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**Vulnerability and Risk Assessment
in Omusati Region in Namibia:
Fostering People-Centred
Adaptation to Climate Change**



CARIAA
*Collaborative Adaptation Research
Initiative in Africa and Asia*



ASSAR
Adaptation at Scale in Semi-Arid Regions

About ASSAR Working Papers

This series is based on work funded by Canada's International Development Research Centre (IDRC) and the UK's Department for International Development (DFID) through the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA). CARIAA aims to build the resilience of vulnerable populations and their livelihoods in three climate change hot spots in Africa and Asia. The program supports collaborative research to inform adaptation policy and practice.

Titles in this series are intended to share initial findings and lessons from research and background studies commissioned by the program. Papers are intended to foster exchange and dialogue within science and policy circles concerned with climate change adaptation in vulnerability hotspots. As an interim output of the CARIAA program, they have not undergone an external review process. Opinions stated are those of the author(s) and do not necessarily reflect the policies or opinions of IDRC, DFID, or partners. Feedback is welcomed as a means to strengthen these works: some may later be revised for peer-reviewed publication.

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Table of Contents

Glossary of Terms	6
Abbreviations	8
Acknowledgements	9
1. Introduction	10
1.1 Regional context: Omusati Region, Onesi Constituency	11
2. The Vulnerability and Risk Assessment Methodology.....	13
3. Findings from the Vulnerability and Risk Assessment.....	22
3.1 Initial Vulnerability Analysis	22
3.2 Determining the Vulnerability Score	23
3.3 Exposure and Sensitivity Analysis.....	26
3.3.1 Droughts and low rainfall	27
3.3.2 Floods and heavy rainfall.....	28
3.3.3 Limited access/availability and use of seasonal climate forecast information ..	29
3.3.4 Cultural beliefs stopping new practices	30
3.3.5 Limited agricultural extension services.....	31
3.3.6 Limited marketing and selling of livestock.....	31
3.3.7 Limited uptake of new agricultural practices and technology	32
3.3.8 High temperatures	33
3.4 Impact Chain Analysis.....	33
3.4.1 Drought Impact Chain Analysis	33
3.4.2 Floods Impact Chain Analysis	34
3.3.9 Impact Chain Analysis for inadequate access to climate information	36
3.5 Adaptive Capacity Analysis.....	38
3.5.1 Adaptive Capacity Analysis for droughts and high temperature	38
3.5.2 Adaptive Capacity Analysis for floods	39
3.5.3 Adaptive Capacity Analysis for climate information	40
3.5.4 Planning for future	40
3.5.5 Reflection and learning from the exercise	43
4. Aligning findings with opportunities.....	44
5. Reflections and Conclusions	45
5.1 Conclusions.....	45
5.2 Reflections from the Knowledge Group.....	46
6. How the VRA findings link to ASSAR work.....	48
6.1 Understanding local governance	48
6.2 Gendered experienced vulnerability.....	48

6.3 Ecosystem services.....	50
6.4 Knowledge systems.....	51
6.5 Research into use	51
7. References	53
8. Other interesting resources.....	54
9. Appendices.....	55
Appendix 1: Hazards and Issues in Omusati*	55
Appendix 2: Social Groups and Livelihoods Activities in Omusati*	57
Appendix 3: VRA Knowledge Group Participants.....	58
Appendix 4: Additional images	60

Glossary of Terms¹

Adaptation	Adaptation means anticipating the adverse effects of climate change and taking appropriate action to prevent or minimise the damage they can cause, or taking advantage of opportunities that may arise (European Union, 2016).
Adaptive capacity	The ability or potential of a system to respond successfully to climate variability and change, and includes adjustments in both behaviour and in resources and technologies (Intergovernmental Panel on Climate Change, IPCC 2007).
Exposure	The extent to which a social group (or a livelihood activity) could potentially – i.e. theoretically – be affected/damaged by the occurrence of a hazard or an issue.
Hazards and Issues	Factors that have an impact on the landscape, both at present and (possibly) in the future. They include weather and climate change impacts, environmental degradation issues, issues of unequal access to goods and services, gender and ethnic-related inequalities.
Knowledge Group	The backbone of the VRA – of its findings and its analysis. The Knowledge Group consists of roughly 15 to 25 people with a stake in the socio-ecological landscape in question. It should have a strong representation of communities and of marginalized groups. The Knowledge Group will spend two full days together and run through the four steps of the VRA in a roundtable discussion approach; as such, the findings of the VRA are largely the result of this group's thinking.
Landscape	A continually changing, ecologically and socially integrated environment where people pursue their livelihood through different strategies. A landscape includes: 1) different groups of people, some powerful, some living at the margin of society, and their cultural norms; 2) a limited pool of natural resources and the services they provide, to which people have different levels of access; and 3) socio-economic and governance factors, as well as national, regional and global forces affecting it. The Little Sustainable Landscapes Book (Denier et al., 2015) defines a landscape as a socio-ecological system that consists of natural and/or human-modified ecosystems, and which is influenced by distinct ecological, historical, economic and socio-cultural processes and activities.
Risk	The likelihood, or perceived likelihood, of the materialization of a hazard.
Sensitivity	The actual impact of a hazard or issue on a social group (or on a livelihood activity) over a set period of time in the past (usually ten years before the VRA is conducted)

¹ Adopted from Morchain and Kelsey (2016)

Social group	A more or less homogeneous group of people within the landscape, such as ‘fisher folk’, ‘women agricultural labourers’ or ‘migrant workers’. For the sake of conducting an assessment of a usually medium-to-large landscape, the VRA will base its analysis on these groups rather than analysing individual or household vulnerabilities.
Vulnerability	<p>Vulnerability is seen as multi-dimensional and understood to be strongly influenced by structural factors, governance systems and inequalities. However, vulnerability is also something that even (most) marginalized and poor individuals can act to reduce. While the VRA uses the original Intergovernmental Panel on Climate Change (IPCC) framing of vulnerability, which makes it a function of exposure, sensitivity and adaptive capacity, we analyse each of these three factors holistically – i.e. beyond a strictly biophysical context.</p> <p>Vulnerability refers to the degree to which people, resources, systems, and cultural, economic, environmental, and social activity is susceptible to harm, degradation, or destruction on being exposed to a hostile agent or factor or hazard.</p>
Risk assessment	A process to identify potential hazards and analyze what could happen if a hazard occurs.

Abbreviations

ASSAR	Adaptation at Scale in Semi-Arid Regions
VRA	Vulnerability and Risk Assessment
RiU	Research-into-Use
NSA	National Statistics Agency
KG	Knowledge Group

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1. Introduction

Understanding who is vulnerable to what stressors, hazards and issues is a very important starting point in deciding how to adapt to climate and other hazards and reduce vulnerability. Too often, interventions are put in place that do not target the groups or individuals that are the most vulnerable and do not understand the local realities of living with and responding to multiple hazards and issues. Often there is a general understanding of vulnerability and risk at the local level, yet a vulnerability assessment is needed to develop a common understanding among a wide range of stakeholders as to what the most important risk and hazards are. This can help to design measures to reduce risk and to support resilience building of people that is suited to local conditions (Morchain and Kelsey, 2016).

Frequently, vulnerability is explored at one scale, with some vulnerability assessments focusing on the local level, including villages or specific local livelihood activities. Other vulnerability assessments might focus on the district or national level, often including more quantitative methods. The Vulnerability and Risk Assessment (VRA) approach responds to this tension and focuses on including stakeholders from local to district scale in order to address the importance of being locally-grounded but contextualised in the reality of the priorities and practices at the district scale.

Vulnerability is a complex term that has many different definitions. Many researchers look at three components, including 1) exposure to a hazard and stress, 2) sensitivity to a hazard and 3) the extent of adaptive capacity to reduce exposure and sensitivity. The VRA methodology aims to consider all three components mentioned above. It explicitly focuses on the qualitative data and capturing different stakeholders' perceptions. The VRA can therefore be complemented by a range of different methods and tools for further understanding vulnerability, including mapping and analysis of biophysical system, indicators and indexes based on both qualitative and quantitative data and more in-depth qualitative narratives through interviews, focus groups or ethnographic methods.

Adaptation at Scale in Semi-Arid Regions (ASSAR) project is working in semi-arid regions across Africa and India. In southern Africa, the project is focused on northern Namibia and south-eastern Botswana. The VRA is one method used to understand local and district level vulnerability in order to identify priority areas for focusing adaptation responses.

The VRA was undertaken in Botswana in late 2015 and in Namibia in March 2016. An Oxfam practitioner led the Botswana VRA, as he had led the VRA process in many countries across the world. Two of the ASSAR team, Gina Ziervogel and Margaret Angula, were at that workshop in Botswana. Based on their experience, they were able to lead the VRA in Namibia.

This report presents the findings of the VRA workshop held from 8 to 9 March 2016 at Outapi Lodge in Omusati Region in North-Central Namibia. The VRA exercise focused on the Onesi Constituency landscape and it was carried out in the context of the ASSAR project. The VRA contributes to ASSAR's work on understanding local level vulnerability and potential adaptation responses by engaging diverse stakeholders and supporting Research-into-Use (RiU) processes.

The workshop was organized and hosted by the ASSAR researcher team from the University of Namibia (UNAM) and University of Cape Town (UCT). The facilitation team that ran the VRA exercise was composed of: Margaret Angula and Elizabeth Ndeunyema from UNAM, and Gina Ziervogel, Dian Spear, Salma Hegga and Irene Kunamwene from UCT.

In addition, Sophie Lashford (INTASAVE-Caribsave, UK) interviewed stakeholders, liaised with the media and took photographs. Ndamonako Annallita, a student from UNAM's Department of Information and Communication Studies, also conducted interviews to develop a vox pop product. Liberty Verbaan and Laurent Hesemans (Endemic Productions) filmed stakeholders as part of the VRA workshop.

The workshop brought together a diverse group of stakeholders to discuss how hazards such as drought, floods and high temperatures affect the Onesi Constituency. Amongst the group were representatives from the Onesi community, the traditional authority, Red Cross, the SCORE project, the Onesi Constituency Development Committee, the Onesi Constituency Office, Olushandja Horticulture Association, the Ministry of Youth, Sports and Culture, Ministry of Agriculture, Water and Forestry and Omusati Regional Council. The attendees represented a wide range of different community livelihoods including crops, livestock, wild food harvesting and handicrafts.

1.1 Regional context: Omusati Region, Onesi Constituency

Omusati Region is a hot spot in relation to climate change impacts (Spear et al., 2015). The majority of people who live in the area are rural communities who are subsistence crop and livestock farmers. There is a number of horticultural farmers along Olushandja dam and the NamWater canal that are engaging in small-scale irrigation vegetable production. A large number of subsistence farmers in Omusati Region suggests that rainfall is the most important climatic variable determining crop yield and maintaining healthy livestock (Angula and Kaundjua, 2016).

According to Namibia Statistics Agency (NSA, 2011:8) 57% of Namibia's rural population resides in communal areas that are reported to be more vulnerable to impacts of climate risks (Spear et al., 2015). Communal areas are impacted by numerous challenges including land degradation, deforestation and overgrazing, scarce water resources and poor land tenure system. On top of this, social vulnerability makes subsistence and small-scale farmers in North-Central Namibia in general, and Omusati Region and in the Onesi Constituency in particular, more vulnerable to impacts of drought and floods that have been experienced in the area over the past decades (Angula and Kaundjua, 2016).

Onesi is one of 12 constituencies in Omusati Region. It is located in North-Central Region of Namibia bordering Kunene Region in the west and Angola in the north. The land tenure system is communal land owned by the state that allows residents to obtain rights to arable and residential land for free. The Onesi Constituency falls under the custody of the Uukolonkadhi Traditional Authority through customary laws as per Communal Land Reform Act of 2002 and administratively it falls under the Omusati Regional Council, Onesi Constituency as per Regional Councils Act No. 22 of 1992.

According to the 2011 Census (NSA, 2011), Omusati Region in general and the Onesi Constituency in particular, have more female-headed households and female members in the population (see Table 1. below). This is because Omusati Region is characterized by high unemployment and migration rates. Many of the economically active male inhabitants have migrated to urban areas within North-Central Namibia and to major cities and towns in Namibia.

Table 1. Onesi Constituency Census Indicators, 2011

Area in sq.km		601.9 km ²
Population	Total	13, 149
	Female	7, 170
	Male	5, 979
	Annual growth rate	0.1%
Population density	People per sq.km	21.8
Households	Number of Households	2,527
	Average size	5.2
Head of households	Female	55%
	Male	45%
Employment	Employed	58%
	Unemployed	42%
Housing Conditions	Safe water	70%
	No toilet facility	80%
	Electricity for lighting	28%
	Wood/charcoal for cooking	70%
Source of income²	Farming	11%
	Wages and Salaries	42%
	Cash Remittances	4%
	Business, non-farming	9%
	Pension	30%
	Living with Disability	6%

² Other studies through livelihood ranking indicated that people perceive farming as main source of income, even if they receive wages and salaries.

2. The Vulnerability and Risk Assessment Methodology

The VRA methodology was developed by Oxfam to support communities, practitioners, decision makers and researchers to gain a better understanding of the context of landscapes and the communities and stakeholders that inhabit and depend on or use them. The VRA methodology aims to actively and systematically include women in the joint development of an understanding of risks and ways forward, highlighting women's capacities and the unfair structures that enhance their inequality. The VRA can be used for multiple purposes and it can be conducted at any stage of a project or programme; the information it provides can be used to help design a development programme or project; it can serve to highlight issues facing women groups or marginalised ethnic groups; it can be implemented iteratively at different moments in time to assess the evolution of vulnerability for different social groups; and it can help raise awareness of a government or donors about specific needs in a landscape among other uses.

