Study of Andean-Amazonian Mountains (ACEMAA)**

This project is based on long-term collaboration between the native high-Andean pastoralist community of Chillca in the Cusco region of Peru and the Association for the Conservation and Study of Andean-Amazonian Mountains (ACEMAA), a local NGO. Linking local traditional knowledge with modern academic approaches, this project facilitates rapid responses to major issues in the community caused by climate change and global change. Working with the National University of Saint Anthony the Abad in Cuzco (UNSAAC), a local university, this project follows a community/citizen science approach which has led to the installation of a high-resolution ecohydrological monitoring system containing 14 weather stations (measuring temperature and rainfall) and 72 groundwater observation wells (installed in *bofedales*, high-Andean wetlands/peatlands), and three main v-notch weirs (for measurements of manual and automatic runoff). Ten local women pastoralists are involved in the project and monitor the depth of groundwater levels in *bofedales* every week. These levels are essential for local pastoralist systems and their ongoing conservation is, thus, crucial. *Bofedales* are social-ecological systems; they are managed to provide pastoralists with water and fodder for alpacas. Pastoralists in the high Andes have been managing *bofedales* for centuries; these are a key part of a water channel system that supports water regulation and retention. They are filled during the rainy season (December–May), and they contribute to the base flow and water security in downriver communities and populations during the dry season (June–November).

Initiative overview

1. As the alpaca fibre/meat value chain starts with healthy and productive ecosystems, in this case the *bofedales*, the role of local pastoralist women in monitoring the *bofedales* groundwater level is key to the pastoralist system.
2. Monitoring *bofedales* groundwater levels constitutes an early warning system against droughts. When *bofedales* are not fully saturated at the end of the rainy season (May), the community risks facing a lack of water resources towards the middle or end of the dry season (August–November). For example, the Chillca pastoralist community suffered a loss of about half of their alpaca population at the end of the dry season in 2022. Because of the low groundwater tables in the *bofedales*, there was not enough fodder plant growth/production and, thus, not enough food for the alpacas.
3. Using the *bofedales* groundwater tables as early warning system indicators can avoid future losses of alpacas at the end of the dry season. For example, local women alpaca herders begin irrigating the *bofedales* at an earlier stage in the year (e.g. in June/July), which guarantees the production of sufficient fodder plants on which the alpaca population depends.

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Women's involvement

Local women alpaca herders are central throughout the alpaca fibre/meat production chain. They spend the most time with the alpacas in the *bofedales* and, thus, their local knowledge of year-round dynamics of *bofedales* and alpaca-bofedale interactions is indispensable.

The Chillca pastoralist women frequently measure – through observation – groundwater wells in the *bofedales*, generating the needed data baseline and allowing insight into the impact of necessary interventions (i.e. *bofedales* irrigation). This enables the *bofedales* to be maintained in conditions that guarantee the year-round growth of the vegetation, which serves as the primary fodder source for the alpacas.

Women champions

Filomena Rojo Quispe, the mother of two children, owns 200 alpacas and serves as the coordinator of the group of women pastoralist monitors in Chillca.

Challenges

Gender norms and biases: The high-Andean pastoralist (alpaca) communities are still mainly male-led, patriarchal societies. Therefore, the empowerment of women is a delicate topic. Most local women do not complete secondary school and, from an early age, are responsible for most household and alpaca herding activities. Therefore, the strategy and process of empowering local women is a challenging undertaking. Nevertheless, as a result of this project, women – like Quispe – are shifting how women are perceived within the community. Ecohydrological monitors generate, analyse, and interpret data, alongside the staff of the NGO, ACEMAA. The role of ecohydrological monitor is exclusively for local women, giving female monitors a voice and greater status within the community, especially regarding decision making processes. Most of the husbands of the Chillca women monitors actively support their wives in this empowerment process.

Promising practices

LATIN AMERICA AND THE CARIBBEAN

Peru

Building wells and using solar pumping to ensure a steady water supply in times of drought: **Association of Women Producers of Milk and Milk Derivatives (AMPLED)**

Photos:
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The Association of Women Producers of Milk and its Derivatives, "Santa Rosa", is located in the Moquegache Japo Peasant Community, Lampa, Puno, Peru. Comprised of 32 Quechua women who have been working together since 2015, the association focuses on organic family farming, cultivating tubers and Andean grains, and producing milk and cheese in small family stables, all in harmony with the environment. Their livelihoods depend on rain-fed irrigation, posing challenges during droughts like the one experienced during the 2022–2023 agricultural campaign, exacerbated by the El Niño phenomenon. This drought impacted their food security and income, forcing them to sell livestock at reduced prices. Women bear the brunt of these climate-related challenges. To address the impacts of the drought, the women implemented a project, led by the Ministry of the Environment and the United Nations Development Programme (UNDP) in Peru, with support from the Global Environment Facility (GEF) Small Grants Programme and local backing from the Puno Peasant Training Center.

Initiative overview

Months before the drought, Santa Rosa became interested in ancestral knowledge of native medicinal plants, focusing on domesticating the wild tuber, *cuchucho*, known as the 'root of longevity' for its antioxidant properties. From *cuchucho*, flour, bread, infusions, and yoghurt were prepared. Despite cultivating *cuchucho* alongside grains, the rains failed in late 2022, leaving rivers dry.

To address this, they innovated, using groundwater. With plans to construct 32 small family wells, they applied a dowsing technique to locate water tables inexpensively, finding water just 2–4 metres deep. Solar panels powered pumps connected to sprinkler irrigation systems, ensuring water supply for oat, potato, quinoa, and *cuchucho* crops. This resilience-building effort sustained their families during the drought and earned recognition from local authorities. As a result, the Provincial Municipality of Lampa initiated a USD 3.9 million public investment project for water supply service, installing up to 350 wells with solar pumping to enhance community resilience.

Women's involvement

In Peru, more than 700,000 female agricultural producers exist, representing 30 per cent of the country's total family producers and up to 47 per cent of the agricultural workforce.

In the southern Andes, women play a fundamental role in the agricultural economy, working in crop production and livestock care and providing their families with water, food, and fuel. Women lead the production of basic foods and are custodians of the varieties and seeds necessary to preserve agrobiodiversity and food. Women also play a key role in family nutrition since they usually prepare food while maintaining and revaluing ancestral knowledge about food.

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As a result of the work carried out by women's networks in Puno, foundations have been created to protect water in this area of the country. Similarly, they have influenced the political level, strengthening capacities and advocating for agreements, ordinances, and public investment projects to conserve agrobiodiversity and ecosystem services. Although women experience the impacts of climate phenomena more acutely, they emerge as agents of change when afforded equal access to opportunities.

Women champions

Emilia Limachi, a naturopathic healer, tapped into her knowledge of herbs and medicinal plants in order to earn a living, after losing her parents as a child. Today, she remains committed to healing the ailments and illnesses of her community. This practice, which relies on the inheritance of ancestral knowledge and resources through generations, is at risk of being lost due to the various crises facing the southern Andean region.

Elsa Mamani, president of the multistakeholder board of the Puno Landscape, has experienced difficulties planting due to the lack of rain, endangering her and her community's food security. As she noted, "... things are not easy for a woman because we leave our chores at home; we are a thousand trades. Leading an organization is not easy; having a head like a balloon and a skirt on well ...". Mamani has found unconditional support from her husband and children, enabling her to assume leadership of the Mesa *Multiactor del Paisaje Puno*, a space for dissemination and advocacy for agrobiodiversity and climate resilience. There, different communities exchange knowledge, share local innovations, and seek alliance with different actors in the public and private sectors to give continuity and scale up their initiatives.

Cristina Ticona, president of the association, recognises that the practices they undertake to address drought could be more effective with more advocacy to replicate them in the Andes. "Some communities are not like this. They don't have water, they don't have wells, there is not that much water out there, it doesn't reach the communities. I want this model to reach everyone", says Ticona.

Challenges

Vulnerability exacerbated by glacier melting: Half of Peru's glacial mountain ranges are in the southern Andes, where glaciers have lost 60 per cent of their surface in the last 50 years. This loss undermines their role as natural reservoirs, impacting agriculture, livestock, and biodiversity, and exacerbates the vulnerability of Andean small farmer communities, particularly women, who face restricted access to resources like land, credit, and decision making spaces.

Gender inequity in education and decision making roles: Rural women, comprising 41.2 per cent without independent income as of 2018, encounter disparities in education access compared to men, especially among native language speakers. Gender disparities persist in water-related decision making, with men dominating technical roles and women relegated to administrative positions.

Risk of droughts and its impacts: Droughts force communities to seek alternative livelihoods, placing women in precarious job conditions. Reduced water availability causes women and girls to spend more time and effort providing water to their homes, limiting their time availability for other activities.

Inspiring women firefighters through the leadership of women in forest fire control, operational issues training, and tool maintenance: **National System of Conservation Areas / SOS Wildfire Association**

The Lomas Barbudal Biological Reserve in San Ramón de Bagaces in Costa Rica is one of the world's last remaining dry tropical forests which occasionally experience drought. **Priscilla Carbonell Ramírez**, the administrator of the park, protects 2,646 hectares as administrator, park ranger, and firefighter and leads a team of four people.

