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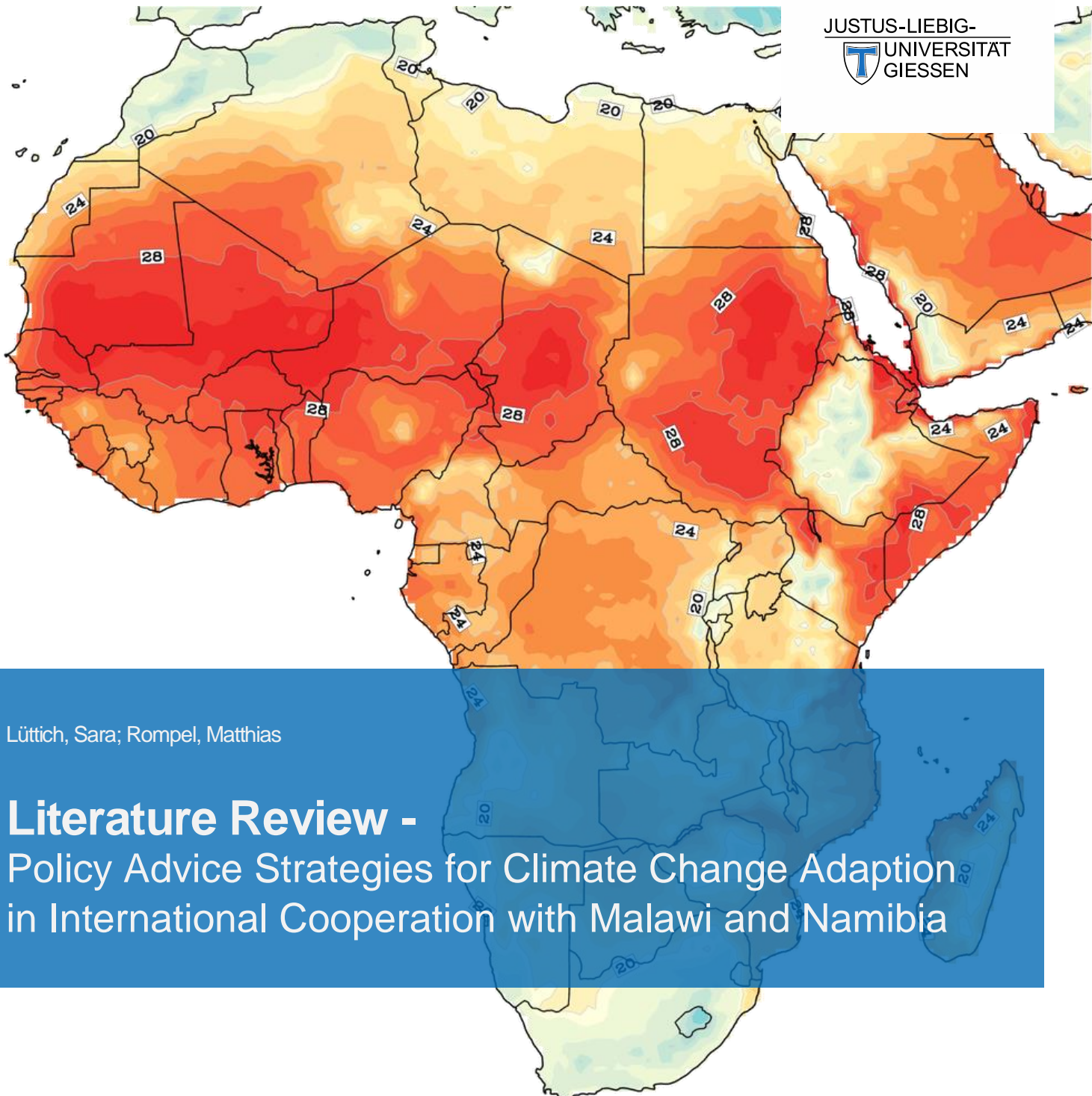


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# Literature Review - Policy Advice Strategies for Climate Change Adaption in International Cooperation with Malawi and Namibia

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**“Social Climate Change Impacts and Sustainability Innovation in Southern Africa and Northern South America (NISANSA)”**

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**“Soziale Klimawandelfolgen und Nachhaltigkeitsinnovation im Südlichen Afrika und Nördlichen Südamerika (NISANSA)”**

*Work-Package 7 (Sociology)*

**Policy Advice Strategies for Climate Change Adaptation in International Cooperation with Selected Member States (Malawi, Namibia) of SADC (Southern African Development Community)**

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## List of Abbreviations

ACC	<i>Adaptation to Climate Change</i>
BMZ	<i>German Federal Ministry for Economic Cooperation and Development (Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung)</i>
CBRNM	<i>Community-Based Natural Resource Management</i>
CC	<i>Climate Change</i>
COP	<i>Conference of the Parties</i>
FISP	<i>Farm Input Subsidy Programmes</i>
GDP	<i>Gross Domestic Product</i>
GHG	<i>Green House Gases</i>
GIZ	<i>Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ) GmbH / Germany Agency for International Cooperation</i>
GoN	<i>Government of Namibia</i>
INDC	<i>Intended Nationally Determined Contributions to the UNFCCC</i>
LDC	<i>Least Developed Countries</i>
MEFT	<i>Ministry of Environment, Forestry and Tourism (Namibia)</i>
MEA	<i>Multilateral Environmental Agreements</i>
MoNREE	<i>Ministry of Natural Resources, Energy and Environment (Malawi)</i>
NAP	<i>National Adaptation Plan</i>
NAPA	<i>National Adaptation Programme of Action</i>
NDC	<i>Nationally Determined Contributions to the UNFCCC</i>
SADC	<i>Southern Africa Development Community</i>
UNFCCC	<i>United Nations Framework Convention on Climate Change</i>

## Key Terms and Concepts

Please note that key terms and concepts are based on the definition from IPCC. Climate change is extremely complex and there is a plethora of definitions on climate change. It is therefore reasonable to refer to the most commonly used key terms and concepts to create a common ground.

Moreover, it must be emphasized that the terms “developing country”, “development country”, “least developed country” or “developed country”, which are still commonly used at political level and by development cooperation, will be used in quotation marks as – from a social scientific postcolonial perspective – these terms are associated with the idea of linearity, according to which development suggests a model in which countries have different stages of development, whereby a “developed” country would be on a higher (industrialized and modern) level than a “less developed” country. This linear stage model of development has an inherent value attachment originating from a Western, Global North perspective, that can easily produce the image of “non-developed” equalling “underdeveloped” and “un-progressive”. Hence, the usage of these terms is deemed to be difficult.

<i>Adaptation</i>	<i>“In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate and its effects” (IPPC, 2018: 542).</i>
<i>Climate Change</i>	<i>“Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic</i>

	<i>changes in the composition of the atmosphere or in land use” (IPPC, 2018: 544).</i>
<i>Climate Variability</i>	<i>“Climate variability refers to variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability)” (IPPC, 2018: 546).</i>
<i>Governance</i>	<i>“A comprehensive and inclusive concept of the full range of means for deciding, managing, implementing and monitoring policies and measures. Whereas government is defined strictly in terms of the nation-state, the more inclusive concept of governance recognizes the contributions of various levels of government (global, international, regional, sub-national and local) and the contributing roles of the private sector, of nongovernmental actors, and of civil society to addressing the many types of issues facing the global community” (IPPC, 2018: 550).</i>
<i>Local Knowledge</i>	<i>“Local knowledge refers to the understandings and skills developed by individuals and populations, specific to the places where they live. Local knowledge informs decision-making about fundamental aspects of life, from day-to-day activities to longer-term actions” (IPPC; 2018: 553).</i>
<i>Resilience</i>	<i>“The capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure while also maintaining the capacity for adaptation, learning and transformation” (IPPC, 2018: 557).</i>
<i>Risk</i>	<i>“The exposure to potentially unfavourable conditions or circumstances that can result in economic, cultural, or physical loss” (Bunting et al., 2013: 227).</i>
<i>Risk Perception</i>	<i>Refers to people’s beliefs, attitudes, judgments and feelings towards hazards, which threaten things people value or rather people’s concern and worry about climate change (Elshirbiny and Abrahamse, 2020: 242; Steynor et al., 2020). The perception of risk, “is a mental construct” (van der Linden, 2015b: 116), ergo it is socially and culturally framed (Mahmud, 2016: 43).</i>
<i>Traditional Knowledge</i>	<i>Traditional Knowledge (often synonymized with Indigenous or Ecological Knowledge) “refers to the understandings, skills and philosophies developed by societies with long histories of interaction with their natural surroundings” (IPPC, 2018: 552).</i>
<i>Vulnerability</i>	<i>“The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt” (IPPC, 2018: 560).</i>

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## 1. Introduction

Climate change is not only a natural science phenomenon but needs to be understood as an interplay of multiple actors with different interests and different cultural and societal conditions. It is hence socially constructed. Moreover, the social dimension must be considered in the climate change discourse that has been (discursively) dominated by a technical-economic perspective and the feasibility and costs of adaptation strategies and technologies in several frameworks (e.g. IPCC reports II and III) in the past decades (Conrad, 2008: 3083).

Consequently, the three-year (2021-2024) BMBF (Federal Ministry of Education and Research) funded collaborative research project “Social Climate Change Impacts and Sustainability Innovation in Southern Africa And Northern South America” (German abbr. “NISANSA”) of the Universities of Marburg (UMR) and Giessen (JLU) explores the **social consequences** of climate change impacts in a trans-regional and comparative perspective, focussing on southern Africa and northern South America. In seven “work packages” and together with international cooperation partners, empirical studies are being conducted in southern Africa (Angola, Botswana, Malawi, Namibia, South Africa) and northern South America (Brazil, Ecuador, Colombia, Venezuela). The collaborative research project aims to generate new insights to understand, shape, plan and govern climate-related social change processes, and to make its knowledge bases available in the countries of the Global South. The seven work packages are sub-projects which are interdisciplinary with contributions of Social Anthropology, Sociology, Human Geography, Political Science, Economics, and Ecology.

This **literature review** forms part of the groundwork of the sub-project “Policy Advice Strategies for Climate Change Adaptation in International Cooperation with Member States (Malawi, Namibia) of SADC (Southern African Development Community)” and aims to map the current state of research on climate change, adaptation, policies and actors. It focusses on Malawi and Namibia (with reference to the Southern African Development Community (SADC) as the regional economic community) and on the role of international cooperation.

Both Namibia and Malawi are being located within the area’s most at risk of climate change in Africa. Recent developments such as elections, upcoming climate policy measures (updating the NDCs, and the forthcoming sixth IPCC report in 2022) and lastly, the impact of the COVID-19 pandemic have marked the current economic and political situation in both countries. Despite their alleged differences – Namibia is rated as upper-middle-income country whereas Malawi ranks among the so-called least developed countries – both countries are subject of the research as they are member states of SADC and are facing similar climate change issues. Besides this and despite different starting-points, several barriers occur in the same way for both countries. Moreover, international donors act and support both countries and SADC by developing and assisting with projects to enhance the adaptation and resilience in the region. It is therefore interesting to analyse the actions of international stakeholders, and to identify successful paths which might be replicated by other stakeholders or countries.

Particularly, in the past few years, the body of **research on climate change (adaptation)** in Southern Africa **has grown** steadily. In this report we intend to take stock of relevant literature, and therefore, outline important findings and identify research gaps that are still present. However, it has to be pointed out that this review is not comprehensive and does not claim to depict every study undertaken in Malawi and Namibia on the issue. Rather, the purpose is to cover a broad spectrum of aspects being involved when addressing climate change, with regard to its social, cultural, and political dimensions.

The structure of the report is as follows:

After the short introduction in **chapter 1**, noteworthy findings are being summarized in **chapter 2**. A brief overview of the respective country, Malawi and Namibia, in terms of relevant (predominantly sociodemographic and country) data, current political and economic situations as well as the impact of the COVID-19 pandemic and development challenges is given in **chapter 3** and **chapter 4**.

**Chapter 5** exemplarily illustrates (social) climate change impacts on smallholder farmers, pastoralists, and rural and urban communities: This is, for instance, the effect on poverty, food security, health, gender, economic, and migration patterns.

Subsequently, findings and issues about (risk) perception on climate change and its impacts among the Malawian and Namibian population are being depicted in **chapter 6**, with a brief overview of current theoretical approaches to measure risk perceptions and importantly associated dimensions involved beforehand.

A more extensive analysis is provided in **chapter 7**, which focuses on climate change adaptation strategies in Southern Africa. By describing international, continental and regional climate change frameworks, approaches on the regional level (SADC), as well as national climate change strategies, plans and institutional frameworks both in Malawi and Namibia, the current policy landscapes on climate change are mapped. The focus lies on the agricultural sector, followed by a large sub-chapter with summaries of multiple studies, reports and articles on adaptation challenges. The chapter concludes by pointing out findings of several authors on the key issue “implementation” and the function of governance, responsibilities, and role distributions within adaptation processes.

Relating to one of the objectives of the sub-project, **chapter 8** deals with literature on the role and challenges of development actors and policy stakeholders in climate change (adaptation) processes.

**Chapter 9** draws a conclusion to the review, and **chapter 10** provides the bibliography of all studies, reports, articles and papers mentioned in this literature review.

## 2. Summary

The effects of climate change are seen around the world, but the African continent is particularly severely hit by climate hazards (IPCC, 2020).

This is even more challenging in the sense that many African countries are simultaneously facing further socio-economic and political issues, e.g. poverty and social inequality, which will be strongly amplified by climate change impacts. In the past years, many (southern) African countries set climate change policies higher on their political agenda, but notwithstanding this observable increase at a national level, their implementation often does not take desirable effect (Mataya et al., 2020; Curran et al., 2018). This shows that despite the will and commitment to tackle climate change which is mirrored in policies, the mere existence of policies does not entail a successful implementation. Barriers, among others, are not seldom financial means (Schaller et al., 2020), and insufficient policy coherence among ministerial sectors (Curran et al., 2018). This poses a problem as “policy coherence is essential to ensure sectors are harmonized and to facilitate mainstreaming of climate change adaptation planning” (Lewis and Su, 2021: 17). However, not only implementation hurdles need to be mentioned, but also the general awareness and perception of climate change of the public which is in a reciprocal relationship to governmental actions and also can impel the alignment of political response to some extent. Hence, an analysis of risk perceptions is crucial as they build and



strengthen both willingness to act on climate change respectively emotional and cognitive engagement and the types of information people use or need to take action (Steynor and Pasquini, 2019: 2; Pandey, 2019: 229). Thus, risk perception and environmental awareness have an enormous effect on risk management behaviour and the formulation of adaptation strategies (Brito et al., 2019; van der Linden, 2015b; Steynor et al., 2021).

It has been proven that climate change in countries of the global South is being associated with a higher risk than in most countries of the global North; indeed as a consequence, building the technical capacity of human resources and mainstreaming climate change adaptation into policy development is being strived, but sufficient adaptation to the impacts of climate variability and change and implementation of those strategies are partially failing in most sub-Saharan African countries, as Mataya et al. (2020: 781) emphasize. One can even argue that policy response to climate change and adaptation given the problems that are already occurring and will become more acute in the future as a result of climate change remains rather “slow” in southern Africa (Rompel, forthcoming).

Moreover, in many “developing” countries, we see conditions which do not exist in industrialized states. For instance, the role of international agencies and donors, such as USAID, UNDP, BMZ, or GIZ is extremely important since they often step in when governmental structures fail, as Pardoe et al. (2020: 3) state. Those interventions by external, international agencies occur more frequently in countries from the Global South, and often derive from historical reasons that are still partially mirrored in present governmental structures: “It is, thus, critical to consider attempts at policy influence and finance disbursement for adaptation in the context of wider debates on aid effectiveness and African states which have been the focus of several decades of attempts to incorporate or strengthen political/political economy analysis” (Pardoe et al., 2020: 3)

This can be a positive force in terms of providing supplement funds for domestic budgets, supporting guiding projects to reduce vulnerability and to manage adaptation, and implementing international climate frameworks at the national level; however, the main responsibility remains at the governments: it is their task to take on and apply the support provided by international actors (Rompel, forthcoming: 21). The fact that policy development in Southern Africa is highly influenced by the external financial and technical support by multi- and bilateral institutions is also outlined by Curran et al. (2018), who also emphasize the importance of policy coherence and joint coordination. Although many sub-Saharan African countries have been established cross-sectoral platforms, there is a clear lack of coordination, but also the strong reliance on donor funding and hence, the lack of control capacity might block effective coordination and cooperation (Curran et al., 2018). Thus, a clear and proper understanding of the respective roles and division of labour but also policy coherence (within and across sectors and at different levels) of both the governments and international cooperation needs to be addressed continuously.

This literature review furthermore reveals that within the past few years, research on climate change in SADC member states has been grown steadily. Yet, there has to be a differentiation of issues occurring: It can be drawn from the evaluated literature that many publications do exist on examining (social) climate change impacts on predominantly rural communities both in Namibia and Malawi. The focus often lies on smallholder farmers, but also more marginalized groups such as pastoralists or groups living isolated. Few studies also consider the increasing urbanization or rather urban areas (e.g. Steynor and Pasquini, 2019; Steynor et al., 2020; Pandey, 2019; Brown, 2011). In terms of impacts, the majority of the studies describe

similar findings: Be it the severe impacts of climate change on socioeconomic aspects (employment and GDP); on the water and electricity sector (shortages due to droughts, reduced rainfall, reduced river flow, access to water); on social practices, forms of work (*ganyu* contracts, unemployment) and way of lives (destruction of livelihoods, poverty); on migration patterns (urbanization, internal migration, land-use conflicts); on health (increase in malnutrition and diseases); as well as on gender-related tasks (stronger vulnerability of women, but also effects on men by migration forces, among others) → **For more details please compare chapter 5.**

There is a **numerous amount of research on climate risk perception** and public discourses in “**developed countries**” (e.g. Capstick et al., 2015; Leiserowitz, 2006; van der Linden, 2015a) whereas the **African context** is still rather **little investigated** in this regard (Steynor and Pasquini, 2019; Corner et al., 2014). Lacks of existing data therefore impede detailed elaboration of all factors playing into the composition of climate change perception **in African countries** and urgently **need further examination** (Steynor and Pasquini, 2019; Dadoo and Hugman, 2012; Pandey, 2019). For instance, a recent study by Steynor et al. (2021) covering an east African context indicates that the (individual) psychological distance and direct experience to an extreme climate event, the perceptions of these risks but also social norms are in a strong relationship on taking on climate change actions.

To summarize, most persons, groups and households surveyed in rural and urban areas of Malawi and Namibia confirm and perceive changes and increases in droughts, floods, and amplified famine et cetera. However, noteworthy is that despite some aggravation of one own's situation, sometimes climate change neither has been perceived as a possible main driver of reduced yields, poor soil fertility or worsened droughts nor could be found a strong understanding of what climate change actually is or what its causes are. Not seldomly, strong religious beliefs are used for explanations, but also cognitive barriers such as low educational level, constrained access to (scientific) information, or the belief that the government would be responsible for providing climate information or to act in general (e.g. Bakuwa, 2015; Inman et al., 2020).

However, not all studies are in line with these findings: For example, in contrast to the findings by Angula (2010) and Bunting et al. (2013), in another case study “education level, household level, farm size and temperature shifts were found to be statistically insignificant in terms of influencing farmer's perception of climate change conditions” (Montle and Teweldemedhin, 2014: 448). Interestingly, subtle differences could be observed especially among urban interviewees' perceived psychological distance, as it was the case in Malawi and Tanzania: Statements about the level of climate concerns might suggest “**that people in positions of power see themselves as more distant from risks than those who have less power**” (Steynor and Pasquini, 2019: 6) as they are less directly exposed to climate change impacts than people, for instance, working in agricultural sectors (farmers etc.).

Furthermore, it must be pointed out that several studies emphasize a **mismatch between local perceptions of changing climate conditions and the evidence within meteorological data** in southern Africa (Sutcliffe et al., 2016; Meze-Hausken, 2004; Rao et al., 2011; Osbahr et al., 2011; Simelton et al., 2013). In some cases, no evidence of rainfall data could prove the perceived seasonal change of rainfalls (as also in Botswana and Malawi, see Simelton et al. (2013)). Reasons might be that either there are errors in the studies conducted, other meteorological data were not included or other factors affected the perception of agricultural producers such as persistent national narratives about maize, where maize is associated with food security and high subsidies are spent to maintain the dominant role of maize as **the** staple food par excellence, as Sutcliffe et al. (2016: 1220) consider.

**For further research, this might be relevant information to consider as there should be discussed to what extent climate change or human-induced/societal activities are the reason for worsening of livelihoods → For more details please compare chapter 6.**

Concerning the SADC level, literature on climate change besides SADC reports and other analysis provided by SADC itself (Quinn, 2020; Chesterman et al., 2020b; Chevalier et al., 2020; Gosling et al., 2020; Chesterman et al., 2020a), explicitly investigating SADC *structures* or *regional and national linkages* (and not only on particular SADC member states) is not very extensive, up to now.

On the **regional (SADC) level, multi-sectoral, comprehensive policy frameworks concerning climate change adaptation strategies were developed later than on the national level** (Schaller et al., 2020: 56). This underlines the nations' autonomous capacity to act but illustrates a weak support of SADC to its member states in terms of implementation. However, "this has been changing recently with respective frameworks being developed and support of implementation being funded by major donors, such as EU (e.g. GCCA+ Programme)" and **projects** supported by GIZ, such as ACCRA (Adaptation to Climate Change in Rural Areas in Southern Africa covering a synopsis of climate risk assessments in the region 2015-2020) and C-NRM (Climate Resilience & NRM in SADC-Region 2021-2023) (Schaller et al., 2020: 56).

The **agriculture sector** as a key sector for the population in Namibia and Malawi is severely impacted by climate change impacts. Therefore, intensive research has been conducted concentrating particularly on the identification of adaptation strategies and coping mechanisms among rural (smallholder) farmers. Noteworthy is the promotion and implementation of so-called **Climate Smart Agriculture (CSA)** concepts, which include conservation tillage, water-saving techniques, and switching to drought-resistant crops and livestock breed. Recommendations drawn from different studies point out the need for better training, stronger stakeholder collaboration as well as greater advocacy in policy since there is evidence that these practices have partially not been implemented successfully so far.

**Concerning climate change adaptation policies, it shall be emphasized, that barriers, hurdles and challenges identified in selected 46 studies covering Malawi, Namibia and Southern Africa are fairly similar and partially overlapping, which means that despite subtle differences arising from different political landscapes, these barriers are described across the region. → Compare chapter 7, see literature review.**

Especially in Namibia, a plethora of legal frameworks has been adopted so far to tackle climate change adaptation challenges.

However, and valid for both Malawi and Namibia, the constrain **is the implementation**, which is underlined by almost all authors and researchers dealing with this issue (MEFT, 2021: 24). **→ chapter 7.**

Implementation **barriers** often emerge in sectors in similar ways, **despite** having multiple, sophisticated or **ambitious policies**. Reasons for those implementation **difficulties** are various factors, such as **severe underinvestment, limited capacity** and **technical skills, poor coordination** among stakeholders, **weak regulation** and enforcement, **bureaucratic efforts mistrust** between public and private institutions and a **lack of monitoring** (Remmert, 2016; 2020). As mentioned in the IPCC report of 2014, adaptation responses and capacities could be enhanced by **replacing hierarchical governance systems** and accompanying siloes within these structures **with integrated, multilevel and flexible governance approaches** (Nian and Ruppel, 2014: 1228). Moreover, there are different approaches to

overcome implementation issues such as community-based management approaches, including participatory and bottom-up methods and approaches towards “smart implementation”.

As already mentioned at the beginning of this chapter, international stakeholders play an important role in the climate change adaptation processes. Particularly within the last three years, investigations about beneficial, but also problematic dimensions occurring in this regard, have been conducted by a range of authors (Pardoe et al., 2020; England et al., 2018a; Curran et al., 2018; England et al., 2018b). The role of these actors particularly in pondering innovative solutions for still existing trade-offs or barriers are an area in which further research is needed, also against the background of recent elections, the upcoming sixth IPCC report in 2022, and other developments such as the Covid-19 pandemic.

### 3. Malawi

#### Overview

The Republic of Malawi is a land-locked country located in south-eastern Africa that borders Tanzania, Mozambique and Zambia. Its constantly increasing population is 18,6 Mio. (as of 2019), of which 17,2% live in urban areas (GoM, 2021). Besides English as the official language, Chi-Chewa is widely spoken by seven to eight million people (GoM, 2021; NSO, 2019). 12 ethnic groups could be stated in 2018, with Chewa (~34%), Lomwe (~19%), Yao (~13%), and Ngoni (~10 %) being the largest of them (NSO, 2019: 20). Approximately 80-83% of its population belongs to Christian religions, followed by 13% Muslims (Ott, 2020: 118; Minority Rights Group, 2021).