The approach encourages common understanding by engaging a wide range of stakeholders about the main hazards and issues affecting people in a socio-ecological landscape; and subsequently to jointly design measures to reduce risk, enhance wellbeing and promote resilient development in that landscape. The methodology follows a participatory process of identification and prioritization of existing and future vulnerabilities, risks, capacities and ambitions. The VRA brings together actors across scales – community, local, and municipal, district, sometimes national – to understand the links between these governance levels. It provides a space for stakeholders to proactively propose ways to move forward and ensure development initiatives are driven by inclusive, locally-relevant decision-making that benefits the poor and the marginalised. In doing so, the VRA aims to trigger a sense of empowerment and collaboration among stakeholders. While this is a complex process, there is flexibility that the VRA methodology is instinctively welcoming to; and one that it addresses with a grassroots and exploratory attitude.

In this context, the term 'vulnerability' in the VRA is seen to be strongly influenced by structural factors, governance systems and inequalities. Vulnerability is seen in this context as something that even marginalised and poor individuals can act to reduce. Thus, the VRA includes an understanding of the hazards, but also the capacities of people and environment to respond, adapt and overcome these hazards.

The VRA methodology, as illustrated in the Figure 1 below, is a series of four steps which are followed after the preparation phase, namely: 1) Initial Vulnerability Assessment (IVA), 2) Impact Chain Exercise (ICE), 3) Adaptive Capacity Analysis (ACA) and 4) Aligning Findings with Opportunities (AFO). The exercise is usually conducted over two days, and it actively engages a wide variety of stakeholders including community members, government, the private sector and Non-Governmental Organisations (NGOs)/Community-Based Organisations (CBOs).

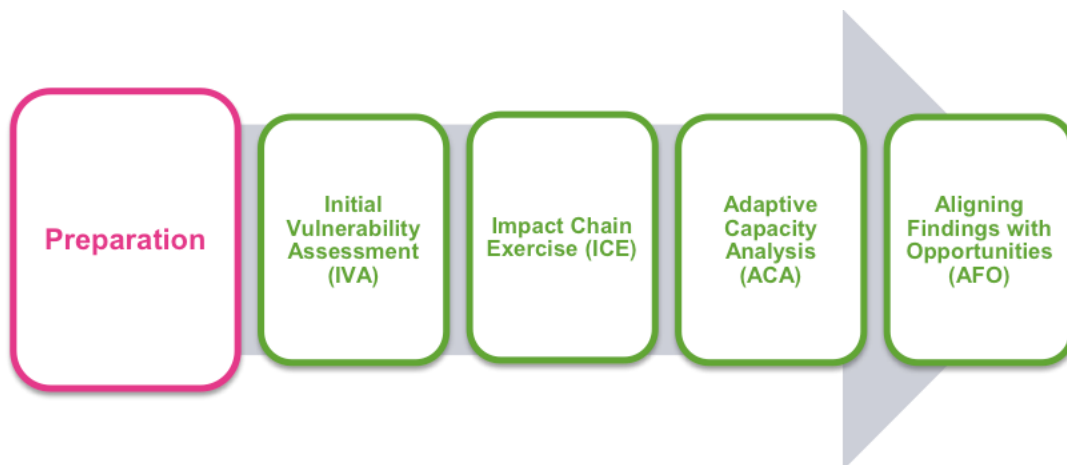


Figure 1. Copied From Morchain and Kelsey (2016)

Before the VRA workshops, the facilitation team conducts a stakeholder mapping exercise to ensure that an inclusive and representative list of participants is selected for the Knowledge Group (KG)³. In the Namibian case, the research team conducted preliminary stakeholder mapping in July 2015 and subsequently updated the information on stakeholders in December and January 2016 to get a clear picture of the key stakeholders in Omusati Region. Selecting the right range of representatives helps ensure the relevance, usefulness and applicability of the findings. The stakeholder mapping helped to identify a diverse group of stakeholders. From the mapping exercise, 22 representatives were invited to attend the VRA workshop. These included policymakers, government officials, representatives from NGOs and local groups. The following organisations were also represented: Regional level i.e. Omusati Regional Council; Youth Directorate from the Ministry of Sports, Youth and National Service; Directorate of Forestry from the Ministry of Agriculture, Water and Forestry; the SCORE project from the Ministry of Environment and Tourism; and Namibia Red Cross Society. In addition, there were community members such as farmers, teachers, and potters. Local government and community leaders were also present from the Uukolonkadhi Traditional Authority; Onesi Constituency Development Committee; Regional Councillor for the Onesi Constituency; Chief Administrative Officer for the Onesi Constituency; and Chief Control Officer for the Onesi Settlement. CSOs and networks were also represented by the Chairperson of the Uukolonkadhi Community Forest and the Chairperson of the Olushandja Horticultural Association. .

³ Knowledge Group refers to representatives of social groups in the group who work through the analysis (VRA).



Figure 2. Stakeholder categorisation: influencing, collaborating and sharing

Table 2. The list of the abbreviations included in Figure 2

National Level	DRFN	Desert Research Foundation of Namibia
	MET-DEA-SCORE Project	Ministry of Environment and Tourism, Department of Environmental Affairs, Scaling-up Community Resilience to impacts of Climate variability and Climate change in Northern Namibia Project
	MAWF-NAFOLA	Ministry of Agriculture, Water and Forestry, Directorate of Forestry, Sustainable Management of Namibia's Forested Lands Project
Regional Level	AMTA	Agro Marketing and Trade Agency
	CES	Creative Entrepreneurship Solutions
	NNFU	Northern Namibia Farmers Union
	JIKA	Japan International Cooperation Agency
	BMC	Basin Management committee
	DRMC-OC	Disaster Risk Management Committee, Omusati Regional
	BMC	Basin Management committee
	MAWF-Forestry	Directorate of Forestry
	MAWF-DAPEES	Ministry of Agriculture, Water and Forestry, Directorate of Agricultural Production, Extension and Engineering Services
	MAWF-Water	Ministry of Agriculture, Water and Forestry, Department of Water Affairs
	MFMR-Aquaculture	Ministry of Fisheries and Marine Resources Directorate of Aquaculture, Omahenene Centre
	MLR	Ministry of Lands Reform
	MGECW	Ministry of Gender Equality and Child Welfare
	MYSC	Ministry of Youth, Sport and Culture
	UNAM-OGONGO	UNAM, Ogongo Campus

Local Level	VDC	Village Development Committee (VDC)
	ORC	Omusati Regional Council, Directorate of Rural Services, Directorate of Planning, Disaster Risk Management Unit, Onesi Constituency Office
	OTC	Outapi Town Council
	CBOs	Community Based Organisations: Northern Seed Growers Omahanene; Lutheran Church Congregations; Eunda and Okasheshete Women CBO; Social Network for People Infected with HIV/AIDS; Okahulona Cooperative; Livestock Marketing Union; Enongo Chicken Project; and Horticultural farmers Association
	CBNRM	Community Based Natural Resource Management: Uukolonkadhi Conservancy; Uukolonkadhi Community Forestry (Incl. Mopane Harvesters); and Water Point Committees
	DRC	Drought Relief Committee
	DRMC	Disaster Risk Management Committee (Onesi Constituency)
	OCDC	Onesi Constituency Development Committee
	OS	Onesi Settlement
	Uk TA	Uukolonkadhi Traditional Authority

ASSAR has followed the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA) programme's suggestion of categorising stakeholders according to their type of interaction with the project activities and outcomes namely for influencing, collaborating or sharing. Stakeholders that attended this VRA workshop mostly fit in the categories of influence and collaboration. As part of ASSAR's Research into Use (RiU) strategy, stakeholders will continue to be involved in the research process and outcomes will continue to be shared.

In order to maximize the knowledge shared and the value of the output produced, a series of preparation activities were undertaken by the ASSAR Southern Africa team. These included:

1. Desk-based literature review to gather existing information about the risks already identified and any other information about community perspectives. This includes reports from the case study site such as the Regional Diagnostic Study Report (RDS, see http://www.assar.uct.ac.za/RDS_reports/SAFRICA), mission reports from the introductory visits that took place in the end of 2014 and key informants interviews that took place early 2015.
2. A preliminary stakeholder mapping exercise was conducted in Windhoek in July, 2015, (see http://www.assar.uct.ac.za/news/Namibia_RiU_workshop) to help identify power dynamics in the target area, those vulnerable or marginalised people who needed to be represented, as well as key decision-makers and influencers who should be invited to join the KG (see Figure 3 and Appendix 2 and 3).
3. Preparatory briefing meetings with the KG members face-to face, and via phone and emails to introduce the VRA concept and confirm their attendance at the VRA workshop. The facilitation team also liaised with the KG regarding logistics and arrangement for the workshop. Accommodation (for two days) for 12 KG members from the Onesi Constituency was arranged in the same lodge where the workshop was taking place. The team also arranged a pick-up and a drop-off for these stakeholders. It was also arranged that the VRA would be conducted in Oshiwambo

because it was the most inclusive language in the region and helped ensure all participants could actively engage.

4. To help focus attention on priority issues during the two day VRA, the facilitation team did an initial analysis to identify key hazards and issues as well as social groups and livelihoods activities that are affected by these concerns. The team came up with 13 hazards and issues and 10 social groups. This list was then reviewed, modified and agreed with the KG at the start of the VRA workshop (see Table 3 and Table 4 below).

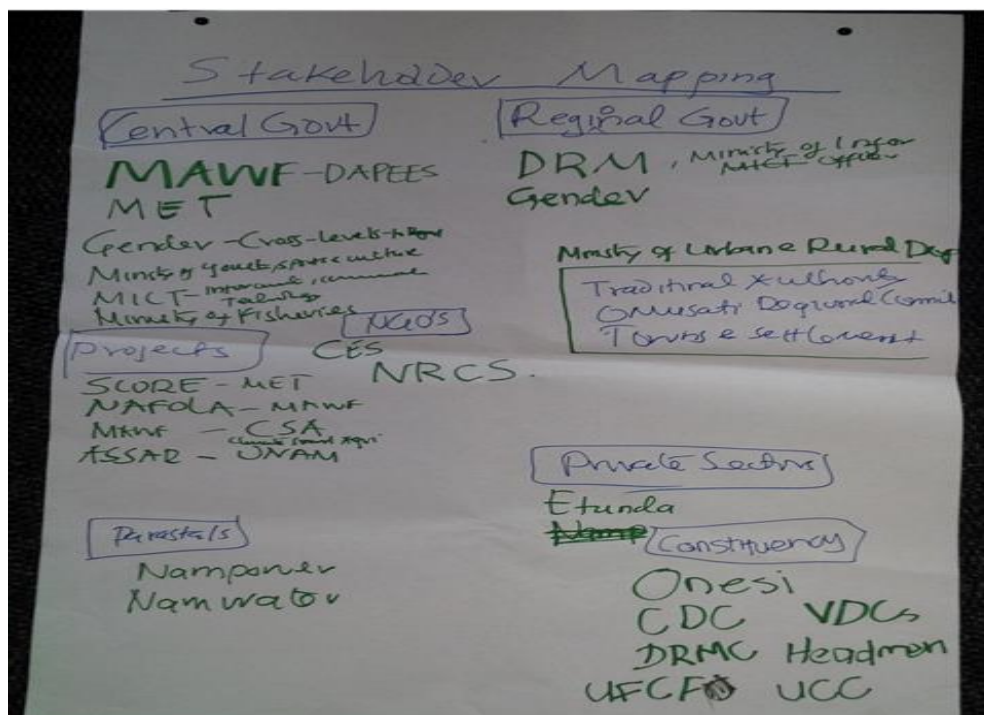


Figure 3. Stakeholder mapping exercise to identify power dynamics among stakeholders groups

Table 3. Hazards & Issues in Omusati, March 2016

	Hazard or issue	Justification
1	Drought, low rainfall (including seasonal shifts in rainfall season)	A common occurrence in north-central Namibia and a key issue affecting people's livelihoods and wellbeing. Increased water shortage associated with droughts, changes in precipitations and rainfall amounts directly affect agricultural yields and animal production.
2	Limited knowledge about climate change (and adaptation strategies)	There is a general lack of awareness about climate change and the risks it poses to the communities and their wellbeing.
3	Limited access and uptake of meteorological data	Relevant, timely and context specific meteorological information and advice do not reach farmers and communities in general. Both lack of understanding of the type of information and uncertainty on the information delivered affects uptake and increase sensitivity to climate impacts.
4	Floods associated with heavy rainfall	Floods occur in Onesi and affect people specifically those living in settlements along <i>oshana</i> . Floods not only spoil crops and lead to hunger, but also cause severe damage to infrastructure.
5	Limited uptake of new agriculture practices and farming technologies	There is a very low uptake of new technologies and new approaches of farming by the subsistence farmers. New technologies of farming are introduced by the central government and there seems to be no ownership by the local farmers e.g. preference on traditional Mahangu over new improved seeds such as Okashana.
6	Poorly resourced agricultural extension services	Insufficient number of extension officers.
7	High temperatures	Increased water shortages associated with higher temperatures directly affect agricultural yields and animal production.
8	Cultural practices preventing the adoption of new practices	There is a strong cultural prestige to have large number of herds which affects destocking as an option to reduce the impacts of drought. If one sells the stocks, one will feel less important in the society than if s/he have more.
9	Lack of alternatives to agriculture based livelihoods	Insufficient access to diversified and resilient livelihood systems is prevalent in Omusati Region. Climate impacts put stress on the majority of the population, who cannot find alternative employment options to farming.
10	Limited marketing and selling of animals	The lack of marketing of livestock is driven in part by strong cultural beliefs, economic factors and the lack of

		institutional support in terms of availability of markets.
11	Youths and male members of the households migrating to urban areas	Migration to the cities is growing for a number of reasons, and could be amplified by climate impacts as living conditions in the countryside are deteriorating. As youths migrate to look for other sources of income, this movement may deprive farms of a necessary young workforce.
12	Access to potable water	Mostly poor households are affected as they cannot afford to have potable water (taps) in their homesteads. They are required to purchase pipes and connect their home with the central collection points thus relying on natural or man-made wells which are often a distant away.
13	Air pollution	

In ranking the above hazards, several statements were made by KG participants to justify the ranking of climate related vulnerabilities and risks:

- “We have to close schools if there are droughts. Parents are affected and do not have food.”
- “Drought is affecting food security. In the past we were able to use our stock from the granaries for up to three years, but now food in granaries do not last long enough.”
- “The government is helping farmers but poor rainfall affects even these efforts. The number of livestock is decreasing. Even in conservancies the drought affects wildlife.”
- “Prices at the markets are very low and that is why people resist to sell their livestock.”
- “Since 2000 we have been fortunate because of the Etunda irrigation project. During droughts we go there and buy maize stalks. It is this fodder that makes livestock survive.”
- “In the past it was easier to predict weather, but now it [the weather] is different and makes difficult to decide when to plant.”
- “In the past we used to harvest bags and bags of Mopane worm, a large edible caterpillar, but now we cannot get them anymore.”