Initiative overview

Ramírez became interested in firefighting at the age of 15 years, while camping in Barra Honda National Park in Nicoya, and now has over two decades of firefighting experience.

Years after that camp, Ramírez found a path for her interest in nature with a Bachelor's degree in Management and Protection of Natural Resources and a Master's Degree in Natural Resources Management and, since 2005, in her experience as a volunteer with the National System of Conservation Areas (SINAC). In 2018, she became an official of the SINAC and, since 2021, she has been the administrator of the Lomas Barbudal Biological Reserve.

Trained in effective water management, controlled burns, and other measures needed to tackle forest fires, Ramírez has observed changes in fire management techniques over time and understands that effectively confronting fire entails far more than mere familiarity with tools or safety equipment. Ramírez knows how to detect and counteract a fire depending on the trees it affects, and her experience allows her to understand that communication, teamwork, and coordination between teams are vital in an emergency. Further, Ramírez understands the need to maintain physical fitness to fight fires, and enjoys lifting weights, practicing karate, and boxing.

Ramírez' leadership role motivates her to encourage other women to actively protect forests, a field that men have primarily occupied. Beyond gender, commitment and empathy matter when fighting fire, and mental and physical resistance are vital to build, the team's trust and safety.

Ramírez notes an increasing presence of female firefighters over the years and points out the importance of continuing to generate training and leadership opportunities for women to dispel the false belief that their participation is limited in the field: "If we look at the statistics, we can see how the number of women forest firefighters throughout the country is growing, and how many of our fellow forest firefighters have stopped thinking that women's role is only in the kitchen."

Voluntarily with the SOS Wild Fire Association, Ramírez has supported forest fire control, operational issues training, and tool maintenance in Latin American countries (Ecuador, Bolivia, Peru, and Costa Rica, among others).

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Women champions

Elida Pena, a mother of three children, has been a volunteer firefighter for four years. After a record-breaking fire in the Lomas Barbudal Biological Reserve, her work made such an impression that she was hired, becoming the first woman in the Reserve to be employed for control and maintenance work.

Gloria Sevilla, a volunteer forest firefighter and mother of three children, became a forest firefighter because of her deep love for nature. When not fighting fires, she works as a security guard.

Doña Hellen has been a volunteer in the Reserve with her husband, Javier, for more than 20 years. Although they no longer go to the field for health reasons, they continue to support the association with food preparation and, often, take food to the field for people involved in extinction work.

Sonia Lobo, a woman who assumed national coordination of the Fire Management Program for many years, helped the programme grow and gain interest within Costa Rica.

Challenges

Gender bias: People's mindsets are slowly shifting to accept women into the firefighter forces and to understand that men and women can share domestic roles.

Risk of fires: The Lomas Barbudal Biological Reserve is a unique ecological site that is at risk of fires. As firefighters see through their experience, fire incidents place at risk animals, plants, and ecosystems, aspects of our world that may not recover from fire-related disasters.

Giving visibility to the economic contributions of women through agroecological logbooks: **The Caderneta Agroecológica**

Photo: © Manuel Cavadas/ Prosemiarido

The *Caderneta Agroecológica*, or "Agroecological Logbook", was developed in 2011 as a political-pedagogical tool for women's training. The aim of this initiative is to empower women through the awareness generated by the logbook. The logbook supports the production of home gardens, giving visibility to the economic contribution generated by women and recognising unpaid work as part of the livelihoods of families, communities, and society. At the same time, the logbook affirms the role of women farmers in developing agroecological knowledge.

A transformative approach to empowering women farmers, promoting sustainable food production and resilient livelihoods, and supporting soil health, biodiversity, and adaptation to climate change, this initiative underscores women's role in diversified and climate-resilient agriculture, emphasising care for the environment and community well-being.

The initiative was developed within the Brazilian agroecological movement, started in 2002 through the National Agroecology Network (*Articulação Nacional de Agroecologia* [ANA]). A platform for civil society movements, networks, and organisations, ANA promotes agroecology, strengthens family farming, supports soil health and biodiversity, and addresses climate change. The movement encompasses approximately 25 state and regional networks and 15 national social movements.

Within ANA, the Women's Working Group (*Grupo de Trabalho de Mulheres [GT Mulheres]*), established in 2004, focuses on empowering women, and the non-profit organisation, Center for Alternative Technologies of Zona da Mata (*Centro de Tecnologias Alternativas da Zona da Mata [CTA-ZM]*), was central to the Agroecological Logbook in 2009.

The collaboration between CTA-ZM and GT Mulheres has led to the widespread adoption of Agroecological Logbook across Brazil. The Agroecological Logbook initiative involves partnerships with academic institutions, environmental justice organisations, and feminist movements nationally and internationally.

Initiative overview

The concept of the Agroecological Logbook is simple: a woman lists the produce in her home garden and values it against market prices, giving her family and her insight into – and proof of – the value of her work and the value of her contribution to the household budget.

The Agroecological Logbook is arranged in four columns: consumption; donation; exchange; and sale. Women note what they use themselves, give away, trade (for other food, goods, services, etc.), and sell in the market. At the end of the month, they calculate the corresponding monetary value of these activities and determine the amount they have saved and earned. This helps give relevance to their work and compare it to the rest of the family's monetary income.

For more information, see here:

https://ctazm.org.br/biblioteca/categoria-cadernetas-agroecologicas-48

The Agroecological Logbook initiative also facilitates group discussions between women using the logbook. They share knowledge on agroecological practices, seeds, medicinal plants, soil health, food storage and preparation, market prizes, etc. It broadens the general view of monetary and non-monetary income and the contribution of women to the food and nutritional security of the family and community.

Through increased awareness and recognition, women's previously invisible contributions to their families' livelihoods are being unveiled. Tasks once labelled as mere 'help', 'housework', or 'women's work' are now understood as essential, both monetarily and non-monetarily. Once women's contributions were made tangible, many began to experience positive changes in their relationships and labour division with their husbands and relatives. Moreover, armed with data and knowledge, women actively engage with policy makers to advocate for supportive policies in agroecological food production. The Agroecological Logbook initiative has contributed to the government's acknowledgment of the vital role of women in Brazilian food production.

In the context of climate change, drought, and adaptation, this initiative is essential, helping women discuss soil health and seeds and reduce the risk of crop failure. In turn, these discussions have led to the sharing of agroecological practices and the creation of community seed banks, allowing women to conserve and share seeds for food production. These seed banks support agrobiodiversity and help communities increase resilience to droughts and other climate change shocks.[2]

Examples of drought wisdom and agroecological practices being exchanged in the Agroecological Logbook women's groups and contributing to drought-resilient home garden production include:

- Monitoring crop production and weather conditions to understand the impact of drought on production
- Rainwater harvesting through cisterns
- Local and Indigenous crops, varieties, and seeds and the importance of agrobiodiversity, especially during dry periods and droughts
- Food processing and conservation techniques for preserving food for longer periods, including droughts
- Tips and tricks for product diversification and commercialisation


Photo: © SASOP

Women's involvement

Agribusiness is a pillar of the Brazilian economy, worth nearly a quarter of its gross domestic product (GDP), with crops such as soybeans, sugar cane, and coffee among the country's most important export products grown on industrialised farms, which mainly employ men. Brazilian family farming plays a pivotal role in supplying the domestic market with healthy products and sustainable management of environmental resources. Boasting 3.9 million farms, family farms represent 77 per cent of all farms and occupy 23 per cent of Brazil's total agricultural land, approximately 80 million hectares. Family farming contributes 23 per cent to the gross value of agricultural production (CONTAG 2023).

As a result of industrial agricultural expansion in the 1980s, many traditional agricultural practices and local seed varieties were abandoned. This led to a decline in the resilience and autonomy of rural communities. However, many rural family home gardens are building on these traditional agricultural practices and local seed varieties. These home gardens provide food and herbal medicine for rural families, do not rely on external chemical inputs, and preserve species and varieties that have been passed down from generation to generation.

2 As Korpelainen (2023) concludes, biodiverse home gardens provide the basis for sustainable agricultural production, adaptation to climate change and economic development. In the same paper, Korpelainen notes measures to enhance home gardens: (1) systematic monitoring and documentation of the home garden; (2) improved knowledge on crops in the home garden; (3) expanded gene bank coverage of home garden materials; and (4) increased availability of these plant materials to both formal and on-farm crop improvement programmes. Korpelainen, H. The Role of Home Gardens in Promoting Biodiversity and Food Security. Plants 2023, 12, 2473. https://doi.org/10.3390/plants12132473

Women tend these home gardens, selling or swapping produce and providing food for their families. Their contributions to their households – taking on domestic responsibilities, raising children, and working in agriculture and other economic sectors – are vital and, yet, often invisible, undervalued and overlooked. If their partner is not a farmer, the value of their work is even less recognised.