In terms of HDI, Malawi ranked 174 out of 189 countries and territories in 2019, which poses the republic among the lower developed nations and also below the average for countries in Sub-Saharan Africa (0.483 vs 0.547) (UNDP, 2021a). Therefore, it counts to the world’s least developed countries (LDCs) (Stringer et al., 2009: 757).

Although there is an observable increase in life expectancy at birth (63,7 years), in (primary) education and a decrease in infant mortality (38 at 1000 live births), poverty and inequality remain extremely high (national poverty rate: 51.5% in 2016/ extreme national poverty: 20.1% in 2016/17) (Destatis, 2021a; Destatis, 2021a; World Bank Group, 2021c; NSO, 2019). The literacy rate for persons aged over 15 years is 83% for males and 68,8% for women (World Bank Group, 2021c).

In comparison to its neighbour countries, Malawi’s total area of 118 484 km<sup>2</sup> is fairly small-sized, with a length of 900 km and a width of about 250 km (FAO, 2006: 1), whereby 47% of its total area is agriculturally cultivated (NSO, 2019). Accordingly, “(t)he agricultural sector contributes approximately 30 per cent to national gross domestic product (GDP) and provides employment for over 80 per cent of the population (World Bank Development Indicators, 2021)” (Ignaciuk et al., 2021: 1).

Malawi’s climate is characterised by tropical continental conditions with cooler temperatures in the highlands (GoM, 2021; FAO, 2006: 1). Lake Malawi, located on the eastern border, comprises a huge part of the surface water bodies that cover 20% of the entire state (FAO, 2006). Between November and April, precipitation is strong, followed by a dry season from May to October (Asfaw and Maggio, 2018: 5). Four topographic zones can be stated comprising the highlands of Mulanje, Zomba and Dedza in the southern part of the country, the plateau of the central and northern regions; the rift valley escarpment and last, but not least

the rift valley plains along the lakeshores of Lake Malawi, the Upper Shire and Lower Shire Valleys (FAO, 2006).

### Political and Economic Situation

Malawi became independent in 1964, after being under the British protectorate and thereafter a part of the colonial Federation of Rhodesia and Nyasaland (MoNREE, 2011: 4). Since the end of a one-party rule in 1993, it has been holding multi-party presidential and parliamentary elections every five years (World Bank Group, 2021c; Meinhardt, 2020: 31). After the May 2019 elections were annulled, previous presidential elections happened in June 2020, with Lazarus Chakwera of the Malawi Congress Party being elected the new president (World Bank Group, 2021c).

In terms of National Development Frameworks, Malawi follows the so-called “Malawi Growth and Development Strategy (MGDS)”, which displays a series of five-year plans. The current Strategy (MDGS III) aims to build a protective, competitive, resilient nation, combating<sup>1</sup> poverty and improving the education, energy, agriculture, health and tourism sectors (Botha et al., 2018). This programme, valid from 2017 until 2022, furthermore aligns to international frameworks, such as the Sendai Framework, the SDGs, SADC Guidelines and the Agenda 2063 of the African Union (Botha et al., 2018: Table 1). Also noteworthy is the Malawi 2063 Vision with the aim of evolving into a “wealthy and self-reliant industrialized ‘upper middle-income country’” (World Bank Group, 2021c).

In comparison to other African countries, the republic has a peaceful environment and more or less stable democracy but notwithstanding this, necessary economic transformations and political reforms to tackle development challenges, which the state is facing, have been failed to appear so far and hence, it would be exposed to the risk of becoming a failed-state scenario if necessary political implementations are missing in foreseeable future (World Bank Group, 2021c; Transparency International Deutschland e.V., 2021; Rompel, 2020: 17,25; Meinhardt, 2020: 50).

Malawi’s economy predominantly relies on agriculture based on traditional, less mechanised rain-fed methods, followed by the forest and fishing sector. Maize is considered the staple food with contributing to 52% of the total agricultural crop area (World Bank Group, 2011: 8). Approximately 80% of the population living in rural and peripheral areas is completely dependent on natural-resource endowments, as Munthali et al. (2019) state, and therefore is highly exposed to vulnerability and external climate shocks. Malawi faces increasing deforestation and forest degradation as agriculture expands, infrastructure develops, charcoal is being produced illegally, urbanization and population growth, and cultivation shifts (Munthali et al., 2019). Deforestation, desertification and soil erosion can further be linked to biomass, which poses the main source of energy for most of the Malawian population. Charcoal and fuelwood production is high since electricity coverage remains fairly low (Munthali et al., 2019).

Moreover, other socio-economic factors such as rapid population growth, the low infrastructure of electricity and energy or political issues like corruption present hurdles that hamper the state’s development (Rompel, 2020). The latter, for instance, makes Malawi being placed in the back third on the Transparency International Ranking (129<sup>th</sup> out of 180 economies in 2020)

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<sup>1</sup> These goals are aligned with the SDGs implying the achievement or enhancement of sustainable inclusive growth, inclusive and human capital development and a transformation where resilient people and institutions can withstand economic and environmental shocks (GoM (2017).

and confines its political potential despite its democratic structures (Transparency International Deutschland e.V., 2021).

Drawing upon Chabal and Daloz (2001), Rompel (2020) traces Malawi's erratic political conditions back to patrimonialism and "disorder", the latter equal to "a high level governmental and administrative inefficiency (...), a lack of institutionalization, a general disregard for the rules of the former political and economic sectors, and a universal resort to personal(ized) and vertical solutions to societal problems" (Rompel, 2020: 25).

### Impact of the COVID-19 Pandemic and Development Challenges

Additionally, to external weather shocks which amplify Malawi's vulnerability and development, the COVID-19 pandemic first emerged in early April 2020 has impacted economic growth and livelihood severely (Nyasulu et al., 2021; World Bank Group, 2021c).

As a result, the (international) tourism sector has been declined, investing in public services had been cut due to the borrowing on debt servicing by COVID-19; food insecurity is increasing due to the additional external reliance on NGO food packages that could only be provided with difficulty; amounts of job losses are high; and a greater burden of the health system (due to the HIV/AIDS rate, preceding cholera outbreaks and then COVID-19) challenges the country at the moment (ActionAid, 2020: 3).

An outlook in terms of food insecurity is given in a policy brief by ActionAid (2020: 6):

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*"While SADC promotes support for smallholder farmers as a key strategy for achieving household food security, agricultural policy making in the region has failed to adequately respond to their needs. Large portions of national budgets are directed into FISPs [Farm Input Subsidy Programmes, note by the author] by providing subsidies that reduce the price of fertiliser and seed (usually hybrid maize). It is estimated up to 1 billion USD is spent on FISPs a year in 10 sub-Saharan African countries, including Malawi, Tanzania and Zambia – accounting for 14-26% of their combined annual public expenditure on agriculture (Jayne 2018). Despite such large outlays on FISPs over the last decade, food insecurity in the SADC region is on an increasing trend (SADC 2020)."*

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All the above-mentioned factors and events thus contribute to an exacerbation of poverty, further driven by low productivity in the agriculture sector, volatile economic growth and rapid population growth, among others (World Bank Group, 2021c).

## 4. Namibia

### Overview

Namibia is a semi- to a hyper-arid country located in south-western Africa, which borders South Africa, Botswana, Angola, Zambia and the South Atlantic (World Bank Group, 2021b; (Spear et al., 2018). With around 2,54 Mio. Inhabitants (in 2020), it rather counts to the less densely populated states in Sub-Saharan Africa in relation to its size (Destatis, 2021b; World Bank Group, 2021a). More than half of the population lives in urban areas (as of 2020), whereby an observable trend in urbanization can be reported (Knoema, 2021; World Bank Group, 2021a).

English is the official language, additionally, Oshiwambo is spoken by almost 50% of the population as well (Nag, 2016). In 2019, nine to ten ethnicities lived in Namibia, with Ovambo (ca. 50%), Kavango (9%), White Namibians (7%), Herero (7%), Damara (7%) and Nama (5%) constituting the largest groups (GoN, 2021, Pariona, 2016). According to the World Atlas,



around 80% of the population belongs to Christian religions, and 15% to Indigenous beliefs (World Atlas, 2017).

With an HDI value of 0,646, the nation ranks 130<sup>th</sup> out of 189 and is classified as an upper-middle-income country, having an average life expectancy of 63,7 years (BMZ, 2021). Literacy rate for 15 years and above counts 92% (as of 2018; World Bank Group, 2020). Despite a rather low infant and child mortality, the maternal mortality ratio has increased; and to the most leading causes of inpatient deaths among all age groups count HIV/Aids, diarrhoea, tuberculosis, pneumonia, and malaria (World Bank Group, 2021a: 27).

Previous transitions and efforts in combating poverty resulted in halving the proportion of Namibians living below the national poverty line (in 2015: 17,4%) (World Bank Group, 2021b). Yet, socio-economic and structural inequalities are still high and also increasing due to the country's history of colonialism, Apartheid, climate change impacts, and economic issues arising from the present COVID-19 pandemic, mirroring in unequal land tenure ships (large privately owned areas), employment rates (ca. 28%), and the likelihood of exacerbating poverty, especially among female-headed households, the less educated, larger families, children and the elderly, and labourers in subsistence farming (World Bank Group, 2021b). Thus, Namibia remains one of the most unequal countries in the world (Gini Index 2010-2018: 59,1 out of a value of 100 equalling absolute inequality; UNDP, 2021b).

Out of an area of 824.292 km<sup>2</sup>, only 2% is arable, 46% is viable for perennial natural pasture, 22% is forest, thus, a great part of Namibia is covered by desert-like the Namib and the Kalahari; the climate spectre ranges from sub-humid woodlands to semi-arid (savannah/karoo vegetation) and hyper-arid (desert) regions (Spear et al., 2018: 10). Hence, temperatures across the country vary, showing very high degrees inland during summer (December to February) and more moderate conditions along the coast (Spear et al., 2018). Besides the agricultural (mainly based on livestock) sector, which poses an important role both in the formal and informal economy and supports up to 70% of the population, the country also relies on the marine sector since good fishing conditions by the cool Benguela current, contributing to both commercial and recreational fishery (Spear et al., 2018: 10; Mupambwa et al., 2021: 2249). Due to the dry environment, the country heavily depends on food imports from other countries, which will be worsened by external factors such as extreme climate events in foreseeable future (Spear). Moreover, other industries such as mining/mineral extraction and tourism are further sectors constituting Namibia's GDP (World Bank Group, 2021b).

## Political and Economic Situation

Since its independence in 1990, Namibia has been a multiparty democracy, whereby the former liberation movement SWAPO has been holding majorities in the parliament the past years (BTI Blog, 2021). At the last national elections in 2019, SWAPO presidential candidate Hage Geingob was re-elected, however, the party lost its hegemonic position (Freedom House, 2021). Although Namibia is deemed to be politically stable, corruption accusations such as the "Fishrot Scandal"<sup>2</sup> in November 2019, frauds and tax evasion reproaches were voiced (Freedom House, 2021; World Bank Group, 2021b). Besides, there has been a recognized lack of institutional openness and transparency (Freedom House, 2021).

Historically, Namibia was under German colonial rule from 1884-1915, under which the genocide of the Herero and Nama people was committed (BMZ, 2021). After World War I, South Africa received mandate power over Namibia in the framework of the mandated territory

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<sup>2</sup> Icelandic fishing company bribery scandal of Namibian politicians to secure fishing grounds.

of the League of Nations, leading to conveying the Apartheid-ideology from South Africa in Namibia (BMZ, 2021).

In terms of Namibia's economy, the country was experiencing growth between 1991 and 2015, with a following recession in 2016. Ever since the economy has mostly contracted (e.g. in 2017 and 2019), "and has suffered from falling commodity prices, weak growth in key trade partners (Angola, South Africa) and tight fiscal policy on the back of government's effort to rebalance public finances" (African Development Bank Group, 2019).

Despite a certain improvement in food security since independence, many households especially smallholder farming communities and poverty-stricken urban dwellers still face food insecurity as food production does not meet food needs (World Bank Group, 2021b). Above all, climate change impacts (e.g. severe droughts) pose major threats to the agriculture sector and maintaining subsistence farming, which provides the main source of income for 40% of Namibia's rural population (Spear et al., 2018). Furthermore, socio-economic factors such as HIV/AIDS (12% of the adult population), chronic poverty, water shortages, restriction on women to access land, and the inequality of the income distribution, particularly prevalent in the north-west regions, exacerbate food insecurity and under-nourishment, among others (FAO, 2021; World Bank Group, 2021a: 4–5).

### Impact of the COVID-19 Pandemic and Development Challenges

In June 2021, Namibia recorded the worst daily death rate by COVID-19 on the African continent (BBC, 2021). Besides its devastating impacts on the population, the pandemic that first emerged in March 2020 hit Namibia's economy hard; for instance, the mining sector contracted by 12% over quarter 1 – 3 in 2020, and the hospitality industry shrunk by 46,5% compared to the previous year 2019 (World Bank Group, 2021b). Furthermore, "the number of poor people measured by the upper middle-income poverty line (\$5.5/person/day in 2011 Purchasing Power Parity terms) has reached a record-high of 1.6 million" in 2020 (World Bank). By some estimates, the upper middle-income poverty rate is expected to stay around 64% until 2022 (World Bank Group, 2021b).

Additionally, reduced global demand for diamonds and other minerals<sup>3</sup> and hence, falling prices, prolonged drought conditions and reduced precipitation further affect Namibia's development, leading to a decline in harvests and mineral production, as well as to lower electricity and water generation also concerning overall industrial productions (World Bank Group, 2021b).

## 5. Climate Change and (Social) Climate Change Impacts in Southern Africa

As the World Risk Report referring to other studies (Lehmann et al., 2018; Faust and Rauch, 2020) confirms, it is proven that (anthropogenic) climate change leads to **changes in regional frequency and intensity of extreme nature events** (Behlert et al., 2020: 9). → **Fig. 1**. Besides physical threats due to these natural events, this affects so-called secondary determinants such as the destruction of livelihoods. Furthermore and as a consequence, migration movements are increasing, be it rural-urban, trans-regional or even transnational

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<sup>3</sup> Among others, diamond, uranium and zinc represent the largest sectors of mining minerals. According to the International Trade Administration (ITA) (2021), Namibia has the resources and potential to mine "critical" minerals (e.g. cobalt and lithium) which are used for renewable energy technologies.

(Behlert et al., 2020). **Correlations** can be set between **climate impacts and poverty**, especially in the Southern African region. Bauer and Scholz (2010: 83) point out that climatically, Southern African regions warm up faster than the global average – hence, along with structural poverty and other socio-economic factors (scarcity of resources etc.) an

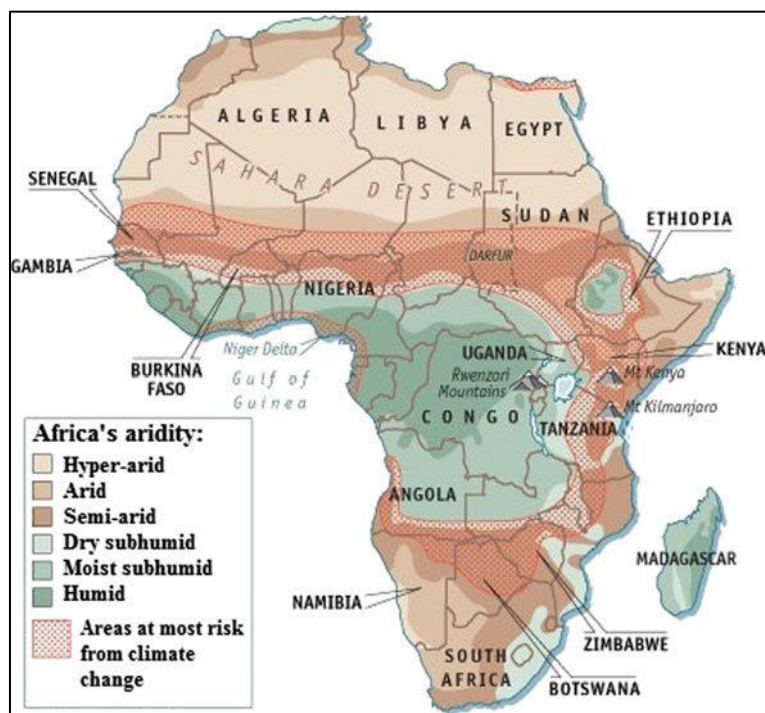


Figure 1: Map of the African regions that are at risk from climate change (Kenya Environmental & Political News Weblog, 2007).

improvement of human development can badly be attained (Bauer and Scholz, 2010: 83). Although African greenhouse gas emissions are minimum in comparison to the global total (Bauer and Scholz, 2010: 87), climate models and scenarios predict and already show that sub-Saharan Africa will be hit severely by climate change impacts (Ruane et al., 2018). Increasing desertification, crop failure and biodiversity loss, humanitarian emergencies like food insecurity, local conflicts about land and narrowed water and land resources occur and will remain, even if climate mitigation will be stabilized at a global average of 2°C (Bauer and Scholz, 2010: 87). Likewise, **growing urbanisation and increasing population (e.g. Malawi) impede food production** to provide sufficient food security.

As agricultural production is predominantly reliant on rain-fed (in *entire* Africa only 6% of the total cultivated area is irrigated whereas 94% is rain-fed; Ifejika Speranza and Scholz, 2013: 472; Frenken, 2005) most African regions are immensely vulnerable to changes concerning soil and land. Several models predict that with 4°C or more warming, more than one-third of cropland in the east and southern Africa will likely be unsuitable for cultivation – depending on particular areas the percentage number might even be higher (Ifejika Speranza and Scholz, 2013: 472).

Notwithstanding a concrete number of temperatures, several authors presume that by 2070, all terrestrial African ecoregions will be affected by extreme weather and temperatures (Beaumont et al., 2011: 472; Ifejika Speranza and Scholz, 2013: 472; Transparency International Deutschland e.V., 2021; Schlenker and Lobell, 2010) assume a reduction in yields of major crops commonly used over the African continent (maize, sorghum, millet etc.) by eight to 22 per cent (Abid et al., 2020: 1). Additionally, or rather as a consequence, **public health** (Malaria, HIV/Aids), **political** (inner-political tensions, little response to climate change adaptation strategies or lacks in their implementation) and other **socio-economic challenges** (crime, unemployment) **may complicate the ability to develop adequate adaptation capacities** as well as **sustainable development**, and exacerbate susceptibility to climate-induced poverty, among others (Ifejika Speranza and Scholz, 2013: 472).

The problematic state of Southern African countries in terms of building up capacities and adopting adaptation strategies is mirrored in the **world risk report**. Hereby, **Malawi is ranked**

**55<sup>th</sup> and Namibia 94<sup>th</sup> out of 181 countries**, built on the mean average in terms of exposition (earthquakes, storms, floods, droughts and rise in sea-level), vulnerability, susceptibility (dependent on infrastructure, food security and economic conditions), lack of coping capacities (governmental, medical supply and social/material assurance) and adaptation capacities (in terms of natural events to come, climate change and other challenges) (Behlert et al., 2020: 59–60).

## Malawi

In general, Malawi has been exposed to extreme weather events at least for over 40 years (MoNREE, 2011: 4; FCFA, 2017). Partially, these events led to irreversible and damaging effects on crop and livestock production, as the Ministry of Natural Resources, Energy and Environment (MoNREE, 2011) describes. Previous events, such as the multi-year drought from 2015/16 and a rise in frequency of severe disasters indicate that anthropogenic warming has approximately doubled the risk of such a drought event occurring (Bhave et al., 2020: 3; Kolusu et al., 2019). One of the drivers provoking immense climatic variability in Malawi determines the El-Nino-Southern Oscillations (ENSO), which has led to the flood in 2016 and subsequently increased the number of people facing food insecurity (Botha et al., 2018: 9). Especially along the hot areas of Lakeshore and in the southern part of Malawi climate change effects and variability has been observed (Nyirenda et al., 2021: 2). Climate trends that have generally been observed in Malawi are, for instance, an increase of annual temperatures by 0,9°C from 1960 to 2006; a higher frequency of hot days and nights in all seasons, and a stronger variability in precipitation (World Bank Group, 2011: 3,4). → **Table 1**.

Lots of research has been done in the last decades, especially concerning the frequency and intensity of extreme natural events and examining the experiences (smallholder) farmers in the agricultural sector have been gathering. Thereby, a majority of these studies concentrate on rural areas, which is understandable considering that around 85% of Malawi's population does not live in urban areas (Stringer et al., 2009; Brown, 2011). Nevertheless, a few studies also take into account increasing urbanization and the climate change impacts bigger cities are currently facing (e.g. Brown, 2011; (Steynor and Pasquini, 2019; Steynor et al., 2020).

By collecting data from 1582 Malawian households through semi-structured interviews, Abid et al. (2020) could show that a majority of the rural farmers have been facing several long and short-term climate shocks in the past ten years. In this period, droughts were experienced at least once by more than two-thirds of the households, one-fourth of the respondents even indicated a frequency of three to five times. Also noteworthy is the **regional occurrence of droughts**, with a focus mainly in **northern** and **southern**, and less in central parts of **Malawi** (Abid et al., 2020: 5).

Additionally, Steynor and Pasquini (2019) also analysed data from projects from six countries in terms of the psychological distances of climate change participants were experiencing. For Malawi, (semi)-structured interviews with municipal staff, academics and civil society were evaluated, showing that in urban regions climate change was not seldom experienced by rainfall variability as well as resulting impacts “included a perceived increase in climate-related health problems, a decrease in water supply and quality and inadequate dam recharge leading to electricity blackouts from hydro-electricity failure” (Steynor and Pasquini, 2019: 6).

## Economy

The **high vulnerability** stated in Malawi is even reinforced by **socio-economic determinants** such as high poverty and growing population rates, food insecurity, political instability, and ethnic tensions (Abid et al., 2020). Socio-economic difficulties were observed by a majority of

farm households surveyed, reporting a huge **increase in food and agricultural input prices** and thus in overall households' expenditures which are suffering even more due to **imperfect market conditions** reflected in declining output prices and less profit: "These findings show an important area of intervention by the government to control prices of agricultural commodities so that producers get the right price for their produces. An increase in livestock diseases and deaths due to direct climatic shocks also call for immediate action by relevant authorities to allocate required resources at the local level to support farmers" (Abid et al., 2020: 10).

Botha et al. (2018: 9) find similar impacts of precarious socio-economic issues, as they mention the **losses in the agricultural sector** which are about 30% to Malawi's GDP, and whose reduction in production after climate shocks involve an **increase in average prices and fuels inflation**. Hiked commodity prices due to events such as the **El Niño drought** are also mentioned in papers by Amadu et al. (2020: 33) and Ubilava (2017).

### **Water and Electricity**

Also, **prolonged low lake levels** caused by droughts can reduce outflows and hence, **affect hydropower generation** respectively commonly load shedding throughout Malawi (Bhave et al., 2020; Conway and Vincent, 2021). For instance, **power shortages** were reported in Blantyre (approx. 1 Mio inhabitants), especially in informal settlements within the city during the time a study was conducted by Steynor et al. (2020: 5). Usually, that power is obtained from hydropower stations at the Shire River located around 50 km from the city (Steynor et al., 2020).

Another qualitative study thematising surface water focuses on the perception of small-scale fishers in Dwangwa, Nkhotakota and their **fishing behaviour** who experienced increased incidences of droughts, erratic rainfall, extremely hot temperatures, Mwera wind, flooding and thus **differences in sea-levels at Lake Malawi** (Limuwa et al., 2018). However, as Limuwa et al. (2018) point out, "these perceptions did not corroborate with time series meteorological data for the area, which reveals a variable climate and non-significant changes" and must be interpreted with caution. Also, observed declines in fish population cannot entirely be attributed to potential climate change events on-site, but **also other factors such as overfishing or lacking knowledge** should be considered when assessing the fishing sector at Lake Malawi; especially since some phenomena, like mixing of lower water due to increased water temperature brings food for fish from the bottom of the lake, could actually enhance yields in fishing (Limuwa et al., 2018: 2).

### **Social Practices and Changes in Work**

Joshua et al. (2016) found out that poor or even no crop yield that is due to climate change and resulting effects, like **famine, affected several (social) practices** that had to be foregone: for instance, among others, brewing free beer for the whole village, children's games (so-called *nomi/masanje* where field leftovers are cooked after the main harvest), games for physical fitness (*suluma/ndidze* or *chipako*) or local maize production in favour of hybrid variations.