The ASSAR research team also identified social groups⁴ with the help of stakeholders during the fieldwork activities ahead of the VRA in March and July 2015. During the VRA exercise, these social groups were considered in relation to different hazards. Some social groups are more affected by the climate change risks than others. There are disparities in vulnerability determined by factors such as sources of livelihoods and age groups. These social differences can also determine the way in which different groups of people are able to respond and adapt to the impacts of climate change. From the stakeholder mapping exercise and earlier

⁴ We consider clustering of people in social groups to be helpful because it provides an appropriate balance between quality of information that is either too individualised/resource intensive or, on the other hand, too vague/ unusable. The understanding that an analysis based on social groups can promote an efficient allocation and use of resources aimed at climate change adaptation, and it can also facilitate upscaling and policy making & implementation.

interviews, a number of stakeholder groups were suggested and these were verified by the KG at the start of the meeting (see Table 2 and Appendix 2).

Table 4. Social groups and livelihoods activities in Omusati Region, January 2016

	Social Group & livelihood activities	Justification
1	Subsistence crops and livestock farmers	The majority of the local community is involved in subsistence crop farming and livestock keeping. Keeping cattle is not only a key livelihood strategy but also a cultural practice for communities in the north-central Namibia. Irregular rainfall poses serious threats to food security and livelihoods of the people.
2	Harvesting of Non-Timber Forest Products (NTFPs) e.g. Mopane worms and Marula fruits	There is a number of Mopane worm harvesters and Marula processing units in Omusati. The collection of the NTFPs is considered of high importance for income generation for women.
3	Small-scale traders (not own products)	This group offers potential of becoming a more relevant livelihood activity outside agriculture.
4	Pottery, handicrafts (basketry) and thatching grass harvest⁵	Relevant income generating activity for women at the same time being an alternative to agriculture-based livelihood.
5	Fish harvesters	Fish harvesting is normally done during the rainy seasons when <i>oshana</i> have water.
6	Small-scale emerging farmers	Farmers do irrigate their cropland and keep livestock. This livelihood activity is important in terms of providing seasonal employment for the local community.
7	Horticultural farmers	These farmers produce more and sell for income. They own more than 200 cattle, more than 15 storage facilities/baskets and use improved agricultural tools.
8	Marginalized groups	Minority group such as Ndongona, Dhemba, San, Ovatua and Himba make up a small percentage of the local community. The Ovatua, San and Himba groups are fully dependent on government support e.g. distribution of food baskets. They are poor, own small fields of Mahangu and work for others than work for themselves. The Himba in particular have become vulnerable because of the recent droughts. Their pastoralist lifestyle has been impacted by the drought.
9	Those on social grants	Pensioners, orphans and vulnerable children, disabled,

⁵ During the discussion KG suggested to put Thatching together with other NTFPs

		and people with HIV/AIDS ⁶ make up a considerable percentage of the local community. The livelihoods of these social groups depend on social welfare programmes such as pensions, other social security benefits and remittances.
10	Unemployed youths (<35yrs)	These are out of school youths who are still in the Onesi Constituency. Most youths have migrated to urban areas in search of employment and income generation opportunities.

Several issues were highlighted by different social groups during the VRA workshop:

1. Vulnerability is related to age. The KG acknowledged that the elderly need special attention when it comes to drought because their vulnerability has been compounded by the lack of labour. They are not able to cultivate their fields timely even when the rains come.
2. Women who are doing pottery were identified as members of a special group. Their activities are resilient to extreme temperatures. They build traditional clay pot making houses underground to ensure the pots are not exposed to extreme heat. However, the risk of flooding of these houses has increased in recent years.
3. The KG acknowledged that high temperatures have differential impacts on the production and processing of Mopane worms. During high temperatures, more stress is experienced because Mopane worms might die from heat stress during the harvesting season. However, the heat is considered good when drying Mopane worms.

⁶ During the discussion KG suggested to not treat people with HIV/AIDS the same way one would treat the social grants group because they do not receive any social grants.

3. Findings from the Vulnerability and Risk Assessment

3.1 Initial Vulnerability Analysis

The purpose of the IVA is to analyse the levels of exposure and sensitivity of a social group or a livelihood activity in relation to the pre-agreed key hazards and issues. The aim of the IVA is to achieve a clearer understanding of who, and what, is vulnerable. Through this process the facilitators aim to support the KG to come to a common understanding of the hazards that currently do, and/or that are likely to pose the highest risk to groups within the community.

The session began by presenting the pre-VRA output of social groups and major hazards identified by the facilitation team. From the original list presented, the KG listed 13 hazards and issues affecting the social groups in the community and also highlighted 10 social groups and their specific livelihoods activities as priority concerns⁷ (see Table 5 and Table 6 below).

Table 5. Voting/ranking output for hazards and issues affecting people of Omusati Region

	Hazards identified	Votes
1	Droughts, low rainfall	29
2	Floods and heavy rainfall	23
3	Cultural beliefs stopping new practices	10
4	Limited access/availability and use of seasonal climate forecast information	9
5	Limited agricultural extension services	8
6	Limited marketing and selling of livestock	8
7	Limited uptake of new agricultural practices and technology	7
8	High temperatures	5
9	Lack of alternatives to agricultural-based livelihoods	4
10	Youths and male members migrate to urban areas	4
11	Limited knowledge about climate change	3
12	Limited access to potable water	2
13	Air pollution	1

⁷ The classification of social groups was mainly based on the livelihood activities and/or amount of resources owned/i.e. wealth/income status

Table 6. Voting/ranking output for ‘social groups’ in Omusati Region, Namibia

	Social groups identified	Votes
1	Subsistence crop and livestock farmers	20
2	Unemployed youths (<35)	20
3	Those on social grants (pensioners, OVC, disabled) and people with HIV/AIDS	16
4	Marginalised groups (minority groups, including Dhemba, Ovatusa, Himba and San)	15
5	Harvesting of NTFPs e.g. Mopane worms and Marula fruit	10
6	Small-scale traders (not own produce)	8
7	Pottery, handicrafts (basketry) and thatching grass harvest	8
8	Small-scale emerging farmers	7
9	Fish harvesting	5
10	Horticulture	0

To identify the final list of hazards and social issues for inclusion in the VRA, the KG team was asked to discuss and vote/rank their priority ‘hazards and issues’ and ‘social groups’. Table 5 and 6 are the ranking scores for the identified ‘hazards and issues’ and ‘social groups’ in Omusati region.

After this exercise, the KG was divided into three groups to work on the hazards and issues that were considered by the KG as the most important. These were 1) Droughts and high temperatures; 2) Floods; and 3) Inadequate access to and use of seasonal climate forecast information (see [section 3.4](#)).

3.2 Determining the Vulnerability Score

The next step was to assess the vulnerability of different social groups to a particular hazard or issue. This was done by rating scores⁸ of vulnerability (exposure and sensitivity) for each hazard/issue across each of the social groups/livelihood activities. This process required careful facilitation to be able to build consensus and reach a score with which all participants were satisfied. As a group the KG analysed the exposure and sensitivity of the first hazard (drought) to all social groups and livelihood activities. As the process took a long time, the KG

⁸ The scores used were 1 to 4, where 1= low exposure/sensitivity, 2=medium, 3=high and 4 = very high exposure/sensitivity.

members were split into three different groups and each group determined the vulnerability of the three social groups as identified below;

- Group 1: Subsistence crop and livestock farmers, small-scale emerging farmers, and horticultural farmers;
- Group 2: Social grants and unemployed youths; and
- Group 3: Crafts, forest products and thatching, and small-scale traders.

Later, the groups gave feedback on the discussions and the other KG members had an opportunity to comment on each group's findings.

Two different questions were used to guide this step;

1. To assess exposure: 'What is the extent to which a social group (or a livelihood activity) could potentially i.e. theoretically be affected/damaged by the occurrence of a hazard or an issue?'

2. To assess sensitivity: 'In the past 15 years what have been the actual impacts of specific hazards (e.g. drought) on different social groups (e.g. subsistence farmers)?'⁹

Figure 4 is a chart that was used to fill the exposure and sensitivity values* from Group 1 including subsistence crop and livestock farmers, small-scale emerging farmers and horticultural farmers.

The other groups completed the same exercise for their social groups (as per hazards and issues identified in Table 3 and 4).

The image shows a handwritten matrix on a piece of paper. In the top left corner, there is a small box containing 'E/S'. The matrix has three rows and seven columns. The rows are labeled: 'Subsistence farmers', 'Small emerging farmers', and 'Horticultural'. The columns are labeled: 'FLOOD', 'Limited access to information', 'Cultural beliefs', 'Limited extension services', 'Limited selling of livestock', 'Limited uptake of new agricultural practices/technologies', and 'High temperatures'. Each cell in the matrix contains two numbers, representing exposure and sensitivity scores respectively. The scores range from 1 to 4. For example, in the 'FLOOD' column, the scores are 4 for Subsistence farmers, 4 for Small emerging farmers, and 3 for Horticultural. In the 'High temperatures' column, the scores are 4 for Subsistence farmers, 4 for Small emerging farmers, and 4 for Horticultural.

	FLOOD	Limited access to information	Cultural beliefs	Limited extension services	Limited selling of livestock	Limited uptake of new agricultural practices/technologies	High temperatures
Subsistence farmers	4/4	3/4	1/2	1/2	3/3	1/3	4/4
Small emerging farmers	4/4	3/4	1/2	1/2	3/3	1/3	4/4
Horticultural	3/4	3/4	NA	1/1	NA	1/2	3/4

Figure 4. Exposure and sensitivity output from the table of the farmers group

***Scoring Methodology:** The scores range from 1 (lowest), 2 (medium), 3 (high) and 4 (very high). The first score on each box represent values for exposure and the second score represent values for sensitivity e.g. a score value of 3.4 on the first column floods of Figure 4 represents a high level of exposure (3) and very high levels of sensitivity (4) among the horticultural farmers to flood

⁹ 2000 was used as a baseline year for sensitivity analysis

Table 7. Exposure for the identified hazards and issues among different social groups

N/A	Hazard is not relevant to the sector or crop							
Low (L)	Some significant exposure is expected							
Medium (M)	Medium level exposure expected affecting medium to considerable area of the activity (or medium to considerable number of the sector's facility)							
High (H)	Significant level exposure expected affecting a considerable area of the activity (or a considerable number of the sectors facilities)							
Very High (VH)	Total area of the activity (or sectors facilities) widely and increasingly exposed to significant climate hazards							
	Enter description of hazard here							
Social group/LH activity	Drought	Flood	Climate information	Cultural beliefs	Selling livestock	Extension services	Agri-cultural practices	High temperatures
Subsistence farming	VH	VH	H	L	H	L	L	VH
Unemployed youths	VH	M	VH	M	VH	H	M	VH
Small-scale emerging farmers	VH	VH	H	L	H	L	L	H
NTFPs & thatch	VH	H	L	N/A	N/A	L	L	H
Small-scale traders	H	M	M	N/A	L	N/A	L	VH
Craft	M	M	L	N/A	N/A	M	N/A	L
Horticulture	VH	H	H	N/A	N/A	L	L	H
Social grants	H	VH	VH	M	M	VH	H	VH

Table 8. Sensitivity Table for the identified hazards and issues among different social groups

N/A	No negative impact, or some positive impact (*)							
Low (L)	Small impact, with little or no effect on operation/ activity							
Medium (M)	Operation/ activity may be negatively affected to a low or moderate extent							
High (H)	Operation/ activity will be negatively affected to a large extent							
Very High (VH)	Operation/ activity will be fully disrupted							
	Enter description of hazard here							
Social Group/ LH activity	Drought	Flood	Climate information	Cultural beliefs	Extension services	Selling livestock	Agricultural practices	High temperatures
Subsistence farming	VH	VH	VH	M	M	H	H	VH
Unemployed youths	VH	H	VH	H	VH	VH	H	H
Small-scale emerging farmers	VH	VH	VH	M	M	H	H	VH
NTFPs & thatch	VH	M	L	N/A	M	N/A	L	VH
Small-scale traders	H	M	L	N/A	N/A	M	L	VH
Craft	M	M	L	N/A	L	N/A	N/A	L
Horticulture	VH	VH	VH	N/A	L	N/A	M	VH
Social grants	VH	H	VH	H	VH	H	VH	H

3.3 Exposure and Sensitivity Analysis

The background behind the assessment of exposure and sensitivity for the selected hazards and issues is elaborated here. The values of exposure and sensitivity are encoded using the table below to calculate the vulnerability scores for each social group. This system is based on the flowing structure: initial vulnerability values go from lowest levels (green), increasing through yellow and orange to the highest levels of vulnerability (red).