For example, in the Jenipapo community, in the northeast region of the Caatinga Biome in Brazil, farmer Fátima Maria dos Santos runs her own farm. Applying the principles of agroecology, she uses a cistern to collect rainwater, retains native vegetation, and develops an agroforestry system comprised of native and fruit tree crops and medical plants. She was among the first farmers to join Agroecological Logbook and monitor her food production to understand the value of her production to the household, monetary and non-monetary benefits, and soil health and biodiversity preservation.

Women champions

Perpétua Barbosa from Uaua in Serra da Besta is a female small farmer and founder of COOPERCUC, the Family Agricultural Cooperative of Canudos, Uauá and Curaçá. She describes how the Agroecological Logbook initiative has helped her household and community:

> *Because of the Cadernetas initiative, I have a better understanding of what I produce, when and how best to store my produce during dry months. For example, thanks to the Caderneta Women's group I got encouraged and motivated to make and sell jam from the Umbu tree (Spondias tuberosa). It has a long shelf life if made and processed properly. Therefore, I still have enough production to sell during the drought. The Cadernetas initiative has also helped me share my knowledge on food growing and inspire other female farmers in this*.

Francineide Santos Dibrito, in rural Remanso, Bahia, enthusiastically describes the impact of the initiative on her work, just three months after starting: "I couldn't believe it! So much money that I saved through my work!? And I haven't even counted all the fruits my fruit trees give us.... You could say that I have earned more than a minimum salary per month. I never imagined this. I think these logbooks are very important."

Edneide Brito Nascimento in Pilão Arcado: "When my husband was unable to work and stayed at home for three months, he finally saw the importance of our garden and my investments in it are for the well-being of our family. Since then, he has treated me with much more respect, and so do my children. All because of the work with the logbooks."

Laeticia Jalil has been contributing to the development of the Agroecological Logbook initiative since she was the coordinator of the ANA GT Mulheres. She is now Associate Professor of Sociology at the Federal Rural University of Pernambuco (Universidade Federal Rural de Pernambuco [UFRPE]), focusing on rural sociology, gender studies, feminism, agroecology, environment, rural development, and the semi-arid region. Together with Beth Cardoso and others, she helped systematise the methodology, leading to the Agroecological Logbook initiative.

Beth Cardoso, an agroecologist by trade, works with women in Brazil to make their labour on family farms visible and remunerated. Cardoso began her journey at CTA, becoming coordinator in 2003. Her professional career is marked by her commitment to gender and agroecological issues, themes that she also studied via her master's degree in Spain. At the Center for Alternative Technologies, she developed the first agroecological logbooks. Together with Laeticia Jalil and others, she helped systematise the methodology, leading to the Agroecological Logbook initiative.

Challenges

Other priorities: Debates on climate policy at the government level focus primarily on safeguarding the Amazon and promoting solutions, like the economy and green economy. However, concerns persist over the neglect of other biomes, such as the Cerrado and Caatinga, which lack protective legislation against deforestation and desertification.

Continued use of fossil fuels: The influence of the agribusiness sector, particularly in advocating for agroindustrial approaches centred on the continued use of fossil fuels (including chemical pesticides, fertilisers, and machinery), poses grave risks to farming women and their families and communities, exacerbating greenhouse gas emissions, contaminating soils and ecosystems, and causing human and environmental health hazards.

Adverse impacts of renewable energy investments: Investments in renewable energy, notably in Northeast Brazil, have adversely impacted territories, disrupting traditional livelihoods and the relationship between biological diversity and socio-cultural systems diversity (socio-biodiversity), with detrimental effects on women's and children's health.

Lack of necessary financial support: Despite ongoing efforts by the ANA Women's Working Group to advocate for gender transformative policies and action, financial resource constraints pose significant challenges, hampering their ability to advance policies recognising women's vital role in climate change adaptation and mitigation efforts. There is an urgent need for sustained support and recognition of women's agency in shaping Brazil's response to environmental and social crises. The Agroecological Logbook is gaining attention, including by international donors and funds. Many donors have shown interest in funding the production of the logbooks. However, the success of the logbooks is more than the logbooks themselves; the success also hinges on the facilitation of women's groups where women convene to discuss the logbooks, the development of knowledge within the women's groups on local, state, and federal policies and budgets, the support of women to connect and network with academics, journalists and other civil society groups, and the coaching of women to do lobbing and advocacy. For these components (facilitation of women's groups, knowledge development, networking, and lobbying and advocacy), identifying and securing funding with (international) donors has been far more challenging.

Strengthening community engagement and women's leadership in response to land degradation challenges: **Corporación Nacional Forestal (CONAF)**

Nerquihue (commune of Lolol, province of Colchagua, Libertador Bernardo O'Higgins region) is located in the dry interior of central Chile. Characterised by a subhumid Mediterranean-like climate, the area has been affected by a prolonged drought – a mega-drought – over the past 13 years. Like other localities in the interior drylands, it has suffered progressive deterioration in soil quality due to drought, water scarcity, forest degradation, overgrazing, and the effects of climate change, lending to limited agricultural production and sustainability of the communities.

The people who live in Nerquihue are small farmer families who own small agricultural properties. Due to the lack of water for irrigation, only small portions of the land are worked for food production. A network of rural drinking water systems, managed, maintained, and operated by rural communities organised in committees or cooperatives with state assistance, provides the water supply for daily consumption.

In this context, families have sought strategies to maintain their economy and the small farmer tradition, in which women and men assume distinct roles. As women have taken on the role of care and work in the orchard, they are the ones who note the transformations underway, given their close relationship with nature through planting, caring for plantations, and harvesting fruit, among others. In addition, they are the ones who dedicate time and effort to find ways to maintain their production system, safeguard biodiversity and, thus, maintain the community.

Initiative overview

To respond to their needs, the residents of Nerquihue formed a community-based group – *La Unidad Peumayen de Nerquihue* – led by women, who carry out actions to find solutions to the problems of drought, water scarcity, soil degradation, and the effects of climate change. To this end, they work with institutions to create collaborative networks, joining initiatives that allow them to acquire knowledge, understand the causes of the problems, and design and implement solutions. They presented a territorial scale initiative to the GEF Sustainable Mediterranean Communities project, which provided them with technical and financial support to design and implement solutions based on nature, sustainable management, and care of their territory.

This initiative strengthened community work, requiring the design of an intervention strategy at the landscape scale, for which it was necessary to receive training, highlighting the commitment mainly of women who, with technical support, defined a work plan to facilitate participation.

To improve plant production, they received training in agroecology and implemented three solutions for water management:

1. Rainwater harvesting: preparing and using house roofs to install a network of rainwater collectors and an accumulation pond to conserve water

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2. Rainwater infiltration and runoff storage: intervening in micro-watersheds
3. Biofilters: using biofilters to recycle domestic wastewater

Led mainly by women, La Unidad Peumayen de Nerquihue has created and strengthened bonds of trust, solidarity, and friendship. In addition to developing and providing training on these skills in decision making, conflict resolution, coordination of activities, administration, and fundraising for the benefit of their community and future development, the role of women as leaders is central to this initiative.

Women's involvement

Within this framework, the women of Nerquihue, especially those participating in the Peumayen de Nerquihue Unit, have promoted collective work and solutions to the various land degradation problems afflicting their community. They have been trained and learned techniques to implement technologies and manage resources, which reflects the importance of participation in the design and planning of initiatives meant to serve the local conditions and communities at the grassroots level.

To this end, they implemented innovative actions and techniques:

- They learned techniques to access water, such as rainwater collection and storage and the reuse of grey water, mainly from households.
- To foster sustainable production, they planted 'edible forests', grew vegetables to supply their households, and recovered lost plant species, thereby diversifying their diet.
- They learned to plan their land, which allowed them to make the most of its characteristics. This is important because there are multiple land uses in Chile, where forest species are cultivated in the same management unit as agricultural crops. As a result of the interaction between these, benefits associated with the diversification of production can be obtained in the short, medium, and long term, maintaining soil fertility and optimising water use, thus achieving long-term sustainable production.
- They also learned to prepare and use natural fertilisers composed of organic waste: compost; humus; bokashi; and guano.

The women of the Peumayen Unit work towards food self-sufficiency for economic savings and the supply of products outside their family groups. They have learned that agroecological food production helps maintain good health both environmentally and socially. In addition, they rescue and promote solidarity practices of seed, patillas and food exchange, incorporate the whole family into the cultivation process (planting, harvesting, and postharvest), and create and strengthen bonds of trust and friendship in the community, attending solidarity activities and accompanying neighbours, as well as grandmothers and grandfathers.

Regarding local governance, they have experience in project management, budget management, and democratic decision making processes, and they have gained experience from participating in community activities. Notably, their female leadership enables them to achieve representation in other territorial organisations, such as the neighbourhood council and the organisation for rural drinking water supply and sanitation services.

In this context, this group of women is willing to face new challenges and gain access to public funds in culture, environment, health, and education through their organisation. They have also gained respect, built relationships with community members, and become eligible representatives for elected bodies.

