Self-evaluation and Holistic Assessment of Climate Resilience of Farmers and Pastoralists (SHARP+)

Resilience and Behaviour Change Assessment in Botswana

in the districts of Chobe and Tutume-Mosetse

CONTEXT

The **Self-evaluation and Holistic Assessment of Climate Resilience of Farmers and Pastoralists** (SHARP+) is a comprehensive approach and tool developed by the Food and Agriculture Organization of the United Nations (FAO), to assess the resilience of smallholder farmers at the household level. It considers various factors that influence resilience, including environmental, economic, social, and governance aspects. Implemented through a modular numerical survey, SHARP+ can be tailored to the specific context of the country or project in which it is utilized.
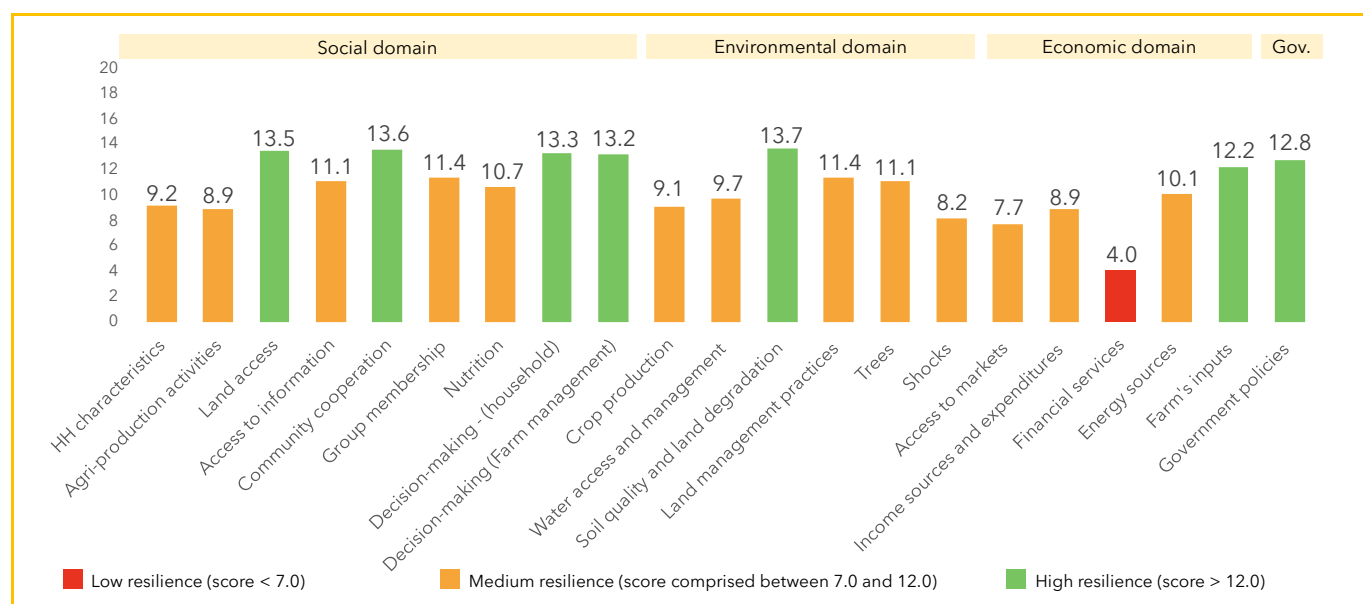
The tool is mainly used **to identify the aspects of the farming system in need of intervention, inform the design of projects activities as well as to monitor and evaluate the resilience and adaptive capacities of the agroecosystem.** This is made possible by an automatic calculation of resilience scores per assessed module, ranging from 0 to 20, as depicted in the Figure below. Modules with a score of less than 7 will be considered as vulnerable and in need of interventions, in order to strengthen the overall resilience of the agroecosystem. Furthermore, SHARP+ facilitates the assessment of existing adaptation capacities, providing valuable insights for informed decision-making and strategy development.
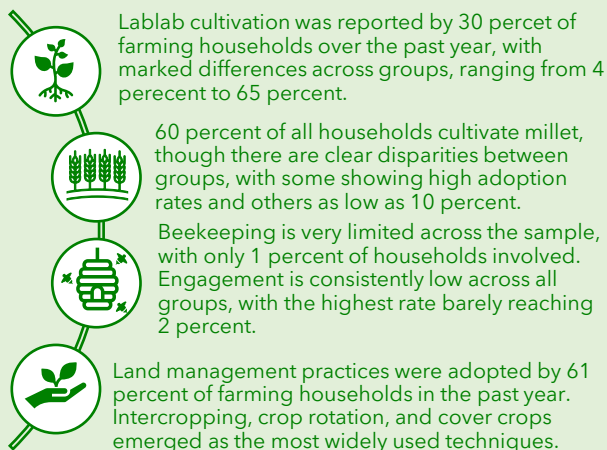
APPLICATION IN THE FIELD

The SHARP+ tool has been deployed in Botswana as part of the Integrated Landscape Assessment Methodology (ILAM) within the Drylands Sustainable Landscapes Impact Program (DSL-IP).