Further social impacts by climate change were mentioned by Stringer et al. (2009) and Mkwambisi (2008) by explaining how **droughts blocked the access to water for domestic use** in the districts of Kasungu and Mchinji and as a consequence respectively **adaptation strategy**, young girls were forced to **engage in domestic work** and to contribute to the households' income. These measures could further lead to an **increase in child labour** and other practices with exploiting characters, such as ***ganyu***, ergo casual rural labour exchange,



which could exacerbate “impoverishment by widening the gap between those who can afford *ganyu* labour and those who rely on it. This has led, in many cases, to exploitative contractual terms, reduction in time to tend agricultural assets and has also been linked to the spread of HIV/AIDS with the incorporation of ‘transactional sex’ into *ganyu* contracts”, as Stringer et al. (2009: 758) referring to Bryceson (2006) note. **Impacts like HIV/Aids, unplanned pregnancies, and abortions among girls and women** by offering sexual activities due to food shortage (low/no yields) for maintaining livelihoods are also mentioned by Nyirenda et al. (2021) and Conroy et al. (2006).

### **Migration and Urbanization**

Other impacts like **forced migration movements** caused by climate change events are emphasized in a paper of Brown (2011: 944), with examples of mass displacements by heavy rainfall events in the Karonga District (Northern Region in Malawi) in April 2011 as banks of the North Rukuru River and Songwe River burst and over 60 villages had to be abandoned. Those displacements do not only lead to the destruction of livelihoods but also affect “the full spectrum of human rights including the rights to life, water, health, food, adequate living standards, security of person, and the right to housing and land”. Moreover, the accompanying **rural-urban shift due to the insufficient ability to maintain land holdings** and therefore rural livelihoods leads to an **increase in informal settlements**, which are not seldom located within flood-prone areas and also reinforce existing poverty, inequality and vulnerability. **Uncontrolled urbanisation** and especially the emergence of these informal communities ergo poses climate change-induced issues particularly in cities and can only be reduced by policy risk management strategies such as spatial planning, as proposed by the authors (Brown, 2011).

### **Health and Diseases**

Strong coherence between **climate change impacts** and **health issues** were pointed out in the paper by Hartwig and Grimm (2012). By analysing representative household data before and after in terms of one of the worst food crisis in Malawian history due to crop failure by drought from 2002, where approximately 2,1 – 3,2 million people were threatened by **starvation**, it was demonstrated that **mortality** especially among male children has risen during the crisis whereas female children (aged 1-2 years) were more likely to show acute **malnutrition** (Hartwig and Grimm, 2012: 148). However, information on the cognitive development of children affected by the food crisis could not yet be provided, as the study tended to focus on short-term periods. Moreover, the authors mainly focused on the efficiency of provided food aid and their potential improvement of the nutritional status of children. Additionally, Abid et al. (2020: 10) and Steynor and Pasquini (2019: 6) report on the emergence of new climate-dependent illnesses in local communities, such as **Cholera, Malaria and diarrheal disease**.

Health impacts stated in other studies were evaluated in a narrative literature review by Talukder et al. (2021) who assessed 91 published documents in terms of climate change-owed health issues on smallholder farmers in Malawi, Bangladesh and India. The findings indicate a steady increase in **communicable** (bacteria, viruses, fungi) and **non-communicable diseases** (malnutrition, cancer etc.), in **mental health issues** (acute stress due to uncertainty of livelihood, sleeping disorders, anxiety, and in worst cases suicides) and in **occupational health** (unsafe and unprotected outdoor work situations), as the authors sum up (Talukder et al., 2021: 3–6).

### **Gender-Specific Impacts and Gender Differences**



**Gender differences**, e.g. that women at a local level are often more vulnerable, is emphasized in several studies (Henriksson et al., 2021; Asfaw and Maggio, 2018; Coulibaly et al., 2015; Kakota et al., 2015; Vincent et al.; Djoudi et al., 2016). This is due to narrowed access to climate information, income, and land size for women living in still persistent patriarchy in Malawi and hence, are not capable to adapt properly to climate change, as Henriksson et al. (2021: 2) sum up. The investigation of above 3.000 households in Malawi from 2009/10 and 2012/13 by Asfaw and Maggio (2018) revealed that temperature shocks indeed have a gender-differentiated impact. Consequently, households solely managed by women were more negatively affected in terms of welfare, reducing consumption, food consumption and daily caloric intake. Besides, there is evidence that in districts where women traditionally have more secure property rights (matrilineal districts), they are less vulnerable to shocks (Asfaw and Maggio, 2018: 21).

Particularly highlighting the **impact of climate change on women** could be shown by a study **focusing on female fishers** living at Lake Chilwa, which is extremely exposed to the variability of rain and temperature, and ever since prone to drying. This affects the fish stock size of the closed drainage lake, which in turn can return women's income (Jørstad and Webersik, 2016). Besides, the drying up concerns the land next to the Lake as well, resulting in crop failure, and food insecurity. Recourse on *ganyu*, so casual daily wage labour, is often the strategy adapted then, but "(w)hile it serves as a backup strategy for poor seasons, it is not a reliable source of income", as Jørstad and Webersik (2016: 985) state.

Research has established a connection between **climate change vulnerability and gender distribution** by showing that **socially constructed gender norms often lead to women having lower levels of education, lower employment opportunities than men and therefore being more dependent on smallholder agriculture**. Consequently, the adoption of climate-smart practices, for instance, cannot be ensured due to missing financial means. At this point, Henriksson et al. (2021), Shackleton et al. (2015) and Djoudi et al. (2016) stress that **social climate change impacts, therefore, need to be intersectional approached since measures to adapt or mitigate climate change impacts are often locked by social power barriers**.

In conclusion, as Brown (2011:941) aggregates, Malawi's vulnerability to climate change is due to three aspects:

"(1) the sensitivity of its ecosystems, food supplies, natural resources and human settlements to the projected impacts; (2) the exposure of these systems to the intensity of the projected impacts; and (3) its low adaptive capacity, which is a function of limited financial resources, education, information skills, infrastructure, access to resources, and stability of institutions and management capabilities" → **Fig. 2**.

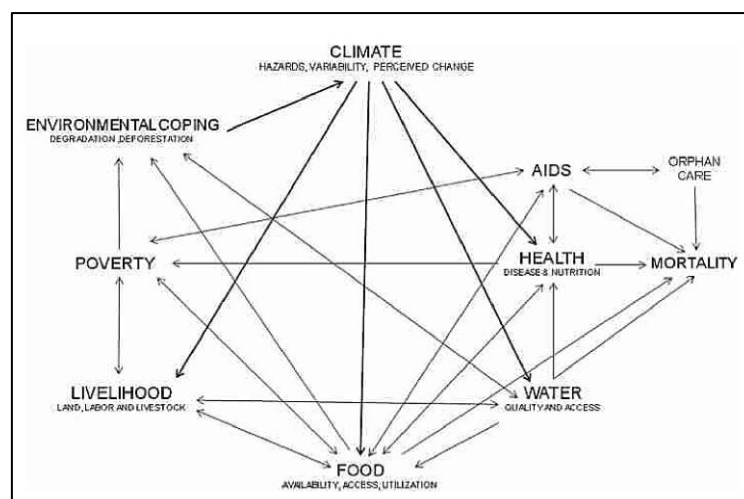


Figure 2: Multiple determinants contributing to the vulnerability web in Malawi (Malcomb et al., 2014: 20, Fig.2).

Table 1: Extreme nature events in Malawi and Namibia since 2000 (only bigger events are depicted; data from Stringer et al., 2009; MoNREE, 2011; Bhawe et al., 2020; Schaller et al. 2020; UNESCO, 2021; Chesterman et al., 2020b; MEFT, 2021: 188,192).

Extreme Nature Events - Year	Sort of Event/Impacts	Country
2000	Flood	Malawi
2000/01	Flush Floods	Namibia
2002	Drought Worst famine in Malawi since 1949	Malawi
2003	Drought 369,611 people affected	Namibia
2003/04	Flood	Malawi
2004	Drought 642,539 people required food assistance	Namibia
2007/08	Floods	Malawi
2008	Flood 350,000 people affected (approximately 17% of the country's population affected); 102 mortalities Drought 540,000 people required drought relief	Namibia
2009	Flood 700,000 people affected; 50 people displaced; 102 mortalities Response allocation from the government amounted to N\$209 million; 110 relocation camps in six regions established	Namibia
2011	Flood 500,000 people affected, with over 60,000 displaced, 19,000 in relocation camps and 65 flood-related deaths	Namibia
2012/13	Drought 42% of the population experienced food insecurity	Namibia
2013	Flood 12,000 people evacuated to 13 temporary camps	Namibia
2015	Flood El Niño	Malawi
2015/16	Drought (Food Crisis)	Malawi
2018	Drought 80,000 livestock died; widespread food insecurity; worst drought event in 40 years	Namibia
2018/19	Flood (Cyclone Idai March 2019) Flash flooding causing approx. 900 human deaths, destruction of infrastructure & crops. 100,000 homes damaged/destroyed \$773 million worth of loss in buildings, infrastructure & crops	Malawi
2019	Cyclone Kenneth 3 million people affected by the combined effects of Cyclone Idai & Kenneth	Malawi
2019	Flood	Malawi
2019	Drought One-third of the Namibian population depended on drought relief systems; 36% were exposed to food insecurity	Namibia

## Namibia

Namibia counts among the driest countries in Africa and is characterised by mostly (semi-) arid areas (around 70%) (Shikangalah, 2020). Thus, the nation is prone to droughts, the extent of which is becoming ever greater in the past years. Significantly, rainfall and temperature is influenced by the El Nino Southern Oscillation (ENSO) and the *Benguela* flowing north along the west coast (Angula, 2010).

Over the past 50 years, temperatures in Namibia have significantly been increasing, with a more pronounced rise in winter than in summer (Spear and Chappel, 2018: 13). Mean temperatures in summer are hence up to 35°C during December and January. Furthermore, trends in decreases in the amount of rainfall and an increased inter-annual rainfall variability result in more frequent emergences of extreme draughts or floods. This is being underpinned by the amount of extreme natural disasters (eight droughts and twelve floods) between 1900-2020 (World Bank Group, 2021a: 13). However, it is important to note, that those climate hazards can differ from region to region, above all among the eastern, northern and central parts of Namibia in terms of temporal precipitation pattern, for instance (GFDRR, 2021). → **Table 1.**

Since more than half of the Namibian population relies on subsistence agriculture, Namibia is highly exposed to climate change impacts (Angula, 2010:17; Spear and Chappel, 2018; MEFT, 2021). The country's most vulnerable sectors are therefore agriculture, forestry, water resources, and health (World Bank Group, 2021a).

### Socioeconomic Aspects, Health and Migration Movements

A high **linkage** between **social conditions of human populations** and **the dynamics of natural hazards** (wildfire, drought, floods etc.) commonly mediated by climate change was illustrated in an article by Kapuka and Hlásny (2020). The authors emphasize the need to understand and consider the heterogeneous implications climate change impacts have in different areas in Namibia. Accordingly, irreparable damage due to climate impacts and increasing social vulnerability is more likely in identified macro-regions with several coincidence factors such as low socio-economic status, high population density and concurrent incidence of different hazard types (Kapuka and Hlásny, 2020: 13). → **Fig. 3.**

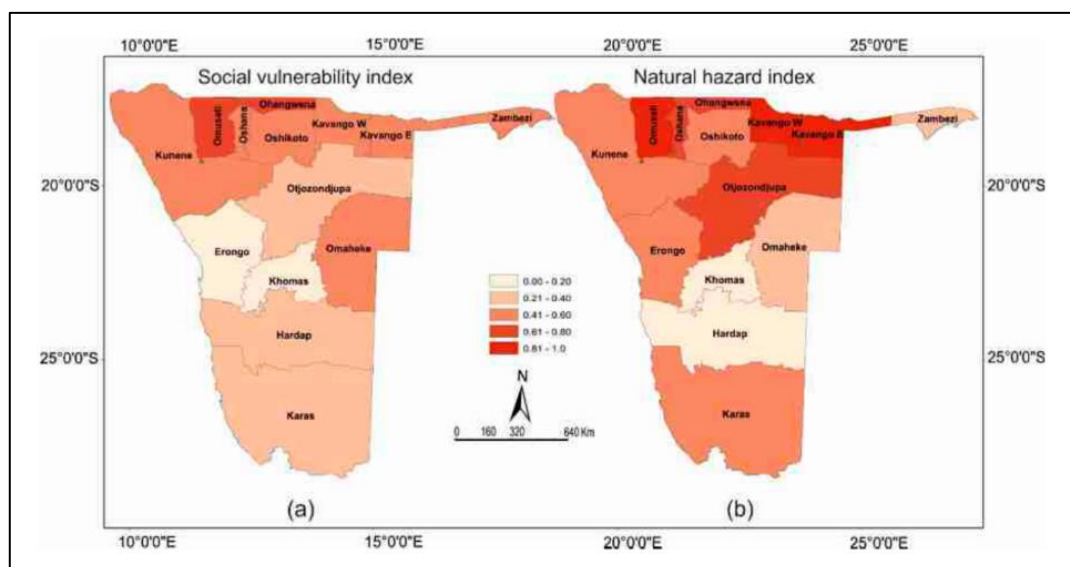


Figure 3: Spatial distribution of the composite index of social vulnerability and natural hazards in Namibia (Kapuka and Hlásny, 2020: Fig. 2).

Impacts of climate change on Namibia's economic sector was reported in a working paper by Spear et al. (2018). According to the authors, the **already prevailing HIV/AIDS epidemic, poverty, malnutrition and diseases** are likely to increase due to climate change (entailing food insecurity, malaria/cholera because of floods and high temperatures, dehydration etc.) and **stress health services**. Also, **tourism** (loss of biodiversity leading to unattractive environments), **infrastructure** (destroy of houses close to floodplains) and **mining** (water and energy supplies needed) sectors are highly concerned about climate change impacts and may **reduce Namibia's economy** (GDP, employment rate) and **political stability** (Spear et al., 2018: 17–19; World Bank Group, 2021a; MEFT, 2021: 32).

Similar impacts were also observed in an article by Keja-Kaereho and Tjizu (2019), which based on the drought and its results in Namibia between 2012 and 2017, summarized the impacts on the economy (including the tourism sector) as well as on the food production in the country. The authors emphasize the interrelation of agricultural production and climate change, exemplified with the highly increased **malnourishment of children** under five due to food insecurity as a **result of the drought** in Namibia that had emerged from 2012/13 (Keja-Kaereho and Tjizu, 2019: 7). This is accompanied by **internal migrations (rural-urban)**, leading to **rapid urbanization**, and a **high unemployment rate** often affecting young people and women who are stronger involved in food production (Keja-Kaereho and Tjizu, 2019: 7).

### Water and Electricity

Another study by Angula (2010) and an article by Angula (2015) reported on climate change impacts in two villages in Namibia. The author stated already visible climate change effects like water scarcity, loss in biodiversity, health impacts, and losses in the agricultural sector, among others. Above all, the **water sector is considered most vulnerable to climate change**, as it is leveraged in crop irrigation and livestock watering, for drinking water, in mining activities as well as ensuring hydropower plants (Angula, 2010: 17). **Shortages in electricity** are therefore impacts of droughts and reduced rainfall periods. Further climate change challenges can be seen in the **energy supply in rural areas**, which still predominantly utilize traditional biomass (~60%) for covering energy needs. Despite some increase in bush encroachment in few areas, fuel wood scarcity remains a problem, as sufficient production of wood is confined to specific areas (remote spatial distance) (Angula, 2010: 18). Besides, in the past twenty years (2001-2021) an overall national trend can be stated in the increase of wood and charcoal utilized by urban dwellers using as the main source of energy for cooking; and a decrease in the number of people with access to safe water in both rural and urban areas (MEFT, 2021: 32). Impacts on the energy sector are further stated in a report by the World Bank Group (2021a: 26) by stressing Namibia's risk to disruption and/or limitation of power supply due to reduced precipitation, reduced river flow and thus reduced hydropower generation.

### Gender Differences

In terms of **gender**, it could be shown that due to **still existing traditional gender roles** there is also a **conventional division of labor** between men and women in some rural settings (Angula, 2010: 23). Although especially among younger generations, a slowly growing participative involvement of women in decision-making processes and committees was reported, climate change affects the livelihoods of women and men differently: Especially since **women are expected to maintain food security** respectively to carry the household and, "among societies that practice subsistence crop and livestock farming as the main source of livelihood, women have a stronger link to environment and climate related sectors" (Angula,

2010: 35), are more vulnerable to impacts of climatic variability and changes and also show a **stronger emotional burden** (above all in providing food to their families) (Angula, 2010: 35). Social challenges reported that concern all gender, like **unemployment, alcohol abuse, crime, teenage pregnancies and social decay** can be reinforced by climate change impacts and can further lead to poverty and, in turn, worsen the countries socioeconomic structures (Angula, 2010: 35). However, **certain diversification and coping strategies of farmers could be identified** in the examined villages, namely engaging in sewing, brick-making, selling of traditional drinks, vending crafts and pottery items, working in the tourism sector, small-scale mining (and selling semi-precious stones) (Angula, 2010: 35,36).

Another report by Wilkes et al. stated gender-differentiated impacts of vulnerabilities in the cattle sector in Namibia and Botswana (Wilkes et al., 2013). Particularly, vulnerabilities, such as rangeland deterioration and reduced availability of grazing and livestock productivity decline, are more likely to show an impact on men in terms of migrating with the livestock (searching for better grazing opportunities) or for employment: "This affects the gendered division of labor, leaving women with the remaining livestock, with some women resorting other forms of wage labor and responsibility of the household. Women's limited mobility due to household responsibilities and other limitations (physical, financial), also affect their options to take adaptive action" (Wilkes et al., 2013: 76). Despite the adoption of some new legislation (e.g. the Communal Land Reform Act in 2003), which sought to enhance women's rights to land ownership, among others, the law did not address seizure of property, as the authors stressed (as of 2005) (Wilkes et al., 2013: 76).

Confirming a high vulnerability among women particularly to financial barriers, which often results in settling in marginal, flood-prone areas is pointed out by Düvel and Stephanus (2000) and Angula (2010).

### **Impacts on the Way of Life and Social Conflicts**

Climate change impacts often affect certain ways of life, for instance, pastoralist and agro-pastoralists since they "are one of the most affected groups all around the globe as they have to respond to climatic variabilities relentlessly" (Inman et al., 2020: 2). In their recently published study examining climate change impacts and strategies of **isolated living pastoralists** in the Kunene region, Namibia, Inman et al. (2020) found out that climate change events such as lack of rain/drought, floods and increased temperature affected the Himba tribe in terms of **losing their livestock** resulting in hunger; of losing houses, garden and tools (being washed away) resulting in stress (physical such as diabetes or being homeless), and emerging diseases and pests (Malaria/Cholera). All reported factors, in the end, would **reinforce poverty**, as the authors (2020) summarize.

Also noteworthy is one effect of migration patterns on coexistence: Davies (2017: 6) and Newsham and Thomas (2011) mention emerging **competition** and **conflict** between herders and cultivators due to widespread migration. Further competition can be stated concerning land use, where questions and disagreements around settlement, cropping and grazing collide (Newsham and Thomas, 2011).

## **6. (Risk) Perception on Climate Change and its Impacts**

### **Theoretical Approaches on Risk Perception**

Even though (anthropogenic) climate change is, generally spoken, widely accepted, individual or even communal perceptions on climate change, its impacts and risks can enormously differ (Steynor et al., 2020). One explanation for this phenomenon might be the temporal and spatial



proximity of climate change events, but cultural values and norms are also influencers not to be underestimated (Steynor and Pasquini, 2019). Hence, an evaluation of **risk perceptions** is crucial as they **build and strengthen both willingness to act on climate change** respectively emotional and cognitive engagement and the types of information people use or need to take action (Steynor and Pasquini, 2019: 2; Pandey, 2019: 229), or to put it in the words of Singh et al. (2017: 93): “The ability to enact policy to address anthropogenic climate change is influenced, in part, by how individuals perceive the risks associated with climate change”. Thus, risk perception and environmental awareness have an enormous **effect on** risk management behaviour and the formulation of **adaptation strategies** (Brito et al., 2019; van der Linden, 2015b).

Basically, risks refer “to the exposure to potentially unfavourable conditions or circumstances that can result in economic, cultural, or physical loss” (Bunting et al., 2013: 227). The **perception** of risk, however, “**is a mental construct**” (van der Linden, 2015b: 116), meaning it is socially and culturally framed (Mahmud, 2016: 43). In terms of climate change contexts, “early research on risk perceptions focussed on the model of rational choice, which hypothesises that humans judge risk in an analytical manner by mentally calculating the odds of the risk and basing choices on the outcomes of those calculations”, as Steynor and Pasquini (2019) describe (see also Dodoo and Hugman, 2012). However, the literature focusing on social aspects of climate change dimensions has grown in the past few decades, meanwhile embracing “inter- and trans-disciplinary approaches to co-producing knowledge addressing cross-cutting issues such as resilience, risk, development, and security” (Lemos et al., 2020). Hence, several authors now emphasize the **interconnectedness of many determinants** which lead to a more complex understanding and explanation of one’s risk perception (van Eck et al., 2020; Steynor et al., 2020; Steynor and Pasquini, 2019). For instance, van der Linden (2015b) established the so-called “**Climate Change Risk Perception Model (CCRPM)**”, a model and theory of risk perception especially applied to the context of climate change. Initially, it was validated on a representative national sample of the UK population that mirrors multiple factors contributing to different public risk perceptions (van der Linden, 2015b). These include **socio-demographic, cognitive, experiential and socio-cultural dimensions**, and other characteristics such as trust in science (van der Linden, 2015b; (van

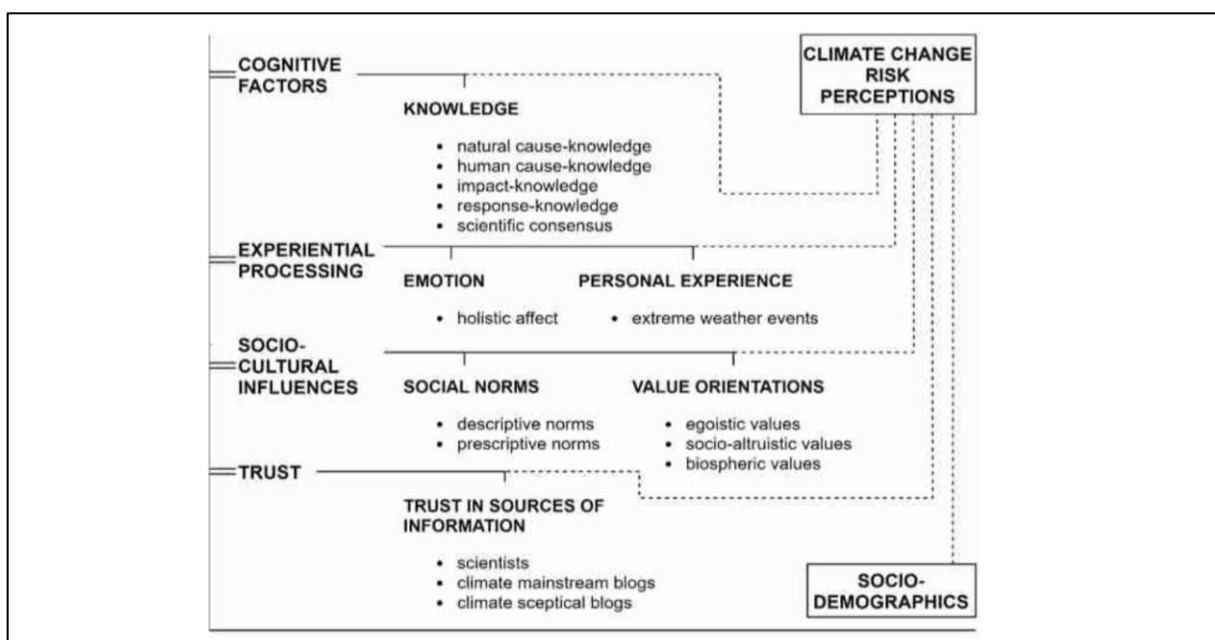


Figure 4: Climate Change Risk Perception Model (CCRPM+) (van der Linden, 2015).



Eck et al., 2020: 2). → **Fig. 4.** Analysing and understanding these elements in a climate-adaptation context may help to adequately address local and specifically tailored needs and adaptation strategies and help policy-makers to develop aptly actions (Singh et al., 2017). By understanding socio-cultural contexts, for instance, climate messages are aligned to traditional values and therefore are more likely to be implemented; a sensitive use of language (adjusted to social and professional positions in local communities) can better reach people on site, or referring on general social norms (if the target audience ascribes a high value to social norms) tend to be more effective than adaptation strategies not being customised to the respective context (Steynor and Pasquini, 2019: 8). For this purpose, it is crucial to figure out climate risk perceptions in different areas as they are decisive for climate change adaptation measures in terms of their perceived efficacy (Singh et al., 2017).