Women champions

Lorena Droguette is the group president and leads the actions benefiting the community. The mother of three daughters and a son is firmly committed to the care of the environment, understanding that it is the basis that allows any development. She is constantly seeking training to acquire new tools that will enable her to support her neighbours, while also being recognised by various institutions for her experience, commitment, and responsibility. Also, an entrepreneur who has promoted fair trade initiatives, Droguette seeks to empower the women in her community to believe in their capabilities.

Katerine Leyton, a tailor and the organisation's secretary, is enterprising, empowered, highly committed to the community, and able to unite and encourage her neighbours. Drawing on these skills, she supports the development of commercialisation spaces and assists in designing and managing initiatives.

Valeria Valdivia, the organisation's treasurer, assumed the position after a personal growth process, convinced that she could contribute to her community. She is constantly learning to do this while steadfastly ensuring the effective expenditure of resources and their transparency.

Carmen Muñoz, a committed partner who loves the environment, is responsible and always willing to implement new technologies, unafraid of trial and error. She is always present for the activities organised by Peumayen.

Challenges

The following institutional challenges have been identified:

Inclusive land governance: There is a need to strengthen inclusive land governance, focusing on people as the basis for advancing neutral land degradation. This is critical due to the gender gap in land ownership, with less than 20 per cent of land in the hands of women and those who have land owning only a small area. This represents a limitation for initiatives, such as this one, to multiply, scale, and contribute to environmental sustainability and income generation since most women still need title deeds.

Local and regional dissemination strategies: Local and regional dissemination strategies should be implemented to ensure more people have access to information and women's participation is integrated into processes related to neutral land degradation and integrated land use planning.

Financial support: Public and private investment in policies, strategies, and actions should be prioritised, to accelerate progress and gender equity.

Alternatives: Expand the alternatives for new generations, aiming at quality of life and permanence in the territory. The above considerations need to account for rural-urban migration processes.

Environmental conservation: There is a need for forestation and restoration actions with native and fruit species to recover the forest and water and improve soil, and to improve the community's rainwater and wastewater catchment and storage capacity and extend the benefits to other localities.

Supporting climate change adaptation, with women's leadership: **CBO La Gloria in Sierra de Cubitas**

The initiative in the community-based organisation, La Gloria in Sierra de Cubitas, Camaguey province, Cuba, is linked to projects funded by the GEF Small Grants Programme and the National Environment Fund. Positioned near Camaguey's vulnerable northern coast, the area is among Cuba's 15 most climate change-affected regions. Challenges to agricultural sustainability include soil degradation, aridity, water scarcity, saline intrusion, and coastal forest degradation. The project focuses on SLM, integrating natural, human, and financial SLM in Cuban agriculture lags, hindered by non-conservationist practices, Cuba's insularity, and climate change challenges. Expanding SLM is vital to enhance agricultural resilience and mitigate environmental degradation.

Initiative overview

The initiative addresses climate change challenges in agricultural sustainability in the La Gloria community through social innovation, focusing on SLM. It identifies and implements good practices across 10 productive sites, emphasising climate change adaptation. The capacity building of 30 producers is integral, enhancing the cultural incorporation of sustainable practices. Improved planning processes encompass sustainability approaches, lending to more rapid assessments and better quality plans.

Implemented practices include soil conservation, invasive species management, biofertiliser application, tree planting, efficient irrigation, and crop variety adaptation. The ecosystem approach extends to rehabilitating 25 hectares of native forests.

The main results include 200 hectares under sustainable management, recognition of Land Initiated in Sustainable Land Management on two farms, two Provincial Innovation Awards, a 6 per cent yearly income increase for farming families, and enhanced food security and climate adaptation. Capacity building spurs further innovative projects, fostering community resilience and continuity of achievements.

Women's involvement

This innovative initiative has been pivotal in advancing Cuba's agenda of reducing gender disparities, particularly by promoting gender equality and empowering rural women within the La Gloria community. Led by women, the project significantly enhanced outreach to female producers, encouraging their active engagement in various activities. Across the 10 farms involved, women's empowerment increased as they actively participated in tasks related to land resource diagnosis and implementation of SLM practices tailored to climate change adaptation.

One notable success story is that of **Rosa Espinosa Rojas**, whose remarkable productivity in a covered cultivation house provided by the project highlights the rapid adoption of nutrition technology for covered crops. With support from her family and friends, Rosa achieved high crop yields within a short

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time, positively impacting both food security within the community and her family's income. Another standout example is **Yoleidi Vázquez**'s leadership in cultivating agroecological potatoes in her community, a challenging endeavour requiring significant effort to assimilate the technology quickly.

Innovative capacities already present in farms, like El Alacrán, facilitated access to specialised scientific and technological services, resulting in yields surpassing expectations and delivering profits to families while supplying essential food to the community. **Elida Diaz Cardenas**, from the La Caridad La Deseada Farm, has embraced agricultural innovation, including cover cropping, biofertiliser usage, and crop diversification, contributing to the farm's recognition for its SLM practices.

Female and male producers actively participated in training and decision making processes, working collaboratively within the initiative. Their newfound knowledge enabled them to showcase their achievements in various forums, fostering knowledge exchange nationally and internationally.

The initiative's emphasis on gender equality, women's empowerment, SLM, and climate change adaptation aligns with governmental goals to expand areas under SLM and tackle climate change. The diverse and motivated group, comprised of individuals of varying ages and expertise, has cohesively worked towards common objectives, illustrating the power of collective action in addressing pressing challenges at the community level. Moreover, the involvement of women researchers and specialists has enriched research, teaching, and extension activities, fostering a productive exchange of knowledge and cultural enrichment within the community.

Women champions

Rosa Espinosa Rojas, coordinator of the project, a generous and supportive woman who enjoys prestige and respect for her work in favour of sustainable food production, has participated in the project since its inception, presented her experiences in national events, and participated in exchanges with farmers in the country. Mayan Belize and Fiji and Solomon Islands, the UNDP Pacific Office in Fiji, awarded this activity as the best example of South-South cooperation in the region. Open to learning and able to establish alliances with specialists and other producers, she stands out today for the assimilation of nutrition technology in her covered cultivation house donated by the project, with excellent productive results that favour the food security of her community. In early 2024, she received the Provincial Recognition for Community Innovation, awarded by the Territorial Delegation of the Ministry of Science, Technology and Environment.

Josefa Primelles Fariñas is a project leader, researcher, and professor at the Environmental Research Center of Camaguey and the University of Camaguey. She succeeded in bringing together producers, researchers, and specialists around the project objectives by creating a participatory environment and dialogue of knowledge. She also helped improve the design and implementation process of SLM plans oriented to climate change adaptation (Provincial Innovation Award 2019) and managed co-funding for the project. She publicised the results through publications, exchanges with producers in the country, presentations, and teaching of the Master's Degree in Sustainable Land Management (University of Camaguey).

Yoleidy Vázquez González, an exceptional producer, is recognised for her innovative capacity and her willingness to face complex technical tasks at the El Alacrán farm, where she shares the productive work with her husband and children. Joyful and open to learning, with the ability to establish alliances with specialists and other producers, she has been an exceptional participant in the project activities.

Roselia Iglesias Moronta is outstanding for the charisma she brings to her agricultural extension work. She has vast experience and relationships with the scientific-technological community associated with this sector in the province. She has favoured the relational capital of the initiative in which she has participated since its inception and has offered valuable support to implement strong SLM practices in productive sites.

Elida Diaz Cardenas, a long-time La Caridad-La Deseada farm producer who has participated in the project since its inception, inspires young producers with her enthusiasm for her work and her love for her land. Her poetry and rhymes also enhance the atmosphere of participatory work.

Challenges

The initiative began with identifying the distinct needs of the women and men in the La Gloria Community – food security, sustainability of agricultural practice, and access to water, all in the context of climate change. The needs identified by the community were linked to gender gaps because, in general, the interests and needs of men and women are not differentiated.

Gender gaps: Gender gaps are expressed in the invisibility of women in the sector, due to their association with the role of housewife, while their participation in productive activities is not recognised. Some women producers identified this gap, favouring the formalisation of their role as usufructuaries of the land, together with their husbands or other family members.

Empowering rural women and facilitating critical access to water: **Ser-tão Mulher Project**

The "Ser-tão Mulher Project" aims to empower rural women, particularly those in the Sertai of Alagoas, Northeast Brazil, who work in and around the Sertao Adductor Canal. These are communities that have historically faced sexism and oppression. The CSO, Terraviva Institute (ITViva), has worked for 24 years towards sustainable agricultural use of the canal, focusing on women-led activities. The canal is a USD 605 million investment that captures water from the Sao Francisco River and takes it across municipalities with the lowest Human Development Index (HDI). Despite the canal, family farmers in the region cannot access water due to a lack of technological and social support and irrigation investment. ITViva has been bringing attention to this situation and exploring strategies to overcome it. Recently, they received the Socio-Environmental Fund, managed by the Caixa Economica Federal Bank (CEF).