Table 9. How exposure and sensitivity values are combined to show the initial vulnerability value. Initial Vulnerability values go from lowest levels (green), increasing through yellow and orange to the highest levels of vulnerability (red).

	SL	SM	SH	SVH
EL	L	L	M	M
EM	L	M	H	H
EH	M	M	H	VH
EVH	M	H	VH	VH

Table 10. Pre-vulnerability score for the identified hazards and issues across different social groups

Activity	Drought	Flood	Climate information	Cultural beliefs	Extension services	Selling livestock	Agricultural practices	High temperatures
Subsistence farming	VH	VH	VH	L	L	H	M	VH
Unemployed youths	VH	H	VH	H	VH	VH	H	VH
Small-scale emerging farmers	VH	VH	VH	L	L	H	M	VH
NTFPs & thatch	VH	M	L	N/A	L	N/A	L	VH
Small-scale traders	H	M	L	N/A	N/A	L	L	VH
Craft	M	M	L	N/A	L	N/A	N/A	L
Horticulture	VH	VH	VH	N/A	L	N/A	L	VH
Social grants	VH	VH	VH	H	VH	H	VH	VH

3.3.1 Droughts and low rainfall

When assessing exposure and sensitivity of the social groups to drought and low rainfall, these indices were ranked as very high for all groups, with the exception of small-scale traders, artisans and people depending on social grants.

The highest level of exposure and sensitivity was expected for subsistence farmers, small-scale emerging farmers and horticultural farmers due to their lack of water. This increases the

likelihood of crop failure or animal mortality. The KG felt that it is necessary to rate farmers as highly exposed and sensitive because drought affects food production directly. The threat was perceived to be very high over the past 15 years because people were able to make use of Mahangu stored in the granaries for up to three years. According to the KG, the stock of Mahangu in the granaries does not currently even last until the next rainy season.

The horticultural farmers were identified as being very highly exposed and sensitive because their farming cycle has been affected by unpredictable rains making it difficult to decide on an appropriate planting time. The KG also highlighted that the impact of drought on horticultural farmers is high due their inability to get enough water for their activities from Olushandja dam.

The NTFP harvesters were assessed to be very highly exposed and sensitive because forest products become scarce during drought. This leads to households having insufficient income. The KG did acknowledge that in the past they used to harvest many bags of Mopane worms, but this is no longer occurs. There was no direct impact identified for crafting¹⁰ because palms used for basketry can even survive even over drought. However, the KG highlighted that purchasing power is low during droughts as people buy food instead of thatch crafts.

The exposure and sensitivity of those living on social grants was ranked as high but lower than those of farmers because social grant buffer. Therefore even during droughts they have ready assistance unlike other groups.¹¹ A high level of exposure and sensitivity was expected for the elderly. The KG was concerned that the impacts of droughts on elderly could be compounded by the lack of labour as they are not able to cultivate their fields on time before the rains come. The KG linked the lack of labour to the migration of the youths who have moved to other areas, often urban areas, in search of better livelihood opportunities. The KG felt it necessary to rate the unemployed youths category as very highly exposed and sensitive because they have few resources when it comes to survival during drought. Reflecting on this, the KG noted that those living nearby Etaka canal have ventured into projects such as building, pottery and gardening, but those living on high grounds are less likely to find alternatives.

3.3.2 Floods and heavy rainfall

Both subsistence farmers and small-scale emerging farmers were considered to have very high levels of exposure to floods and rainfall because floods wash away crop fields, infrastructure and houses. Very high level of sensitivity was highlighted because floods increase the likelihood of crops being immersed hampering farmers' ability to harvest. The KG felt that it is necessary to rate the subsistence farmers and small emerging farmers as very highly exposed and sensitive because floods directly affect food security as "there is no food when there are strong rains". The KG also highlighted the impacts of floods on livestock because

¹⁰ It was felt that thatching should not be grouped with craft, so thatch was placed in the NTFPs group.

¹¹ There was disagreement with this position from other KG members, noting that in time of drought, the grant received is used to purchase food and that during drought periods, food also tend to be expensive thus the grant becomes too little to cover the beneficiaries needs. It was further noted that for those living with HIV/AIDS, they require nutritious foods but this will not be available during drought years. There was also a concern that people living with HIV AIDS should not be placed in the same group with those receiving social grants as they do not get social grants.

heavy rains increase the likelihood that the grazing land (including cattle posts) will not regenerate. The KG stated “when there is water there are no grasses”.

Horticultural farmers were seen to be highly exposed but not as exposed as subsistence farmers because they are applying Climate Smart Agriculture¹² practices elsewhere such as ridges to channel water. However, the KG highlighted that these practices work well only to crops such as rice and sorghum that are tolerant to floods and wet soils.

For those on social grants and living with HIV/AIDS, exposure was ranked as very high and sensitivity to floods was ranked as high. It was noted that floods, for example, limit the access of the elderly to certain areas where they might get support. Similarly, those living with HIV/AIDS may end up missing on medication due to their limited access to antiretroviral (ARV) drug collection centers.

For the unemployed youths, sensitivity was scored as high and exposure as medium since not all parts of the constituency are affected by floods. It was however noted that floods may restrict youths’ access to services, for example access to the Regional Council or Constituency Offices where they routinely go to look for advertised job opportunities and employment information. It was noted that floods may also negatively impact youths involved in gardening as production is affected.

The KG considered floods to have a substantial impact on pottery making. Flooding affects the underground houses where clay and pots are kept to protect them from the harsh elements such as wind and to prevent clay from cracking. In addition, if a flood strikes, these structures have to be rebuilt. However, floods are not considered to have an impact on basketry so crafts were scored as having medium exposure and impact. Medium level exposure and sensitivity was agreed for small-scale traders. Their access to selling location and their stock of e.g. Mahangu might be affected by floods. Regarding the harvesters of the NTFPs, a medium exposure and sensitivity was agreed upon as the Mopane worms get washed away when there is a flood, thereby disrupting their lifecycle. In addition, Marula trees do not yield well during flooding.

3.3.3 Limited access/availability and use of seasonal climate forecast information

The KG members acknowledged that access to climate information is a serious issue. High levels of exposure with very high sensitivity was agreed on all three groups of farmers. The highest level of sensitivity was expected because farmers do not have access to potential knowledge and skills to cope with the impacts of climate variability and change.

Reflecting on the challenges of accessing and using information, the KG members stated that if farmers knew what to expect in advance, they would have made their decisions differently. Farmers would like to be able to make informed decisions on when to plant and apply strategies, such as delayed cultivation or early planting. The KG members brought up several examples of farmers having prepared their fields and planted for that season only to find out

¹² Climate Smart Agriculture (CSA) integrates the three dimensions of sustainable development i.e. economic, social and environmental by jointly addressing food security and climate challenges (FAO, 2009). The focus is on Sustainably increasing agricultural productivity and incomes, Adapting and building resilience to Climate Change, and Reducing and/or removing greenhouse gases emissions.

that the rains were delayed. Alternatively, the rains sometimes last for a short time making the crops vulnerable to drought. Similarly, when it rains heavily, the crops are destroyed by water.

The KG felt it is necessary to rate farmers' sensitivity very high because farmers have to use their food stock seeds from the granaries. The best quality seeds they have chosen often die from the first planting attempt. This indirectly affects yields because the stock is meant to be consumed as food and the seeds are not of required quality. Those who do not have food stock available have to look for seeds elsewhere. Similar issues were raised in terms of livestock keeping as farmers would not be able to decide when to sell.

With regard to people living on social grants and/or with HIV/AIDS, the impact of inadequate access to climate information was ranked as very high. It was noted that this results in a lack of adequate preparations by family members, which in turn hampers responsible authorities' ability to assist people in this group. Planning for this group of people, who ordinarily have to depend on other people during the times of distress, is therefore compromised by the lack of reliable and adequate climate information. Exposure to hazards was also ranked high for this group, because it was noted that even though information may become available in the future for example with improved technology, most of this information is delivered in languages and terminology that people in this category, the elderly in particular, do not understand.

For unemployed youths, the KG felt that there is really no difference in sensitivity and exposure from what is experienced by those on social grants and those living with HIV/AIDS. The degree of exposure and sensitivity is also very high as the context remains the same and therefore the effects would be the same.

The KG had few comments on the importance of seasonal forecasting information for small scale traders (ranked as medium for exposure and low sensitivity), basket makers, potters (ranked as low for exposure and sensitivity), Mopane worm and Marula harvesters (also ranked as low). However, the potter mentioned that she has recently relocated her underground hut used for making pots.

3.3.4 Cultural beliefs stopping new practices

With regard to subsistence and small emerging farmers, low levels of exposure and medium sensitivity were captured related to cultural beliefs stopping new practices. This value of exposure and sensitivity was agreed upon based on the fact that keeping livestock for prestige is a common practice in Oshiwambo culture. These beliefs affect destocking e.g. during drought time; the more livestock a person has, the wealthier he is perceived. However, the exposure was seen as low because the KG believed that farmers are adapting to changes over time.

For horticultural farmers, no significant exposure was expected because they produce predetermined products for the market and are not necessarily influenced by cultural practices.

For those on social grants, it was noted that attitudes in general are becoming more positive towards new agricultural practices and technology.

During the times of normal rainfall, the elderly in particular tends to take up their old traditional ways of cultivation and planting. For example, the elderly was said to tend to hold on to their cultural beliefs when it comes to livestock management. When they are advised to destock prior to droughts, they tend not to listen as according to their culture, keeping livestock is a form of wealth and a symbol of status. For this group, medium level of exposure and high level of sensitivity was assessed by the KG.

Unemployed youths were scored as medium for exposure and high for sensitivity. However, it was noted that youths have not been resistant to new agricultural practices and technology. Therefore, both exposure and sensitivity to this problem is limited. Regarding small-scale traders, basket makers and harvesters of Mopane worms and Marula fruit, cultural beliefs affecting their livelihoods were not considered important.

3.3.5 Limited agricultural extension services

The limited access to agricultural extensions services was medium for subsistence farmers and small-scale emerging farmers (E: low, S: medium). The KG highlighted that the limited number of extension service providers is a critical challenge delaying farmers' access to information and delivery of extension services. Both low exposure and sensitivity were agreed for horticultural farmers because they receive information directly from the MAWF-DAPEES. According to the KG, the MAWF-DAPEES was considered responsible for taking care of these groups of farmers because they depend on horticultural farmers in seeking information on what was produced for planning purposes e.g. importation of agricultural produce from outside. The horticultural farmers are connected to the MAWF through AMTA.

Sensitivity and exposure of people on social grants and those living with HIV/AIDS was said to be very high. It was noted that there are only two extension officers in the whole constituency and they normally focus their activities around business centers. Therefore, most of the people in this group, who are the ones who are in need of the free inputs the most, may not be able to walk long distances to obtain information from the extension officers. Most people on social grants do not have transport to bring extension officers to their farms for advice.

For unemployed youths, sensitivity was scored as very high and exposure was scored as high for this problem. However, it was noted that most can walk to meet the extension services offices where they can easily get advice and, if available, free inputs. Extension officers were considered to play a role in providing information at trade fairs to some craft makers as well as introducing new technology.

3.3.6 Limited marketing and selling of livestock

High exposure and sensitivity were noted for subsistence farmers and small scale emerging farmers because of the low market price of livestock. The low market price for livestock was linked to the lack of pricing mechanisms when selling livestock.¹³ The KG noted that the Meat

¹³ Low prices reflect the fact that buyers prefer tender meat which comes from young animals yet farmers sell older animals which are big but quality of meat has deteriorated hence low price even though expectation of the farmer is that a bigger animal should fetch more.

Corporation of Namibia (MeatCo) has a set price scheme, but sometimes the price set on the market is very low.

Horticultural farmers are unlikely to be exposed and impacted (N/A) as they do not need to do marketing to sell their products. They engage directly with, and produce for, AMTA. This social group is also not engaged in significant livestock raising.

It was noted that for those on social grants and the HIV/AIDS group, sensitivity to this issue was high. The distance to markets to sell livestock is often far and most likely the local customers in the villages are unable or unwilling to pay the real value for the livestock. For example, it was noted that there was a time when it was very lucrative to sell livestock across the border in Angola. At that time, it was said to be very evident how those on social grants, particularly the elderly, and those living with HIV/AIDS could not make the long distances across the border. The KG however agreed that exposure to this risk may be medium because there has been an increase livestock selling center in the area in the last five years. In the past there has only been one. This might be an advantage to those in the social grants group.

For unemployed youths, it was noted that most people in the group do not have livestock nor money to buy and sell the livestock therefore they are not really affected by this issue. However, the group was scored very high for exposure and sensitivity.¹⁴ It was speculated that the impact of people not selling their livestock informally can lead to limited availability and high prices of meat by small traders.¹⁵

Crafts makers and NTFP harvesters are unlikely to be exposed and impacted (N/A) by the existing marketing because they are not directly linked to marketing and selling of livestock.

3.3.7 Limited uptake of new agricultural practices and technology

Subsistence farmers and small emerging farmers were identified to have low levels of exposure to new agricultural practices and technology but were considered highly sensitive. A low exposure scale was selected because the uptake of new agricultural practices has been challenging in the past but now it is changing and farmers are more receptive to new practices. For horticultural farmers a low-level exposure was captured with medium-level sensitivity because this group of farmers is always active in applying new agriculture practices to increase production. For the social grants group, particularly the elderly, high level exposure with moderate sensitivity was agreed because they tend to hold on to their cultural beliefs when it comes to livestock for example destocking when droughts are expected. For limited uptake of new agricultural practices it was thought that there could be some indirect links for harvesters of the NTFPs. The KG scored this group as low for both sensitivity and exposure.

¹⁴ Young women do not often own livestock, especially cattle. There is no market for small livestock such as goats. They are highly sensitive because livestock sale income could support youths as well.

