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The Adaptation at Scale in Semi-Arid Regions (ASSAR) project uses insights from multi-scale, interdisciplinary work to transform climate adaptation policy and practice in ways that promote the long-term wellbeing of the most vulnerable and those with the least agency.

Semi-arid areas in Botswana are characterised by high rainfall variability, frequent droughts, low soil moisture and extreme events such as flash floods which normally combine with governance shortcomings and structural inequalities to exacerbate the vulnerability of communities. Such communities are generally dependent on primary production and natural resources, rely on rainfed agriculture, have limited livelihood options and employment opportunities, depend on activities that are sensitive to the impacts of climate change, face high levels of poverty, are exposed to high levels of HIV/AIDS, have limited infrastructure and services, and are affected by limited institutional capacity and weak resource governance. These factors combine to make Botswanan communities vulnerable to food insecurity and unstable livelihoods as well as leading to unsustainable agro-ecological systems, crop failure and unproductive rangelands.

INTRODUCTION

In November 2015, ASSAR's southern Africa researchers – from the University of Botswana, University of Cape Town, University of Namibia and Oxfam GB – conducted a two-day [Vulnerability Risk Assessment](#) (VRA) workshop in Bobirwa, Botswana.

The workshop was attended by various government officials, Village Development Committee members, local community members, and representatives from farmer committees, collectively known as the VRA Knowledge Group.

The VRA process aims to develop a common understanding among various stakeholders (government officials, village committees and local communities) of the main hazards and issues affecting those living in a given social-ecological landscape. This is done so as to design measures that reduce risk, enhance wellbeing and promote resilience to hazards in the landscape.

There are four steps that make up the VRA process, including:

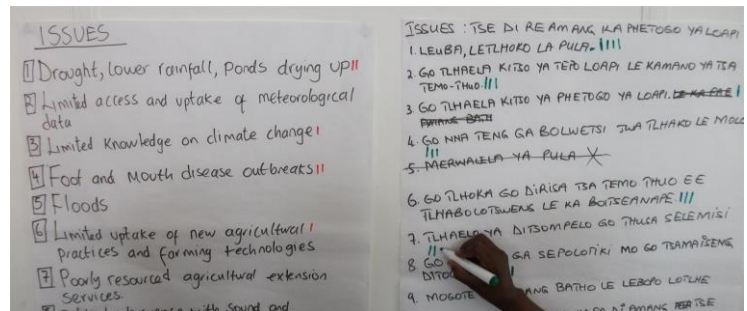
- ◆ an initial vulnerability assessment,
- ◆ an impact chain exercise,
- ◆ an adaptive capacity analysis, and
- ◆ the alignment of findings with opportunities.

FINDINGS FROM THE VULNERABILITY AND RISK ASSESSMENT

During the **initial vulnerability assessment** the main aim is to assess levels of exposure and sensitivity of a social group or livelihood activity to identified hazards and issues. This gives information on who and what are vulnerable and why. The selection of social groups was based on the main livelihood activities and social differentiation of the Bobirwa sub-district. The following is a summary of the thinking developed jointly by the VRA Knowledge Group on vulnerability to various hazards (shown in bold):