Initiative overview

Key elements outlined in the Ser-tao Mulher Project are the following:

- Sustainable use of the Ser-tao Canal waters
- Empowerment of rural women who face sexist oppression and social exclusion
- Use of solar energy as a technological innovation
- Pursuit of organic certification to add value to production
- Implementation of Agroforestry Systems, under the leadership of women's groups, to combat desertification

Women's involvement

Women are typically involved in daily domestic activities, such as meal preparation and household management, which gives them general knowledge of the consumption patterns involved in production sustainability. Women also bring in added income from activities, such as animal husbandry and, despite weaker decision making power, they participate in day-to-day crop tasks, therefore informing household livelihoods.

Due to drought and off-season work scarcity, which induces seasonal labour migration, women are left responsible for maintaining their households, using resources provided by men. They learn to adapt creatively during these periods, facing the more challenging environmental factors of the winter season. These periods are when women can show their entrepreneurial potential, work towards autonomy and confidence, and play roles in organisational, productive, and political spaces.

The will and eagerness of women to become involved in decision making and to lead agricultural businesses can buffer against resistance to women's involvement in these sectors. The Ser-tao Mulher Project has provided training and support for women involved in the project to change their behaviours in this way.

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Women champions

Maria Clara da Silva dos Santos is an Indigenous woman, farmer, and mother of seven children. Better known as Dona Maria do Barraco, she has always been a source of inspiration and leadership for community-based groups of the Ser-tão Mulher Project due to her commitment to human rights and women's empowerment.

Kelly dos Santos da Silva, quilombola, farmer, and mother of three daughters, is on a quest to promote the well-being of her people and make improvements in their lives. A quilombola leader in her community, she recognised an opportunity for women's development in the project.

Maria Gomes de Barros dos Santos, a farmer and mother of three children, is determined to achieve social rights and opportunities for rural youth. She is recognised for her commitment to agroecology and her extraordinary mobilising power in the context of the Ser-tão Mulher Project. Always concerned about formative processes, she has moved the community towards searching for knowledge and reducing illiteracy.

Josefa Maria Silva do Nascimento is a farmer and mother of six children. Better known as Dona Bia, she is a strong advocate in the social environment and an exemplary agroforestry farmer. She has a significant role in the project, with her empirical teachings on producing in harmony with nature and sensitivity to the social cause.

Ana Cristina Accioly, a teacher at Good Living Teaching, has recognised – through the Ser-tão Mulher Project – that ecofeminism empowers women from the Sertão of Alagoas and awakens within them a sense of freedom and utopia.

Challenges

Sexism: Sexism remains a key challenge faced by women. Men hold leadership roles and make decisions on agricultural production. Men are empowered to decide what to plant, when to buy, how to care for agriculture, and how to apply gains and make decisions on yields. Women, on the contrary, are viewed as holding secondary positions in all aspects of agricultural production, including organisation participation, and are kept in domestic roles. Albeit the foundation of their households, women are not given opportunities to advocate for community improvements due to their lack of political power and representation. The project initially caused household tensions, preventing women from exercising their right to involve themselves in business management. This caused issues with educating women on Agroforestry Systems and alienated men who were also not familiar with technological innovations. Empowering rural women, part of the project's methodology, would and has overcome some of these challenges.

Infrastructure support: There is a lack of infrastructure support for family farming, such as public services, precarious roads, inadequate electric supply, and inadequate agricultural assistance.

Other challenges: There are also challenges faced by land speculation from larger corporations, inconsistent rains, and climate issues, such as desertification, climate change, and dependence on expansive new agriculture technologies that shift conventional agriculture to monocultural systems.

Rehabilitating and operationalising small water infrastructure and supporting women's role in water management: **Anticipating the Impacts of Agricultural Drought in the Venezuelan Guajira**

La Guajira, Venezuela is an arid region, home to the Wayuu and Añú peoples, facing severe poverty, with 90 per cent of income spent on food due to recurring droughts. The COVID-19 pandemic and economic crises have worsened their plight, leaving them highly vulnerable. Prolonged droughts diminish food production and income, escalating food prices and impacting vulnerable families, in particular. This situation intensifies food insecurity, agricultural livelihood challenges, and migration. During drought peaks, families resort to selling assets for water and food, while school closures disrupt feeding programmes. Global models forecast an 80–90 per cent probability of transitioning from a neutral El Niño/Southern Oscillation (ENSO) phase to a warm phase (El Niño) between June and August 2023, likely causing below-average rainfall. This will adversely affect the agricultural season, reducing crop yields, impacting small livestock health, exacerbating food scarcity and price hikes, and threatening regional food and nutritional security.

Initiative overview

FAO initiated the project, "Anticipating the Impacts of Drought on Agriculture in the Venezuelan Guajira", to address anticipated drought impacts on food security and agricultural livelihoods. This project aimed to rehabilitate and operationalise a network of small water infrastructure for human and animal consumption. FAO adopted a phased approach to slow-onset crises, starting with obtaining Free, Prior, and Informed Consent in Indigenous communities, coordinating inter-institutional efforts, disseminating forecasts, identifying beneficiaries, establishing baselines, and promoting water management practices.

The second phase involved the following:

- The rehabilitation of 28 community water wells will benefit 19,494 people who no longer need to purchase water from tanker trucks, saving each family up to USD 32 monthly or avoiding non-potable water consumption from artificial lagoons.
- The implementation of drip irrigation systems for 100 families enables the cultivation of 5,000 square metres, yielding 40 kilogrammes of vegetables per family every three months.
- Twenty artificial lagoons were rehabilitated for community use, a storage capacity of 36,000 cubic metres was restored, and 1,050 vulnerable individuals from Guajira and Mara municipalities were supported to maintain 15,146 livestock without losses or forced sales. These cattle serve as vital assets for vulnerable families, representing their savings.

The third phase involved impact analysis studies, documenting best practices, and recognising the crucial role of Wayuu women in water management on their ancestral lands.

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Women's involvement

The Venezuelan Guajira is experiencing one of the harshest droughts in its history, with women particularly affected. In addition to suffering the negative effects of drought, women are also responsible for providing water for their home. Due to limited availability, women sometimes resort to extreme coping measures, such as walking several kilometres by foot each day, adding additional burden to their already heavy home care and production in the field, to find water that, most of the time, is contaminated, which exposes them and their families to chronic illnesses and diseases. Given their role, women have been made responsible for water management. Strategies developed to mitigate the effects of droughts, include:

- Protection and administration of *jaguey* water: *Jaguey* water, traditional water storage systems for livestock consumption fenced with ecological structures (cacti) to limit the force of the wind, is being managed and protected through community dynamics that restrict access and use and prioritise the water for animal consumption, thus safeguarding the well-being of their livestock and ensuring food security and nutrition for all.
- Leadership: Measures are being made to improve the administration of community wells and windmills, avoiding secondary environmental impacts.
- Efficient irrigation strategies: Efficient irrigation strategies are promoted for maximum water use, without compromising food production.
- Safeguarding of ancestral seeds: Climate-resistant properties, such as *guajiro* beans, millet, and early corn, are being used to safeguard ancestral seeds. Wayuu women play a fundamental role in selecting, classifying, and storing seeds that go to the seed bank (*wauya*), which will later be used for the next sowing.
- Usage of crescents to trap rainwater: The construction of crescents on the ground are being promoted as a means to trap rainwater, protect it from winds, and maintain soil moisture.

Women champions

Keila Beatris Fernández Wayuu Ipuana, educator by profession and vocation, is a community leader of 56 years who has dedicated her life to the preservation and socialisation of ancestral knowledge and tradition, mainly to the native ways of collecting and preserving water and planting drought-resistant crops. During the project, she dedicated herself to providing training on anticipatory actions, adapting strategies to local practices, and accompanying the families participating in the project in the Bolivarian Guajira Indigenous Municipality in the appropriation and use of this initiative. At the community level, she actively promotes the permanent and systematic construction of shallow wells (artisanal) and, at the family level, the harvesting (collection) of rainwater and the conservation and planting of native crops resistant to drought.

Mariela Morillo, a 49-year-old Wayuu Ipuana woman who has lived her entire life in the community of the Albaricoque, is a mother and grandmother dedicated to her family, community, and traditional practices and culture. She is a proud artisan and seamstress who passes on traditions to younger women. Just as her grandmother and her mother did in the past, she guides and accompanies the creation and care of the *Yüuja* (conducts/family gardens) among the families of the community. At the same time, she teaches them how to reuse domestic water to plant traditional crops.

Lucinda Ramírez, a Wayuu leader of the Pushaina Clan and a Miralejos resident in the Mara Bolivarian Indigenous Municipality, protects and manages the *jagüeyes*, organising community dynamics for animal consumption, planting, and caring for the lagoons. In addition, she promotes planting and harvesting food in the schoolyard, which contributes to the food and nutritional security of girls and boys while conserving traditions and food practices typical of the Wayuu people. She also promotes and accompanies the artisanal production of drip irrigation.

Wayuu women have historically been the guardians of natural resources and the ancestral knowledge of its people, playing a fundamental role in the food security and nutritional needs of their families and communities, which is why they work hard in the management, use, conservation, collection and administration of water for the home. In addition, they look for firewood to prepare food and collect wild fruits that allow you to feed your backyard livestock, counteracting the effects of drought and strengthening their productive skills in these arid territories.