¹⁵ Limited availability and high prices of meat reflect that small traders have less meat to sell hence high prices based on demand not being met due to limited supply of livestock from the farmers.

3.3.8 High temperatures

Very high levels of exposure and sensitivity were captured for subsistence farmers as compared to high level exposure and very high sensitivity experienced for small emerging farmers and horticultural farmers. On a more general note, the KG associates the impacts of high temperatures in the farming community with an outbreak of pests and diseases that have an impact on crops and animals.

The risk of exposure and sensitivity to high temperatures was placed as high for those on social grants (E: very high, S: high). Due to the heat, most people in this group will not be able to work long hours on their fields, eventually leading to reduced productivity. It was further noted that high temperatures increase the risk of diseases such as skin cancer in this group, worsening their socio-economic situation further.

For unemployed youths, it was agreed that they are stronger and healthier than those in the social grants group. Therefore, their sensitivity to high temperatures was expected to be less (E: very high, S: high).

With regard to possible cracking of clay products, high temperatures are thought to have a low effect. The impact of high temperatures on small-scale traders was perceived to be very high due to heat stress on the traders and faster expiry of their produce. Exposure and sensitivity is assessed as high (E: high, S: very high) for the NTFP harvesters, such as Mopane harvesters, because high temperature affects the number of Mopane worms as the eggs get overheated and burst before the worms hatch.

3.4 Impact Chain Analysis

This ICA exercise allowed the KG to assess the possible positive and negative future impacts of the identified hazards and issues. An ICA is a visual tool to represent the consequences of an individual hazard. By taking a forward looking, systemic lens this process should identify both direct and indirect consequences. The ICA should help outline how vulnerability propagates through a system and illustrate the potential impacts over the coming decades. Three groups were formed to address three issues; 1) droughts and high temperatures; 2) floods; and 3) climate information.

3.4.1 Drought Impact Chain Analysis

Group 1 worked on drought ICA and highlighted four direct impacts on different sectors and livelihood activities;

1. Crop failure: Reduced crop yields (less food available at household level) and low fodder production (less available stover/stalks from crop residue for livestock)
2. Low rainfall: Reduced water and grass for grazing in the livestock sector
3. Heat wave: Reduced NTFPs such as Mopane worms, increased livestock mortality and loss of wildlife
4. Decreased water availability: Reduced water supply and less grass for grazing in the wildlife sector

Based on the KG reflections, these livelihoods are highly impacted by changing rainfall patterns, including low rainfall, and increasing temperatures. For example, reduced crop yields affect farmers in terms of inadequate food supply. This will result in impacts on health and loss of income from agricultural produce. Similarly, heatwave and decreased water availability reduce water supply to wildlife and this will subsequently result in loss of wildlife which may affect the number of tourists and earnings from tourism. Lack of water and increased heat reduce fodder production and grass for grazing, have an impact on livestock health and mortality rates. These conditions also reduce the availability of NTFPs, for example by killing Mopane worms' larvae and resulting in loss of income and food source for Mopane harvesters. As a consequence, lower income can lead to impoverishment. Inadequate food supply can lead to hunger and subsequently increase risky behavior, such as theft and transactional sex in exchange for food or cash. This can lead to an overall increase in household conflicts. Malnutrition of school children can lead to poor health and to an increased number of school dropouts.

Apart from reduced milk and meat production and loss of income and livestock, it can also lead to a loss of social capital such as status, prestige and participation in the social networks in the society. The KG highlighted that in Owambo culture a person who owns a large number of livestock is perceived to be among the most prestigious member of the society with high social status. In cases like this, even the ability of people to participate in social cultural events is affected. Animals play a significant role in ceremonies such as weddings and other social celebrations.

3.4.2 Floods Impact Chain Analysis

Group 2 worked on the flood impact chain analysis and highlighted six direct impacts on different sectors/ livelihoods activities;

1. Damage to infrastructure such as roads and homes
2. Water borne diseases
3. Loss of life
4. Less grazing
5. Loss of crops (Horticulture)
6. Soil erosion

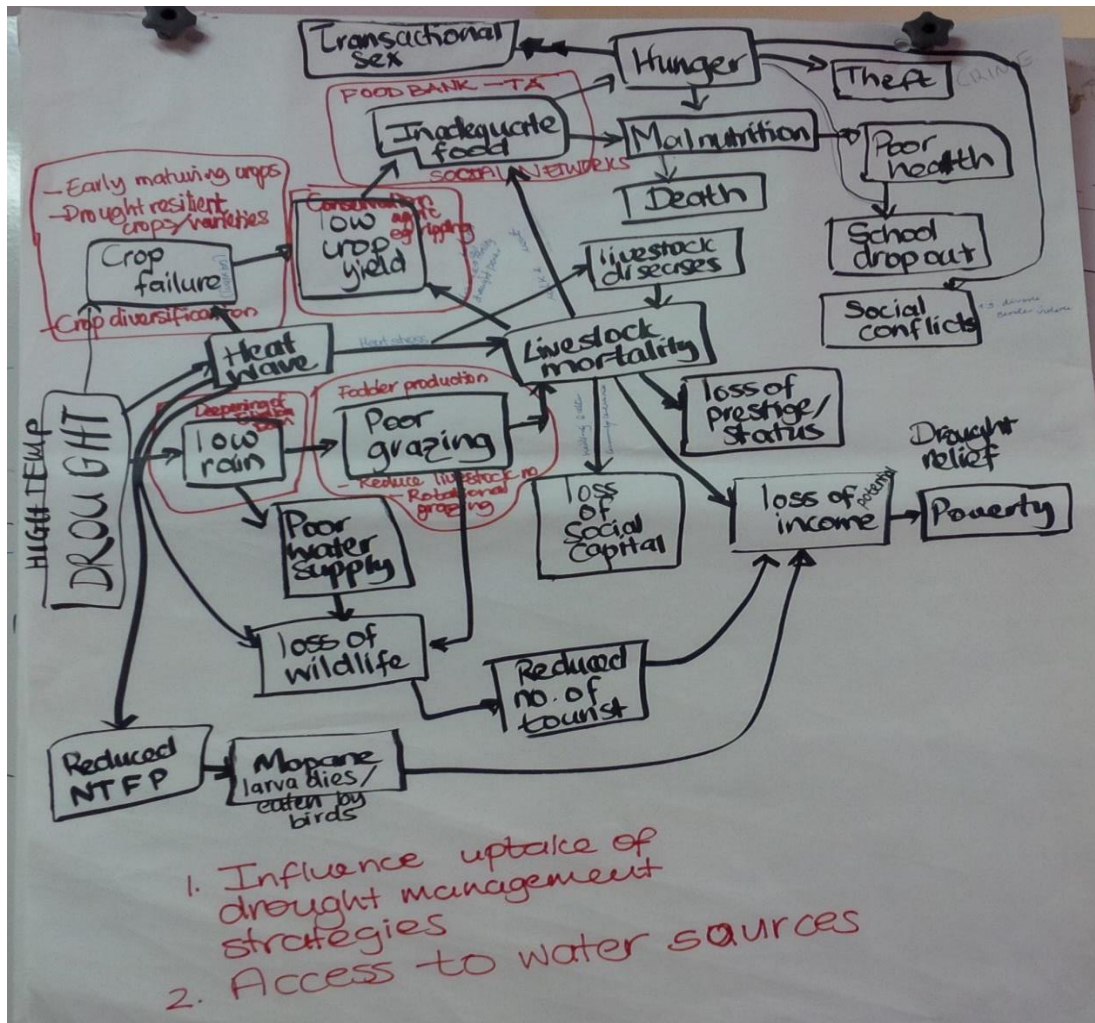


Figure 5. ICA for drought hazard.

The KG identified that the damage of floods to infrastructure such as roads and homes have many far-reaching negative effects including a limited access to health services and markets. Damaged infrastructure results in the closure of schools which in turn leads to poor performance of students and eventually to an increased number of school dropouts. The far-reaching consequence of school dropouts and poor performance in general is predisposition to unemployment due to reduced employability.

Additional effects of infrastructure damage include household relocation which may lead to a loss of domestic animals. The KG linked relocations of households during floods with the encroachment of settlements near and along the floodplain as there is little safe land available for residential development. Flooding also has adverse effects on human life where it can potentially increase the outbreaks of waterborne disease. This leads to an increased cost for medication and awareness raising by both government and NGOs.

A further implication of flooding is that there is less grazing land and significant losses of life. In horticulture, flood events sometimes lead to a loss of crops which results in a poor harvest. As a consequence, members of the communities attempt to access drought relief funds from

the government and NGOs. The loss of crops can also lead to hunger and/or malnutrition. The KG also discussed flooding effects on soil erosion resulting in a deterioration of soil fertility that in turn contributes to poor harvests of crops.

Apart from the negative impacts, the KG also identified positive ecological impacts of floods on freshwater biodiversity and ecosystems. As noted during the discussion, there are “more flood water means high aquatic biodiversity and birds” which increases the aesthetic value of this semi-arid ecosystem. The KG noted that flood events can also cause an increase in the number of fish caught in the nearby *oshana*, a pond, with a potential impact on improved nutrition and income generation. However, the KG was concerned that uncontrolled fishing in the *oshana* might contribute to an increasing school dropout rate as children are engaged in fishing.

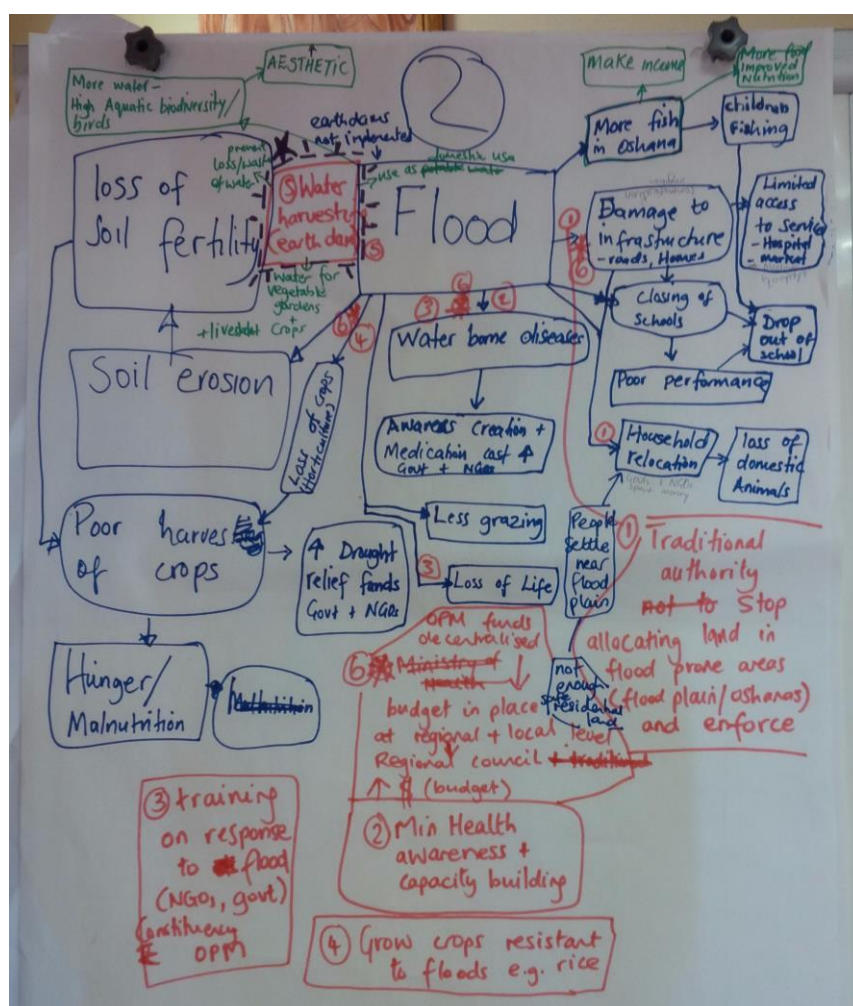


Figure 6. Impact chain analysis for floods

3.3.9 Impact Chain Analysis for inadequate access to climate information

Group 3 undertook the ICA to explore the impacts of inadequate access to climate information and they identified four direct impacts:

1. Bad timing for crop planting

2. General compromised planning on the farm which may lead to people prioritising other issues when they should be farming
3. Failure to set aside fodder for the livestock
4. Limited ability of relatives, the government, NGOs and other stakeholders to plan for important interventions such as food relief, evacuation (in case of floods), material provisions and additional support

Bad timing for crop planting leads to a situation that more resources, including money and seeds, are needed for replanting. This depletes funds for other allocated critical household expenses such as food, healthcare and school fees. Bad timing for planting can also lead to low yields, which then can lead to household hunger and children's misbehaviour or the children might end up living on the streets. Female children are also sometimes exposed to abuse resulting in increased early pregnancies. An increase in street children also links to increased criminal activity, which exerts pressure on the national safety and security budget.

Bad timing for crop planting together with general lack of proper planning may lead to low yields. This in turn might lead to hunger at individual household levels, malnutrition and compromised school performance for children still in school. Failure to set aside fodder for livestock may potentially lead to livestock losses, thereby impacting negatively on a potential source of income for the households.