To be understood as *one* determinant contributing to one's risk perception is the "psychological-distance" approach coming from construal level theory, which observes a connection of (individual) psychological distance of an event and the way people (mentally) construe that event (Steynor and Pasquini, 2019: 2). Hereby, four dimensions constitute the principles of psychological distance: the temporal dimension, the spatial dimension, the social dimension and the hypothetical (=un)certainly of an occurrence of the event) dimension (Steynor and Pasquini, 2019; Trope and Liberman, 2012; Singh et al., 2017). Elaborating the psychological distance of individuals could contribute to adopting adaptation strategies as "(t)here is a significant association between individual dimensions of psychological distance, levels of concern for climate change impacts, and support for adaptation policies. Findings suggest that the "nearer" individuals believe climate change impacts are to them, the more supportive they are of enacting climate adaptation policy, assuming that policy is perceived as effective", according to Singh et al. (2017: 98).

There is a numerous **amount of research on climate risk perception** and public discourses in "**developed**" **countries** (e.g. Capstick et al., 2015; Leiserowitz, 2006; van der Linden, 2015a) whereas the **African context is rather little investigated** in this regard (Steynor and Pasquini, 2019; Corner et al., 2014). Lacks of existing data therefore not seldomly impede detailed elaboration of all factors playing into the composition of climate change perception **in African countries** and urgently **need further examination** (Steynor and Pasquini, 2019; Dadoo and Hugman, 2012; Pandey, 2019).

A recently published study by Steynor et al. (2021) emphasizes that one must consider the developing country context which might display different characteristics in terms of determinants being decisive in risk perceptions. The authors examined the **determinants of risk perception** in concert with each other by developing a model to professional action through risk perception in an **East African context (focusing on policy decision influencers)** in order to set up a basis for informing climate services development going forward. As a result, they could identify rather indirect factors such as self-enhancing or self-transcending values (*moral principles, e.g. loyalty*), or socio-demographic aspects (*age, gender, education*), and more direct effects such as the **experience of extreme weather events, psychological proximity** of climate change, **social norms** and climate change **risk perceptions**, which show a **great impact in motivating professional action**. (Steynor et al., 2021: 10–12). In particular, there could be recorded a strong relationship between **social norms** and **climate change action** (Steynor et al., 2021: 12).

Up to now, large-scale country based surveys concerning belief/scepticism in climate change both in developed and developing nations (e.g. Gallup, Inc., 2020; Ipsos, 2020) outline the hypothetical dimension of climate change. One of the findings was that the number of

participants affirming and considering climate change as human-induced was significantly greater in developing countries (e.g. Indonesia, 93; Argentina and India, 88%) than in developed countries (e.g. Japan, 63%; Australia, 73%; UK 74%) (Steynor and Pasquini, 2019: 3; Voss, 2010).

Moreover, Steynor and Pasquini (2019) emphasize a certain uniform treatment, also given climate change actions, for African countries by international organizations due to their homogenous designation as developing countries and the allocation as more or less homogenous socio-economic groups. This indicates that, although the perception of climate change may not be equal among all African states, certain differences among African areas are probably lower than among continents like Europe and Africa (Steynor and Pasquini, 2019: 5).

## Malawi

Up to date, there are multiple studies especially examining smallholder farmers', fishers' or urban dwellers' perceptions and experiences on climate change, as depicted below. Notwithstanding that considerable amount of research, these studies commonly only focus on single villages, cities or areas, reflect perceptions of particular focus groups (e.g. farmer, policy-makers etc.) and often do not especially deal with risk perception but with perception in a more generalized way (perception of changing climate events, beliefs about climate change, influencing factors etc.).

A comprehensive dissertation, however, aimed to encompass **broader public perceptions of beliefs, attitudes, and perceptions on climate change occurring in Malawi** by providing data from eleven out of 28 districts, both from urban and rural areas. In his study, Bakuwa (2015) analyzed statements of n=287 Malawian citizens by face-to-face interviews and questionnaires. The findings underpin an awareness of changing climate over time among Malawians, but often there is a lack of information about causes and effects and hence, about how to tackle climate change properly. Due to their **experiences**, which also illustrates the **primary source of awareness**, many respondents feel threatened by climate changes in terms of their livelihood (Bakuwa, 2015: 234). Besides, certain frames for explaining climate change could be proven: Widespread, for instance, is the belief of "**the will of God**", commonly stated by rural dwellers and less-educated persons who rely on pre-existing knowledge, among others (Bakuwa, 2015: 236). Noteworthy is also that alleged contradicting frames are consulted simultaneously so that climate change is seen both caused by God and natural processes. "Unsurprisingly, people who believe that climate change and its impacts is the will of God also believe that the solution the problem of climate change rests with God" (Bakuwa, 2015: 236). → Fig. 5.

**Differentiations** in perceptions of climate change can be made in **urban** and **rural** areas. Here, the author emphasizes that persons from rural sites are 6.5 times more likely to agree on the negative effects on their livelihoods provoked by climate change than urban dwellers (Bakuwa, 2015: 236). **Higher education** referred **sources of information** (e.g. by local village headmen, politicians, teachers, scientists), the **trustworthiness** of people/institutions providing climate change data as well as **access to information** is also decisive whether **perceptions** and understandings of climate change are more of **scientific or religious nature**. As a conclusion, multiple frames of perceiving climate change could be observed which mirrors a broad **heterogeneity** in **Malawian society** and should be considered when and especially where to adopt respective adaptation strategies, according to Bakuwa (2015: 238,239).

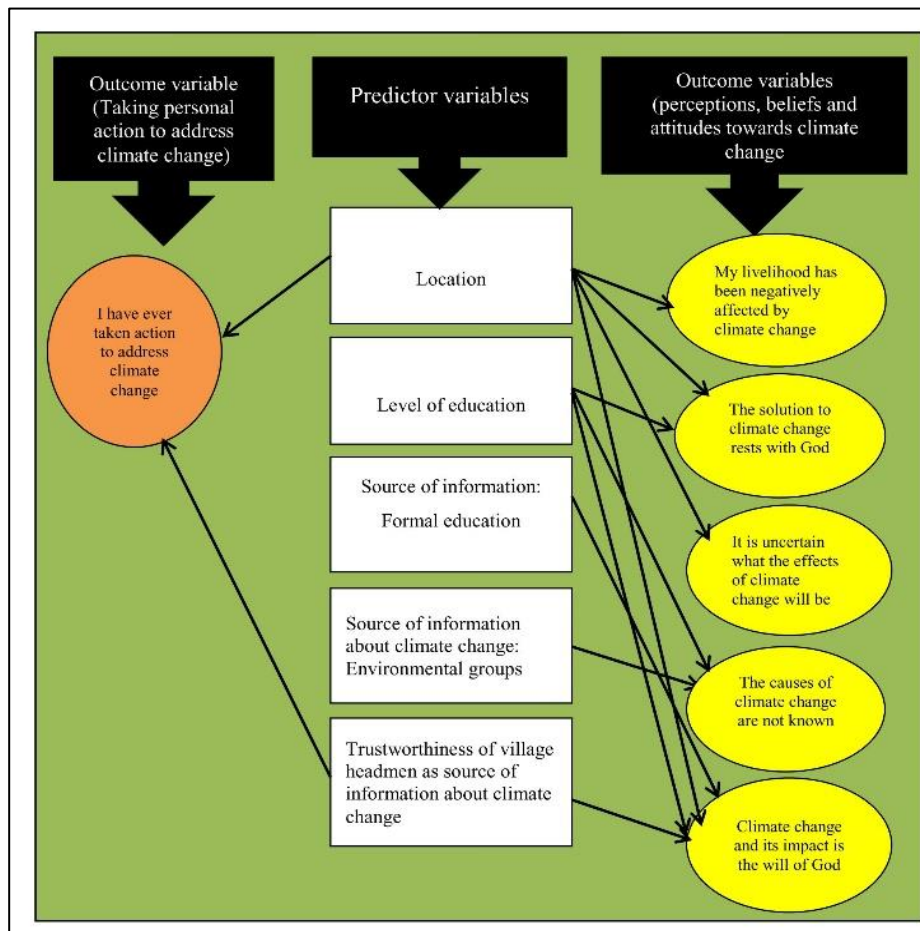


Figure 5: Malawians' perception, beliefs and attitudes towards climate change (Bakuwa, 2015: Fig. 6.2).

Also, a recently published paper by Steynor and Pasquini (2019) investigated and evaluated four projects conducted in Mozambique, South Africa, Malawi, Zimbabwe and Tanzania in terms of the participants' **psychological distance on climate change questions** by (semi)-structured interviews and online surveys with a total of  $n=166$  participants from urban and rural areas. Results are, among others, a **strong affirmation on human-induced climate change**, the view on climate change as a current and imminent threat in Africa (temporal proximity) and the often-mentioned **personal experience of climate change events** (changing precipitation patterns, high temperatures, drought as well as unpredictable seasonal patterns of erratic rainfall). Limitations of these projects must be drawn, however, given the demographic characteristics: participants were predominantly high educated professionals or civil society members and do not reflect the general population (Steynor and Pasquini, 2019: 5). Interestingly, subtle differences could be observed especially among urban interviewees' perceived psychological distance, as it was the case in Malawi and Tanzania: Statements about the level of climate concerns might suggest **"that people in positions of power see themselves as more distant from risks than those who have less power"** (Steynor and Pasquini, 2019: 6), as they are less directly exposed to climate change impacts than people working in agricultural sectors (farmers etc.), for instance.

Furthermore, in their latest research Steynor et al. (2020) could identify high psychological proximity to climate change in three Southern African cities, namely Blantyre (Malawi), Harare (Zimbabwe) and Gaborone (Botswana). Workshops with a total of  $n=40$  policy influencers underpin the perception of **climate change as real and imminent** in Southern African cities.

Upon these findings the authors highlight the **need for enhanced interaction** with city decision-makers and “to provide concrete, solution-based information on a short to medium-term time scale”, to establish inter and transdisciplinary collaborations and to **create holistic, context-specific climate service products**, as the connection of African cities is often strongly interwoven with surrounding and agricultural areas and “**mean that cities are often significant engines for change in their local region**” (Steynor et al., 2020: 6).

Perceptions on climate change in a semi-arid area in southern Malawi (Chikwawa District) were examined by Joshua et al. (2016). The study used qualitative and quantitative methods, such as focus group discussions, key informant interviews, Participatory Rural Appraisals as well as (historical) data from weather stations. Findings show that the investigated communities perceive climate change variations like unpredictable seasonal rainfall, shifts in rainy months, a declining amount of rainfall, warming temperatures, stronger winds and more frequent and prolonged droughts in the course of the wet season and showed evidence with the recorded technical weather data (Joshua et al., 2016: 4). Moreover, impacts of climate change events from a key informant perspective were partially entire **crop failures or damages, so that people with money had to buy rice from Blantyre** or only survived on finger millet or maize husks (*madeya*), as well as observable high death rates of livestock (Joshua et al., 2016: 5).

Another study by Munthali et al. (2019) focuses on the local perception of drivers of land-use and land-cover change dynamics in the Dezda district (Central Malawi) and hence, climate-related changes. By using face-to-face interviews in the form of key informant interviews, focus-group discussions, and semi-structured household questionnaires as well as GIS-based data, the authors could identify that almost 60% of the respondents (n=586) perceived a decline in agricultural land use, and nearly 90% observed a decline in forest areas (Munthali et al., 2019: 1,11). As drivers of land-use and land-cover changes were named **perceived population growth, unreliable rainfall patterns, poor access to alternative-energy supply, lack of alternative livelihood strategies and high costs of agricultural inputs**, among others (Munthali et al., 2019: 12). Local communities’ perceptions of changed precipitation coincided with rainfall data in this area from 1991 to 2015. Further findings of this study indicate that “rural communities in Dezda depend on the sales of forest produce as a common survival strategy in the case of land degradation, decline or failure of crop production, soil infertility, frequent and prolonged droughts, and unreliable rainfall” (Munthali et al., 2019: 15). The findings also depict that **education level** significantly **affected** interviewees’ **perceptions** toward some of the drivers of LULC (*Land Use and Land Cover*) changes, specifically, that “education level negatively and significantly affected ... high perceptions of local communities on firewood collection, agricultural expansion, poverty, and population growth... Charcoal production and settlements were not significantly influenced by age, gender, education level, land-holding size, and household size” (Munthali et al., 2019: 13).

**Other studies** undertaken also report equal or similar perceptions and experiences of smallholder farmers and their households described above in different areas in Malawi, Namibia and further southern African countries (e.g. Fink et al., 2020; Mulwa et al., 2017; Simmance et al., 2021; Chakufwa et al., 2016; ActionAid, 2006; Bewket, 2012; Jørstad and Webersik, 2016).

However, there exist a few studies that emphasize a **mismatch between local perceptions of changing climate conditions and the evidence within meteorological data** in southern Africa (Sutcliffe et al., 2016; Meze-Hausken, 2004; Rao et al., 2011; Osbahr et al., 2011; Simelton et al., 2013). In some cases, no evidence of rainfall data could be proven the

perceived seasonal change of rainfalls (as also in Botswana and Malawi, see Simelton et al. (2013). Reasons might be that either there are errors in the studies conducted, other meteorological data were not included or other factors affected the experiences of agricultural producers, as Sutcliffe et al. (2016: 1220) consider. Furthermore, **widespread narratives could also bring a shift in local perceptions**. For instance, Mandala (2005) found out that in Ngabu (southern Malawi) millet and sorghum originally dominated and deemed to represent subsistence staples as the production of Maize has historically been paltry. Through the association of maize with food insecurity, the status of maize has grown and became a strong national narrative (Smale, 1995). Sutcliffe et al. (2016: 1221) point out “This, coupled with provision of government subsidies for maize inputs in the area, may underlie misguided beliefs that summer maize production should be feasible”.

Investigations about how social media is being used and influences youth’ perception (15-35 years old) on climate change in Malawi was undertaken in a Master Thesis by Kachali (2020), by using questionnaires and qualitative interviews to figure out that social media is taken as a communication channel to discuss climate change. The platform most used was Facebook (62,5%), followed by WhatsApp. Moreover, it could be shown that there is still a lack of involving experts and of deeper knowledge about adaptation and mitigation actions and climate change in general in the climate change discourse on social media. Further findings emphasized the influence public figures in social media climate change communication influences how young people use the platform (Kachali, 2020).

## Namibia

Likewise, in Namibia, there has been conducted comprehensive research particularly figuring out smallholder farmers’ perceptions on climate change, some of which are listed in the following.

A study by Spear and Chappel (2018) interviewed n=31 farmers from three villages in Omusati region in north-central Namibia in July 2017. In terms of past changes, farmers reported a decline in soil quality and a decrease in nutrients due to less rainfall, coming along with periods of drought and hence, the death of livestock (Spear and Chappel, 2018: 3). Interestingly, the authors found out that **although the precarious agricultural situation, farmers partially did not perceive climate change as the main driver of reduced yields or the worsened droughts** (Spear and Chappel, 2018: 5). Notwithstanding the concerns the farmers voiced about soil fertility and some uncertainty, many smallholders did **not show much awareness** in terms of their **vulnerability** occurring from climate change and a need for adaptation. Despite a perception of changing environments, a lack of changing or adapting appropriate strategies could be observed in other studies as well (e.g. Bryan et al., 2009). This is why Spear and Chappel (2018) point out the importance of considering cultural, cognitive and social barriers and that might explain the apparent absent awareness, knowledge or willingness to change. These **might be skepticism of climate change in general, a strong religious belief and trust in God, a low educational level, dependence on government, and other traditional norms** (Spear and Chappel, 2018: 6). Especially in Namibia, there is a culture of **expectancy of the government to act**; additionally, chronic **poverty, marginalization and inequality** are further contributors to a certain **paralysis** in adopting climate-change combating practices (Spear and Chappel, 2018: 6; Davies, 2017).

In a recently published study, Inman et al. (2020) focus on **pastoralists** living in the Kunene region in Namibia and the possibility of adopting Ecosystem-based Adaptation (EbA) approaches to tackle climate change-induced poverty. In terms of the perception of climate

change, 67% (n=60 household interviews) of the respondents may have heard of climate change, however, the **majority did not understand what climate change is or what it can cause**; some persons traced climate change **causes back to God** (26%). Noteworthy is also the finding that 52% of the participants did **not attach any importance** to climate change in their lives. Overall, despite the de facto perception and experience of climate change/variability by the pastoralists, such as delayed rainfall or a lack of rain, the authors could state a gap of knowledge and awareness concerning the “what and why” of climate change, and also the **constrained access** to (scientific) **information**: “Discussing climate change and explaining it to the community members seemed like a wake-up call, a new knowledge to them”. (Inman et al., 2020: 10). Additionally, it has been revealed that **no local initiatives or campaigns** building up awareness, providing early warning schemes or climate information were located in that area (Inman et al., 2020).

Similarly, Siyambango et al. (2015) could observe that there is the belief that shifts in rainfall or a higher frequency of droughts are being caused since communities have surrendered traditional practices and rituals, or even the (Christian) belief of climate change appearing as a precursor to “the end of the world/doomsday” (Siyambango et al., 2015: 265).

Knowledge about climate change and especially the differentiation of climate-change-related terms and definitions was queried in a **case study** with focus group discussions and key informant interviews by Angula (2010) in north-central and in the western-north of Namibia. As a result, surveyed women and men did **not differ between climate change and natural climate variability** and basically associated climate change to a specific period of time (up to the past thirty years in many cases). In terms of age and gender, it could be stated that especially **young men show more awareness due to higher education and media (radio); whereas adult women’s and elderly’s understanding of (global) climate change is rather low** (Angula, 2010: 26). Moreover, a certain **passiveness** when facing climate changes, and the **belief that the government is responsible** for providing climate information could be stated (Angula, 2010: 34). **Nevertheless, perceptions of observable changing environments within the last decades are present.** These changes include frequent droughts, reduced grazing areas, less prolonged rainfall periods, string winds and floods (Angula, 2010: Table 3). An agreement was found regarding human influence on the environment which has been exacerbating through **overpopulation** and **increased demand for settlement** (Angula, 2010: 27).

Another study investigating local perceptions of livelihood risks and gender differences on the perception of climate change concerns in the Caprivi Strip of Namibia and northern Botswana concluded that **female-headed households showed greater worries than men-led households** (Bunting et al., 2013: 239). By evaluating 330 surveys and using methods of risk mapping, the authors found out that, besides a certain heterogeneity of risk perception among the seven surveyed villages due to environmental, social, and political conditions, **most key issues concern natural and financial assets** (Bunting et al., 2013: 246). However, “(w)hile adaptive measures directly related to climate-related vulnerability are found, they appear less important in shaping rural livelihood strategies than adaption to economic factors”, as Bunting et al. (2013: 247) aggregate.

The coherence of economic impacts and climate change in Namibia was examined in a case study in the framework of the Ndonga Linena irrigation project by Montle and Teweldemedhin (2014). All 30 small-scale irrigation farmers observed the negative effect of climate variability on their production levels (Montle and Teweldemedhin, 2014: 447). Long-term perceptions often were, inter alia, an increase in air temperature, a reduction in rainfall and resulted in poor



yields (Montle and Teweldemedhin, 2014: 448). Economic impacts of climate change would involve a **rise in poverty/a decrease in income if adaptation or mitigation strategies are not implemented in foreseeable future**. Surprisingly, **in contrast to the findings by Angola (2010) and Bunting et al. (2013)**, “education level, household level, farm size and temperature shifts were found to be statistically insignificant in terms of influencing farmer’s perception of climate change conditions” (Montle and Teweldemedhin, 2014: 448).

## 7. Climate Change Adaptation Strategies in Southern Africa

In order to address climate change, simultaneously increase resilience, and reduce the vulnerability of one’s country, there is the need to adapt or mitigate these climate change impacts by implementing several strategies at national, regional and local levels. Thus, **adaptation is defined** by the IPCC as “the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to the expected climate and its effect (IPCC, 2014: 1758). The ability of a system to modify its existing behaviour or structures to manage external stresses is therefore seen as “**adaptive capacity**” and is decisive in terms of taking advantage of opportunities or responding to consequences (Joshua et al., 2016; IPCC, 2014: 1758). In contrast to adaptation strategies, which primarily concern climate change impacts and aim to reduce a country’s vulnerability, **mitigation** comprises human intervention to tackle greenhouse gas emissions by decreasing the responsible sources (IPCC, 2014: 1769). Despite their different targets and outcomes, these **two approaches** to cope with climate change **complement each other** and should not be handled separately but as **holistic approaches** in order to set up and optimise respective policies and actions (GIZ, 2021b). **Hence, a transformative alignment is needed when dealing with climate change actions.**

According to the Church and Hammill (2019: 2), climate change **adaptation initiatives** and activities consist of managing coastal retreat, enhancing infrastructures, adjusting in farming, livelihood diversification or strengthening traditional resource governance mechanisms, to name just a few. These are being **implemented and carried out at different levels** (governmental, intergovernmental, organisational, communal, individual) (Church and Hammill, 2019; Arslan et al., 2018).

Noteworthy, and as already mentioned in the previous chapter, the *implementation* of adaptation strategies is, among others, closely associated with the way **climate change is being perceived** by affected people (Joshua et al., 2016). Yet, multiple obstacles can hamper effective implementation. An overview of **human, social, economic and institutional**

Category	Description	References
Human	<ul style="list-style-type: none"> <li>– Cognitive and behavioural obstacles</li> <li>– Lack of knowledge and information</li> </ul>	Hornsey et al. 2016; Prokopy et al. 2015; Wreford et al. 2017
Social	<ul style="list-style-type: none"> <li>– Undermined participation in decision-making and social equity</li> </ul>	Burton et al. 2008; Laube et al. 2012
Economic	<ul style="list-style-type: none"> <li>– Market failures and missing markets: transaction costs and political economy; ethical and distributional issues</li> <li>– Perverse incentives</li> <li>– Lack of domestic funds; inability to access international funds</li> </ul>	Chambwera et al. 2014b; Wreford et al. 2017; Rochecouste et al. 2015; Baumgart-Getz et al. 2012
Institutional	<ul style="list-style-type: none"> <li>– Mal-coordination of policies and response options; unclear responsibility of actors and leadership; misuse of power; all reducing social learning</li> <li>– Government failures</li> <li>– Path-dependent institutions</li> </ul>	Oberlack 2017; Sánchez et al. 2016; Greiner and Gregg 2011
Technological	<ul style="list-style-type: none"> <li>– Systems of mixed crop and livestock</li> <li>– Polycultures</li> </ul>	Nalau and Handmer 2015

Figure 6: Soft barriers and limits to adaptation (Hurlbert et al., 2019: 715, Table 7.4).

**barriers** to adaptation to land-climate challenges found in different literature has been summarized by Hurlbert et al. (2019: 715). → **Fig. 6.**

Taking on a more theoretical perspective, different **types of adaptation strategies** that currently exist were summarized by the International Institute for Sustainable Development (Church and Hammill, 2019): So-called **technocratic approaches** predominantly focus on changing practices rather than addressing structural causes of risks, as the ISSD states (2019: 2). This includes an expansion of infrastructures, new technologies and natural resource management techniques, for instance (Church and Hammill, 2019). **Incremental approaches**, on the other side, imply actions whose goal is to maintain the essence and integrity of a system (IPCC, 2014: 1758). However, both approaches are too narrow or may even result in maladaptation as they are only applicable under particular conditions, such as having high capacities or a low economic and agricultural vulnerability in general (Castells-Quintana, Lopez-Urbe, & McDermott, 2018). Furthermore, the “climate-proofing” attempt pursued by incremental approaches might “ultimately protect BAU development policies and programs - some of which contribute to and drive the very vulnerability that adaptation programs should seek to address” (Church and Hammill, 2019: 2). There is a nascent call in recent literature to move from the above mentioned and in practice still prevalent approaches to **transformational approaches** that tackle “fundamental attributes of a system” (IPCC, 2014: 1758) like poverty, gender, geography, access to (technical) infrastructure and information et cetera (Singh et al., 2017). Hence, inherent in transformational approaches is the view of adaptation as a process and not a single policy, pulling a nexus between multiple levels and sectors and thus, leading to a better increase of resilience.

From an economic-theoretical perspective, Eisenack and Stecker (2010: 4) introduced some core concepts to address climate change adaptation by using the so-called “**action theory of adaptation**”. → **Fig. 7.** Hereby, the authors explain possible limitations that can arise during implementations. For instance, adaptation is hindered by missing operators despite available means or vice versa; means are not sufficiently employed despite the availability of means and operators; the network of exposure units, operators and receptors is too complex and impedes decision-making or institutional arrangements are not properly tailored for operators/receptors (Eisenack and Stecker, 2010: 8).