Challenges

The main challenges encountered were:

Investment in infrastructure: There is a lack of investment in public infrastructure, which serves as the only means of water reservoir.

Youth migration: The migration of youth – who hold knowledge about strategies to combat and confront droughts/disasters, knowledge that will be needed in the future – is problematic for the sustainability of efforts.

Communication and coordination: Weaknesses in effective communication and coordination between institutions adversely affects the dissemination and use of findings in climate decision making.

Preparation: Predictive actions should be put on the public agenda as a fundamental element that saves lives in the context of recurrent droughts.

Awareness-raising and advocacy: The culture of water saving and avoidance of inefficient use should be promoted, recognising the importance of advising Indigenous households to use the exact water they need for their crops.

Constructing a system of rain ponds and supporting women as water guardians: **Asociación Bartolomé Aripaylla**

Photo. © Asociación Bartolomé Aripaylla

In the central Andes of Peru, the Machaca Mendieta sisters migrated from the countryside to the city to study agricultural engineering, a traditionally male career. They were discriminated against because of their gender and origin, but they never gave up. They returned to their farming community but, instead of applying what they had learned at the academy, they immersed themselves in the knowledge of their ancestors, enriched their relationship with nature and, thanks to them, their community had water again.

In the Andean world, knowledge is the set of practices, signs, secrets, attitudes, and values resulting from constant communication and relationships between people, nature, and deities. Instead of referring to water resource management, they refer to water nurturing, an Andean concept that denotes the symbiotic relationship between the community and nature. Efforts are not only made to ensure there is no lack of water, but that it is also loved and nurtured. The sisters highlight that many agricultural engineering colleagues influenced by Western culture must also seek to understand this concept.

When the sisters returned to their community of Quispillaccta (located at 3,860 metres above sea level), in the district of Chuschi, province of Cangallo, department of Ayacucho, the situation was complex. The Wayunka and Paqcha glaciers, water sources for those who live in this high Andean area, had melted. A great diversity of seeds had been lost, and the pastures for livestock feeding were dry due to the community's water deficiency. The community was experiencing fierce food insecurity. Following the Andean worldview, the Machaca Mendieta family also felt that the relationship between the community and nature, particularly water, had deteriorated. This is why it was necessary to return to treating Mother Earth with affection, offering to her, singing to her, and taking care of her.

After long conversations with the *yachaqs* (wise men), they founded *Asociación Bartolomé Aripaylla* (ABA Ayacucho) to revive traditional practices, emphasising a harmonious relationship with nature, known as water nurturing. Recognising the urgent need for action, they constructed reservoirs to store rainwater, beginning with the Apacheta lagoon in 1995 and, by September 2023, they had built over 170 lagoons, benefiting thousands of people. Facing a worsening water crisis in the 1990s, they reclaimed Indigenous knowledge alongside their elders to address water scarcity. The Machaca sisters and their brother, Gualberto, remain dedicated to preserving Quechua culture and safeguarding their community's relationship with nature, highlighting the importance of embracing traditional wisdom in the face of environmental challenges.

Initiative overview

Based on the traditional practice of 'rainwater breeding', the Machaca sisters' project has created a system of rainwater conservation and generation they call 'rainwater planting and harvesting'. This system involves constructing a system of *qochas*, or rain ponds, in natural depressions that function as a network that retains, stores, and infiltrates runoff to aquifers.

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Rainwater planting and harvesting maintains a permanent water flow during the dry season. It is based on the sacred relationship between nature, man, deities, and the knowledge and actions of the natural world. This process constitutes an important contribution to solving water scarcity and climate consequences. It is also a low-cost solution to these problems.

To date, 188 rain ponds have been built, with capacities ranging from 1,604 to 450,000 cubic metres. The project has also trained young people as community extensionists for sowing and harvesting rainwater; the community extensionists are mobilised at the national level to support their communities in constructing rain ponds in other regions, such as Guatemala and Costa Rica.

Another element of this project is planting species known as 'mothers of water', maintaining water resources and organising livestock ownership and controlled grazing – all planned within a culturally affirming and determined framework. These practices have been developed collectively with local communities since 1994.

Women's involvement

Droughts are a constant threat in communities like those where the Machaca sisters work, and women play essential roles in SLM. They exercise authority in caring for the land and the community, actively participate in decision making, and contribute their invaluable knowledge.

Additionally, women are crucial in protecting and distributing irrigation water to the family. In times of drought, they become guardians of water, watching to prevent its theft and ensuring its correct use. In prolonged drought or increased water demand, women solve problems and regulate its distribution. They act not only as authorities but also as ritual figures who maintain a sacred relationship with water. Their ability to decide when to release irrigation water or call for rain highlights their power and responsibility as guardians of this vital resource.

Women champions

Marcela Machaca Mendieta is involved in expanding the innovative initiative, "Sowing and harvesting rainwater" (SCALL), to other territories, such as Costa Rica and Guatemala.

Magdalena Machaca Mendieta leads a project to scale up the experience of the initiative, "Sowing and harvesting rainwater", towards new districts, together with the young people trained by ABA Ayacucho as SCALL Community Extensionists, and the implementation of projects to stimulate economic entrepreneurship and community tourism.

Victoria, Lidia, María, and Rosalinda Machaca Mendieta, all of whom have received numerous recognitions at the local and regional levels, are part of the ABA Ayacucho team. They collaborate closely with Marcela and Magdalena to carry out these valuable initiatives.

Improving the quality of life of small farmer families through the construction of cisterns, education on farmers' rights and land law, and more: **El Jabalí Producers Association**

El Jabalí Producers Association is located in the Chaco province of Argentina. It includes more than 60 members who have historically inhabited the territory and who joined together in 2017 to fight for the rights of peasants in defence of their lands and forests and a healthier ecological environment.

The region has a low population density due to environmental factors, such as low water availability and a lack of basic services, such as communications, public services, and transportation. When forests are destroyed in this region, serious issues such as erosion, environmental damage, drought, and higher temperatures decrease productivity and biodiversity. The region's forest has been threatened for almost 20 years by large enterprises (*latifundios*) that are fumigating and clearing forest areas. For this reason, this initiative works to strengthen small farmer families who use sustainable production practices. The project also includes multiple efforts to improve access to basic rights, such as access to water. Before these efforts, many local families did not have access to potable water or water for productive use. Women's participation in this work has been key and, without the role of women and collective work, these objectives could not have been achieved.

Likewise, the project acknowledges that ensuring women's access to land rights is critical to support their engagement – as stewards of the land and active participants in its maintenance and preservation – in decision making roles at higher levels. This has been highlighted as one of the main challenges (see below).

Initiative overview

The association's main objective is to improve the quality of life of small farmer families in various aspects, such as production, marketing, housing, water, health, education, sports, and environment. Initially, the association conducted a survey to identify community needs and collaborated with public organisations. They conducted training sessions and workshops on various topics, including farmers' rights and land law, developed signage for locations, and participated in workshops on land use planning.

Water provision is a major challenge due to the location in a dry region with frequent drought. The association implemented projects in response to water shortages, including three that resulted in the construction of 28 cisterns with collector roofs, 21 cisterns of 16,000-litre tanks, and nine community dams. Currently, six cisterns are being built with the participation of women, who actively collaborate in training, handling tools, and preparing construction materials.

The lack of water remains a pressing issue, along with other difficulties members face. These activities have strengthened ties between institutions and residents, contributing to the sustainability of traditional productive activities and improved living conditions in the region.

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Women's involvement

Since 2017, the association has noted the significant role of women in founding a legal small farmer organisation and their continued involvement in addressing inequalities and challenges faced by rural communities. Women play a crucial role in sustaining activities both within and outside the home, including ensuring family nutrition, performing domestic care tasks, raising livestock, supporting children's education, and engaging in production and marketing activities. Despite facing climatic vulnerabilities, water scarcity, limited technological resources, and low levels of formal education, women remain the backbone of rural life, organising and caring for life in the territory. They contribute to the survival and continuity of rural communities despite economic dependencies on climatic factors and limited access to land titles.

Women champions

Ramona Marcela, a small farmer and mother of two who received education at the primary school level, works in collaboration with her partner to raise cattle, sheep, poultry, and goats on a larger scale, producing approximately 500 kilos per year. The sale of these animals is an essential source of income for the family.

Rosa Clotilde, a widowed mother of 11 adult children and grandmother of three minors who are in her care following their mother's death, was unable to complete her primary education but can read and write. She uses her income and state aid that she receives to pay for feeding and caring for the poultry, cattle, and pigs, and she raises poultry, cattle, and pigs on a small scale. She holds the position of first alternate member of the organisation, supporting preparation of the hall for activities and benefits.

Aldana Soledad, one of the youngest mothers in the association, has two children and primary level education. Three years ago, she and her partner founded her family farm and, together, they are making improvements. In addition to caring for the house and children, she is involved in setting up the farm, cleaning the land, carrying water, and building fences and the plate cistern, an improved means to store water. Her family is among the households that suffers the most from a lack of water due to droughts and from the economic situation, which cause a lack of basic necessities, with only a minimum income to cover the expenses for the household.