Exposure and Sensitivity

- Foot and mouth Disease (FMD):** Livestock keepers were identified as having the highest level of exposure because FMD directly affects the availability and price of beef. This makes it difficult for livestock keepers to find secure markets outside of the Bobirwa sub-district and makes them mere price-takers with a very limited geographical (and market) reach.
- Limited knowledge of climate change:** Limited awareness of climate change is a serious issue for those who depend on the land and other natural resources for their livelihood. This is especially true for arable farmers.
- High temperatures:** Arable farmers also have the greatest exposure to high temperatures. Extreme high temperatures have been increasingly frequent in the last 15 years. There has also been low and inconsistent rainfall. Conversely, commercial farmers were considered less sensitive to high temperatures as they have resources to construct nets for shade and access to irrigation (in some cases); commercial farmers also have easier access to drought-resistant crop varieties.
- Poorly-resourced extension services:** Livestock keepers are the most sensitive to poorly-resourced extension services, followed by arable farmers. The lack of transport has prevented extension officers from visiting and consulting with their farmers. This has led to farmers using their own resources. This has meant that extension officers have provided minimal guidance, with a corresponding low uptake of new forms of farming.
- Limited access and uptake of new agricultural practices:** The inability of farmers to undertake adaptive strategies could be seen as vulnerability in and of itself. However the VRA Knowledge Group rated this sensitivity as medium as some farmers have been able to adopt new agricultural practices.
- Difficult access to markets:** Limited access to markets suggests low regional purchasing power. Given that most arable farmers produce for subsistence they aren't very sensitive to market access. On the other end of the spectrum livestock farmers are highly sensitive to market access constraints. These farmers also have to deal with the added challenge of farming in a Red Zone linked to FMD outbreak.
- Lack of access to alternative livelihoods (compared to current agriculture-based livelihoods):** Both arable and livestock farmers are sensitive to this hazard. With rainfall having become increasingly inconsistent over the past 15 years and agricultural production having diminished, there is an increased need for people to have access to non-agricultural income generation. However, a lack of development planning, the inability to attract investment and chronic poverty have resulted in no such alternatives being available. Commercial farmers were ranked as least exposed to this hazard as they are not reliant on one activity only but they also practice other forms of income generation, such as rearing wild animals.
- Limited access and uptake of meteorological data:** Although past weather predictions were inaccurate, over the years information has improved in accuracy and consistency. As meteorological information is being used increasingly to inform arable farming, level of exposure to this hazard was rated as medium to low sensitivity.
- Drought, lower rainfall and drying of ponds:** Both arable and livestock farmers, as well as phane harvesters were considered the most sensitive to this hazard. This is because the lack of water leads to crop failure, cattle death and a lack of mophane worms. Furthermore, this threat is increasing as rainfall patterns have been inconsistent over the past 15 years and the frequency/impact of drought has increased.
- Unequal access to water at the sub-district level:** Water scarcity affects all social groups, particularly women who are care givers to all family members at household level. Water scarcity is compounded by drought, low rainfall, ponds drying up and occasional floods.

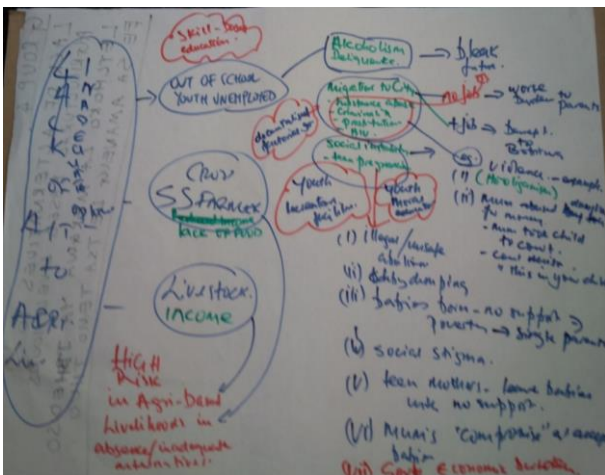
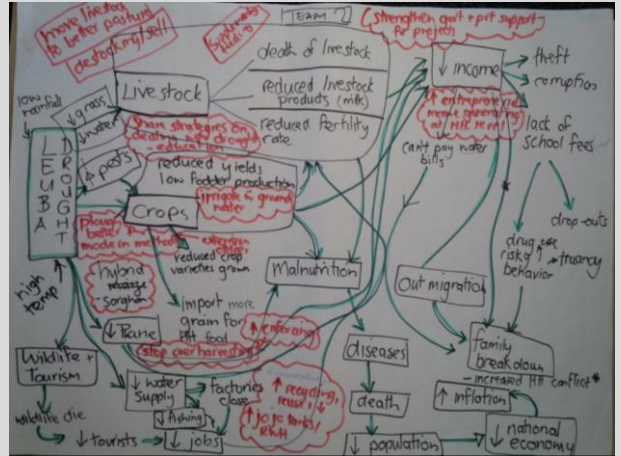