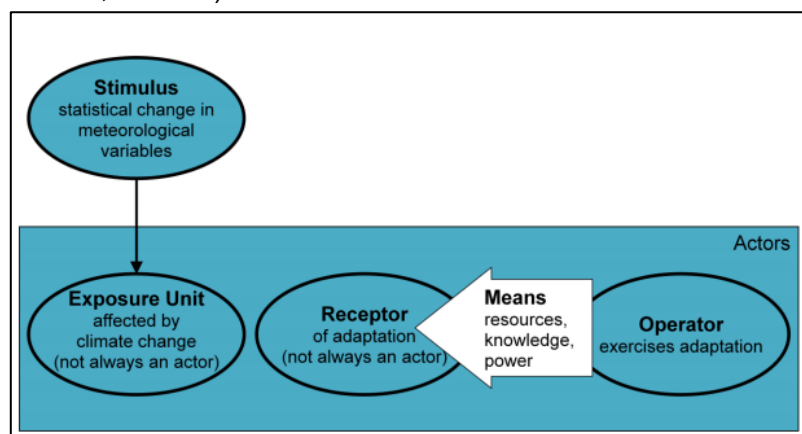


Figure 7: Schematic overview of the „action theory of adaptation “ (Eisenack, 2010: 5).

Pelling et al. (2015) further enriched adaptation theory and practice with a **transformational component**. By incorporating non-linear systemic and environmental change (*transformational*) and thus power and action preferences, the authors created a theoretical “adaptation activity space” consisting of seven domains (the individual, technology, livelihoods,

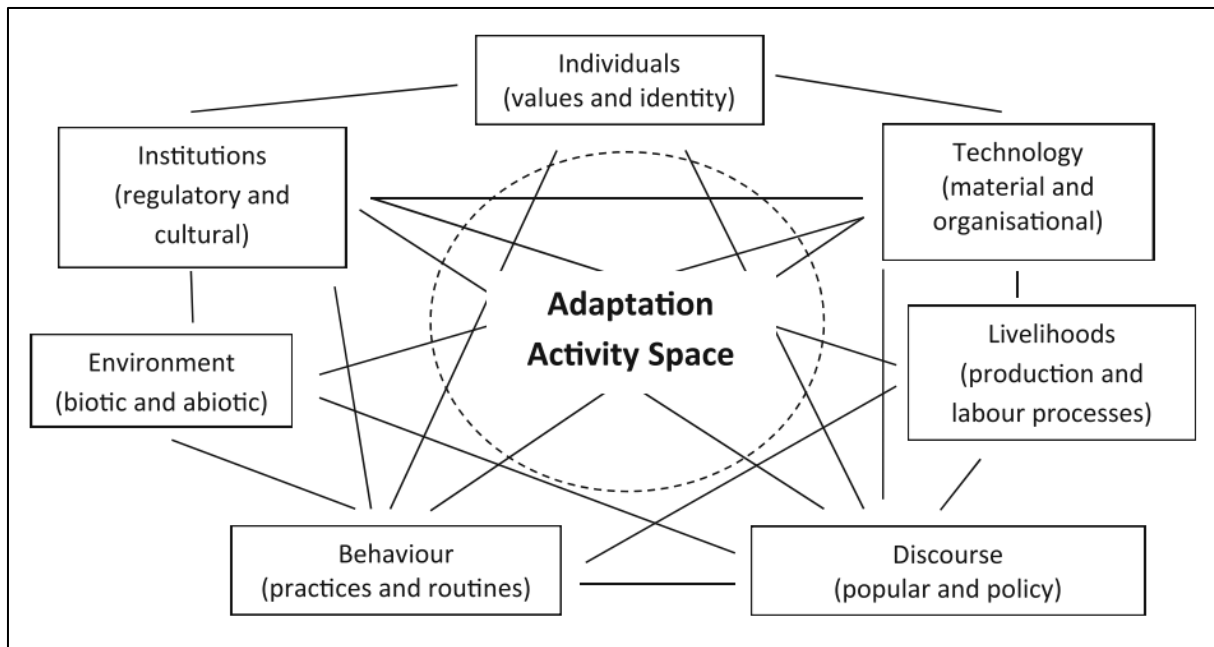


Figure 8: The seven areas of the “adaptation activity space” (Pelling et al., 2015: 119, Fig.2).

discourse, behaviour, environment and institutions) to help develop decision-making for appropriate adaptation strategies in practice (Pelling et al., 2015: 113). → **Fig. 8.**

More approaches to **adaptation assessment** are outlined in a paper by Berrang-Ford et al. (2019). Hereby, the authors differentiate between adaptation frameworks focusing on vulnerability/risk assessment (e.g. measuring the degree of vulnerability or risk of a population), on adaptation efforts, including adaptation processes (agenda-setting or governance) or outputs (such as policy, economic incentives etc.) (Berrang-Ford et al., 2019: 441). To be considered as a subcomponent of monitoring, reporting and evaluation (MRE) of climate adaptation, *adaptation tracking* is applied systematically across governments and organizations - and not as usual for MRE tailored to individual projects (Berrang-Ford et al., 2019: 440). Consequently, a new theory-driven adaptation assessment framework exemplified with the province British Columbia (Canada) by the authors was attempted to cover government progress on adaptation which is scalable across levels of government, and that can be systematically compared between governments by addressing “core components of adaptation assessment (vulnerability, goals and targets, adaptation efforts, and adaptation results) and characterizes subcomponents focused on adaptation effort (leadership, organizations and policy)” (Berrang-Ford et al., 2019: 440).

### International, Continental and Regional Climate Change Frameworks

In December 2015, representatives from 196 countries proclaimed the Paris Agreement in the context of the United Nations Framework Convention on Climate Change (UNFCCC), intending to limit global mean temperature rise below 2°C above pre-industrial levels, while making all efforts to stabilize the temperature rise at 1,5°C above the pre-industrial state (Ruane et al., 2018: 18). Besides the Paris Agreement, the Sustainable Development Goals (SDGs) (in the course of the 2015 United Sustainable Development Agenda 2030) depict two of the previous milestones of international governance (England et al., 2018b: 2). “Importantly, the SDGs will require transformative action precisely because of the need for climate change to be mainstreamed and integrated in all aspects of development work (Maxwell, 2017). The requisite level of ambition is prescribed by the Paris Agreement” (England et al., 2018b: 2). As an operational bridge under the Paris Agreement contributing to the SDGs, national adaptation

plans (NAPs), established under the Cancun Adaptation Framework (CAF), have been developed in 126 out of 154 developing countries (as of December 2020), among these Malawi and Namibia (UNFCCC, 2021). Also noteworthy is the “new cooperative mechanisms” under the Paris Agreement, which, in contrary to the Kyoto Protocol, do not hold the developed countries into account in terms of pursuing investments/technology transfer, but focus on a “more pragmatic, decentralised and collaborative approach” (Hurlbert et al., 2019: 704). → **Fig. 9.**

Further linkages to the UNFCCC processes can be drawn by the National Determined Contributions NDCs, which “embody efforts by each country to reduce national emissions and adapt to the impacts of climate change” and are commonly including information about adaptation (Taibi et al., 2020: 11; UNFCCC, 2021). Particularly in Malawi and Namibia, implementation of the NAPs is supported by international actors such as GIZ, NAP Global Network, Open NAP initiative, UNCDF, UNEP (in Malawi) and the Commonwealth Secretariat (in Namibia) (Taibi et al., 2020: 41).

Other climate goals at a global level are given with the “Sendai Framework for Disaster Risk Reduction” (2015-2030), the “Convention on Biological Diversity’s Strategic Plan for Biodiversity” (2011-2020), the “Ramsar Convention on Wetlands”, the “Convention to Combat Desertification” and also the “Convention on International Trade in Endangered Species of Wild Fauna and Flora” (Chevalier et al., 2020: 17). Superior continental frameworks, which involve SADC member states, is, for instance, the AU (African Union) Agenda 2063 and the “Comprehensive African Agricultural Development Programme” (CAADP) (Chevalier et al., 2020: 17). Additionally, each regional economic community in Africa (EAC, ECOWAS, SADC) aspires to meet its own development visions. With regards to SADC, to which Namibia and

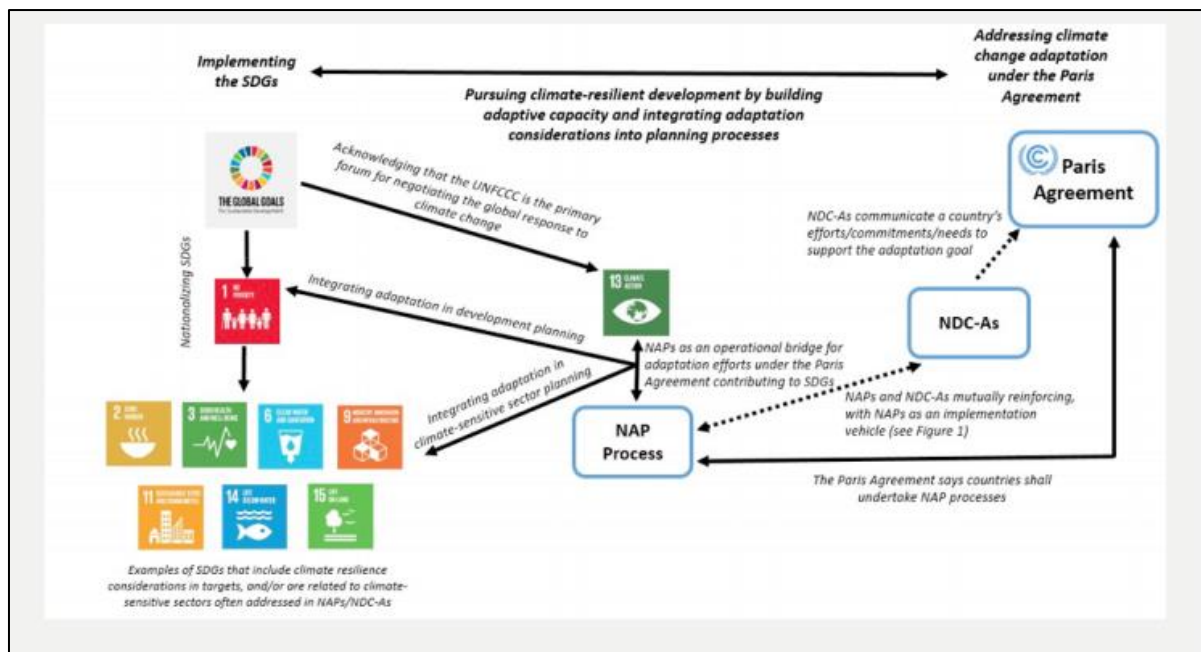


Figure 9: Linking NDC-As and NAPs to implement the Paris Agreement and the SDGs (NDC Partnership, 2021).

Malawi as southern African nations are parties, this is SADC’s Vision 2050, RISDP (a 10-year road map for regional development) and “The Regional Indicative Strategic Development Plan (2020-2030)” (Chevalier et al., 2020: 17).

## Approaches on the Regional Level: Southern African Development Community (SADC)

The Southern Africa Development Community (SADC) was established in 1992 and currently has **16 member states**: Angola, Botswana, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, the United Republic of Tanzania, Zambia, Zimbabwe and Comoros. The SADC Secretariat is located in Gaborone (Botswana) and is currently run under the chairperson of President Chakwera of Malawi (SADC, 2021b; German Embassy Gaborone, 2021). → **Fig. 10**. Through regional integration, the aim is to build up economic development, peace, security and growth as well as reduce poverty, among others (SADC, 2021a: 3). Among these achievements also belongs environment and disaster risk management, wherefore SADC has instituted several programmes and agreements to tackle climate change.

For instance, in 2016, SADC adopted a regional water climate change adaptation strategy and a flood early warning system by establishing the “Southern African Regional Climate Outlook Forum (SARCOF)”, a platform for reviewing rainfalls seasons and discussing potential impacts. One year later, in 2017, the “SADC Disaster Preparedness and Response Strategy and Fund (2016-2030)” was passed; furthermore, cooperation and coordination were amplified by setting up transboundary cooperation in water and other natural resources, and a disaster risk reduction unit at a regional level. (SADC, 2021a: 17).

Literature or research, besides SADC reports and other analysis provided by SADC itself (Quinn, 2020; Chesterman et al., 2020b; Chevalier et al., 2020; Gosling et al., 2020; Chesterman et al., 2020a), explicitly investigating SADC *structures* or *regional and national linkages* (and not only on particular SADC member states) on climate change is not very extensive, up to now.

A paper by Barnard from 2014 shed light on the role of harmonised law and policy on mitigation in the energy sector from a SADC perspective by investigating developments in the formulation of harmonised SADC law and policy on climate change in general and law and policy pertaining to mitigation in the energy sector specifically (Barnard, 2014: 26) As a result, the author states: “Although a number of climate-related programmes and initiatives exist in SADC, much still needs to be done in terms of SADC climate law and policy” (Barnard, 2014: 31).

Another study focused on the governance of disaster risk reduction (DRR) and climate change adaptation (CCA) in different institutional frameworks (Nemakonde and van Niekerk, 2017). By including a literature review concerning DRR and CCA, interviews and online surveys among the SADC member states, the authors could demonstrate “that DRR and CCA as fields of practice are fragmented as they are carried out by different departments, ministries and/or agencies in all but three SADC member states” (Nemakonde and van Niekerk, 2017: 372). Hence, the authors propose to apply a normative model for integrating organisations for disaster risk reduction and climate change among the member states. (Nemakonde and van Niekerk, 2017).

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*“With DRR and CCA coordinated by separate organisations in 12 of 15 SADC member states, the countries lack integrated organisational and institutional mechanisms to effectively address disasters risk emanating from both natural hazards and climate change. Integration of organisation for DRR and CCA becomes pertinent in developing countries including SADC member states that cannot afford parallel structures as these structures might impede each other’s work and send mixed messages to policy makers and budget holders (Becker et al., 2013)” (Nemakonde and van Niekerk, 2017: 365).*

Bopape et al. (2019) investigated the implementation of the SADC Cyber-Infrastructure Framework, which was approved in June 2016, and aims to enhance and develop a holistic



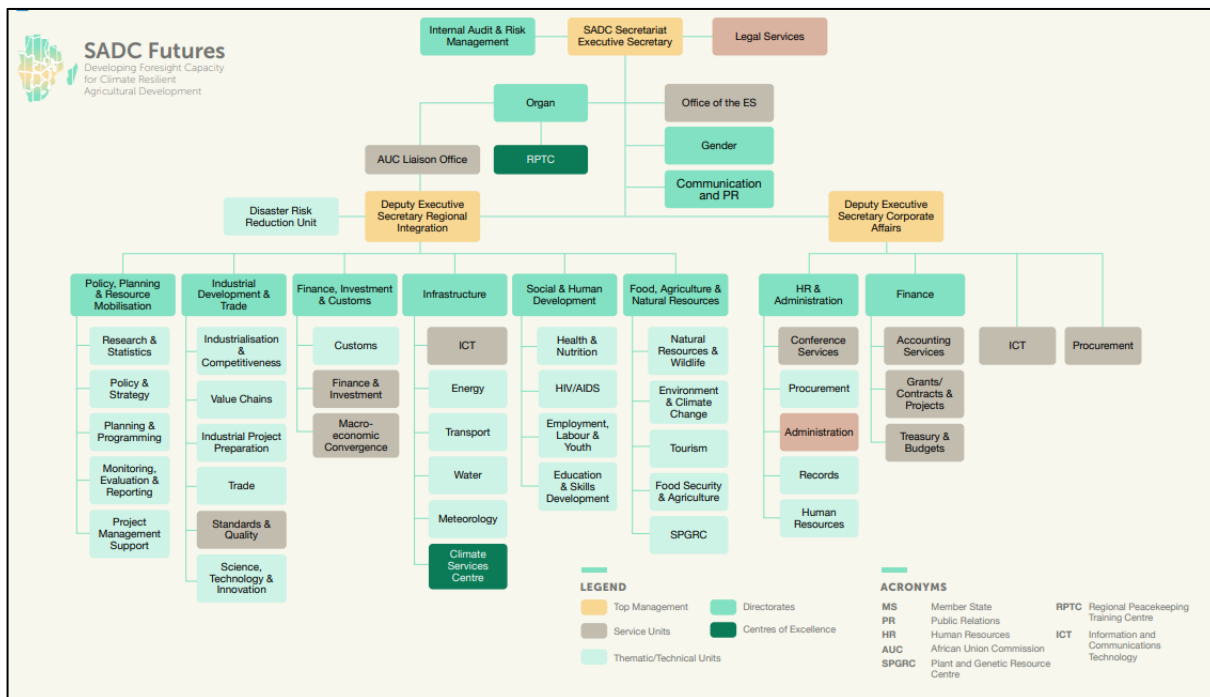


Figure 10: SADC Organisational Structure (Chevalier et al., 2020: 12).

cyber-infrastructure system in the SADC region. By conducting a situational analysis, it could be figured out whether Meteorological Services and/or Universities utilize weather and climate data and models, and which software tools were applied. The study indicated that yet, modelling and data analysis activities in the region across all timescales are present, but capacities to use and implement IT structure partially remains limited. Moreover, there is a need for the Meteorological Services to engage with the cyber-infrastructure experts in the respective countries. (Bopape et al., 2019: 1,8).

Particularly within the last years, there has been greater development in terms of climate change issues at the SADC level. Thus, there was designed a “SADC Future Training Series” project, which consists of webinars and a toolkit, and was initiated within the SHARED Decision Hub, a collective of stakeholder engagement behavioural specialists and transdisciplinary scientists, founded in 2012 (Chesterman et al., 2020b). Such virtual series provide foresight methods, tools, and approaches with the “aim to equip users to practically apply the range of foresight tools and methods for innovative strategic planning and policy formulation” (Chesterman et al., 2020b: 4).

Also noteworthy are recommendations for the SADC within a recently published report by Gosling et al. (2020), which scrutinises agriculture in the SADC region under climate change. Important is the linkage from a regional to a national level undertaken in some advice on the inclusion of agriculture in climate change policies, strategies and planning. The authors recommend including climate-resilient agricultural strategies and input from national farmer organisations (NFOs) in the revision process of the SADC 2015 Climate Change Strategy and Action Plan (2020-2025) at a regional level; and at a national level, to “[u]se the next iteration of Nationally Determined Contributions (NDCs) (2020) and LongTerm Strategies (LTSSs) as vehicles to guide productive, resilient, and inclusive farming practices such as climate-smart agriculture (CSA), conservation agriculture and the ecosystem approach for sustainable agricultural intensification” (Gosling et al., 2020: 12). Additionally, an enhancement of inter-governmental collaboration and coordination of agricultural and climate change, as seen between Zambia, Kenya, Uganda and Ghana, is desirable (Gosling et al., 2020: 13).



As the German International Development Agency (GIZ) emphasizes, **on the regional (SADC) level, multi-sectoral, comprehensive policy frameworks concerning climate change adaptation strategies were developed later than on the national level** (Schaller et al., 2020: 56). Yet, this underlines one's nation subsidiary capacity to act but is also weakened SADC's support of its member states in terms of implementation, which is further amplified by a strong limitation in human resources. However, "this has been changing recently with respective frameworks being developed and support of implementation being funded by major donors, such as EU (e.g. GCCA+ Programme)" and projects supported by GIZ, such as ACCRA (Adaptation to Climate Change in Rural Areas in Southern Africa covering a synopsis of climate risk assessments in the region 2015-2020) and C-NRM (Climate Resilience & NRM in SADC-Region 2021-2023) (Schaller et al., 2020: 56).

### Projects and Programmes on CCA at SADC-Level: Examples

#### **Adaptation to Climate Change in Rural Areas in Southern Africa Programme (ACCRA)**

From 2015 until 2021, the ACCRA project has been implemented by the support of the GIZ, commissioned by the BMZ and executed through the SADC secretary with the goal to increase resilience to climate change; mainly operating in the areas "regional knowledge dissemination on climate-smart agriculture" and "climate proofing of agricultural value chains". Further, it supported the implementation of some aspects from the SADC Regional Agricultural Policy and the strengthening of the capacity of CCARDESA (Centre for Coordination of Agricultural Research and Development for Southern Africa). Outcomes of the project are, among others, a revamping of digital applications as well as an increase in the amount of users of CCARDESA's information and knowledge management system (including the Southern African Agriculture Information Knowledge System (SAAIKS)), climate change and agriculture relevant training courses, stronger visibility of CCARDESA at different events and, with a view to Malawi, an establishment of projects such as maize-legume systems with Malawi, Zambia and Zimbabwe in partnership with the International Maize and Wheat Improvement Centre. (GIZ, 2021a).

#### **Climate Resilience and Management of Natural Resources in the SADC Region (C-NRM)**

Building up on the previous ACCRA programme and the project "Transboundary use and Protection of Natural Resources in the SADC region" (TUPNR), the C-NRM intends to foster "the mainstreaming of climate change adaptation and mitigation in transboundary protected area management, thereby strengthening the climate change resilience of the local population in and around TFCAs [Transfrontier Conservation Area, note of the author]" (GIZ, 2021d: 1). It is scheduled to operate from 2021 until 2023, implemented by the GIZ, commissioned by the BMZ and executively led via the SADC secretariat. It further aims to disseminate knowledge about climate-smart agriculture and climate-sensitive management of natural resources, including ecosystem-based adaptation by high-quality training offers, among others. (GIZ, 2021d).

#### **Global Climate Change Alliance Plus programme (GCCA+)**

The aim to strengthen the capacity of SADC member states to undertake regional and national adaptation and mitigation actions, along with south-south cooperation with Caribbean and Pacific areas and also to support universities and research centres from the SADC region in developing innovative solutions, is pursued with the GCCA+ programme within a period of four years (2019-2023). It is funded by the European Development Fund and launched by the EU and SADC Secretariat. (SADC, 2019).

### **Regional Vulnerability Assessment & Analysis Programme (RVAA)**

The goal to inform resilient livelihoods by strengthening national and regional vulnerability analysis systems, which in turn affects policy formulations, development programmes and emergency interventions, was set by the RVAA programme established in 2005. It is currently (2017-2022) in the phase of supporting resilient and sustainable rural and urban livelihoods, environments and institutions in reducing poverty and enhancing well-being in the SADC region (SADC, 2021a: 62).

Objectives are, among others, enhancing regional and national response to the issues of climate change and poverty, resilience building and livelihood vulnerability, convening the regional Annual Dissemination Forum to share information on the state of food and nutrition insecurity and vulnerability in the Region. Moreover, in 2021, an online vulnerability atlas was launched providing data and information relating to food, nutrition and livelihoods security from 16 SADC Member States (SADC, 2021a: 62,63).

### **Strengthening the National-Regional Linkages in Southern Africa (SNRL)**

From 2016 until 2022, the GIZ, commissioned by the BMZ, and co-funded by the EU, support the SADC Secretariat in implementing the so-called SNRL-project, which aims to improve the capacity of SADC Member States' structures to foster and coordinate the implementation of the Regional Agenda at national level (GIZ, 2021c). Despite the economic and political focus, this project also connects to climate change issues since it relies on the Regional Agenda which also includes climate change(-related) dimensions. Outcomes are, for instance, the enhancement of actors and stakeholders in facilitating, managing, monitoring and reporting on the implementation in agriculture, industrialisation and infrastructure as well as the provision of training for policy makers, managers and technicians to design effective industrial policies at a national level. (GIZ, 2021c).

### **National Climate Change Strategies, Plans and Institutional Frameworks in Malawi and Namibia**

In the course of these international goals, least developed countries (LDC) have submitted so-called National Adaptation Programs of Action to the United Nations Framework Convention on Climate Change (UNFCCC), some of which explicitly focus on adaptation strategies like diversification (in agriculture, fishing, livelihoods) in order to build up resilience (Arslan et al., 2018). As the IPCC reports in its Fifth Assessment Report in 2014, these prioritized adaptation measures predominantly focus on the sectors agriculture, food security, water resources, forestry, and disaster management and show less integration with economic planning and poverty reduction (Nian and Ruppel, 2014: 1227). Upper middle-income countries like Namibia do not have initiated NAPAs but “National Climate Change Response Strategies” (NCCRS).

In the past years, multiple countries have set climate change policies higher on their political agenda. Notwithstanding this observable increase at a national level, their implementation often does not take desirable effect. Barriers, among others, are not seldom financial means (Schaller et al., 2020) but also societal factors such as risk perception should be taken into account. Also, activities coming from SADC level are often deemed “from outside” and thus, not lending that much weight at the national level (Schaller et al., 2020: 56).

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*„Legislative and policy frameworks for adaptation remain fragmented, adaptation policy approaches seldom take into account realities in the political and institutional spheres, and national policies are often at odds with autonomous local adaptation strategies, which can act as a barrier to adaptation, especially where cultural, traditional, and context-specific factors are ignored” Extraction from the IPCC report 2014, Chapter 22 Africa (Niang et al.: 1228).*

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## Malawi

Since counting to the least developed countries of the world, Malawi has submitted the so-called National Adaptation Programmes of Action (NAPA) to the United Nations Framework Convention on Climate Change (UNFCCC) in 2006 (GoM, 2020).