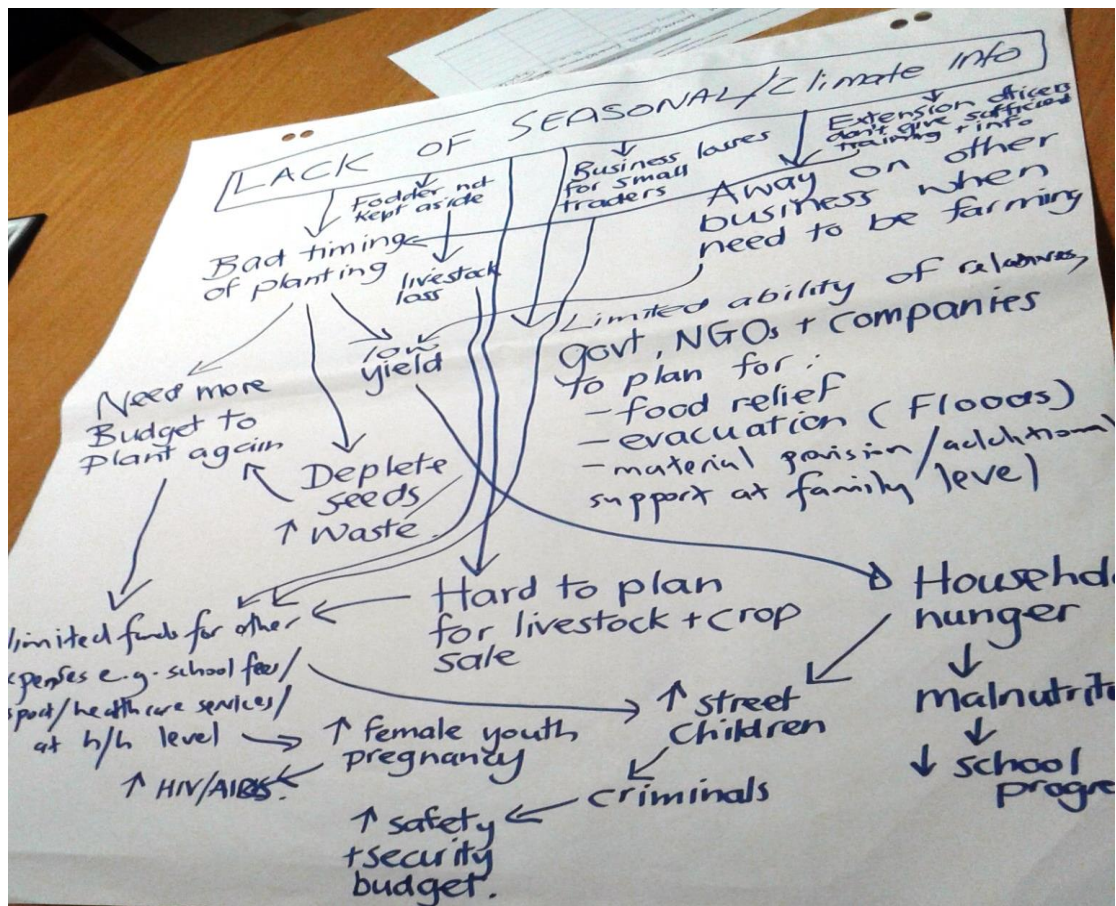


Figure 7. Impact chain analysis for inadequate access to climate information

Overall, the impact chain of vulnerability to climate change affects different groups in different ways. One critical concern is that climate change impacts such as extreme temperatures have a far more intangible social and cultural effect on local communities. These include the impact on social status and the ability to provide support and participate in socio-cultural ceremonies such as weddings because these activities depend on good health of the animals.

3.5 Adaptive Capacity Analysis

The fourth stage of the VRA allows the KG to explore opportunities to address the vulnerabilities identified in steps 1 and 2. This also assist in building the resilience of the landscape under investigation by exploring the ideas developed during the ICE step and turn some of the proposed solutions into full adaptation responses.

3.5.1 Adaptive Capacity Analysis for droughts and high temperature

Group 1 identified the following opportunities to address the vulnerabilities of different sectors and livelihood activities to drought and extreme temperatures, including:

1. To address inadequate food supply and food security

- a) Promote food bank mechanism¹⁶ to address food insecurity at the community level. As part of this, each household is encouraged to contribute 20 litres of Mahangu that is stored by the traditional authority and used during times of distress
 - b) Use of social networks. For example, in Owambo culture when there is hunger people ask their families and relatives for food. There is also a tendency of bartering livestock or meat for Mahangu grains
 - c) Remittances from the family members and government
- 2. To increase crop yields and reduce impacts of crop failure
 - a) Promote the use of drought resistant crop varieties
 - b) Use early maturing crops for faster yields e.g. Okashana which is ready in short-term
 - c) Advise people on how to practice crop diversification e.g. mixing millet with cowpeas, groundnuts and pumpkins
 - d) Apply conservation agriculture practices e.g. ripping
 - e) Practice irrigation where there is sufficient water
- 3. Initiatives to promote production in livestock sector
 - a) Irrigation to increase fodder production
 - b) Practice rotational grazing (when healthier pastures to move the livestock is available) mostly during the normal rainy seasons farmers can be advised to reserve some area.¹⁷
 - c) Reduce livestock number i.e. destocking/selling
- 4. Initiatives to ensure adequate water supply during drought/dry seasons: Deepening of Etaka dam to increase its capacity to store more water during heavy rains (rainwater harvesting).

3.5.2 Adaptive Capacity Analysis for floods

Group 2 identified the following opportunities to address the vulnerabilities of different sectors and livelihoods activities in relation to floods:

- 1. Water harvesting, specifically building earth dams, would enable more supply of water for domestic use, vegetable gardens and livestock. Water harvesting would also prevent the loss of waste of water. More available water would lead to improved aesthetics such as high aquatic biodiversity and birds.
- 2. To address damage to infrastructure, the traditional authority should stop allocating land in *oshanas*. They should also enforce this.
- 3. To address water borne diseases the Ministry of Health should create and increase awareness and capacity building at the community level.

¹⁶ The main purpose of the food bank is to alleviate hunger and provide for the basic needs of vulnerable people in Namibia by soliciting, collecting, packaging food and other basic needs for vulnerable people (Selma Shipanga, 2013). Government to establish Food Bank (Published on 2013 - 02 - 09 at: <http://www.namibian.com.na/>)

¹⁷ Farmers highlighted the challenge faced in practicing rotational grazing because some of the areas that have been used for grazing have been converted to Mahangu fields.

4. To address the loss of life. The NGOs and the government should provide training on response options to flooding. This can be done in collaboration with the constituency and the Office of the Prime Minister (OPM) Disaster Risk Management Unit.
5. DRM funds should be decentralised to local and regional levels and be housed in the regional council.
6. To address the loss of crops it would be good to grow more crops that are tolerant to floods. In this case rice would be ideal.

3.5.3 Adaptive Capacity Analysis for climate information

Group 3 identified the following ways to address the various vulnerabilities associated with inadequate access to climate information:

1. Strengthen communication of seasonal climate forecast information through the dissemination of information in all languages and through all available media platforms
2. Strengthen advice and options for seasonal climate information from extension officers, with extension officers aligning their extension information/advice with the available seasonal climate information
3. More appreciation and documentation of local and indigenous knowledge as well as finding ways of combining it with scientific information to benefit farmers
4. Strengthening traditional methods of storing seeds

3.5.4 Planning for future

From the discussion of possible opportunities to reduce the vulnerabilities and build resilience, the KG decided to focus on one opportunity per hazard/issue and explore it further, aiming to incorporate it into community, municipality and/or district development plans. For this exercise, the facilitator suggested five principle guidelines to help inform the KG decision making¹⁸:

1. Assets base: what will be needed in order to accomplish the expected output
2. Institutions: kind of support in order to do the work
3. Knowledge and information: kind of information available and necessary
4. Innovation: what new skills, technology, institution support and assets necessary to facilitate the work
5. Flexible and forward looking decision making and governance: steps, institutions and assets to address future problems

¹⁸ Adapted from ACCRA's Local Adaptive Capacity framework.
http://community.eldis.org/ACCRALocalAdaptivePolicy_new.pdf

Table 11. Priority measure from Group 1: Influence uptake of drought management strategies and access to water sources

Assets base	<ul style="list-style-type: none"> • Train seed growers • Increase the number of farming implements e.g. rippers, planters and tractors • Secure financial resources • Strengthening existing social networks¹⁹ e.g. Okakungungu (a network that supports agriculture. A person slaughters a livestock and they invite people to work on his/her crop field in exchange for a cooked meal), and Ondjambi (a system of working for others in the field and a person will offer them a traditional drink). • Use of the canal and Etaka/Olushandja dam for water supply
Institutions	<ul style="list-style-type: none"> • Several institutions are already in place but the KG highlighted the need to improve them e.g. VDC, farmers committees, MAWF for extension services, DRM, etc. • DRM (under OPM) has been decentralized from the national level to regional, constituency/settlement levels to village level. These institutions are responsible for multi-sectoral responses including drought relief. • Need to put in place mechanisms to ensure extension service providers are adequately equipped to inspect and provide services in time before seeds are attacked by birds • Namwater is there for water supply but need to ensure technical support for rehabilitation
Information & knowledge	<ul style="list-style-type: none"> • Information on new farming practices is needed
Innovation	<ul style="list-style-type: none"> • Skills of new farming practices • Use of new crop varieties
Flexible and forward looking	<ul style="list-style-type: none"> • Formation of cooperatives – for crop and livestock marketing • Adjusting cropping calendar as per changing climatic conditions

Table 12. Priority measure from Group 2: Use of earth dams for flood control

Assets base	<ul style="list-style-type: none"> • Financial support • Material and equipment • Engineer • Labour • Land
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¹⁹ The KG noted that these forms of social networks are dying as people are moving to a more commercialized life system where no one can provide services for free. One participant stated that *'in the past people were helping each other in preparing their farms, but now a farmers will need to look for someone (farm workers) from Angola...nothing can be done without payment'*. The KG members also reflect on other cultural practices within the society where there are exchanges of food among the households by taking a basket full of food to the house visiting, and in return a lady from that house will put in something else for the guest to take-home. During hunger the similar practice was used to inform the relatives or friends that their loved ones are in trouble by putting a cow dung in a basket and take it to someone who is wealth. A cow dung is a message that someone is starving to death; in return a friend will put in food or drinks to assist the family.

	<ul style="list-style-type: none"> • Expertise on relevant income generation activities
Institutions	<ul style="list-style-type: none"> • Government • Non-governmental organisations (NGOs) • Donors/ agencies • Business people • TA and community members (all stakeholders)- participatory approach
Information & knowledge	<ul style="list-style-type: none"> • Site identification/EIA • Knowledge in building and maintain a dam • Relevant information on income generation activities
Innovation	<ul style="list-style-type: none"> • Dam built in such a way that appropriate livestock water supply, gardening and household use does not affect the water quality. • Fencing off the dam- safety for both animals and humans • Income generation projects
Flexible and forward looking	<ul style="list-style-type: none"> • Maintenance committee (community members, regional council, MAWF, technical advisor, rural water supply)

Table 13. Priority measure 3: Strengthening advice and options for seasonal climate information from extension officers

Assets	<ul style="list-style-type: none"> • Ensure there are enough extension officers • Increase the number of extension officers if needed • Stable flow of funds to extension officers for operational costs e.g. transport/fuel etc. • Demonstration plots where extension officers may be able to effectively put their messages across • Training workshops in the villages • Communication materials e.g. booklets, pamphlets, radios, picture messages, etc.
Knowledge and information	<ul style="list-style-type: none"> • Extension officers turning climate forecasts into actionable agricultural information • Forecasts to be more specific to areas (improving spatial resolution)
Institutions	<ul style="list-style-type: none"> • Strengthen outreach to the elderly, those living with disabilities, and those who cannot be at regular meetings • Engage with authorities who are influential in taking seasonal climate information to communities e.g. regional councilors, village headmen etc., thereby strengthening credibility • Build forums/platforms for exchanging and disseminating seasonal climate information between and among various

	institutions such as government ministries, traditional authorities and farmer associations
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3.5.5 Reflection and learning from the exercise

Some useful learning from completing this exercise was the need to obtain targeted data on the effects of different issues and hazards and adaptive responses on different social groups. The lack of adequate disaggregated data remains a problem in understanding different effects of the identified issues. In particular, gender and age disaggregated data of the chosen vulnerabilities and adaptive responses was identified as a critical requirement. Information provided suggests that men, youth, children, elderly and women are affected differently by hazards and require different adaptive responses to reduce climate-related risks.

There is also a need to obtain targeted data on differential impacts of climate change within a particular sector and livelihood activity across key stages of a production system. The impacts of climate change identified are inherently connected with people's livelihoods particularly across different production levels within a specific livelihood activity as the production systems depend directly on nature. Assessment of vulnerability can actively consider different stages of a production system to identify the impacts these hazards have on different stages of the production systems/livelihood activity.

4. Aligning findings with opportunities

As a final step of the VRA process, the KG engaged in an open discussion to identify key areas for further analysis and development. The discussion aimed to identify the ways the KG can align findings and suggestions with opportunities that exist in the area to inform future development plans. The discussion focused on what needs should be addressed and what actions need to be implemented in order to get a better respond to the priorities identified in the exercise.

Participants highlighted the need to promote conservation agriculture, which is part of the project funded by FAO. It was highlighted that the MAWF is mandated to look for opportunities and train extension officers and farmers on how to practice conservation agriculture. Suggestion was also made to look for an opportunity to include the Onesi Constituency during the Phase 2 or 3 of the MAWF's SCORE project when scaling up its programmes. At the constituency level, there is the Constituency Development Committee which can assist in looking for funds. Development of cooperatives was also suggested. These efforts can be made possible by applying for funds through the Millennium Challenge Account to train farmers in marketing of livestock.²⁰ It was suggested to follow-up and lobby MAWF to fund training of people. This can be organised by the Constituency Office or CDC. Similarly, institutions such as the Settlement Development Committee (SDC) and the Constituency Disaster Risk Management Committee could also be involved in the follow-up meetings, as well as. Traditional authorities should also be involved in raising awareness on the risks and responses discussed in the VRA workshop.