The DSL-IP aims to advance Land Degradation Neutrality (LDN) in drylands across eleven countries in Africa and Central Asia, by addressing common challenges through innovative, income-generating solutions. Each country project focuses on a unique core theme that not only aligns with local priorities and opportunities but also serves as a model for scaling out across the region, enabling other countries to benefit from the lessons learned. In Botswana, the project focuses on fencing with beehives as one of the core themes, which helps reduce human-wildlife conflict while also providing income streams and supporting pollination services. Furthermore, in Chobe, the project centres on diversified food production to supply sustainable tourism faciltites in the area. In Tutume-Mosetse, the focus is on promoting lablab and millet production, underutilized species recognized for their drought tolerance and nutritional benefits for livestock.

Resilience scores per module from the social, environmental, economic and governance domains (N=538)

Resilience scores per module bar chart. Social domain: HH characteristics 9.2, Agri-production activities 8.9, Land access 13.5, Access to information 11.1, Community cooperation 13.6, Group membership 11.4, Nutrition 10.7, Decision-making - (household) 13.3, Decision-making (Farm management) 13.2. Environmental domain: Crop production 9.1, Water access and management 9.7, Soil quality and land degradation 13.7, Land management practices 11.4, Trees 11.1, Shocks 8.2. Economic domain: Access to markets 7.7, Income sources and expenditures 8.9, Financial services 4.0, Energy sources 10.1, Farm's inputs 12.2. Gov.: Government policies 12.8.

Legend: ■ Low resilience (score < 7.0) ■ Medium resilience (score comprised between 7.0 and 12.0) ■ High resilience (score > 12.0)

Core themes of the DSL-IP in Botswana

Lablab cultivation was reported by 30 percet of farming households over the past year, with marked differences across groups, ranging from 4 percent to 65 percent.

60 percent of all households cultivate millet, though there are clear disparities between groups, with some showing high adoption rates and others as low as 10 percent.

Beekeeping is very limited across the sample, with only 1 percent of households involved. Engagement is consistently low across all groups, with the highest rate barely reaching 2 percent.

Land management practices were adopted by 61 percent of farming households in the past year. Intercropping, crop rotation, and cover crops emerged as the most widely used techniques.

To align with the project's objectives and context, the SHARP+ tool has been customized to include a comprehensive **Behaviour Change Assessment**, following the conceptual framework of the COM-B Model. This framework examines three key drivers of behaviour (B): Capabilities (C), Opportunities (O), and Motivations (M). By integrating these elements, this adaptation identifies both barriers and motivators for adopting the projects' core themes, which in the case of Botswana incorporates the target behaviours of cultivating lablab and millet, engaging in sustainable beekeeping and more generally the application of sustainable land and forest management practices.

The analysis differentiates between 'doers' (those already engaging in the target behaviours) and 'non-doers' (those that are not practicing it), providing valuable insights into the factors influencing decision-making and behaviour change among farmers. This nuanced understanding, which also considers underlying gender dynamics, enables the development of targeted interventions that address the unique needs and motivations of different groups within the community, ultimately facilitating the adoption of sustainable land management practices at scale.

SHARP+ was implemented as part of the project as a baseline assessment. 538 surveys were conducted in the districts of Districts of Chobe and Tutume-Mosetse in July 2024. The analysis and results encompass five categories, among which four Forest and Farm Producer Organizations (FFPOs): Itsoseng Dryland Farming Agricultural Management Association, Makuta Dam Association, Gulugwe Cluster Field Fence, located in Chobe and Tutume-Mosetse, other FFPO members and non FFPO members. The SHARP+ analysis and Behaviour Change Assessment results are disaggregated per FFPO due to their potential to act as agents of change within the landscape. This disaggregation is designed to effectively target and prioritize project interventions while the broader focus reflects the project's long-term aim to scale out the promoted behaviours to other farmers in the landcape.

Key findings from SHARP+

On average, the **overall resilience score is 10.9/20**. Only one module, namely access to financial services ranks as low. Results reveal that households generally have **secure land access**, **strong community cooperation, gender balanced decision-making regarding farm and household management**, **high soil quality**, **minimal land degradation**, **sufficient access to farm inputs** and **strong involvement in government projects**.

