

# People-centric Ecosystem-based Adaptation

## A case study from Sudan

Photo credit (top): UNEP/Lisa Murray

The United Nations Environment Programme (UNEP) has been working with the Government of Sudan and partners on a project titled *Enhancing the resilience of communities living in climate change vulnerable areas of Sudan using Ecosystem Based approaches to Adaptation (EbA)*. Funded by the Global Environment Facility (GEF)'s Least Developed Countries Fund (LDCF), the project has helped to build resilience against the impacts of climate change in Sudan through a practice known as '[Ecosystem-based Adaptation](#).'

Located in northeast Africa, Sudan is the third largest country on the continent, bordered by seven neighbouring countries and the Red Sea. The country is made up largely of desert and semi-desert areas, as well as woodland, savanna, mountain ecosystems and the Nile River and its floodplain. Sudan has a population of about 45 million people, more than 70% of whom depend on crop production or livestock rearing for their livelihoods (Sudan, Ministry of Environment, Natural Resources and Physical Development [MENRPD] 2016).

Ecosystems and people in Sudan are severely vulnerable to the impacts of climate change. Increasing temperatures, variable rainfall, expanding desertification, and sea level rise threaten biodiversity, livelihoods and the national food supply. For example, according to climate projections, wheat production in Sudan may decrease from 16% to between 4.5% and 12.2% by 2050 (Trisos *et al.* 2022). Disease outbreaks and malnutrition from climate shocks, disasters and conflict have resulted in acute humanitarian needs in Sudan amidst political and economic instability. Climate change can exacerbate the root causes of conflict, risking ongoing cycles of violence (Scheffran *et al.* 2014; Sax *et al.* 2022).

### Project Title

Enhancing the Resilience of Communities Living in Climate Change Vulnerable Areas of Sudan Using Ecosystem-based Approaches to Adaptation

### Executing Agency

Higher Council on the Environment and Natural Resources of Sudan (HCENR)

### Timeframe

2017-2023

### Key Figures

<b>800</b> Households in 43 villages in White Nile State are benefitting from EbA	<b>400</b> Hectares of forest and rangeland restored	<b>45%</b> Of households that have adopted EbA measures are headed by women
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### Funding

Supported by the Global Environment Facility's Least Developed Countries Fund



Co-finance  
\$7.9m



GEF Grant  
\$4.3m



## Implementing Ecosystem-based Adaptation in White Nile State

White Nile State in southern Sudan is one of the most vulnerable regions of the country, impacted by climate change-induced droughts and floods. Less than a third of households in the state have access to safe drinking water (United Nations Environment Programme [UNEP] 2020). Most of the population are smallholder farmers and pastoralists, vulnerable to climate impacts due to unsustainable practices, insufficient water and land management and lack of alternative livelihood options.

Gender inequality is deeply rooted in Sudanese society, where women face barriers to accessing resources and participating in decision-making. Women are generally responsible for household food security, child-rearing and collecting water and firewood, tasks that are made more difficult by recurrent droughts and erratic rainfall. In rural Sudan, women cultivate crops in backyard farms (*Jubrakas*), which provide additional income and food outside of harvesting season.

To strengthen communities' adaptive capacity in the face of climate change, women and men must have equal access to information, land and livelihood opportunities and the ability to participate in planning and decision-making. In a global survey, EbA stakeholders identified "partnership and stakeholder engagement challenges" as the second most important barrier to overcome to implement and scale up EbA, after financial barriers (UNEP 2023). There are few

practical examples of how nature can provide adaptation benefits in a Sudanese context, where dependency on a war economy and post-conflict power dynamics are leading to maladaptation outcomes for the poor population (Young and Ismail 2019).

To enhance the resilience of communities against the impacts of climate change, the United Nations Environment Programme (UNEP) implemented an ecosystem-based adaptation (EbA) project in White Nile State. The Global Environment Facility (GEF) funded the project under the Least Developed Country Fund as part of the implementation of Sudan's National Adaptation Plan.