²⁰ MCA assisted with livestock marketing, however the project came to an end more than 2 years back

5. Reflections and Conclusions

5.1 Conclusions

The VRA illustrated the complexity of living with and responding to hazards and social issues experienced at the community level. It also illustrated the potential adaptive strategies that could be strengthened. Some of the responses are happening in small ways and need to be more systematically supported, while others are relatively new.

The VRA enables participatory knowledge generation and sharing

The VRA in Omusati helped bring together a wide range of stakeholders to discuss complex issues of relevance to people as well as their implications in long-term. The method creates a space for dialogue for different stakeholder groups to discuss issues they experience openly, and hence provides an opportunity to participatory knowledge generation and sharing for informed decision making. While there are other institutions such as the Constituency Development Committees where the local community can meet and discuss the issues they experience the VRA offered a more focused platform for detailed discussion of a range of hazards and issues and analysis for inclusive outcome.

Fostering relations between different stakeholder groups

The VRA provides an opportunity to strengthen stakeholder relations and collaboration between government actors at regional and constituency levels and community members which can assist the design and implementation of inclusive adaptive measures. By taking turns in identifying issues, assessing vulnerabilities and identifying different measures respective to different social groups, the exercise provided an opportunity for building trust among stakeholder groups including the local community (e.g. horticultural farmers, women working in pottery and handicraft, and small scale farmers), government officers at the regional and constituency level, NGOs and researchers.

Development of plans

VRA is important in supporting the opportunity to inform ongoing development plans at local, constituency or regional level on issues related to climate change adaptation, disaster risk management or development in general. The VRA provides an opportunity for the participants to ensure the inclusion of measures identified into future plans at different levels of governance. Similarly the measures designed can be aligned with existing funding opportunities or inform design of programmes for development organisations/humanitarian organisations such as Namibia Red Cross Societies.

Stakeholder informed research

In the ASSAR project, the VRA findings are used to develop a stakeholder-informed understanding of vulnerability that specifically addresses social differentiations. Similarly, the issues highlighted from the VRA will contribute to future work in the context of the Transformative Scenario Planning.

5.2 Reflections from the Knowledge Group

At the end of the workshop, the KG was asked to reflect on their experiences in participating on the VRA. The discussions were highly rated by participants as an opportunity to discuss important issues that would promote best practices. From these quotations it seems VRA was successful in establishing an environment conducive for exchanging information and joint knowledge about vulnerabilities and adaptive responses and creating a sense of agency among participants. Some of the reflections of the group are paraphrased below:

Knowledge exchange platform different stakeholder groups and local actors

- “When we come together from different parts of the society, we share information. Each of us has something useful information.”
- “I have learnt a lot from farmers. We are working with them on the ground; this was a good way to gather information.”
- “It was successful. Farmers are the most resourceful people when it comes to the issue of climate change.”
- “The workshop was productive and I found it an interesting platform. People have been involved in gathering information as part of the process.”
- “Impressed to hear from the farmers, they could easily participate in the discussions. They have a lot of knowledge when it comes to some of the issues and they are learning fast.”
- “The day was good...I think I am blessed to be here in this group. Through discussions I realized that it's the information that is needed. If all the people were here to hear what we have discussed it would be easier for us to deal with the changes in climate. I am impressed and surprised by the information [we get] some of it I didn't know about.”
- “I want to express our gratitude especially by guests from far...the information we get here is important and reflections are important for us.”
- “In this workshop, I learned ways and methods to deal with drought and floods.”
- “I have learnt a lot although I can't mention everything. I agree with previous speakers and I wish that the information received in the workshop isn't just packed away but implemented so the aims of the workshop will be achieved.”
- “It is quite amazing that the group here is so responsible. All information here came from them. I wish this type of activity continues and that there is a momentum that activities like this don't just happen in two years' time.”

On policy change and decision making

- “The assessment and research is useful in informing policy and decision making, not just at local level but even at the national level for policy change and implementation.”
- “The workshop was an eye opener. If I check what discussed here it is what is affecting our community members. It is going to help us to make decisions about things affecting our community members in the constituency.”

- “Fruitful; lots of stakeholders, thank farmers gave lots of information. Hope counselor is listening well. Interventions and other stakeholders follow up.”
- “The workshop was very successful. What we have been discussing here are the issues that affect us, even the mitigating factors are solutions that we didn’t have before. We would like to have the information so that when we forget we can go back to papers and remind us.”

Developing a sense of agency among participants

- “I call upon all of us that attended a very nice workshop to come up with an idea of how we can disseminate this information to the rest of the community. The information is not only for us it is the information for the community and those that are not able to tend. It is for us to go home and give that information to each and every one, the impact and the problem facing each and every one.”
- “I have learned a lot from the workshop...I will take a lot of the things from here back to the Community Development Committee who are living with communities. I will convey message to them.”
- “I learnt a lot from this workshop. I got more information from my friends when we were discussing in groups. The information about hazards affecting our livelihoods. If we implement tomorrow it would be a story of the past. Let's go and disseminate this information to our friends that are not here.”
- “The information we get here is not going into deaf ears.”

6. How the VRA findings link to ASSAR work

The VRA exercise identified priority hazards and issues for the Onesi constituency and Omusati region; levels of impacts on different social groups and future impacts of identified hazards on individuals and social groups. This is crucial for the social differentiation ASSAR research theme because it improves our understanding of which social group or livelihood is more exposed and sensitive to identified hazards and issues. Some of these hazards are climate related while others are not. This is helpful in understanding barriers and enablers to adaptation. Furthermore, the VRA provided an excellent platform to follow up with focus group discussions and in-depth interviews with community members from the Onesi Constituency and Omusati region. It also provided important baseline information for ASSAR's different research streams and issues to consider for Research-into-Use.

6.1 Understanding local governance

Although the VRA format does not focus explicitly on governance, in terms of including the policies and processes for managing natural resources and the relations between stakeholders, a number of insights did emerge. Cross-level governance is clearly critical for managing hazards and issues in the district. In Omusati Region, the Regional Council plays an important role in implementing projects and programmes to reduce disaster risk, support agriculture and alternative livelihoods. A number of the regional stakeholders were at the workshop and shared some of the challenges they face as well as the responses they are undertaking. At the constituency level, Regional Councilors and Traditional Authorities are seen as central to liaising and working closely with the regional level, to secure resources and share the concerns of villagers and Village Development Committees. Importantly, it is through the constituency and traditional authority governance arrangements, that local villagers express their concerns and needs. Therefore, if there are strong councilors and village leaders, with good relationships at the regional level, more progress is made with on the ground activities and securing resources.

At the VRA workshop, there was good representation from local villagers, village and constituency leadership and regional stakeholders. Having these stakeholders all in the same room to talk about how to adapt to hazards and issues and reduce the vulnerability was an important learning experience. It gave the participants a chance to hear the desires and challenges of living and responding at different levels. Often these forums do not exist and decisions are made that do not take into consideration the realities of operating at different scales.

6.2 Gendered experienced vulnerability

The facilitation and planning team hosted the VRA in March 2016 which is the harvesting season for most subsistence and small scale farmers. The two-day workshop required stakeholders from institutions and local community to put their work and responsibility aside to attend the workshop. It was interesting to note that 10 out of 22 participants were female. This illustrates a paradigm shift in cultural norms that prohibited women from attending workshops or events that require them to spend nights away from their household.

Men and women were both encouraged to engage and participate equally in the discussions. Although, the co-facilitator interpreted the process in local language, female farmers were reserved and slow in giving their input. However, facilitators were conscious of their needs and when encouraged to give input, it was valuable. The women tended to engage more actively in breakaway groups. The women who are formally employed and can express themselves in English were more actively engaged than the elderly female farmers. The stakeholder engagement process during the VRA did not reflect signs of gender inequalities because the VRA employs a broader gender-sensitive and flexible understanding of vulnerability.

During initial vulnerability analysis and determination of vulnerability scores, the KG in their discussions implied that impacts of drought and high temperature as well as floods and heavy rainfall affect men and women equally. The gender differentiation of these impacts is not obvious and would only come out more clearly during the impact chain analysis stage. This is because when the farming system is affected and lead to low crop output, it affects the whole household irrespective of gender. The KG members implied that there is social differentiation in terms of age to impacts of drought and flooding. The elderly and youth are reported to be more exposed and at risk of drought and flooding. However, the KG members mentioned that youth migrate to other areas and this has implications during drought because there is insufficient agricultural labour in the household. This affects elderly and women who are often left behind when male members of the household and the youth migrate for in search of employment. Women are culturally responsible for household chores and children rearing. This offers them limited opportunities to engage in activities that are at a distance from their villages. The opportunities that are available such as selling of basketry and pottery, vegetables and groceries are impacted by low buying power during drought or flooding.

Another gendered dimension is the impact of drought, high temperature and flooding on livestock farming. Loss of livestock changes the status of men in the community because in Oshiwambo culture livestock is seen as a sign of wealth and prestige. Lack of access to seasonal forecasts impede on planning and ability to respond wisely for men when faced with climate variability. This was illustrated by the fact that livestock farmers are caught unprepared by effects of drought. Timely and reliable access to seasonal forecasts would assist in deciding timely to destock and reduce herds of livestock.

Bad timing for cropping can also create gendered consequences because hunger can cause risky behaviour among female youth such as transactional sex for food and cash leading ultimately to unplanned and unwanted pregnancies. Other risky behaviours that tend to be more prevalent among male youth are livestock theft and increased street children. These risks affect intra-household relations between different age groups and genders in the household. When household cohesion is weakened, the resilience of the family to drought and floods is also at risk.

A number of opportunities to address vulnerabilities were suggested. These suggestions mainly call for implementation, provision, outreach and engagement activities plus dissemination of seasonal forecast and farming technology related information at local level in Onesi community. This strengthens both men and women because equal opportunity will be afforded to them by eliminating the problem of distance and time consuming travels to

access these services. Women are usually at a disadvantage because they are not able to travel longer distances leaving their family and household chores behind more frequently to attend trainings, demonstrations and information sharing events required to build resilience. Community-based adaptation strategies and opportunities to address vulnerability at local level would address that.

6.3 Ecosystem services

The VRA workshop made it clear that ecosystem services are very important for the communities' livelihoods but also that there is limited understanding of the impacts of climate change on these ecosystem services. For example, members of the KG speculated about the impacts of climate change on Mopane worms saying things like the eggs burst when it is too hot, or Mopane larva being eaten by birds during floods as well as drastic reductions of Mopane worms in general. The ASSAR ES questions intend to investigate the types of key ecosystem services found in the study sites, the spatial and seasonal patterns in these key ES as well as how different social groups benefit from these ES. Moreover, ASSAR ES questions intend to investigate how ES contribute to the wellbeing and vulnerability in the study area. The issues raised by the KG like the Mopane worms, aligns well with the questions on the changes in quantity and quality and distribution of ecosystem services over the past decades which ASSAR is trying to address.

Effects of climate change were viewed by most of the KG as the main cause of stalling the commercialisation of Mopane worms of which some members of the community had received training on and had travelled to several countries for familiarisation with methods that could have enhanced such commercialisation.

During VRA workshop, the KG raised other pertinent issues such as low livestock sales which otherwise could have been used to generate income to buffer crop failures as a result of droughts. Although the main reasons given for low livestock sales by the stakeholders seemed to be low market prices and inadequate marketing infrastructure, there seems to be other reasons such as cultural beliefs where status is measured by the number of livestock one has. However, discussions with KG also brought to light that many of the livestock end up dying during drought though some who can afford may purchase fodder from Etunda or other outlets to sustain the livestock until the next wet season. This however, proves to be costly to many as the returns from this activity become non-existent as no sales take place. This (livestock sales) could provide other avenues that could be used to reduce vulnerability and enhance wellbeing of the communities. Livestock sales during droughts could be used as a safety net and a control mechanism to reduce pressure on limited grazing. Key questions that arise from this observation may include what would it take to influence decisions of farmers to sale livestock in light of effects of drought, what other options could be available in terms of livestock that farmers could keep that could be used but are less susceptible to drought/flood effects. As evidence during discussions suggested that livelihood strategies that are derived from ES are declining and wellbeing affected as well as increased vulnerability exposure, thus means to reduce these need to be employed.

As far as the non-timber forest products are concerned, there seems to be a general decline in availability as highlighted by stakeholders due to persistent droughts in the past 4 to 5 years

hence reducing the available livelihood strategies. Community conservancies' members in the KGs also indicated that droughts had detrimental effects on wildlife numbers as grazing was greatly reduced and, as a result cash inflows mostly from tourists, are affected as there are less wildlife available for viewing. This links very well with ASSAR's questions on how benefits from ES accrue to different social groups and in turn linked to vulnerability exposure of different groups.

It also emerged that drought was reducing inflows into the Olushandja dam and oshanas thereby affecting the small scale horticultural farmers who depend on the water for irrigation purposes and households' food security. This was also deemed to contribute to unavailability of fish resources which many communities depend on especially during floods.

6.4 Knowledge systems

The VRA workshop was important for two aspects of knowledge system work. Firstly, it provided a general picture of the dominant forms and sources of climate risks, impacts and adaptation information in the area. Secondly, it provided an overview of issues around impediments to and opportunities for the improvement of the utility of the different sources of information in the area. This was aided by the fact that limited access, availability and use of seasonal climate forecast information was selected as one of the three top issues of concern in the area, that went on to be discussed over the duration of the workshop.

It was clear from discussions in the workshop that scientific knowledge dominates in as far as weather and climate information in the area is concerned. It was also apparent that there is a reduction in the utility and wide usage of local/indigenous knowledge in the area. People still recognise its relevance as indicated by suggestions for its documentation as put forward by the climate information KG vis-a-vis addressing the challenge of lack of seasonal/climate information in the area. The VRA workshop was therefore an important first step towards understanding the nature of and issues around climate and adaptation-related knowledge production, use and transfer in the area and the desire across levels for better access to climate information.