Impact Chain Analysis (ICA)

The second part of the exercise was to create a visual tool to represent the consequences of an individual hazard. This allowed the Knowledge Group to assess the possible positive and negative future impacts of the identified hazards and issues.

Group 1 worked on a drought ICA and highlighted five direct impacts of drought to different sectors/ livelihood activities:

1. Reduced water and grass for grazing.
2. Reduced yields and low fodder production.
3. Reduced mophane worms for phane harvesters.
4. Reduction in wildlife species that affects the tourism sector.
5. Reduced water supply for fishing and factories.

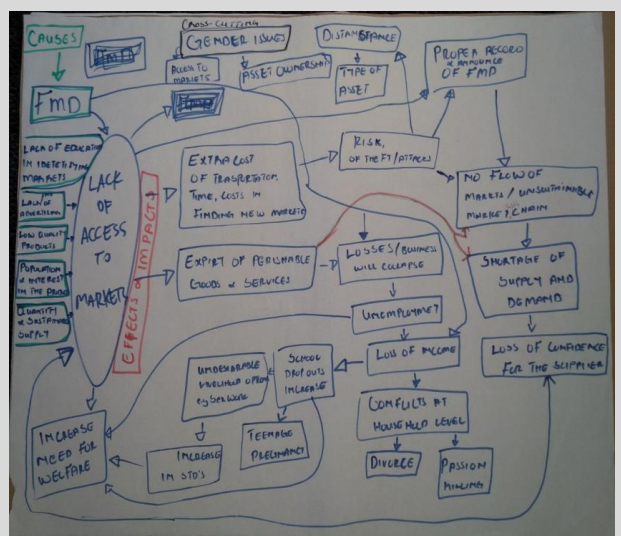


Group 2 used ICA to explore the impacts of inadequate alternatives to agriculture-based livelihoods, and identified three key direct impacts:

1. Fewer options for income generation as well as low food production leading to malnutrition.
2. Reduced income for livestock farmers.
3. Increased number of out-of-school and unemployed youth which leads to undesirable behaviour.

Group 3 indicated that FMD is a hindrance for access to markets for livestock farmers. They also thought that other factors – such as low quality products, and the lack of education in marketing goods – are leading to low levels of interest in the products. Key direct impacts were:

1. Extra cost (time and finance) in transportation to find new markets.
2. Perishable goods with an expiry date reaching consumers late can lead to reduced markets.
3. Increased dependence in welfare programs.



Adaptive Capacity Analysis

The third and final stage of the VRA provided an opportunity for the Knowledge Group to explore possible solutions/strategies that build resilience and help people to adapt to the vulnerabilities identified in the initial vulnerability assessment and impact chain exercise.

Example from Group 1: Potential responses to drought and high temperatures

1. Initiatives to improve crop production

- a) Advise people what type of crops to grow (e.g., early-maturing crops for faster yields or hybrid maize and sorghum).
- b) Irrigate using underground water.
- c) Use education to share strategies to deal with drought.
- d) Plough better and use modern methods (guided by extension services).

2. Improved pasture and livestock management practises

- a) Move livestock to healthier pastures.
- b) Destocking.
- c) Supplementary feeding.

3. Promote sustainable harvesting of mophane worms

- a) Leave mophane worms on the ground to allow them to reproduce for the next season.
- b) Enforce policy to prevent over-harvesting.



4. Options for improving water use efficiency

- a) Reduce, recycle, and reuse water.
- b) Invest in water harvesting (e.g., use rainwater harvesting tanks that are currently used for backyard gardening).