Analía Griselda, a young mother of two, has a primary school education. She takes care of household chores, childcare, and education and helps her partner raise goats, sheep, and cattle. She also cleans the lot and enclosures, carries firewood, and builds cisterns. At a young age, she has the capacity to learn and develop many new skills to help advance further improvements within her household and community.

Débora Elizabeth, a mother of two daughters, completed primary school but could not complete her secondary schooling. Together with her partner, she founded their farm three years ago and is responsible for housework, childcare, and maintenance and construction in the family home. She cleans and has built enclosures for the property as well as cisterns and a borehole to help them raise poultry, goats, and cattle, activities they are starting due to the lack of water. She is a producer who knows how to make manufactured products and Creole cheeses, which help her increase her income and cover her family's expenses.

Elisa Mabe completed primary education and is a founding member of the association. One of her oldest daughters helps with household chores, enabling Mabe and her husband to raise poultry, cattle, and goats on a larger scale, and sell them to pay for family expenses. She is a third board member of directors and participates in workshops and training sessions organised at the legal headquarters and other institutions.

Luisa Marie, a mother of three adult children and a grandmother of five grandchildren, is a founder of the organisation and farmer who, together with her partner, cares for the fields and raises poultry, cattle, sheep, and goats, which they use to support their families by selling meat, eggs, milk, and other by-products, as well as cheese.

Balvina lives with her two youngest children on the farm that she founded and is one of the few female heads of the farm with land titles in the advanced stages of being titled. She is a small farmer producer and head of household who does all of the work required in the field. She raises cattle, poultry, and goats on a larger scale, the sale of which is her primary source of income for her household and other needs. She is also a craftswoman, making regional weavings and participating in local fairs.

Griselda del Jesús, a mother of five children, has completed primary school and takes care of household activities and education. Together, she and her family raise poultry, cattle, and goats, which they use to cover part of their needs. She is a member of the board of directors, holds the position of alternate auditor, and actively participates in the organisation's different activities.

Hortencia is a primary school teacher with 32 years of service in rural areas. Also a farmer, producer, and founding member of the association, she owns 250 hectares of land. She advocates alongside other members to defend the land, forest, and environment. She coordinates, manages, and accompanies others in support of the initiatives and procedures of the association.

Challenges

Many of the challenges that the women in the association face can be attributed to gender inequalities:

Scarce and differentiated access to land tenure and ownership: Most women do not have land titles and must travel approximately 900 kilometres to complete related procedures. This makes it difficult for economic and logistical reasons, and it is not easy to leave home due to the number of tasks and responsibilities women have. Many of them found the association helpful in carrying out the procedure or claim for land management. However, even with this support, it is still complicated and the responses are complex.

Limited autonomy in decision making, associative, and representative roles: For several generations, women have been left out of decision making roles, as cultural norms assume that they are in charge of the home and will not go out to the city or participate in meetings.

Long working hours taking care of the house: Rural women work more than men, in unpaid or very low salaried employment. They generally work long hours doing productive and domestic work.

Little economic autonomy and meagre income to cover essential demands: Women are the heart of the family economy but rarely handle bank accounts, bank procedures, financial operations involving investments, etc. Government social assistance and pensions can be a first step towards independence. Still, even the procedures necessary to obtain this type of assistance are complicated because the nearby banks are closed daily. The distances to them are long, requiring someone with a vehicle to travel there to carry out the procedure or to go by motorcycle. In general, women do not drive cars in rural areas; they depend on their husbands or drive motorcycles on very complicated roads, subject to the weather.

No job opportunities or projects that help cover basic household needs: Food, housing, water, connectivity, health, education, etc., are each essential for all. Yet, the distances to educational establishments and the lack of connectivity complicate primary education and trade training for women, who also have less time for training.

Promising practices

LATIN AMERICA AND THE CARIBBEAN

Mexico

Strengthening community capacities in favour of ecosystem health and sustainable use through dialogue and action: **TEJIDO/ RED por el Cuidado del Río de La Arena**

Photo: ©Google Maps

The Tejido/network is part of the follow-up to the Environment and Ecology Forum held in San Andrés Huaxpaltepec in April 2022. After the forum, actors from the Sand River region were brought together to discuss environmental challenges and community commitments for its restoration. Following the meeting, other initiatives related to water monitoring, ecotourism workshops, agroecological transition, and fire prevention began. As a result, the First Meeting of Peoples and Communities of the Sand River was convened, in August 2023, and became an essential space for dialogue and exchange between the different communities that inhabit the varied environmental levels of the basin. As part of the meeting, the 'Declaratory of the Itya Ka'nu Río de la Arena' was issued, establishing a first socio-environmental diagnosis of the basin and identifying the priority actions to move towards the sanitation and restoration of the basin.

Initiative overview

The Tejido/network seeks to strengthen community capacities for the proper management of the territory, with the aim to safeguard the good health of the ecosystem and natural common goods and their sustainable use for the benefit of all. As such, the network seeks to provide the tools, mainly to agrarian representatives and community authorities, to strengthen the internal agreements and regulations of communities and ejidos, in support of watershed care. Communication between communities is of particular relevance, allowing for the exchange of experiences on successes and failures in land use planning and management. At the same time, members recognise the challenges they face, such as the exploitation of stones, which require more sensitive and strategic cooperation, due to the economic interests involved and the risk of outright denouncing related actions. The network is, thus, committed to binding actions with the government to try to move towards the care of the basin without risking the integrity of the people. In this sense, the network considers defence of the territory as a reflexive, dialogic, and emancipatory process that leads to making decisions to continue knowing, caring for, restoring, and agroecologically managing the territory, where reflexive processes are developed to reduce environmental crises and multidimensional violence experienced in these spaces of the basin.

These actions are carried out around seven axes:

1. Community conservation and environmental restoration
2. Water monitoring and implementation of eco-techniques for water sanitation
3. Prevention and Integral Management of Urban Solid Waste
4. Transition to conservation livestock
5. Forest Fire Prevention
6. Ecofeminism and care of the territory
7. Community communication for sustainable watershed management

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Women's involvement

During the meetings and workshops, the members prioritise the reflection of ecological issues with a gender perspective, and they insist on integrating women to know their perspectives and integrate them into the community analysis; that is, participation is transversal to all issues. Likewise, they identify the most vulnerable people and places in their communities to prioritise the care and defence of their territory.

The meetings between women have allowed them to express themselves and create collectively to make visible the challenges that Indigenous, Afro-Mexican, and mestizo women have faced. They recognise that the environmental destruction their environment has suffered makes their daily tasks more difficult since their bodies and the care of their children are affected, and the future of their communities at risk. On the other hand, they recognise that it is necessary to continue strengthening women's political participation to make decisions in an integral manner and recognise the fundamental role of women as caretakers and defenders of the territory.

Their main resource has been the volunteer work, or tequio, that they have given to the Tejido/network and the organisation of workshops and meetings by the river. However, they have also received in-kind contributions from two municipal councils and ecology and environment directorates (e.g. food, loans of furniture and venues, and support in dissemination and transportation for the realisation of activities). They have also received in-kind contributions from the Mesoamerican Water Caravan to study basic water parameters for human use and consumption and advice on interpreting results. In 2023, they obtained, through a community radio station, a grant of MXN 70,000 for the First Meeting of Peoples and Communities of the Sand River.

Women champions

Julia Herrera Bustos, a member of the Afro-Mexican people, is an environmental leader whose outstanding achievements include being a member of Cooperation of Peoples in Defense of the Verde River (COPUDEVER), where the construction of a dam was intended, which would lead to the privatisation of the water resource, leaving the communities of the lower basin of the Verde River without this fundamental resource for life.

Esperanza del Carmen González Hernández, an environmental activist specialising in watershed analysis as well as the study of mangroves on the coast and the impact of community actions, is currently the spokesperson for the "*Tejido/Red por el Cuidado del Río de la Arena*" project.

Lilia Rosibel Gallegos, a member of the Indigenous people, environmental promoter of the Program for the Well-being of Indigenous Peoples, and specialist in coastal communities, has visited 20 municipalities where community diagnoses are carried out and actions are taken to avoid deforestation, especially in the areas of the sand river account. She is currently the spokesperson for the "*Tejido/Red por el Cuidado del Río de la Arena*" project.

Challenges

The following threats are identified for the Río de la Arena watershed: It is collectively recognised that the historical process of deforestation in the lower basin is due to **cattle pastures**, and the introduction of commercial crops is linked to the **indiscriminate use of agrochemicals** and **unplanned tourist development**. Together, these factors place pressure on the dunes and mangroves lending to desertification and putting at risk the habitats of many local species. In addition to the appearance of **pests** that defoliate and dry out the mangroves, a socio-environmental crisis experienced by the inhabitants who depend on fishing for self-consumption and sale is affected by the **drying out of the lagoon** systems.

Mexico

For the project and women's involvement, they face the following issues:

Violence against women: Women face various forms of violence, including discrimination, because it is assumed that women cannot be leaders of high-impact movements in the communities.