6.5 Research into use

In terms of RiU some of the main issues that came up were:

- Communication materials need to be translated into Oshiwambo.
- Verbal translation into Oshiwambo is time consuming and difficult as the language does not have as extensive a vocabulary as English.
- Stakeholders requested information to help them better understand climate change.
- Stakeholders requested information on what people in other countries in similar environments are doing to respond to the impacts of climate change.
- Stakeholders e.g. the councillor asked what we can do to help them in terms of implementation of interventions. When the TSP process was mentioned and the idea of writing a proposal to access external funding the councillor expressed that this would be favourably received by the community as they expect government intervention but see externally funded interventions as additional input.

Some ideas stemming from the issues raised include:

- A community exchange programme, whereby community champions travel to other communities in countries where ASSAR is working to learn about innovative measures that are being implemented.
- Communication material needs to be strategically developed and translated into Oshiwambo to improve understanding of climate change and to distribute lessons from other areas on effective adaptation interventions.
- One idea is to influence the school curriculum and get learning on climate change into the curriculum including what it is, vulnerabilities, impacts and possible responses.
- Because of the interest of the councillor in bringing financial support and interventions to his constituency it is important to invite him to the TSP training (30 and 31 May 2016 in Windhoek) and enroll him for the TSP workshop in September. We should also get funders or NIE staff to come to the TSP training.

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9. Appendices

*Appendix 1: Hazards and Issues in Omusati**

S/N	Hazard or issue	Justification
1	Drought, low rainfall (including seasonal shifts in rainfall season)	A common occurrence in north-central Namibia and a key issue affecting people's livelihoods and wellbeing. Increased water shortage associated with droughts, changes in precipitations and rainfall amounts directly affect agricultural yields and animal production.
2	Poverty and food insecurity	Poverty is most pronounced in rural areas of the region, and is often linked to food insecurity which is exacerbated by climate impacts. Poverty makes communities vulnerable as they have a low capacity to develop and sustain economic activities, are more reliant on natural resources that are more likely to be affected by climate impacts.
3	Limited knowledge about climate change (and adaptation strategies)	There is general lack of awareness about climate change and the risks it poses to the communities and their wellbeing.
4	Limited access and uptake of meteorological data	Relevant, timely and context specific meteorological information and advice do not reach farmers and communities in general. Both lack of understanding of the type of information and uncertainty on the information delivered affects uptake and increase sensitivity to climate impacts
5	Floods associated with heavy rainfall	Floods occur in Onesi and affect people specifically those living in settlements along oshana ²¹ . Floods not only spoil crops and lead to hunger, but also cause severe damage to infrastructure.
6	Limited uptake of new agriculture practices and farming technologies	There is very low uptake of new technologies and new approaches of farming by the subsistence farmers. New technologies of farming are introduced by central government and there seems to be no ownership by the local farmers e.g. preference on traditional Mahangu over new improved seeds such as Okashana.
7	Poorly resourced agricultural extension services	Insufficient number of extension officers
8	High temperatures	Increased water shortage associated with higher temperature directly affect agricultural yields and animal production.
9	Cultural practices preventing	There is a strong cultural prestige to have large number

²¹ Floodplain

	adoption of new practices	of herds which affects destocking as an option to reduce the impacts of drought. If one sell the stocks will feel less important than if s/he have more.
11	Lack of alternatives to agricultural based livelihoods	Insufficient access to diversified and resilient livelihood systems is prevalent in Omusati Region. Climatic impacts put stress on the majority of the population, who cannot find alternative employment options to farming.
12	Limited marketing and selling of animals	The lack of marketing of livestock is driven in part by strong cultural beliefs, economic factors and lack of institutional support in terms of available markets.
13	Youth and male members of the household migrating to urban areas	Migration to the cities is growing for a number of reasons, and could be amplified by climate impacts as living conditions in the countryside are deteriorating. As youth migrate to look for other sources of income, this movement may deprive farms from a necessary young workforce.
14	Access to potable water	

*this is the original list of hazards and issues developed by the facilitation team prior the VRA exercise. The list was presented to KG who reviewed and prioritise the issues for discussion accordingly.

Appendix 2: Social Groups and Livelihoods Activities in Omusati*

	Social Group & livelihood activities	Justification
1	Subsistence crops and livestock farmers	Majority of the local community are involved in subsistence crops farming and livestock keeping. Keeping cattle is not only a key livelihood strategy but also a cultural practice for communities in the north-central Namibia. Irregular rainfall poses serious threats to food security and livelihoods of the people.
2	Harvesting of non-timber forest products e.g. Mopane works and Marula	There is a number of Mopane worm harvesters and Marula processing in Omusati. This being of high importance in regards to income generation for women.
3	Small Scale Traders (not own products)	This group offers potential for becoming a more relevant livelihood activity outside agriculture.
4	Pottery, handcrafts (basketry) and thatching grass harvest ²²	Relevant income generating activity for women; at the same time being an alternative to agricultural based livelihood.
5	Fish harvesters	Fish harvesting
6	Small Scale emerging farmers	They do irrigate their crop land and keep livestock. This is important in terms of providing seasonal employment for the local community.
7	Horticultural farmers	These farmers produce more and sell for income. They own more than 200 cattle, more than 15 storage facilities/baskets and use improved agricultural tools.
8	Marginalized groups	Minority group such as San, Ovaherero and Himba make up a small percentage of local community. This group fully depend on government e.g. food basketry, they are very poor, own small fields of Mahangu and work for others than work for themselves.
9	Those on social grants	Pensioners, orphans & vulnerable children, disabled, and HIV (AIDS) suffer make up a considerable percentage of the local community. The livelihoods of these social groups depends much on social welfare programmes such as pensions and other social security benefits and remittances.
10	Unemployed youth (<35yrs)	These are out of school youth that are still in the Onesi Constituency. Most youth have migrated to urban areas in

²² During the discussion KG suggested to put Thatching together with other Non-Timber Forest Products (NTFPs)

		search for employment and income generation opportunities.
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*this is the original list of social groups developed by the facilitation team. The items were presented to the KG for their review and discussion accordingly as presented on Table 2 above.

Appendix 3: VRA Knowledge Group Participants

Day One: 8th March 2016

	Name	Gender	Occupation
1	Beata Nambundunga	F	Farmer
2	Sara Titus	F	Community Court Judge
3	Malakia shoombe	M	Uukolonkadhi Secretary T/A
4	Pineha Kapuka	M	Farmer
5	Jeremia Shou Shetunyenga	M	CDC member (Teacher)
6	Paulina Mbute lipinge	F	Teacher
7	Timoteus Muhama	M	Branch Assistant - NRCs
8	F. Ndeshihafela Valombola	F	CDC member
9	Hilya Amukwelele	F	Youth Officer, Ministry of Youth
10	Ruusa Musole	F	Student – UNAM, Ogongo
11	Regina Ndumba	F	Student – UNAM, Ogongo
12	Cecil Togarepi	M	Lecturer - UNAM, Ogongo
13	Edmund Ilishuwa	M	Chief Administrative Officer (CAO), Onesi Settlement
14	Victoria N. Shooya	F	Chief Administrative Officer (CAO), Onesi Constituency
15	Nestor lipinge	M	Chairman, Uukolonkadhi Community Forest
16	Elifas Nuuyoma	M	
17	Filippus Wambuli	M	Lecturer, UNAM - Ogongo
18	Erastus Shiwadha	M	Chairman, Uukolonkadhi Conservancy
19	Lasarus Gregorius	M	Forestry Technician, MAWF - DOF
20	Ndapanda Kanime	F	Deputy Director, ORC

21	Epfania Lepala	F	SCORE Regional Coordinator
22	Mirjam N. Kaholongo	F	Regional Project Coordinator Oshana, Omusati, Kunene. SCORE Project - MET

Day Two: 9th March 2016

	Name	Gender	Occupation
1	Beata Nambundunga	F	Farmer
2	Sara Titus	F	Community Court Judge
3	Malakia shoombe	M	Uukolonkadhi Secretary T/A
4	Pineha Kapuka	M	Farmer
5	Jeremia Shou Shetunyenga	M	CDC member (Teacher)
6	Paulina Mbute lipinge	F	Teacher
7	Timoteus Muhama	M	Branch Assistant - NRCs
8	F. Ndesihafela Valombola	F	CDC member
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20	Ndapanda Kanime	F	Deputy Director, ORC
21	Epfania Lepala	F	SCORE Regional Coordinator
22	Mirjam N. Kaholongo	F	Regional Project Coordinator Oshana, Omusati, Kunene, SCORE Project - MET

Appendix 4: Additional images

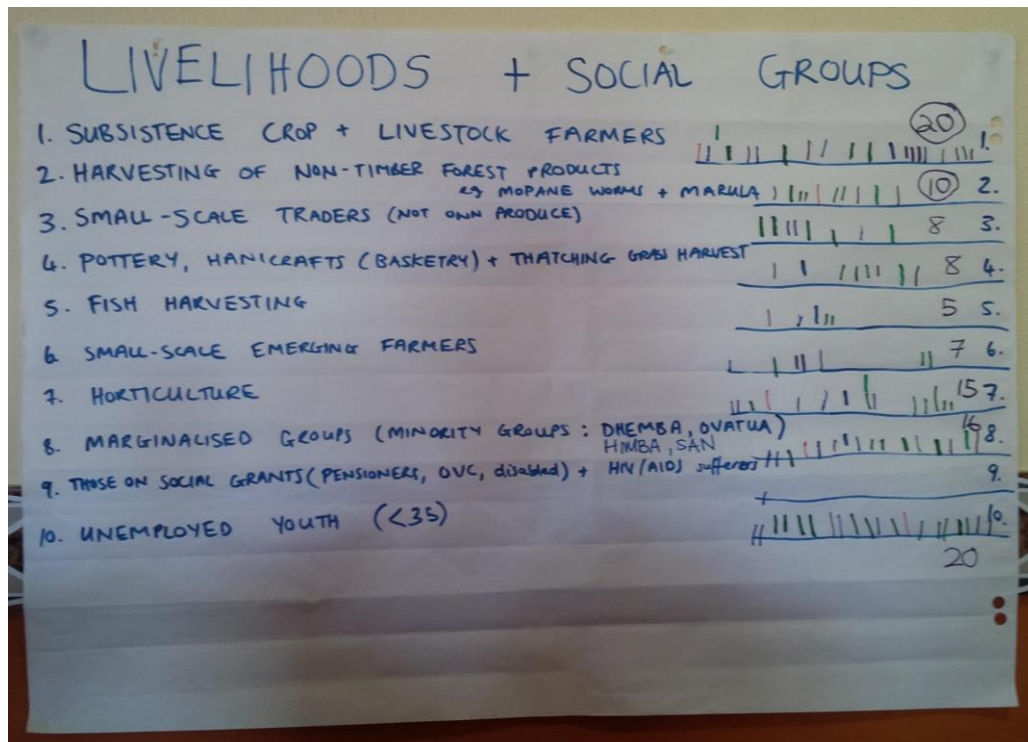


Figure 8. Voting/ranking output for 'social groups' in Omusati Region, Namibia

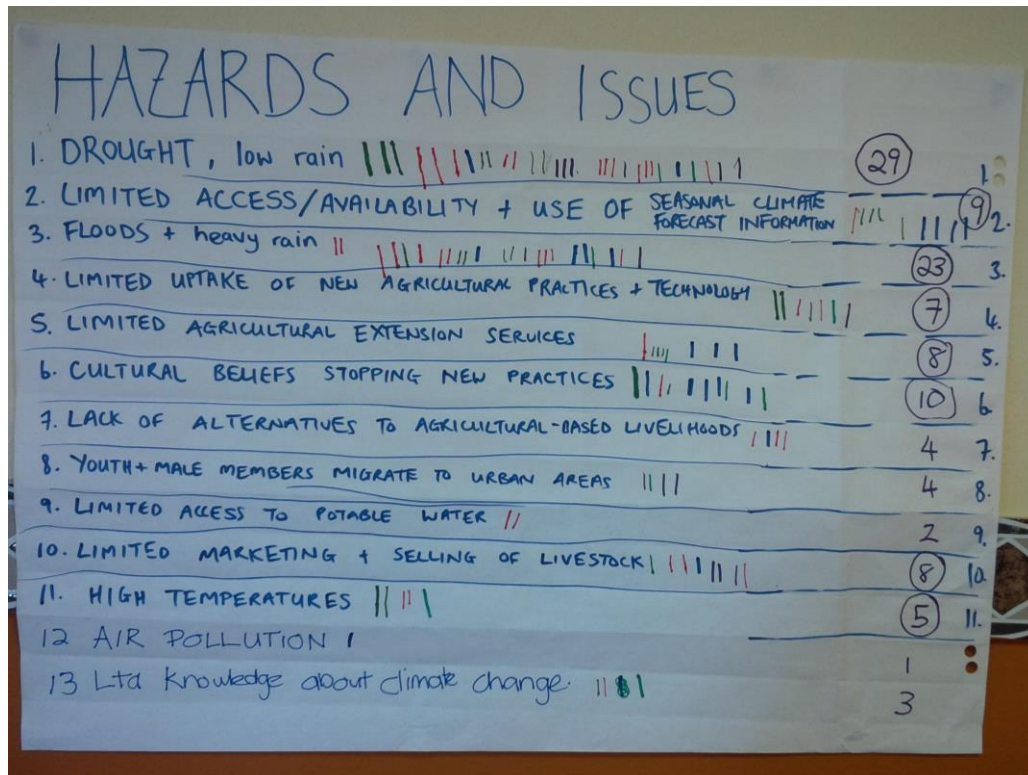


Figure 9. Voting/ranking output for 'hazards and issues' in Omusati Region, Namibia



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