As mentioned by Mataya et al. (2020: 781), “the government of Malawi recognizes the importance of adaptation in its long and medium-term development plans (Vision 2020 and the Sixth National Development Plan), as well as through a range of policies and strategies, such as the Malawi National Climate Change Management Policy”. Building the capacity of technical human resources and the aim of mainstreaming climate change adaptation into policy development is being strived; however, sufficient adaptation to impacts of climate variability and change and implementation of those strategies are partially failing in most sub-Saharan African countries including Malawi (Mataya et al., 2020: 781). → **Table 2.**

Furthermore, the Government of Malawi pursues a new pluralistic extension policy intending “to support farmers to overcome barriers to increasing production and adapting to changing climatic conditions”; however, coordination among extension providers remains fairly insufficient up to now (→ **Table 6**; Zabronsky, 2021).

## Namibia

In Namibia, National Development Contributions are set high on the political agenda, and climate change, as well as adaption to climate change, is considered in the Economic Development Plans and on the agenda of the Ministry of Environment and Tourism. → **Fig. 11.** A lack of ACC can be observed in the Ministry of Agriculture, among others, and the problem of existing silos in the ministries is still present, according to a GIZ analysis (Schaller et al., 2020: 59; → **Table 6**). As the World Bank Group (2021a: 33) states, “Namibia’s approaches to addressing climate change are focused on ensuring strategies are consistent

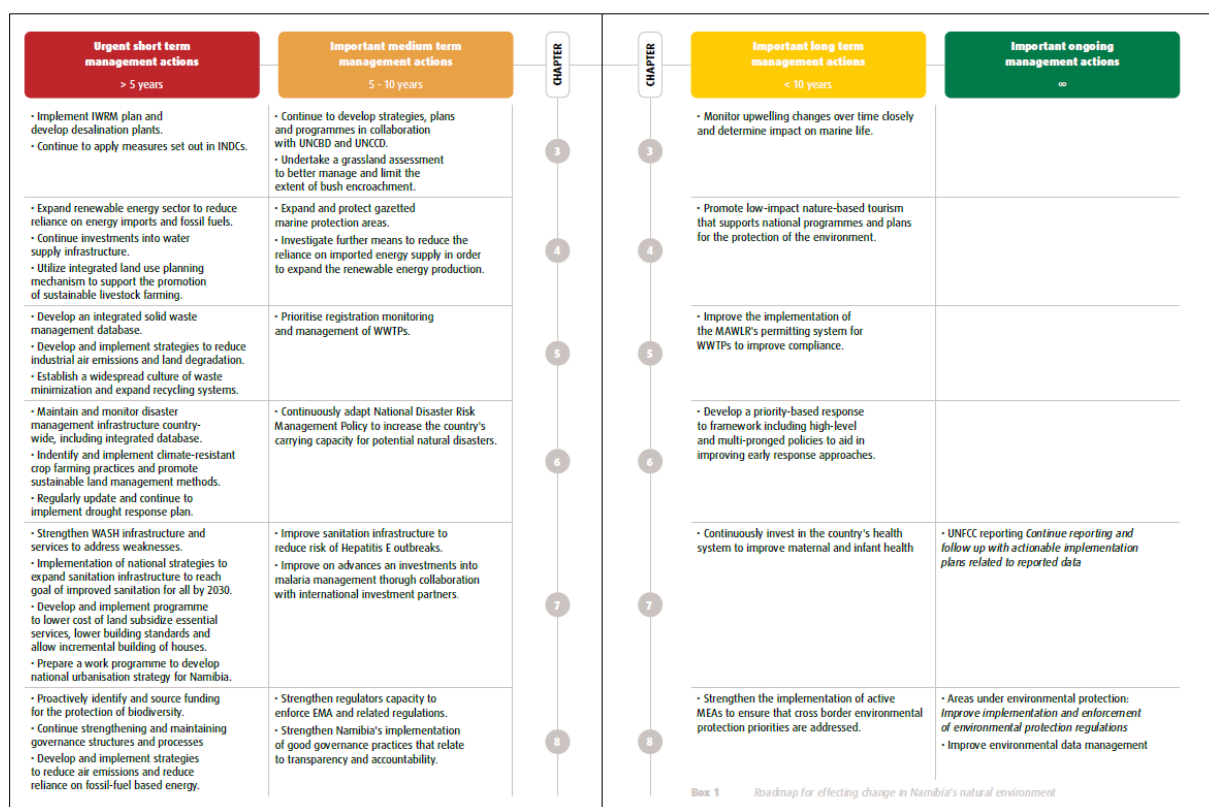


Figure 11: Roadmap for effecting change in Namibia's natural environment (MEFT, 2021: xxxix, Box 1).

with national development priorities and the use the energy sector as a key driver for sustainability and economic growth.”

Like in Malawi, in the past few decades many policies, strategies, plans and programmes were adopted → **Table 3**. Among these are main objectives such as sustaining household food security, accessing to potable water, enabling the farmers to adopt self-reliant practices to drought risk, maintaining livestock herds, minimising degradation to natural resources, maintaining health and finance drought relief, diversification, reducing disaster risk and building resilience to disasters, to name just a few.

However, as Spear and Chappel (2018) state, although adaptive capacity exists in Namibia, especially at a regional (subnational) and national level, this capacity is more generally aligned. This goes along with limited implementation as often specific capacity related to dealing with development is needed (Nyantakyi-Frimpong and Bezner-Kerr, 2015; Spear and Chappel, 2018). “This type of capacity is inadequate for dealing with both current and future climate risk and the inequality and poverty that exists. While at the local level, remote communities can be well equipped to cope with climate variability and change (...), they are often marginalized, chronically disadvantaged and can battle to secure resources to respond to changes in the climate (Maru et al., 2014). (...). Limited capacity to respond to the effects of climate change leads to increased vulnerability of communities and sectors. A number of factors contribute to low adaptive capacity, including informational, technical, infrastructural, political, financial, attitudinal and cultural issues. This capacity is limited at both the individual and household level, and at the national institutional level in many cases” (Spear and Chappel, 2018: 23,24). Although national policies have put more effort in formulating and prioritising adaptation strategies, systemic shifts or rather more transformative steps failed to appear, up to now. This might be due to barriers in implementing these strategies; for instance, adaptation efforts at the grassroots level have been rather incremental, reactive and aligned to short-term solutions than bringing about major changes, as Davies et al. (2020: 268) emphasize.

*Table 2: Overview of relevant national climate change frameworks in Malawi (data from Pardoe et al., 2020 (titles of the columns were adopted in modified form); GoM, 2020; Spezowka, 2018; GoM, 2002, 2012; Chinseu et al., 2018; GoM, 2021; LSE, 2021a).*

Year	Political Milestones	Institutional Level	Policies and Strategies (Executive) Acts (Legislative)		Plans and Programs	
2000			Agricultural Extension Policy (2000)		National Action Programme for Malawi for the United Nations Convention to combat desertification (2005) National Adaptation Programme of Action (NAPA 2006)	
2002			Water Policy (2002)			
2004			Energy Regulation Act (2004) Rural Electrification Act			
2005		Ministry of Development Planning and Cooperation (Department of Economic Planning and Development)			National Climate Change Programme (under Africa Adaptation Programme 2008-2012)	
2006						
2008						
2009						
2010						
2011	Agricultural Policy		Malawi Agricultural Sector Wide Approach (ASWAp) (2011-2015)			
2012	President passed away (Bingu wa Mutharika)	Ministry of Environment and Climate Change Management	National Climate Change Policy (2012) Climate Change Learning Strategy (2012)		National Development Plan	
	Interim election (Joyce Banda)		National Climate Change and Environment Communication Strategy 2012-2016			
2013	President Arthur Peter Mutharika	Ministry of Natural Resources, Energy and Mining (Environmental Affairs Department and Department of Climate Change and Meteorological Services)			National Climate change Investment Plan 2013-18	
2014						
2015			National Disaster Risk Management Policy (2015)			
2016			Growth Development Strategy II 2016			
			National Climate Change Management Policy 2016			
2017	National Disaster Recovery Framework (2017, Volume II: Drought)				National Adaptation Programme of Action 2015-2020	
	Environment Management Act (No. 19 of 2017)					
2018	Invalid /cancelled elections		National Resilience Strategy (2018-2030): Breaking the Cycle of Food Insecurity in Malawi		Biodiversity Strategy and Action Plan 2015-2025	
2019						
2020	President Dr. Lazarus McCarthy Chakwera					

Table 3: Overview of relevant national (climate change-related) frameworks since 2000 in Namibia (data from Remmert, 2020; MEFT, 2021; World Bank Group, 2021a; LSE, 2021b).

Year	Political Milestones	Institutional Level	Policies and Strategies (Executive)   Acts (Legislative)   Reports		Plans and Programs		
2000			National Water Policy White Paper (2000)				
2001		National Climate Change Committee (NCCC)					
2002			Communal Land Reform Act of (2002)				
2003			Namibia's Initial National Communications to the UNFCCC				
2004			National Drought Policy (2003)				
2005			Vision 2030				
2005	President Hifikepunye Pohamba (SWAPO)		National Malaria Policy (2005)				
2008			National Land Tenure Policy (2008) Water Supply and Sanitation Policy (2008)		National Development Plan III 2008		
2009			Disaster Risk Management Policy (2009)				
2010			National Policy on Climate Change for Namibia (2010)  Integrated Water Resource Management Plan (IWRM)		National Health Policy Framework (2010–2020)		
			National Gender Policy (2010-2020)				
2011			Second National Communications to the UNFCCC (2011)  National Climate Change Policy (2011)		National Disaster Risk Management Plan (2011)		
2012			Disaster Risk Management Act (2012)		National Rangeland Management Plan (NRMPS) 2012  National Development Plan IV 2012/13-2016/2017		
2013				The Water Management Act 2013		Climate Change Strategy and Action Plan (CCSAP) 2013-2020  Drought Relief Response Plan of 2013 – 2014  Third National Action Programme of the UNCCD (2014-20124)   <	



## Agriculture Sector: Adaptation Strategies and Programmes

The agriculture sector in Malawi and Namibia poses a key sector to the lives of the majority of the population since particularly, the employment in agriculture is very high (Namibia: 20,1%, Malawi: 85% of the population (CIMA Research Foundation: 8; FAO, 2021; MEFT, 2021). Agriculture contributed around 7,2% to the Namibian economy in 2019, whereas in Malawi, this sector accounts for over 30% (CIAT and World Bank, 2018; MEFT, 2021). Additionally, to the relevance of the agri-sector for the population in terms of employment and food security, particularly for Namibia, immediate management action is required since climate change impacts needs to strengthen and build up agricultural resilience (MEFT, 2021: 207) → **Fig. 12.**

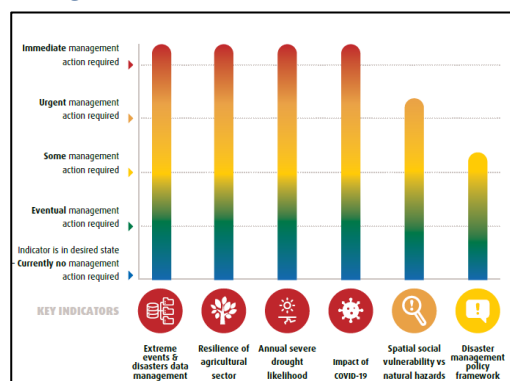


Figure 12: Action dashboard for extreme events and disaster management in Namibia (MEFT, 2021: 207, Fig. 5-9).

In **Namibia**, livestock farming is mainly being practiced both in commercial and subsistence sectors, including cattle, goat, sheep and pig production, yet, “Namibia is showing a downward trend in livestock numbers influenced by a range of environmental and economic factors, which impacts the sustainability of livestock farming” (MEFT, 2021: 133). Besides, ranching and open grazing is among common farming methods. Crop production is adopted by smallholder farmers, too. In Namibia, the commercial sector (44% of total land coverage, accommodates 10% of the population) is relatively well developed, export-oriented and capital intensive, compared to the subsistence-based communal sector (41% of total land coverage, accommodates 60% of the population), which is characterized by high-labour and low-technology (FAO, 2021). As the commercial sector is to a large extent export-driven, this chapter rather focuses on adaptation strategies within (rural) subsistence farming (World Bank Group, 2021a: 17).

In **Malawi**, Tobacco plantations are the predominant commercial good (representing the major national export followed by raw sugar, tea, groundnut, and cotton lint), while within rural subsistence economy, the predominant goods are mainly livestock farming and crop production (maize, rice, cassava, legumes, sweet potato) which are produced for domestic consumption to 80%. (Hatuikulipi, 2008: 37; CIAT and World Bank, 2018). Hereby, smallholder production contributed to about 70% of the agricultural GDP in 2018 (CIAT and World Bank, 2018: 2). In terms of land tenure, there is customary (68%), public (20%) and private land (12%); the total agricultural area amounts 21% of the total land area (CIAT and World Bank, 2018: 3). With more than 90%, rain-feeding poses the most used method, only 4% of the cultivated land is irrigated. According to CIAT and World Bank (2018: 4), “(s)ome farmers, (mostly in Salima, Karonga and the lower Shire which are all vulnerable to floods), also practice recessionary agriculture (6% of production), resulting in another harvest season for these regions”. Livestock production (cattle, goats, pigs and poultry) is rather practiced in the northern region. Hereby, extensive grazing mostly happens in communal lands and intensive livestock production on the estates. (CIAT and World Bank, 2018).

Akoh et al. (2011) differentiate **various types of adaptation based on the agriculture sector**; these are, for instance, anticipatory/reactive, supply-driven/demand-driven, private/public, and autonomous/planned. → **Fig. 13.** Additionally, regarding the agriculture sectors in Namibia and Malawi, there must be a distinction between the agricultural industry and subsistence farming, which in turn leads to different adaptation strategies.

Type of adaptation		Definition	Examples
Autonomous		Actions that can be taken by farmers and communities independently of policy, based on a set of technology and management options available under current climate conditions	<ul style="list-style-type: none"> <li>• Crop calendar shifts (planting, input schedules, harvesting)</li> <li>• Cultivar changes</li> <li>• Crop mix changes</li> </ul>
Planned (non-autonomous)		Actions that require concerted action from local, regional and/or national policy	<ul style="list-style-type: none"> <li>• Land use incentives</li> <li>• Pollution control from inputs</li> <li>• Water costing</li> <li>• Germplasm Development Programs</li> </ul>
Two types of planned adaptations:	Supply-side	Influencing the accessibility of resources and inputs	<ul style="list-style-type: none"> <li>• Building water reservoirs to collect rainwater</li> <li>• Expanding drainage infrastructure as a major way to accommodate heavy precipitation events</li> </ul>
	Demand-side	Influencing behaviour of individuals and organizations towards certain behaviour	<ul style="list-style-type: none"> <li>• Water-metering to support water conservation</li> <li>• Changing standards such as construction codes, limits per unit of production, or environmental standards to address changes in climate</li> </ul>

Sources: (1) Tubiello F. N. and C. Rosenzweig (2008). Developing climate change impact metrics for agriculture. *The Integrated Assessment Journal* 8(1): 165–184. (2) Bizikova, L., T. Neale and I. Burton (2008). *Adapting to Climate Change – Handbook for Canadian communities*. Environment Canada and University of British Columbia, Vancouver, pp. 95.

*Figure 13: Important types of adaptations, their definitions and examples with focus on agriculture (Akoh et al., 2011: Table 1-1).*

Within a **Malawian** context, Abid et al. (2020) could identify so-called “ex-ante-adaptation” and “ex-post”-strategies among rural (smallholder) farm households (n=1518 respondents). Hereby, the former refers to risk management strategies, the latter to coping strategies to climatic shocks. Surveys have shown that (besides a great percentage of adopting “none” “ex-ante-adaptation”) mechanisms like doing more on-farm casual work, planting early, planting crops adapted to water logging, using resistant varieties, increasing seed rate or intercropping were most used. Concerning “ex-post”-strategies draw a similar picture, with mostly doing nothing about it (40%), followed by planting drought and disease tolerant varieties, crop diversification, early planting, changing an eating habit, doing more on-farm casual work, or borrowing money. (Abid et al., 2020: 7). Furthermore, as Bezner Kerr et al. (2019: 550) point out, “(i)ntensification is the dominant model of agriculture promoted in Africa to address food insecurity and malnutrition, but has had limited success, with benefits mainly accruing to large landholders and input suppliers”.

For **Namibia**, coping mechanisms such as diversifying livelihoods to off-farm activities, growing drought-resistant crop varieties, keeping heat-resistant breeds of livestock, adjusting planting of crops by delaying, and soil and water conservation through conservation tillage, ripping, ridging, or farrowing, crop rotation or intercropping, supplemental feeding, selling livestock, receiving remittances from family members from urban areas, or getting pension grants from the government were named in several studies (Spear and Chappel, 2018: 2). Further specific adaptation options such as “land-use planning and promotion of climate-compatible land uses and associated production systems”, “adaptive livestock management”, or “water conservation” were identified in a community-based initiative by compiling climate change toolkits and training materials conducted in all regions in Namibia (David et al., 2013: 223–226).

Moreover, the **agriculture** sector is tightly **interwoven** with the **water sector**, as it uses up to 75% of the total water production. Hereby, commercial agriculture consumes the most amount of water, whereas communal farmers need the least. (World Bank Group, 2021a). An example

of how the farming sector is generally tight-knit is linked to other environments, is being illustrated in → Fig. 14.

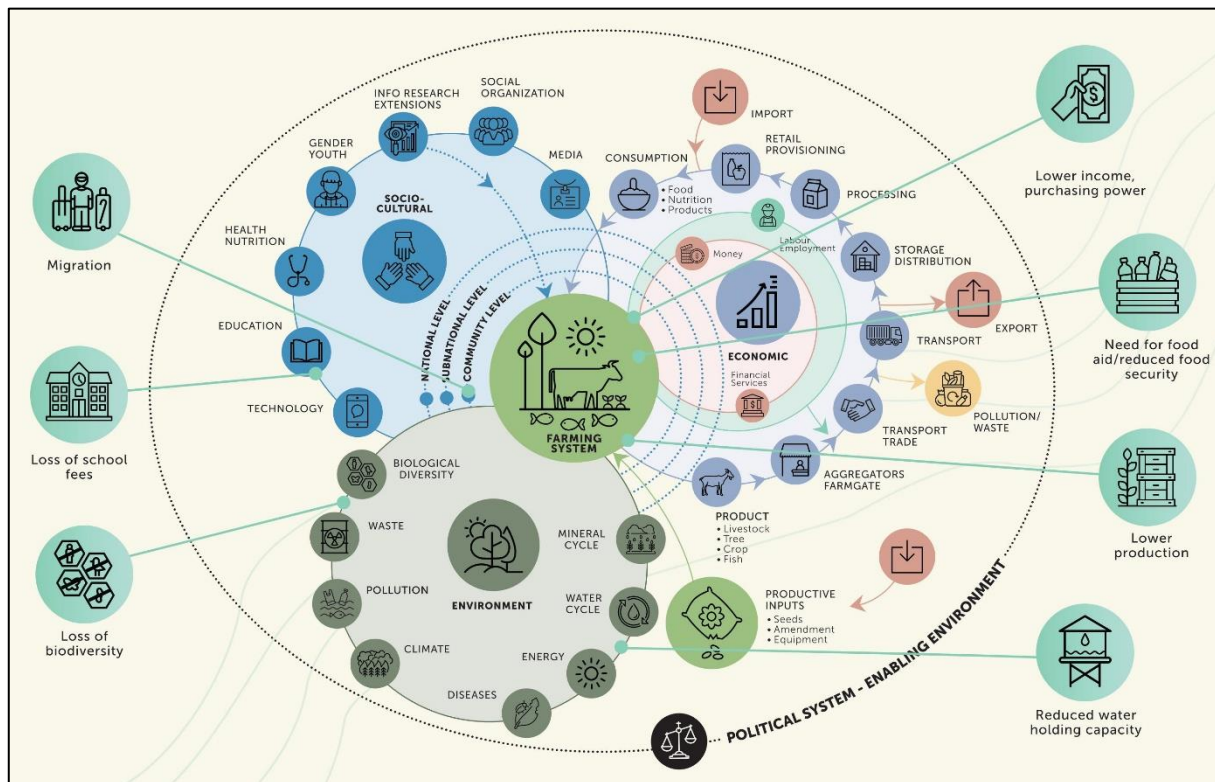


Figure 14: Relations and linkages of systems, exemplified with the farming system, which influences or is influenced by several dimensions (e.g. economic, environmental) and socio-economic drivers such as employment, science and technology, markets, urbanisation et cetera. In this case, “the driver ‘land degradation’ could result in negative outcomes such as lower income, reduced food security, lower production, reduced water holding capacity, migration, loss of school fees, and loss of biodiversity” (Chesterman et al., 2020a: 338).

## Alternative and Sustainable Farming Methods: Climate Smart Agriculture (CSA) Concepts

There are multiple alternative farming methods and actions for climate resilience agricultural production emerging and being conceptualized in which have been put effort within the last years (Kalt, 2020), for instance, Sustainable Intensification, Good Agricultural Practices (GAP), and Climate Smart Agriculture (CSA) (Gosling et al., 2020: 11). So-called Climate Smart Agriculture (CSA) practices, such as conservation tillage, water-saving techniques, and switching to drought-resistant crops and livestock breeds (Davies et al., 2020), are to be understood as agricultural adaptation programs, initially launched by the FAO in 2009, to help mitigate environmental risks and link to the increase of food security by pursuing “pathways” such as intensification of input and investment, focus on income and expenditures, or risk mitigation (Amadu, 2019; Amadu et al., 2020; Lipper et al., 2018; Ruben et al., 2019: 305–306). Thus, CSA “reflects an ambition to improve the integration of agricultural development and climate responsiveness” (Sova et al., 2018: 7). Both Namibia and Malawi have included CSA in their NDCs (Corps). Many case studies on different continents were undertaken in the past decades to scrutinize the efficiency of such concepts (e.g. Lipper et al., 2018). As a result, efficacious adaptation responses appear to be conservation practices (Komarek et al., 2021; Ruben et al., 2019), diversification strategies (for Malawi see Arslan et al., 2018), cash transfer programs (for Southern Africa and Latin America see Asfaw and Davis, 2018); and insurance for farmers (also for Malawi see Mullins et al., 2018); among others. These can all be

subsumed under five bigger technology clusters, namely water management, crop tolerance to stress, intercropping, organic inputs, and conservation agriculture account, which depict the main categories of CSA (Sova et al., 2018: 5). One of these clusters is conservation agriculture (CA), an innovational sustainable farming system, focusing on minimalizing soil disturbance, permanent soil cover, and crop associations (Chinseu et al., 2018: 51). However, implementation of CA practices on the ground is still being complicated “even though CA features at lower policy levels in implementation plans, poor allocation of human and financial resources is inevitable” (Chinseu et al., 2018: 57). Low evidence of farmers adopting climate-smart practices in Namibia is furthermore stated by Davies et al. (2020: 274). Thus, recommendations are, for instance, the need of strengthening stakeholder collaboration and greater advocacy in the policy. Further, Spear and Chappel (2018:8) stress that building the adaptive capacity of communities to help themselves must be part of the CSA practices. More barriers to CSA adoption observed in Sub-Saharan Africa, are hurdles in training/information, in the economy, in policies/institutions, as well as social, cultural and environmental barriers (Sova et al., 2018: 15).

### Literature Review on Climate Change Adaptation Strategies, Challenges, Barriers and (Policy) Advice

Although, as Mataya et al. (2020: 883) point out, there is commitment at the governmental level to address and tackle capacity gaps by highlighting obstacles in climate change concepts and adaptation strategies (such as strengthening skills development in human resources), multiple challenges and barriers at different levels (international, national, local) and among different stakeholders remain both in Malawi and Namibia. Climate change does not seldom play a decisive role in exacerbating already existing problems (population growth etc.) and simultaneously, might be “misused” by political actors to justify policy failures, according to the GIZ (Schaller et al., 2020: 59).

Emerging barriers and challenges as well as (policy) advice and proposed solutions in different sectors identified in **46 selected** studies/reports from the past years are grouped by authors and years in the attached overview. → **Table 6**.

A summary of those mentioned barriers in adaptation strategies, their implementation as well as recommendation and advice for several sectors found in the selected literature are furthermore summarized hereafter: → **Table 4** and → **Table 5**.