Agricultural practices and crop cultivation

- Households perform an average of 1.6 activities on their farmland, with crop production being the dominant activity, followed by livestock production.
- Agrobiodiversity is moderate with an average of 4.9 crop species per households (mainly maize, pearl millet, sorghum, and watermelon), however only 10 percent planted perennial crops in the last 12 months.
- High rates of pre-harvest crop losses, especially among Itsoseng members, and a widespread trend for declining yields pinpoint significant vulnerabilities.

Climate and Environmental Challenges

- Frequent shocks such as drought, extreme heat and wildlife encountering threaten productivity and food security.
- More than half of households who experienced shocks adopted coping strategies, but these are mostly limited to off-farm employment or aid reliance, leaving farmers less engaged in adapting their agricultural systems.

Soil quality and land management practices

- Soils reveal key strengths such as high organic matter, good water absorption, and ease of tillage.
- Low soil biodiversity, including scarce beneficial organisms could pose a risk to long-term soil health.
- Over the past year, 61 percent of households have employed land management practices with intercropping being the most widely adopted across all groups (46 percent), followed by crop rotation (32 percent).

Access to markets

- Less than half of farming households are market-oriented, suggesting that farming is primarily for subsistence.
- Most market-oriented households, struggle to sell as much as desired, mainly due to insufficient production.
- 92 percent of them sell individually, often to local markets, on the street or to neighbours.

Income sources, savings and financial services

- Most households rely on one or two sources of income, mainly employment outside agriculture and government transfers, indicating limited livelihood diversification and low profitability of farming activities.
- Despite most respondents not being able to save money, only 15 percent requested financial support over the past three years.
- 48 percent of farmers reported being unsatisfied with the loan amounts they received to cover their expenses.

Key findings on Behavior Change

Lablab

- Lablab is primarily grown for personal use, especially as livestock fodder. While many farmers recognize its profitability, regular sales are mainly reported among Gulugwe members. Market access for lablab remains a key barrier across all groups.
- The crop is mainly appreciated for its high yields, contribution to livestock nutrition, and drought tolerance.
- Major challenges include pest and disease pressure, as well as limited access to quality seeds, particularly among members of the Makuta FFPO.

Beekeeping

- Environmental benefits were mentioned by many beekeepers, underscoring the role of bees in pollination and promoting biodiversity.
- Predation was one of the primary concerns, as wildlife or livestock can damage hives and disrupt honey production.
- Community conflicts and safety concerns emerged as a significant challenge among doers and non-doers, with members expressing concerns about being stung or disturbed by bees.

Millet

- Pests and diseases are the most common challenge to millet cultivation across all FFPOs. Quelea birds are a major issue, along with crop damage from baboons, warthogs, and other wildlife.
- The most frequently cited reason for farmers not to cultivate millet was limited access to seeds, a challenge particularly prevalent among farmers from the Itsoseng FFPO.
- Farmers value millet for its strong drought resilience and quick harvest time, making it ideal for fast returns. Its cultural importance is also notable, as it is a staple food for the Bakalanga people, traditionally prepared as "zengwe."

Application of SLM practices

- Only 7 percent of farmers reported using nitrogen-fixing plants, despite many cultivating lablab, a nitrogen fixing plant. This suggests a gap in awareness about the environmental benefits of legumes, particularly their role in improving soil health.
- Intercropping is the most widely practiced SLM technique across all groups. Common combinations include maize, sorghum, and marama beans, with legumes like groundnuts, cowpeas, and lablab also present, though less frequently.
- Farmers widely recognize intercropping for enhancing land-use efficiency and improving soil quality.

Gender insights

- Role repartition reveals that while both men and women often share responsibilities for agricultural activities, women are frequently the primary individuals responsible when tasks are not equally divided.
- Women face considerable challenges in acquiring lablab seeds.
- Safety concerns around beekeeping are more frequently raised by women and hinder adoption.
- Beekeeping is seen as a male-oriented activity, with men receiving more encouragement and support than women.
- Female-headed households show the lowest adoption of land management practices. In examining the barriers to SLM, a significantly higher percentage of women compared to men identified a lack of technical know-how as the primary reason
- Female-led households depend more on informal sales, with many women reporting no access to formal markets.

WAYS FORWARD

Following the assessment, focus group discussions have been carried out with the prioritized FFPO members to validate the survey results and collaboratively identify solutions to the challenges identified. As a next step, the results will be used to guide the design of Farmer Field School (FFS) interventions, enabling the scaling up of SLM practices and the strengthening of targeted green value chains. Key findings will be accessible, visualized, and integrated into the DSL-IP dashboard, along with data gathered through remote sensing as part of ILAM.

This approach enables the unique needs of each FFPO to be accurately addressed, offering a comprehensive understanding of the situation and dynamics and supporting the promotion of sustainable practices across countries

RESOURCES

SHARP+ guidance document

Project website: http://www.fao.org/in-action/dryland-sustainable-landscapes

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