A combination of knowledge, cultural, resource and structural barriers limit inclusive stakeholder engagement and gender mainstreaming in EbA in Sudan and White Nile State (Table 1). Working with policy stakeholders and local communities, the Sudan EbA project had three main components:

- 1) Capacity development for EbA and policy mainstreaming.
- 2) Implementation of EbA measures to build adaptive capacities of vulnerable communities.
- 3) Knowledge management for appropriate EbA design.



The UNEP project has empowered thousands of women, like Nina Elmassad, by helping them choose from a range of climate adaptation techniques, including more than 1,000 women who were trained how to grow vegetables in tough climatic conditions. Credit: UNEP/Lisa Murray

## Stakeholder Engagement and Gender Mainstreaming in Ecosystem-based Adaptation

The proactive and continuous engagement of stakeholders was critical to the Sudan EbA project. From design and planning to implementation, dialogue among stakeholders at national, state and local levels created a sense of shared ownership of the project. This was done by carrying out gender-sensitive vulnerability assessments at the beginning of the project and creating specialized committees that brought together diverse perspectives to guide and implement EbA actions.

The project faced challenges following the December 2018 revolution and subsequent political and economic instability in Sudan. Changes in government structures

and a high turnover of staff meant a lack of continuity for the EbA project, while inflation and fuel and currency shortages caused delays in executing project activities. The COVID-19 pandemic compounded delays and hindered stakeholder engagement and outreach, although some of these activities were carried out virtually.

Despite setbacks, the project succeeded in engaging a wide range of actors and supported the establishment of Village Development Committees (VDCs) and sub-committees responsible for spearheading the implementation of EbA measures in their respective villages.

Stakeholder engagement and gender mainstreaming approaches	Barrier category	Target group(s)
Gender-sensitive climate risk and vulnerability assessments and workshops	<ul style="list-style-type: none"> <li>• Knowledge and evidence gaps</li> <li>• Limited space</li> </ul>	<ul style="list-style-type: none"> <li>• Communities in Al Salam, Tandaltei, El Dweem, and Gulli</li> </ul>
White Nile State Technical Committee Project Steering Committee Village Development Committees (VDCs) and sub committees	<ul style="list-style-type: none"> <li>• Limited awareness and understanding</li> <li>• Insufficient political and public support</li> <li>• Governance challenges</li> </ul>	<ul style="list-style-type: none"> <li>• State and national level decision makers</li> <li>• Federal and White Nile State decision- and policy makers, research institutes</li> <li>• Communities in 43 villages of White Nile State</li> </ul>
Participatory consultations and partnership building	<ul style="list-style-type: none"> <li>• Governance challenges</li> <li>• Limited awareness and understanding</li> <li>• Insufficient political and public support</li> </ul>	<ul style="list-style-type: none"> <li>• Government ministries</li> <li>• Research institutes</li> <li>• Communities</li> <li>• Civil society</li> <li>• Private sector</li> </ul>
Meetings, interviews and policy dialogues	<ul style="list-style-type: none"> <li>• Technical capacity constraints</li> <li>• Insufficient political and public support</li> </ul>	<ul style="list-style-type: none"> <li>• Federal and White Nile State decision- and policy makers</li> <li>• Technical support staff</li> <li>• Communities and community leaders</li> </ul>
Stocktaking exercise for policy- and decision-makers on incorporating EbA	<ul style="list-style-type: none"> <li>• Policy and regulatory challenges</li> <li>• Finance challenges</li> </ul>	<ul style="list-style-type: none"> <li>• Federal, White Nile State and local decision- and policy makers</li> </ul>
Learning by doing and social learning	<ul style="list-style-type: none"> <li>• Technical capacity constraints</li> <li>• Knowledge and evidence gaps</li> </ul>	<ul style="list-style-type: none"> <li>• Farmers and pastoralists</li> </ul>
Gender-specific adaptation technologies and livelihood diversification initiatives	<ul style="list-style-type: none"> <li>• Governance challenges</li> <li>• Knowledge and evidence gaps</li> </ul>	<ul style="list-style-type: none"> <li>• Women and women-headed households in the targeted villages</li> </ul>
Female representation in decision making	<ul style="list-style-type: none"> <li>• Governance challenges</li> <li>• Knowledge and evidence gaps</li> </ul>	<ul style="list-style-type: none"> <li>• Women at federal, state and local levels</li> </ul>