Table 4: Summary of barriers and challenges of and for different adaptation strategies and implementation in multiple sectors in Malawi/Namibia (particularly mentioned for Namibia, Malawi, and Sub-Saharan Africa, author examples in brackets) identified in the Literature review (for more detail see Table 6):

Agriculture	<ul style="list-style-type: none"> <li>✚ Slow implementation of the Country Climate Smart Agriculture Programme (partially, due to a lack of capacity to adapt within farming communities) (Davies et al., 2020)</li> <li>✚ Technological know-how, limited agricultural inputs and implements for conservation agriculture hindered the uptake of conservation agriculture (Taapopi et al., 2019)</li> <li>✚ Little understanding about CA practices (Taapopi et al., 2019)</li> <li>✚ Access to improves crop varieties (Montle and Teweldemedhin, 2014)</li> </ul>
Economic/ Financial	<ul style="list-style-type: none"> <li>✚ Large investments (purchase of livestock, tree seedlings etc.) (Climate and Development Knowledge Network, 2019)</li> <li>✚ Increased labour allocation (FAO, 2021a)</li> <li>✚ Financial constraints (Spear and Chappel, 2018)</li> <li>✚ Limited resources (Kalt, 2020; Montle and Teweldemedhin, 2014; Curran et al., 2018)</li> <li>✚ COVID-19 → tourism/economy growth (Schaller, 2020)</li> <li>✚ No regular employment of trainers (Mataya et al., 2020)</li> <li>✚ Access to finances (Spear and Chappel, 2018)</li> <li>✚ Access to markets (Montle and Teweldemedhin, 2014)</li> <li>✚ Lack of incentives (Taapopi et al., 2019)</li> <li>✚ Poor subsidised services (Taapopi et al., 2019)</li> <li>✚ Underinvestment in water and agriculture sectors (Remmert, 2020)</li> <li>✚ Poor inputs (fertilizers, manure, seeds) (Taapopi et al., 2019)</li> <li>✚ Expensive tillage services using a ripper (Taapopi et al., 2019)</li> <li>✚ Privatisation of seed companies (Actionaid, 2006)</li> </ul>
Health	<ul style="list-style-type: none"> <li>✚ COVID-19 (Schaller et al., 2020; MEFT, 2021)</li> <li>✚ CC related health impacts → reduction of work performance, income and productivity (Talukder et al., 2021)</li> <li>✚ HIV/Aids (orphans) (World Bank Group, 2011)</li> <li>✚ Overloading of the health care systems (Talukder et al., 2021; World Bank Group, 2011)</li> </ul>
Human/ Social/ Cultural/ Educational	<ul style="list-style-type: none"> <li>✚ Several existent educational programmes cover a range of issues, but NO measurement of the impact of environmental programmes on awareness and environmental engagement (MEFT, 2021)</li> <li>✚ Lack of knowledge (at a local level and among other stakeholders) (Spear and Chappel, 2018; Montle and Teweldemedhin, 2014; Inman et al., 2020)</li> <li>✚ Uncertainty over future benefits (FAO, 2021a)</li> <li>✚ Lack of contextual education knowledge (Kalt, 2020)</li> <li>✚ Lack of human capacity (Remmert, 2016; Davies et al., 2020; MEFT, 2021)</li> <li>✚ Training “fatigue” (concerning workshops etc.) → wasted efforts (Mataya et al., 2020)</li> <li>✚ Language and translation barriers, different understandings about climate change (vs. climate variability etc.) (Keja-Kaereho and Tjizu, 2019)</li> <li>✚ Beliefs/norms/values (“will of good”) (Davies, 2017; Spear and Chappel, 2018)</li> <li>✚ Different perceptions of knowledge (e.g. Disregard of community knowledge) (Nicholson, 2020)</li> <li>✚ Lack of understanding future risks (Spear and Chappel, 2018)</li> <li>✚ Lack of communication networks (Shackleton and Ziervogel, 2015; Spear et al., 2018)</li> <li>✚ Lack of awareness (Mulwa et al., 2017; Montle and Teweldemedhin, 2014; Spear et al., 2018; MEFT, 2021)</li> <li>✚ Indigenous knowledge not considered (David et al., 2013)</li> <li>✚ Poor oral transfers of traditional knowledge → knowledge loss (Spear et al., 2018)</li> <li>✚ Urban-rural migration → loss of traditional knowledge from rural areas (Spear et al., 2018)</li> <li>✚ Limited public participation (Spear and Chappel, 2018)</li> <li>✚ Urban-rural differentiations (Stringer et al., 2009; Stringer et al., 2010; Brown, 2011; Bakuwa, 2015)</li> <li>✚ Access to education/information (Bakuwa, 2015; World Bank Group, 2011; Kalt, 2020)</li> <li>✚ Low coverage of climate science at all levels of the education system (Joshua et al., 2014)</li> <li>✚ Justice and equity aspects (Shackleton and Ziervogel, 2015)</li> <li>✚ Poverty (World Bank Group, 2011; Jørstad and Webersik, 2016)</li> <li>✚ Historical processes (Apartheid in Namibia) (Kalt, 2020)</li> <li>✚ No access to climate information (Inman et al., 2020)</li> <li>✚ Widespread migration has led to increased competition and conflict between herders and cultivators (Davies, 2017)</li> </ul>
Infrastructural	<ul style="list-style-type: none"> <li>✚ Lack of infrastructure (poor possibilities of transportation) (Spear et al., 2018)</li> <li>✚ Land size affects the feasibility of diversification (Arslan et al., 2018)</li> </ul>
Institutional/ Political	<ul style="list-style-type: none"> <li>✚ Existing policies and strategies do not adequately address disaster risk management, which emphasizes coordination, early warning, preparedness and response through knowledge sharing (MEFT, 2021)</li> <li>✚ MEFT has weak coordination capacity and institutional linkages to the Directorate DRM and other related stakeholders (MEFT, 2021)</li> <li>✚ Weak monitoring system and lack of a risk profile (MEFT, 2021)</li> <li>✚ Insufficient human capacity and financial resources (MEFT, 2021)</li> <li>✚ Sectoral silos hamper mainstreaming of ACC, lack of responsibility (Schaller, 2020; Kalt, 2020)</li> <li>✚ Dependency on international and private funding → lack of national resources (Schaller, 2020)</li> <li>✚ Lack of diverse stakeholder inclusion (Kalt, 2020)</li> <li>✚ Poor implementation of policies (Remmert, 2020; 2016)</li> <li>✚ Unclear policy environment hampers investment (Remmert, 2016)</li> <li>✚ Lack of vertical integration among organisations within the climate sector (Davies, 2017)</li> <li>✚ So far, the incorporation of climate change has aimed to mainstream climate change issues/actions into particular sectors (vertical integration) → lack of horizontal, cross-sectoral linkages! (Curran et al., 2018)</li> <li>✚ Insufficient sharing of information (Davies et al., 2017)</li> </ul>

	<ul style="list-style-type: none"> <li>✚ Weakened government through corruption, conflicts of interests (Kalt, 2020)</li> <li>✚ Top-down, hierarchical structure of content development among government and research institutions (Zabronsky, 2021)</li> <li>✚ Organisational network: many operate within the periphery, no connection (Zabronsky, 2021)</li> <li>✚ Power dynamics within government, inter-ministerial power struggles (Davies, 2017)</li> <li>✚ ACC/CC is donor-driven → e.g. Driven by interest in attracting international finance (Schaller, 2020)</li> <li>✚ Power dynamics (Davies et al., 2020)</li> <li>✚ Structural barriers within governments and donor agencies affect mainstreaming (Joshua et al., 2014)</li> <li>✚ Lack of resources (World Bank Group, 2011; Mataya et al., 2020; Climate and Development Knowledge Network, 2019)</li> <li>✚ Buy-in from supervisors (Mataya et al., 2020)</li> <li>✚ Failure to delegate agency to individuals (Mataya et al., 2020)</li> <li>✚ Aid bureaucracy delivery system itself → limited progress towards integrating political analysis into its practice (Pardoe et al., 2020)</li> <li>✚ Tendency to focus adaptation strategies more on rural areas, leaving urban areas behind → low political support for adaptation programmes in the urban regions (Joshua et al., 2014)</li> <li>✚ Limited standing of local governments in international climate change negotiations (Joshua et al., 2014)</li> <li>✚ Reliance on donor funding (Climate and Development Knowledge Network, 2019)</li> <li>✚ Complex interaction between power and resources (Pardoe et al., 2020)</li> <li>✚ Policy incoherence across sectors (Davies, 2017; Curran et al., 2018)</li> <li>✚ Poor knowledge exchange in planning and implementation among policies (concerning conservation agriculture) (Chinseau et al., 2018)</li> <li>✚ Domination of mitigation instead of adaptation (energy sector Malawi) (Curran et al., 2018)</li> <li>✚ Inconsistency in timeframes of policy development (Curran et al., 2018)</li> <li>✚ Limited leadership for coordination (Curran et al., 2018)</li> <li>✚ Recent (I)NDCs are not acting as a catalyst for national climate actions (England et al., 2018a)</li> <li>✚ Uncertainty associated with climate change impacts used as justification reactive rather than pro-active responses (England et al., 2018a)</li> <li>✚ Low priority of climate change in Namibia compared to other issues (Spear et al., 2018)</li> <li>✚ Lack of decentralisation (Davies et al., 2020; Spear and Chappel, 2018)</li> <li>✚ Decentralization policy and drought relief programme have not been implemented effectively or sustainably in practice (Davies et al., 2020)</li> <li>✚ Unclear mandates at an operational level (Davies, 2017)</li> <li>✚ Dependency on government → limitation of people's capacity to adapt autonomously (Davies, 2017)</li> <li>✚ In-country migration is overlooked in national policies (Springer et al., 2009)</li> </ul>
Technological	<ul style="list-style-type: none"> <li>✚ Limited resources (Davies et al., 2020; MEFT, 2021)</li> <li>✚ Limited access to technologies (e.g. Drought resistant seed) (Spear and Chappel, 2018)</li> <li>✚ Lack of technological Know-How (Taapopi et al., 2019)</li> </ul>

Table 5: Summary of the advice and recommendations named by the authors in Malawi/Namibia identified in the Literature review (for more detail see Table 6).

Agricultural Sector	<ul style="list-style-type: none"> <li>✚ Need to incorporate other production means such as organic manure, fertilizer trees, soil, and water conservation technologies (Nyirenda et al., 2021)</li> <li>✚ Policymakers should consider reviewing the past interventions (input pricing, promotion strategies, sustainable practices, policies) in the maize subsector to enhance maize productivity (Nyirenda et al., 2021)</li> <li>✚ Delivery of consistent climate adaptation practices such as conservation agriculture and good agriculture practices should be a top priority for extension providers (Zabronsky, 2021)</li> <li>✚ Increase engagement of farmers in the co-production of agricultural knowledge (Taapopi et al., 2019)</li> <li>✚ Support management of soils (Abid et al., 2020)</li> <li>✚ Livelihood diversification (Jørstad and Webersik, 2016; Spear and Chappel, 2018)</li> <li>✚ Access to necessary inputs and information to pursue alternative climate-smart farm investments (FAO, 2021a)</li> <li>✚ Increase farmers' understanding of the principles of conservation agriculture (Taapopi et al., 2019)</li> <li>✚ Not only look at the economic importance but also its socio-economic importance of the local people, e.g. By some form of incentives (Taapopi et al., 2019)</li> <li>✚ More access for smallholder farmers to extension services, especially where there is no radio and cellular phone network (Spear and Chappel, 2018)</li> <li>✚ Consider the effect of climate change on the natural resources that the communities rely on (Jørstad and Webersik, 2016)</li> <li>✚ Build farmers' capacity on climate SMART agriculture, an integrative approach to address interlinked challenges of food security and climate change (Joshua et al., 2016)</li> <li>✚ Identify and implement climate-resilient crop farming practices and promote sustainable land management methods (MEFT, 2021)</li> </ul>
Economic/ Financial	<ul style="list-style-type: none"> <li>✚ Develop complimentary markets (FAO, 2021a)</li> <li>✚ Adequate price incentives (FAO, 2021a)</li> <li>✚ Provide incentives (Taapopi et al., 2019)</li> <li>✚ Standardization of funding for young entrepreneurs for scaling necessary (Schaller et al., 2020)</li> <li>✚ Guidance and financial assistance/loans (Talukder et al., 2021)</li> <li>✚ Greater access to funding for adaptation projects (Spear and Chappel, 2018)</li> <li>✚ Explore funding models for long-term water and sanitation infrastructure needs, considering national development goals such as industrialisation and agriculture schemes and threats, particular climate change and pollution (Remmert, 2016)</li> <li>✚ Facilitate platforms like the NACDC (National Agriculture Content Development Committee) that involve diverse extension providers and allow for the vertical integration of information sharing among actors within different levels of government and farmers themselves (Zabronsky, 2021)</li> </ul>



	<ul style="list-style-type: none"> <li>✦ Improving access to joint resources that are beneficial at the local level and could be used by locals to cope with climate shocks (Abid et al., 2020)</li> <li>✦ Providing marketing, extension services, credit services (Abid et al., 2020)</li> <li>✦ Focus towards the long-term economic development goals of the country and not only short-term ones (Keja-Kaereho and Tjizu, 2019)</li> <li>✦ Extensive funding for developing an inexpensive and clean energy production (Keja-Kaereho and Tjizu, 2019)</li> <li>✦ Facilitate access to resources (Davies, 2017)</li> <li>✦ Development of financial and economic mechanisms at both international and national levels (England et al., 2018a)</li> <li>✦ Foster credit markets for easy accessibility and affordability by farmers (Montle and Teweldemedhin, 2014)</li> <li>✦ Reduce the immediate dependency of production systems on environmental conditions (Bauer and Scholz, 2010)</li> <li>✦ Strategic investment in rural development (Davies et al., 2020)</li> <li>✦ Financial promotion by national policies for coping or adaptation approaches that are already being employed by pastoralists in their communities (Inman et al., 2020)</li> </ul>
Institutional	<ul style="list-style-type: none"> <li>✦ Improve integration of organizations from lower governance levels → diversify the types of organizations operating in Malawi's core extension network (Zabronsky, 2021)</li> <li>✦ Development of a Climate Change Transformation Platform in Namibia, which facilitate holistic and inclusive coordination of transformation towards sustainability, ensure its implementation and the promotion of climate-related niche innovation (Kalt 2020)</li> <li>✦ Empowerment of all stakeholders through strong mutual control mechanism (Kalt, 2020)</li> <li>✦ Support micro-credit institutions → providing micro insurance (FAO, 2021a)</li> <li>✦ Address resource challenges by providing tailored training for their staff and leveraging partnerships within the extension network to fill gaps in staffing capacity (Zabronsky, 2021)</li> <li>✦ Building new partnerships between organisations and donors (Brown, 2011)</li> <li>✦ Building relationships and networks, engaging stakeholders at all levels, aligning policy priorities and integrating science with traditional knowledge (Davies, 2017)</li> <li>✦ Requirement of champions to drive climate change (Davies, 2017)</li> <li>✦ Institutional access for farming communities (Abid et al., 2020)</li> <li>✦ Among actor groups with diverse knowledge and experience, including government, farmers, community members, NGOs, researchers and the private sector → Integration between government and communities (Davies et al., 2020)</li> <li>✦ Providing autonomy and operational budget to government staff (Climate and Development Network, 2019)</li> <li>✦ Cross-sectoral planning (Curran et al., 2018)</li> <li>✦ Shifts in adaptation governance structures, which are currently centralized at the national level (Spear et al., 2018)</li> <li>✦ Co-production of knowledge by re-searchers and wider stakeholders → building societal and institutional capacity</li> <li>✦ Inclusion of various stakeholders such as local authorities (Regional Governors and Councillors), environmental agencies, farmers' organizations, government ministries (Taapopi et al., 2019)</li> <li>✦ Donors and non-governmental organisations should actively engage and support multistakeholder coordinating fora and consider supporting Sector-Wide Approaches (swaps) that enable Multi-Donor Trust Funds to enable coordinated expenditure in line with nationally-determined priorities (Curran et al., 2018)</li> <li>✦ Housing climate change in a more strategic ministry (such as Finance, Planning or the Office of the President) could increase the likelihood of it being considered a more urgent priority → effect on providing budget (Davies, 2017)</li> <li>✦ Using a participatory strategy (Inman et al., 2020)</li> <li>✦ Communal natural resource management: opportunity to transfer to other governance issues (Schaller, 2020)</li> </ul>
Policies	<ul style="list-style-type: none"> <li>✦ More integrated approach demanded: greater alignment of policies and strategies (improving cooperation and communication among ministries) (Davies et al., 2020)</li> <li>✦ Policy coherence: National development strategies or policies should be reviewed, updated or developed (Curran et al., 2018)</li> <li>✦ Local-level participation and national political ownership in implementation of programmes (Curran et al., 2018)</li> <li>✦ Requirement of multiple and simultaneous policy and programmatic interventions: modifying existing social protection programmes (Curran et al., 2018)</li> <li>✦ Climate change-related health impacts on smallholder farmers should be given special consideration in public health policy and disaster management (Talukder et al., 2021)</li> <li>✦ Understanding of health impacts (health impact modelling and forecasting) for better health policy (Talukder et al., 2021)</li> <li>✦ Mainstreaming climate change into policies (Keja-Kaereho and Tjizu, 2019)</li> <li>✦ Finalize and promulgate certain policies and establish key governing institutions (Remmert, 2016)</li> <li>✦ Implementation of certain policies such as the Water Resource Management Act of 2013 (Remmert, 2020)</li> <li>✦ Consideration and incorporation of latest international and regional findings on climate change into policies and plans - especially for the water and agriculture sectors in Namibia and the agricultural sector (Remmert, 2020)</li> <li>✦ Government should refrain from ad hoc policy responses or those measures that are overly dependent on international donors and that do not engage local communities (Remmert., 2020)</li> <li>✦ Recognise the importance of power structures and need for political analysis (Pardoe et al., 2020)</li> </ul>

	<ul style="list-style-type: none"> <li>✦ Short-term interventions (such as drought relief and time-bound, donor-driven projects) need to be complemented by more strategic programmes that build the adaptive capacity of vulnerable communities in the long-term (Davies et al., 2020)</li> <li>✦ Include climate change in policy and planning processes across sectors and governance scales (Davies et al., 2020)</li> <li>✦ Use of innovative and structured learning tools and guides such as action plans (Mataya et al., 2020)</li> <li>✦ Strategies and policies to reduce poverty need to consider local contexts, social norms and values (Taapopi et al., 2019)</li> <li>✦ Strengthen multidisciplinary research and engagement with policy makers and processes</li> <li>✦ Support of new policy instruments (England et al., 2018a)</li> <li>✦ Reconciliation between policy statements that target the long-term and the short-term nature of policy planning linked to electoral cycles and the need for immediate as well as long-term economic gains (England et al., 2018a)</li> <li>✦ Acknowledging uncertainties in climate change projections (Spear et al., 2018)</li> <li>✦ Need for clearly designed policies to disseminate climate change information to farmers (Mulwa et al., 2017)</li> <li>✦ Better horizontal alignment of policy adaptation strategies at the national level could help facilitate local autonomous adaptations and improve vertical integration, particularly if cooperation and communication can be enhanced horizontally among relevant ministries (Stringer et al., 2009)</li> <li>✦ Develop larger-scale adaptation strategies (nationwide early warning, food security systems...) (Stringer et al., 2009)</li> <li>✦ Development of legislation, administrative measures, and capacity building for implementation and enforcement at the local and national levels for observing environmental systems (MEFT, 2021)</li> <li>✦ In support of the National Disaster Risk Management Framework and Action Plan, maintain and monitor disaster management infrastructure country-wide, including a database of extreme events and disasters (MEFT, 2021)</li> <li>✦ Regularly update and continue to implement Drought Response Plan to proactively address reoccurring severe drought (MEFT, 2021)</li> <li>✦ Empowerment of farming communities to establish long-term adaptability (Inman et al., 2020)</li> <li>✦ Establish Ecosystem-based Adaptation (EbA) strategies with focus on ecological restoration (Inman et al., 2020)</li> <li>✦ Sharper focus on the state - community cooperation to strengthen the implementation of policies (Kalt, 2020)</li> </ul>
Social/Human/ Education/Health	<ul style="list-style-type: none"> <li>✦ Establish programmes that measure data on proenvironmental activities and programmes (MEFT, 2021)</li> <li>✦ Involving women in capacity building (Zabronsky, 2021)</li> <li>✦ Awareness-raising, skills development (Davies et al., 2020)</li> <li>✦ Better education about climate change at the grassroots level, encouraging formal and informal farmer and community groups through training and formalization (Davies, 2017)</li> <li>✦ Livelihood diversification (Spear et al., 2018)</li> <li>✦ Build local capacity through community out-reach program on climate change adaptation actions (David et al., 2013)</li> <li>✦ Encourage social capital formation among rural communities (Mulwa et al., 2017)</li> <li>✦ Capitalize on existing strengths (such as a robust sense of community trust in local leaders) (Davies et al., 2020)</li> <li>✦ Make use of existing resources, including traditional agro-ecological knowledge, the presence of individuals committed to the climate change agenda and the strong NGO and donor support base (Davies et al., 2020)</li> <li>✦ Providing village headmen with accurate information about climate (Bakuwa, 2015)</li> <li>✦ Sensitize Malawian public about climate change (Bakuwa, 2015)</li> <li>✦ School curricula → climate change issues (Bakuwa, 2015)</li> <li>✦ Build on existing community movements (Nicholson, 2020)</li> <li>✦ Provide information that is understandable and where to relate to (vernacular languages) (David et al., 2013)</li> <li>✦ Access to alternative livelihoods (Spear et al., 2018)</li> <li>✦ Acknowledging uncertainties (Spear et al., 2018)</li> <li>✦ Strengthen local communities' autonomy (Stringer et al., 2009; 2010)</li> <li>✦ Conduction of experimental sites (Montle and Teweldemedhin, 2014)</li> <li>✦ Social learning, training of farmers (Montle and Teweldemedhin, 2014)</li> <li>✦ Appreciate community power dynamics (Nicholson, 2020)</li> <li>✦ Strengthen WASH infrastructure and services to address weaknesses identified during the COVID-19 pandemic (MEFT, 2021)</li> <li>✦ Provide a live feedback system to encourage citizen participation in environmental management (MEFT, 2021)</li> <li>✦ Deal with displaced farmers and farm workers and citizens by looking into its issues of colonialism (Keja-Kaereho and Tjizu, 2019)</li> <li>✦ Raise awareness (Keja-Kaereho and Tjizu, 2019)</li> <li>✦ Development of alternative livelihoods, as opposed to focusing mainly on the promotion of climate-sensitive sectors such as agricultures (Spear et al., 2018)</li> </ul>
Supra-Regional	<ul style="list-style-type: none"> <li>✦ South-South exchange/mutual learning (Schaller, 2020)</li> </ul>
Technology/ Infrastructures	<ul style="list-style-type: none"> <li>✦ Easily understandable digital information systems (Talukder et al., 2021)</li> <li>✦ Provide more effective and efficient medical services and warning systems (Talukder et al., 2021)</li> <li>✦ Deepen promotion of already existing government agricultural projects through radio (Spear and Chappel, 2018)</li> <li>✦ Provide irrigation infrastructure (Joshua et al., 2016)</li> <li>✦ Technological innovation (Montle and Teweldemedhin, 2014)</li> <li>✦ Provide access and means (radio) (Taapopi et al., 2019)</li> <li>✦ Invest in resources (MEFT, 2021)</li> </ul>

Urban Focus	<ul style="list-style-type: none"> <li>✚ Modernization of existing infrastructure in the water sector (Remmert, 2016)</li> <li>✚ Urban farming for young people (Schaller, 2020)</li> <li>✚ Identify urbanization and the urban disaster risks associated with climate change as priority areas in the MGDS and NAPA (Brown, 2011)</li> <li>✚ Adaptation research in urban areas (Brown, 2011)</li> <li>✚ Accommodating the interlinkages between rural and urban (Stringer et al., 2010)</li> <li>✚ Need to define a clear role for local governments in urban areas to better engage them in the adaptation process (Stringer et al., 2009)</li> <li>✚ Prepare a programme to develop a national urbanization strategy for Namibia (MEFT, 2021)</li> <li>✚ Need of an appropriate institutional framework for mainstreaming adaptation into urban planning (Joshua et al., 2014)</li> <li>✚ Integration of urban adaptation to climate change into national climate change policies, where the local municipalities and authorities are clearly mandated (Joshua et al., 2014)</li> </ul>
Research Gaps in Namibia (World Bank Group, 2021: 34)	<ul style="list-style-type: none"> <li>✚ Improve, support, and reinforce the teaching of meteorology, climatology, and general hydrology in Namibia, especially within the higher education and university channels of natural sciences and build capacity of hydro-met service staff</li> <li>✚ Enhance capabilities for handling climate change data at the national, regional and local levels</li> <li>✚ Develop effective early warning system for monitoring, preventing, and effectively responding to the human diseases associated with climate change</li> <li>✚ Evaluate needs and develop a national strategy for technology transfer to support NDC adaptation measures</li> <li>✚ Undertake research to quantify the potential impacts of climate change at the local, national and regional levels to enable informed decision-making and action</li> <li>✚ Monitor ecosystem and biodiversity changes and their impacts</li> <li>✚ Improve coordination of climate research to optimize meeting the needs of policy makers</li> <li>✚ Undertake research on sea-level rise and its impact along Namibia's coast</li> <li>✚ Develop and project climate change scenarios at higher resolutions for the different regions of the country</li> </ul>

Table 6: A literature review (n=46) with identified challenges and barriers of climate change adaptation, as well as recommendations and advice predominantly in Namibia and Malawi, chronologically and alphabetically sorted (note that some extracts from the studies are partially adopted verbatim).