5. Approaches to deal with the impacts of drought on income

- a) Propose income-generating activities instead of waiting for rain.
- b) Move away from dependency on government projects.
- c) Strengthen existing government and private sector projects.



The final part of the **adaptive capacity analysis** was for the Knowledge Group to focus on one measure for a specific hazard/issue. This was done in an attempt to build adaptive measures into the district development plan. For this exercise the Knowledge Group explored the different components needed for a successful implementation of two adaptive measures: (1) the awareness and uptake of drought-management strategies, and (2) the development of marketing skills and education.

Component	(1) Awareness and uptake of drought-management strategies	(2) Development of marketing skills and education
Assets base <i>What will be needed in order to accomplish the expected output?</i>	<ul style="list-style-type: none"> ◆ Farming equipment and new farming methods. ◆ Improving land fertility and access to pasture. ◆ Water infrastructure (e.g., boreholes). ◆ Skills for craft making/business. ◆ Social networks (e.g., Letsema – a network that supports agriculture; Mafisa – lends cattle for draft-power and milk); Majoko – a system of working for others in exchange for agricultural produce). 	<ul style="list-style-type: none"> ◆ Equipment supplies e.g. computer and software ◆ Working capital to meet overall costs
Institutions <i>What kind of support is needed to do the work?</i>	<ul style="list-style-type: none"> ◆ Several institutions are already in place but the Knowledge Group highlighted the need to decentralise them (e.g., VDC, farmers committees, DEP/DMT, Kgotla, BAMB, RIIC, Rural Training Centre (RTC), council and district administrators). ◆ Continuous capacity building of the people in these institutions. ◆ Review of mandate to align with current issues such as climate change. 	<ul style="list-style-type: none"> ◆ Information and broadcasting department ◆ LEA, CEDA, MLG, MYSC, SPEDU ◆ Social and community development
Information and knowledge <i>What kind of information is available and necessary?</i>	<ul style="list-style-type: none"> ◆ Awareness programmes (TV, Kgotla), ◆ Early Warning and Weather Data system needed for rain and temperature forecasts. 	<ul style="list-style-type: none"> ◆ Media (facebook, twitter, whatsapp) ◆ Trainers (marketing, business development, life centres skills) ◆ Course package with relevant materials ◆ Keynote speakers
Flexible and forward-looking governance <i>What steps, institutions and assets are needed to address future problems?</i>	<ul style="list-style-type: none"> ◆ Review strategies, such as emerging technologies. ◆ Formation of groups and associations. 	<ul style="list-style-type: none"> ◆ Refresher courses as follow up ◆ Formation of interest groups for support.
Innovations <i>What new skills, technology, institution support and assets necessary to facilitate the work?</i>		<ul style="list-style-type: none"> ◆ Computer packages ◆ Mentors/motivational speakers ◆ Launching of project

Conclusions

In Botswana it is customary to discuss issues of development during “Kgotle” (community) meetings. There is a Setswana that says “mafoko a kgotle a mantle otlhe” – this translates literally to “everything said at a Kgotle meeting is valuable”. The VRA adopted this approach in that it brought together a diverse range of stakeholders (in institutional, sectoral, social, economic, educational capacities, as well as gender, age and interest) to discuss their ideas and experiences openly and freely.

In so doing, the VRA provided a unique platform for detailed discussions and analyses leading to an all-inclusive outcome. The VRA also presented an opportunity to foster collaboration between government officials at district and local levels, and community members and civil society organisations. This collaboration can – and has – led to the design and implementation of sectoral and multi-sectoral measures and strategies.

Based on this, the local government leadership – Assistant District Administrator and the Senior Assistant Council Secretary – hailed the VRA workshop and its output as veritable and readily usable for sub-district planning. The leadership committed support for at least another VRA workshop involving participants from other villages of the sub-district. *This workshop is scheduled for May 2016.*



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