### **Gender-differentiated risk and vulnerability assessments as entry points for gender-responsive EbA**

A participatory vulnerability assessment was carried out to assess the current and future climate change risks and vulnerabilities in four target localities in White Nile State (Al Salam, Tandaltei, El Dweem, and Gulli). The assessment was fundamental in guiding EbA interventions for the project, with an emphasis on addressing systemic climate-related vulnerabilities and low adaptive capacities of women, youth, and the elderly.

Stakeholder consultations highlighted women's important role in activities such as integrating alternative energy sources, raising poultry and goats, vegetable gardening and rural dairy processing, using local knowledge and techniques.

Targeted adaptation solutions were implemented for women-headed households across 43 villages in White Nile State, such as the distribution of poultry cages, improved cookstoves and goats for producing milk, and the establishment of backyard gardens for vegetables and fruit. These targeted activities are expected to boost food security and enhance household nutrition, while at the same time providing alternative income options for women. More than 8,000 households in White Nile State adopted EbA measures as a result of the project, with women representing 45% of participants.

### **Bringing diverse perspectives to EbA: Multi-stakeholder approaches**

At state level, the White Nile State Technical Committee was established to coordinate cross-cutting adaptation activities, bringing together representatives of government ministries (e.g. finance, agriculture, livestock, water and forestry), universities, the rainfed farming sector, and local communities in White Nile State. The White Nile State Technical Committee is composed of 36 members (33% women) and plays a critical role in supporting the planning, coordination, strategic guidance, technical oversight and monitoring of EbA interventions in the state. At national level, the Project Steering Committee, chaired by the Secretary General of the Higher Council on the Environment and Natural Resources (HCENR), oversaw and provided guidance and support to the EbA project.

Policy dialogues aimed at federal, state, and local community levels enabled inter-institutional collaboration on EbA measures. Peter Kamau, Chief Technical Advisor on the project, commented on the importance of cross-sectoral collaboration throughout the entire EbA project cycle, "We try to diversify our network. We work with more than ten or fifteen government institutions. We closely involve them in the whole cycle of project execution, planning, work plans,

setting up outputs and targets, delegation of responsibilities. We agree on this together."

By bringing together different perspectives on ecosystem management from diverse sectors and social groups, the Sudan EbA project promoted better coordination across government ministries, laying the foundation for cross-sectoral partnerships and programmatic synergies during planning on climate change adaptation.

### **Creating gender-sensitive local governance structures**

Village Development Committees (VDCs) were formed in 43 villages of White Nile State to empower local communities to plan, implement, monitor, and evaluate community-based EbA measures. Under each VDC, separate sub-committees were created for particular areas of work (e.g. backyard farming, poultry, environmental protection, and improved stoves). All 43 VDCs have been registered with the Humanitarian Aids Commission, giving them legal recognition to continue supporting development initiatives beyond the Sudan EbA Project.

With women representing at least 30% of the membership, VDCs have allowed women to become more active in local decision-making processes. The largest committee elected a woman as Chair, a significant achievement in a highly patriarchal society. To overcome the cultural barriers that restrict women's participation in decision-making, the project team held workshops with village elders to raise awareness of the need for gender inclusion. The mixed-gender project team held separate forums for men and women to ensure that women had a safe space where their voices could be heard.

The VDCs have also helped to mitigate conflicts between farmers and pastoralists, such as over uncontrolled nomadic settlements and crop farming in open rangelands. Land use planning and mapping of sites for EbA measures is done in liaison with communities through VDCs and sub-committees engaging local leaders (village elders, religious leaders and government agency representatives) in the process. This has helped to address power imbalances that shape conflict and to promote transparent, equitable and just resource allocation for men and women farmers and pastoralists.