Male chauvinism in some communities: Male engineers are often invited to be heard or to carry out workshops.

Limited support at the government level: Civil and traditional authorities have been called to participate in these meetings and workshops, but they have not generally responded and, when they have responded, they have only sent representatives.

Lack of economic resources: Conservation livestock workshops (agrosilvopastoral systems) are needed to carry out these actions with the 11 municipalities in the Rio de la Arena watershed.

Need for workshops: There is a need for workshops on developing agreements to strengthen internal regulations around community conservation.

Demonstration module: A demonstration module needs to be implemented for conservation cattle ranching.

Monitoring: Water should be monitored for human use and consumption, using both dry samples and rainfall samples.

Learning opportunities: A workshop and exchange of experiences is needed on preventative fire management.

Improving food and nutritional security in vulnerable communities: **GACEM Savings and Credit Groups for Women's Empowerment**

Photos: GACEM / WFP Guatemala

Guatemala is a multiethnic, multicultural country that faces socio-economic and gender inequality issues, climate vulnerability, and racial discrimination. ICF estimates indicated that 4.3 million people suffered acute food insecurity in June–August 2023. In Guatemala, the effects and conditions of unequal variability have had critical repercussions on the population's food security.

For women, the conditions of vulnerability are aggravated due to the socio-economic and gender inequality they face. Guatemala has been classified as the most unequal country in Latin America, ranking 117 out of 155, according to the Gender Inequality Index. Women represent 37 per cent of the economically active population, with 104.4 women in poverty for every 100 men; and the wage gap is at 20 per cent at the national level, reaching 42.5 per cent among Indigenous women. Their limited access to economic opportunities, lack of control over their income, low literacy rates, and greater time commitment to unpaid care and domestic tasks – reaching 60.1 per cent of time among women aged 25–64 years old – constitute critical barriers to sustainable participation in resilience actions. This is in addition to gender norms, biases, and stereotypes present in social spaces, which limit their access to economic activities, technical training, risk management, financial education, access to credit, marketing, or entrepreneurship because they are conceived as 'masculine' activities.

The 'dry corridor' covers 10,200 square-kilometres in the departments of Quiché, Lower Verapaz, Progress, Guatemala, Zacapa, Chiquimula Jalapa, and Jutiapa. This region experiences long summers and is characterised by a reduced or absence of precipitation during the rainy season.

Initiative overview

Since 2020, an initiative has been implemented in the dry corridor of Guatemala (Chiquimula, El Progreso, and Zacapa) to build resilience in rural communities vulnerable to food and nutritional insecurity caused by climate crises. The World Food Programme (WFP) works with 6,000 people and their households in 60 communities in these municipalities.

The initiative set its general objective to improve the food and nutritional security of the communities through four goals:

1. Increase income and adoption of sustainable and climate-resilient production methods
2. Mitigate the effects of soil, forest, and water degradation
3. Improve and expand planning and budgeting processes for adaptation to climate change and mitigation of its impact
4. Improve the quality and diversity of the diet. To ensure a significant impact, participatory planning mechanisms were established to contextualise and diversify responses based on needs with a gender transformation approach, favouring women's and young people's participation and leadership development

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In this framework, the training of young people to obtain decent employment has become an essential component for obtaining results: organise GACEM (Savings and Credit Groups for Women's Empowerment) and promote associative entrepreneurship; promote biofortified seeds against drought; strengthen value chains and create assets to mitigate the degradation of soils, forests, and water; support access to microinsurance; undertake anticipatory actions; and maintain a nutritional component.

The entire initiative has incorporated data collection methods, disaggregated by sex and age, allowing the components to be adapted to meet the specific needs of each group.

Women's involvement

To strengthen and develop women's capabilities, the constitution of GACEM was promoted as a platform to expand their opportunities to access the resources from which their capabilities could be extended. Organisational, administrative, and financial capacities facilitated the development of new critical thinking for investment, favouring the creation of profitable associative ventures in local markets, providing organised spaces for training and education on their rights, gender-sensitive nutrition, and the importance of women's participation, and progressively developing their leadership skills. Currently, 120 GACEMs engage more than 2,000 women. With the savings, women have led structural improvement investments in the community and their homes and have established 65 associative ventures that support income diversification and strengthen community and family resilience.

The innovative design of microinsurance (or productive insurance), which covers excess rain and drought, has protected commercial activities, not just agricultural ones. Women have become the best promoters of this type of mechanism and represent 85 per cent of the policies issued. The insurance companies have a transfer strategy where, each year, whomever seeks to renew the policy contributes a per centage of the total payment, while WFP subsidises what remains. This per centage increases yearly until the beneficiary makes the full payment upon verifying the benefits of covering any losses sustained in their economic activities in the event of catastrophic events.

Access to insurance and credit from the GACEM brings women closer to new methods of financing and protection, provides greater sustainability to their economic activities, and develops capacities for management and participation. In addition, women have developed financial and administrative skills, and they have managed to see insurance and their savings and credits as complementary mechanisms that support their empowerment and strengthen their decision making and leadership skills.

Women in the climate services component represent 85 per cent of the population trained in the Participatory Integrated Climate Services for Agriculture (PICSA) methodology. Their understanding of climate forecasts has strengthened their decision making within the community and their families for agricultural management and maintaining their productive chains and economic activities in local markets.

The climate services component is complemented with a pilot project of anticipatory actions against drought. A network of climate monitors was trained to record rain gauges and agroclimatic sensors. Women also make up 60 per cent of the team of 'climate monitors', who supervise and record climate data, in addition to interpreting data, reading agroclimatic bulletins, using technological equipment to record data (e.g. precipitation, soil temperature, humidity, and wind speed) in their communities, disseminating agroclimatic messages, and strengthening climate-smart decision making. This group is also a fundamental part of the anticipatory actions pilot.

It is essential to highlight that the majority of sustainability actions are linked to maintaining and expanding the connection of women and their organisations to local institutions and partners to facilitate the formalisation of their associative ventures and expand their opportunities to participate in larger local market profitability (e.g. scalar food), which requires that 70 per cent of its purchases be made from local production.

Women champions

Wendy García, a climate monitor, has learned to interpret the weather forecast, better understand climate data, and use the rain gauge and the agroclimatic sensor. García lives in the La Mina community in Jocotán, Chiquimula, in the dry corridor of Guatemala. García has been hands-on in promoting climate-smart decisions and directly delivering climate services. "I want to learn everything about the climate to help my dad produce better", says the 19-year-old girl as she proudly shows where the agroclimatic sensor is located on the family plot. Wendy's interest in climate information began in 2022 when her community was affected by excessive rain, which caused families to suffer crop losses. That was the year her family started participating in the parametric insurance implemented by WFP. The young woman mentions that the insurance payment helped them buy food to cover the losses of the partial harvest.

Edna Duarte, a mother, saw her dreams of being a teacher cut short by the few opportunities provided to women due to gendered biases and stereotypes that still prevail in families and communities, limiting women's work to the home and preventing their personal development. She and her family have seen firsthand how droughts affect their activities; Edna was among the first women insured in 2022. After a brutal winter in 2022, Duarte and her family were able to stay on track, thanks to the insurance and her ability to restart. She fuelled the food business with the insurance payment, allowing her to multiply her capital. Currently, Duarte is an insurance ambassador for her family and in her community, sharing her experience and supporting, together with the municipality, additional beneficiaries to the catastrophic weather insurance programme since she was among the women who had contributed 12 per cent to their premiums for the 2023–2024 coverage cycle.

Damaris Reyes lives in the community of La Lima, in the department of Chiquimula, in the Central American region known as the dry corridor. Reyes is the 'promoter' of the community of +50 women who, with the support of WFP, have transformed the land into a space of hope and opportunity for the families who live there. They are growing drought-resistant crops, making organic pesticides, and are prepared for the dry season. Reyes is part of the climate monitors. In addition to promoting climate-smart decision making, she also promotes the manufacture of organic fertiliser. She has been trained in human rights and gender equality and, thus, is dedicated to promoting these in the community.

Challenges

Literacy: One of the main challenges encountered is little opportunity for women to participate in activities outside their homes. Women have low literacy levels, hindering the inclusion of women in activities to strengthen technical skills, especially those linked to climate information. Therefore, WFP established an agreement with the National Literacy Committee to promote literacy among women. Significant work on this remains for widespread change.

Distrust in banking: The distrust in banking institutions and processes involving credit required awareness-raising as well as practice to enable women to see the advantages of the GACEM since they are the directors of the operation. This is achieved by establishing clear rules, which facilitate gathering and which simplify the procedures, without sacrificing transparency or access to financing to put ideas into practice and open economic opportunities.

Investment and institutional strengthening against biases and stereotypes: WFP has considered and adapted its activities to the interests of adult women, older adults, and young people to achieve greater inclusion, which requires more significant economic investment as well as institutional strengthening, which is undermined by biases and gender stereotypes maintained by select individuals, who view work linked to technological development or productive improvement as limited to men. This requires work to raise awareness and support pedagogical mediation and gender transformation, which are insufficient even in multi-year projects.

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