However, gender mainstreaming in Sudan is threatened by political instability and ongoing conflict. The White Nile State Women's Union, which was initially a project partner, ceased activity following the 2018 revolution. With women and girls facing combined vulnerabilities in Sudan due to the continued conflict as well as climate change, support and investment is needed to ensure that women can continue to be stewards of adaptation at the local level.

## Lessons Learned

### **Lesson 1: Localize governance structures to support adaptation.**

The creation of specialized committees at different levels was critical to overcoming the knowledge and awareness barriers and generate political support for adaptation in the Sudanese context. Local governance structures in the form of Village Development Committees created a platform to support locally-led adaptation action. Attaining legal recognition is important to their long-term sustainability. Dialogues between different stakeholders and governance levels helped to align strategies and visions.

Despite the significant progress towards women's participation in the project, gender mainstreaming remains a key challenge in Sudan. Communities in Sudan are predominantly patriarchal, leading to the exclusion of women from decision-making processes, and the ongoing political conflict and instability further threatens women's participation. Further investments are needed in localizing governance structures that can foster peacebuilding through inclusive and gender-sensitive approaches to EbA.

### **Lesson 2: Inclusive approaches require planning, time and good communication.**

The routines, attitudes and cultural norms of each community can guide the stakeholder engagement approach. For example, the Sudan EbA project staff found it was best to engage with communities during the cold season, after harvesting was complete and people had more time. They avoided going to villages when the men were travelling and only the women and children were home, due to the suspicions and mistrust this could generate.

While the process of stakeholder engagement and gender mainstreaming has had tremendous benefits towards addressing climate vulnerability, reaching consensus from a diverse range of stakeholders proved to be time-consuming. This sometimes led to delays in project activities, which needs to be factored into planning. Consistent communication with stakeholders and designing the right forums (e.g. separate forums for men and women) supported inclusivity and provided opportunities for men and women to actively contribute to the project.

### **Lesson 3: Involve stakeholders in early design and planning of EbA options.**

In the Sudan EbA project, local ecological, social and cultural factors influenced the ultimate success of different measures. For example, fruit trees supplied to households had low survival rates due to water scarcity, soil quality, browsing by livestock, and the community's lack of experience or interest in growing fruit trees. On the other hand, measures such as the water harvesting reservoirs were seen as very successful as they addressed a fundamental local need – access to water. Peter Kamau, Chief Technical Advisor for the project, explained, "This is in everybody's minds that all we need in this village is water. Even before the seeds, they will tell you 'forget about the seeds, just give us water'. This is the Sahara Desert."

When evaluating potential EbA measures, it is important to examine the opportunities, risks and trade-offs associated with each. To ensure the best possible outcomes, community members should be involved in designing tailored solutions that meet their needs.

### **Lesson 4: Scale up EbA through investments in public sector technical capacity and private sector engagement.**

While the White Nile State Technical Committee shared positive impressions of the project, members were concerned about the capacity of the government to continue the activities after the funding ends. The lack of resources and capacity within the government poses a risk to scaling up EbA across Sudan.

Government institutions struggled to meet their co-financing commitments due to the political turmoil and inflation affecting Sudan throughout the project. Further work is needed to generate finance for EbA and ensure that climate risks are meaningfully addressed in policy and practice.

In Sudan, private sector engagement in EbA has been slow. However, there are signs of this shifting, as government officials begin to realize the important opportunities and benefits of wider engagement with the private sector. Given the risks posed by conflicts and climate change, the private sector needs to step up and engage in EbA action to improve the resilience of businesses and economies.





Children collect water from a 30,000m<sup>3</sup> water reservoir established by the UNEP project to combat water scarcity in Sudan. Credit: UNEP/Lisa Murray



The UNEP project is being implemented in the White Nile State of Sudan. Credit: UNEP/Lisa Murray

## Sustainable Development Goals



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## Further Resources

**Project Factsheet:**  
[Sudan Ecosystem-based Adaptation, 2017-2023](#)

**Story:**  
[Sudan's Water Crisis and the Women Fighting Back](#)

**Video:**  
[Women Adapt to Sudan's Water Crisis](#)

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