Source	Level/ Focus/ Area	Country/ Region	Title   Issue/Methods	Findings	Challenges/ Barriers of cc adaptation	Advice
Ignaciuk et al., 2021	Local/ Agricultural Areas	Malawi	<p><b>Title</b> Assessing the profitability and feasibility of climate-smart agriculture investment in Southern Malawi. Understanding the costs and benefits in a volatile and changing climate.</p> <p><b>Issue/Methods</b> Climate-Smart Agriculture Scenarios</p> <p>Analysis of the financial costs and benefits of introducing two different sets of climate-smart agriculture (CSA) practices, tailored to different conditions in southern Malawi</p>	<p>-adoption of climate smart scenarios (CSA) for farmers associated with high initial investment, including acquisition of livestock, tree seedlings and increased labour input.</p> <p>-lack of necessary knowledge to weigh current costs and medium- or long-term returns from practices</p> <p>-lack of accurate information on various aspects of adopting climate smart practices, including the labour required to implement them and local input costs</p> <p>- Yet, observable profitability of integrating CSA practices for farmers, including soil conservation, agroforestry and livestock diversification, into conventional maize-legume and maize-monocultures</p>	<p>-adoption barriers: <b>large initial investments for farmers</b>, including livestock purchases, tree seedlings acquisition, and increased labour allocation</p> <p>-additionally: <b>uncertainty over future benefits, lack of management information</b>, and limited necessary <b>infrastructure</b>, such as tree nurseries and livestock services</p> <p>-lack of <b>farmer's knowledge</b> and lack of <b>stakeholders' information</b></p> <p>- Even when this information is available, communicating this to the farmers using an <b>accessible language</b> remains an open challenge</p>	<p><b>-requirement of multiple and simultaneous policy and programmatic interventions</b></p> <p>-need to address liquidity and risk constraints that limit adoption of improved farm management practices among smallholder farmers</p> <p>-option I: <b>modifying existing social protection programmes</b> to make them conditional on the adoption of improved, climate-smart practices or to bundle the distribution of social protection assistance with extension advice on climate-smart agricultural practices → consisting of social protection support, in cash or in-kind → reduce the risk to farmers of adopting new farm practices</p> <p>-option II: <b>risk sharing mechanisms to support local lending and micro-credit institutions to extend lending periods</b> (currently only one week to one month)</p> <p>-need of simultaneous support to <b>develop complimentary markets and support institutions</b></p> <p>-need of <b>adequate price incentives and access to necessary inputs and information to pursue alternative climate-smart, farm investments</b></p> <p>-need of <b>multi-dimensional approach</b> to promoting climate-smart agriculture</p>
MEFT, 2021	All Levels	Namibia	<p><b>Title</b> Second National Integrated State of the Environment Report for Namibia</p>	<p>-Namibia has a fairly strong institutional network</p> <p>-Areas, where improvement is required, include human-wildlife conflict, inadequate infrastructure in protected areas, the financial sustainability of CBNRM programmes and waste management systems and practices</p>	<p>- several existent educational programmes covering a range of issues, but <b>NO measurement of the impact of environmental programmes on awareness and environmental engagement</b></p> <p>-Existing policies and strategies do <b>not adequately address disaster risk management</b>, which emphasizes coordination, early warning, preparedness and response through knowledge sharing</p> <p><b>-institutional level: MEFT has weak coordination capacity and institutional linkages to the Directorate DRM and other related stakeholders</b></p> <p><b>-weak monitoring system</b> and lack of a risk profile</p>	<p><b>-establish programmes that measure data on proenvironmental activities</b> and programmes</p> <p><b>-invest</b> in sufficient human, technical and financial resources for MEA implementation</p> <p>- On the ground: Development of legislation, administrative measures, and capacity building for implementation and enforcement at the local and national levels for observing environmental systems.</p> <p>-overall need to <b>strengthen the capacity and resourcing</b> of the various structures</p> <p>- <b>Identify</b> and implement climate-resilient crop farming practices and promote sustainable land management methods</p> <p>-In support of the National Disaster Risk Management Framework and Action Plan, <b>maintain and monitor disaster management infrastructure country-wide</b>, including a database of extreme events and disasters</p> <p>-Strengthen WASH infrastructure and services to address weaknesses identified during the COVID-19 pandemic</p>

Source	Level/ Focus/ Area	Country/ Region	Title   Issue/Methods	Findings	Challenges/ Barriers of cc adaptation	Advice
					<b>-Insufficient human capacity and financial resources</b>	- <b>Regularly update</b> and continue to implement Drought Response Plan to proactively address reoccurring severe drought - Prepare a programme to <b>develop a national urbanization strategy for Namibia</b> - <b>providing a live feedback system to encourage citizen participation in environmental management</b>
Nyirenda et al., 2021	Local	Malawi	<b>Title</b> Delving into possible missing links for attainment of food security in Central Malawi: farmers' perceptions and long-term dynamics in maize ( <i>Zea mays</i> L.) production  <b>Issues/Methods</b> Assessment of maize production, area and yield dynamics on production data from 2004/05–2018/19 and farmer perceptions (Focus Group Discussions) Salima, Central Malawi	- Although sources of improved maize were numerous, farmers expressed a lack of such markets for local maize - Farmers perceptions of maize varieties showed that no one type of maize satisfied farmers needs - under farmer conditions, only 26–35% of maize production potential could be achieved - local maize will always be a 'fallback on' alternative should the management of hybrid and OPV maize fail to meet farmers' needs or remain expensive		- <b>policymakers should consider reviewing the past interventions</b> (input pricing, promotion strategies, sustainable practices, policies) <b>in the maize subsector</b> to enhance maize productivity - need to <b>ensure that some qualities associated with local maize</b> i.e. good taste, the appetizing smell when cooked fresh, poundability, pest resistance in storage be <b>imbedded in hybrid</b> and OPV maize - <b>need to incorporate other production means such as organic manure, fertilizer trees, soil, and water conservation technologies</b> if to achieve meaningful yields
Talukder et al., 2021	Regional/ National	Malawi, India, Bangladesh	<b>Title</b> Health impacts of climate change on smallholder farmers  <b>Issues/Methods</b> Informal Interviews, Narrative Literature Review, field observations	-smallholder farmers have learned how to cope, adapt, and develop resilient practices in the settings surrounding their homesteads and farms - Climate change is increasing the incidents of extreme weather events and creating favourable conditions for the emergence and spread of communicable and non-communicable diseases, and smallholder farmers are most often the victims -smallholder farmers central actors involved in achieving the United Nations' Sustainable Development Goals (SDGs)	- facing climate change-related <b>health impacts that can reduce work performance</b> , income and productivity and perpetuate a downward spiral into ill health - smallholder <b>farmers' health has often been neglected in debates about the future of agriculture and left out of policymaking approaches</b> such as climate-smart agriculture, sustainable agricultural intensification, transformation of global food systems, ensuring food and nutritional security, circular agriculture, regenerative agriculture, ecosystem health, poverty reduction, and agroecology-based adaptations	- Climate change-related health impacts on smallholder farmers should be given special <b>consideration in public health policy and disaster management</b> - <b>Easily understandable digital information systems</b> to explain the climate change-related health impacts on and to smallholder farmers should be created to identify the risks as well as to <b>provide more effective and efficient medical services and warning systems</b> - <b>Guidance and financial assistance/loans should be provided</b> to purchase new equipment needed to adapt and to adopt new management practices to cope with climate change impacts to protect agriculture as well as health - A good <b>understanding of health impacts</b> is necessary for better health policy for smallholder farmers, health impact modelling, and forecasting
World Bank Group, 2021	National	Namibia	<b>Title</b> Climate Risk Country Profile: Namibia  <b>Issues/Methods</b>	-trends of climate variability and longer-term change are likely to exacerbate cc impacts in key sectors such as agriculture, water, energy,	For barriers and recommendations (concerning research, see → Table 5; for data and information issues as well as institutional gaps, see summary of <i>World Bank Group, 2021: 35</i> )	For barriers and recommendations (concerning research, see → Table 5; for data and information issues as well as institutional gaps, see summary of <i>World Bank Group, 2021: 35</i> )



Source	Level/ Focus/ Area	Country/ Region	Title   Issue/Methods	Findings	Challenges/ Barriers of cc adaptation	Advice
			Synthesis of most relevant data and information on climate change, disaster risk reduction, and adaptation actions and policies at the country level	health, and biodiversity and tourism -focus on ensuring strategies are consistent with national development priorities and the use of the energy sector as a key driver for sustainability and economic growth		
Zabronsky, 2021	National/ Local	Malawi	<b>Title</b> Climate Change Adaptation and National Extension Approaches in Malawi: A Stakeholder Assessment  <b>Issues/Methods</b> Qualitative Interviews Theoretical Approach: the diffusion of innovation theory, social network analysis, and DLEC's conceptual framework	-Within Malawi's extension network, the direction of information exchanges both in the development of content and sharing of information within the network is notably asymmetric -Certain organizations hold substantial power within this network because more information comes to them, than is shared by them - Content development network shows an imbalance of power between high-level government departments and other organizations operating in the extension system - there is a clear integration of multi-sectorial actors within Malawi's extension system and the composition of organizations within the core of the information-sharing network is heterogeneous -the types of organizations present within the core of the network are fairly diverse with the exclusion of private sector actors - farmers are not only receivers of information, but also are important transfers of knowledge between organizations addressing climate change impacts in Malawi - farmers are the receivers of agricultural information and transfer knowledge to other organizations, but are not commonly involved in the content development process	-lack of vertical integration among organizations involved in content development -top-down, hierarchical structure of content development among government departments and research institutions perceived to be experts in climate change adaptation and agricultural technologies - a significant number of organizations are <b>not as well connected to the core of the network and operate within the periphery</b> → These organizations are not only reliant on actors to receive information but also may experience difficulty in communicating their messages to core actors within the network	- need for <b>improved integration of organizations from lower governance levels to diversify the types of organizations operating in Malawi's core extension network</b> - Government representatives should also continue to <b>facilitate platforms like the NACDC that involve diverse extension providers and allow for the vertical integration of information sharing</b> among actors within different levels of government and farmers themselves - extension providers should also <b>focus on supporting farmers with specific and consistent agricultural technologies</b> that will address climate change risks - The <b>delivery of consistent climate adaptation practices such as conservation agriculture and good agriculture practices</b> should be a top priority for extension providers - <b>increased engagement of farmers in the co-production of agricultural knowledge</b> can help to facilitate greater adoption of climate adaptation practices - <b>Involving women:</b> women's contributions to Malawi's agriculture sector are vitally important to the success of the industry and the ability of farmers to adapt to climate change - organizations should continue to <b>address resource challenges by providing tailored training for their staff and leveraging partnerships within the extension network to fill gaps in staffing capacity</b> . New partnerships with donors and within the private sector could also help to increase funding for the delivery of EAS in Malawi
Abid et al., 2020	Local/ Rural Smallholder farmers	Malawi	<b>Title</b> Ex-ante and ex-post coping strategies for climatic shocks and	-limited number of farmers adopted certain measures in advance of climatic shock(s) -The key ex-ante measures include more off-farm work,	-Financial constraints and limited resources	<b>-Support management of soil</b> -farming communities need to be connected and given <b>more support and institutional access</b> -Need to enhance focus on <b>improving access to joint resources</b> that are beneficial at the local



Source	Level/ Focus/ Area	Country/ Region	Title   Issue/Methods	Findings	Challenges/ Barriers of cc adaptation	Advice
			adaptation determinants in rural Malawi  <b>Issues/Methods</b> Comprehensive data set from 1582 farm households, bivariate probit model	early planting, use of drought-resistant varieties and a higher seed rate -farm households adopted several measures to cope with climatic shocks, most farmers preferred drought and disease-resistant varieties, crop diversification, early planting and changing eating habits -farm characteristics, particularly soil fertility and soil slope, significantly influence adaptation decisions → farmers may be supported in better managing their soils -social networks and social capital are found to be important factors influencing farmers' adaptive decision making → farmers who interact and network more with other farmers and institutional services are more likely to adapt to changes in climate		level and could be used by locals to cope with climate shocks → <b>providing marketing, extension services, credit services</b> → scope of climate information needs to be enhanced by adding support for climate change adaptation
Davies et al., 2020	National	Namibia	<b>Title</b> Avenues of understanding: mapping the intersecting barriers to adaptation in Namibia  <b>Issues/Methods</b> Exploration of the policy-practice partition and the adaptive capacity challenge	-In the case of local water governance, for example, → failure of decentralization has more to do with a lack of investment in capacity building at the local level, than with the decentralized approach itself -conservatism associated with customary values interweaves with dependency attitudes, risk aversion, and information, resource and capacity deficits to create stronger barriers to the uptake of novel or alternative farming practices -impacts of intersecting barriers across space and time which can result in 'resilience tradeoffs' (Chelleri et al., 2015) → higher-level institutional and political challenges, like a lack of coordination in government and the low prioritization of the adaptation agenda, filter down to the community level where the consequences of these barriers play out with more immediate effect	-'the policy-practice partition': While a national policy agenda for adaptation exists on paper, this does not always translate to effective adaptation on the ground → <b>lack of technology, human capacity and finances for adaptation activities</b> → more 'software' barriers, such as power dynamics within government, the perception of climate change as a 'green' (environmental) issue, and a poor understanding of community needs and values - several barriers, including water scarcity, budget deficits, a lack of infrastructure and limited access to alternative livelihood ('hardware barriers') - 'the adaptive capacity challenge,' in which the <b>decentralization policy and drought relief programme have not been implemented effectively</b> or sustainably in practice - <b>slow implementation</b> of the Country Climate Smart Agriculture Programme is due, in part, to a	- <b>improving the degree to which adaptation is mainstreamed</b> into development practice by ensuring that <b>climate change is explicitly included in policy and planning processes across sectors and governance scales</b> - Greater <b>strategic investment in rural development, awareness raising, and skills development</b> important for building the adaptive capacity of communities and for addressing some of the barriers to adaptation - also, important for <b>stakeholders</b> to begin <b>recognizing where more transformative forms of adaptation are required</b> - a <b>more integrated approach</b> to adaptation is needed: (a) between national, regional and local level government → <b>greater alignment of policies and strategies</b> , which itself depends on improved communication and cooperation among ministries, as well as a commitment to more inclusive and collaborative planning processes (b) across time, meaning that <b>short-term interventions</b> (such as drought relief and time-bound, donor-driven projects) need to be <b>complemented by more strategic programmes</b> that build the adaptive capacity of vulnerable communities in the long-term □ skills development, awareness raising around climate change and adaptation options (e.g.: through on-

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					lack of capacity to adapt within farming communities	site demonstrations) and the creation of opportunities for <b>livelihood diversification</b> (e.g.: through greater investment in rural economies) (c) among actor groups with diverse knowledge and experience, including government, farmers, community members, NGOs, researchers and the private sector→ <b>Integration between government and communities</b> is particularly important for ensuring that adaptation interventions consider, and are tailored to, the needs and values of local people; while <b>integration between NGOs and government or boundary organizations</b> is essential for ensuring that adaptation projects are impactful across broader spatial and temporal scales <b>-capitalize on existing strengths</b> (such as a robust sense of community trust in local leaders) <b>-make use of existing resources, including traditional agro-ecological knowledge</b> , the presence of individuals committed to the climate change agenda and the strong NGO and donor support base
Inman et al., 2020	Local	Namibia	<b>Title</b> No safety net in the face of climate change: The case of pastoralists in Kunene Region, Namibia  <b>Issues/Methods</b> Exploration of the use of EbA to help pastoralists adapt to climate change. Example: Himba community. Mixed-methods approach (structured interviews)	-pastoralists have coping and adaptation approaches at the community level (such as making gardens, fishing, etc.), but these have become ineffective as climatic uncertainty and change persist -pastoralists no longer get benefits from the environment, such as food and fodder -there are currently no biodiversity interventions at the community level to address the impacts of climate change	-need to develop new practical adaptation strategies <b>-lack of scientific knowledge</b> of climate change among pastoralists - have no <b>access to climate change information</b>	- <b>financial promotion</b> by national policies for coping or adaptation approaches that are already being employed by pastoralists in their communities. -alternatively: raising money through several <b>NGOs or international organisations</b> , with the help of <b>researchers</b> -using a <b>participatory strategy</b> -provide <b>location-specific and needs-based information</b> to pastoralists <b>-empowerment of farming communities</b> to establish long-term adaptability -establish <b>Ecosystem-based Adaptation (EbA) strategies</b> with focus on <b>ecological restoration</b>
Kalt, 2020	National	Namibia	<b>Title</b> Governance for a Transformation towards Sustainability in Namibia. How can the societal transformation towards sustainable development and climate resilience in the face of climate change in Namibia be initiated and promoted through a state-driven governance approach?  <b>Issues/Methods</b> Development of a theoretical strategy	Development of a "Climate Change Transformation Platform" through: 1. an understanding of the multi-scalar complexity of climate change and transformation Step 2. the initiation of a macro-social negotiation process, with the state having the task of facilitating and guiding 3. Cooperation, involving state actors, external actors, market actors, civil society organizations and, above all, local actors (traditional authorities, the indigenous	- <b>weakened government</b> through corruption, conflicts of interests and the -general lack of contextual <b>education knowledge</b> about climate change and sustainability throughout the population -lack of <b>financial resources</b> -conflicts of interest and power - Lack of <b>compliance capacity</b> - Failure of designing a proper governance system - Lack of <b>diverse stakeholder inclusion</b> - Lack of <b>responsibility</b> (working in silos)	-sharper <b>focus on the state - community cooperation</b> to strengthen the implementation of policies - <b>development of a Climate Change Transformation Platform</b> in Namibia, which facilitate <b>holistic and inclusive coordination</b> of transformation towards sustainability, ensure its implementation and the promotion of climate-related niche innovation -empowerment of all stakeholders through <b>strong mutual control mechanism</b>

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			extended by qualitative expert interviews.	population, youth, religious representatives and farmers) 4. Obstructive factors hindering the transformation towards sustainability of the governance system need to be destabilized and eliminated 5. start of negotiation process 6. Managing the governance strategy by a meta governance committee		
Mataya et al., 2020	Local	Malawi	<b>Title</b> How can we effectively build capacity to adapt to climate change? Insights from Malawi  <b>Issues/Methods</b> Qualitative Research, technical government and non-government staff, education of capacity building interventions	- there is a predominance of reliance on short-term training in workshop format which can lead to practical benefits but has challenges	<b>- trainers are not regularly employed</b> to support follow up and thus the benefit of these in the long run is often sub-optimal -limitations to the training design and methods (particularly <b>overreliance on workshops</b> ), the inadequacy of training needs assessments, ineffective use of capacity building opportunities (for example organizations not sending the most appropriate participants) and the limitations of agency within the organizational structure -issues with ' <b>training fatigue</b> ', and organizations failing to identify appropriate trainees to participate meeting their individual and organizational training needs <b>→wasted efforts and resource inefficiency</b> during training, but also impedes effective implementation of skills and knowledge when trainees return to work <b>-Institutional barriers</b> , such as <b>lack of resources, buy-in from supervisors and failure to delegate agency to individuals</b>	-Use of <b>innovative and structured learning tools and guides</b> such as action plans should be encouraged for successful adaptation processes
Nicholson, 2020	Local	Malawi	<b>Title</b> Government resettlement as participatory adaptation to climate change: exploring the role of knowledge in the lower shire region of Malawi  <b>Issues/Methods</b> Focus: the impact of flooding on migration patterns and the subsequent move by government actors to govern these migration	-flooding related movements already occur in the communities but, due to the increasing severity of flooding, there is a growing desire by those in government and NGOs to initiate their own resettlement - communities themselves can re-appropriate resettlement to indicate their needs in the process, illustrating the fluidity of knowledge and power within the resettlement process in Malawi	-official <b>resettlement</b> due to flooding is novel in Malawi, and there is <b>confusion</b> over <b>what it entails</b> and who is involved. → This appears to lead to a <b>disconnect</b> between resettlement, established by the government and resettlement, movements initiated by those in vulnerable communities → a key reason this disconnect develops is due to the <b>different perceptions of knowledge</b>	1. <b>Build on existing community movements</b> 2. <b>Incorporate the host community from the beginning.</b> 3. <b>Appreciate community power dynamics.</b> → influence of the village head in the community decision making, and village heads may have their own agendas. 4. <b>Enter into a resettlement conversation</b> with vulnerable community members

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			patterns through resettlement in Malawi Interviews with stakeholders in government and NGOs			
Pardoe et al., 2020	National/International	Malawi, Zambia, Tanzania	<p><b>Title</b> Evolution of national climate adaptation agendas in Malawi, Tanzania and Zambia: the role of national leadership and international donors</p> <p><b>Issues/Methods</b> Role of national leadership and international donors, convergence of power and resources Survey, interviews, document analysis</p>	<p>-two main factors that are common across all three countries but show that how they have operated and interacted in each country have led to three different trajectories of policy evolution: the roles of national leadership and donors</p> <p>-In Malawi, the evolution of the national climate change agenda, as manifest in policies, programmes and institutions, is very closely linked to power exercised through political leadership</p> <p>-donors can significantly influence power and ideologies by providing resources in terms of financial but also technical support</p> <p>-resources can incentivise attention to climate change—but this takes place through different mechanisms, depending on the stance of the leadership/president on the importance of climate change in the national agenda</p> <p>-Whilst power brings resources, however, resources may also bring power, and the influence of donors is not always benevolent → especially the case in developing countries, where scarce national resources often result in a de facto surrender of power to those that provide the financial resources</p>	<p>-barriers through <b>aid bureaucracy delivery system itself</b>, □ limited progress towards <b>integrating political analysis into its practice</b></p> <p>-In Malawi, intense <b>competition for scarce resources has created obstacles to the cooperation</b> and coherence required to address a cross-sectoral issue such as climate change adaptation</p> <p>-<b>The interaction between power and resources (and the power embedded within the resources) creates a different—and arguably more complex—political economy landscape for climate adaptation in sub-Saharan Africa, relative to the global North</b></p>	<p>-Calls for opening up rather than closing down opportunities for contestation and a <b>more transformative agenda</b> for adaptation recognise the <b>importance of power structures</b> and <b>need for political analysis</b></p>
Remmert, 2020	National	Namibia	<p><b>Title</b> Briefing Paper Weak Policies &amp; Conflicting Visions: Drought, Water Shortages and Climate Change in Namibia</p> <p><b>Issues/Methods</b></p>	<p>-changing climate conditions will especially impact communal and subsistence farming negatively</p> <p>- future impact of climate change in Namibia seems to be excluded from most discussions around water supply and agriculture</p>	<p>- All issues have major political <b>problems in implementation</b></p> <p>- water and agriculture sectors have been <b>neglected by government</b> and stakeholders, suffering from underinvestment in the recent years</p> <p>- Drought response (which can be characterised as a sub-issue) has</p>	<p>- need for the <b>enactment and of a legally binding water regulatory framework</b> → ensure that the Water Resource Management Act of 2013 is implemented</p> <p>- <b>latest international and regional findings on climate change should be considered</b> and incorporated into policies and plans - especially for the water and agriculture sectors in Namibia and the agricultural sector</p>

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			Addressing and linking three sectors: drought, water security and climate change, scrutinizing policies and content of parties on climate change	-sectors are strained to meet development needs - repeated warnings from studies and water experts, as well as public officials regarding the deteriorating situation over the past decade have not been persuasive enough for government leaders → lack of governmental interest and will	<b>attracted funds, but primarily only in emergency contexts.</b> Yet, key guidelines in the drought policy and strategy remain unrealized	-Government and relevant stakeholders need to undertake a <b>comprehensive regulatory review</b> -Government leaders should carefully consider that the <b>prioritisation of challenges is already decisive to the socio-economic development path in Namibia</b> -government should <b>refrain from ad hoc policy responses</b> or those measures that are <b>overly dependent</b> on international donors without a demonstrated understanding of the complexities involved and that do not engage local communities -Especially concerning climate change, adaptation and mitigation measures that are tailored to the <b>local context</b> are <b>more likely</b> to be <b>successful</b> in the long run.
Schaller et al., 2020	National/ Local	Namibia	<b>Title</b> Climate Change in Southern Africa & approaches of Development Cooperation to cope with and adapt to climate change. OE 1300 Southern Africa. Background Information as of August 2020		- <b>Silos/mainstreaming of ACC</b> into sectors - <b>Dependency on international (+ private) funding</b> due to lack of national resources - <b>COVID-19</b> → international (wildlife) tourism	- <b>Urban farming</b> for young people; challenge: buy-in of banks; standardization of funding for young entrepreneurs for scaling necessary -Mutual learning important/ <b>South-South exchange/necessity</b> to switch from hind cast to forecast for successful adaptation - Communal natural resource management: opportunity to transfer to other governance issues
Keja-Kaereho and Tjizu, 2019	National/ Local	Namibia	<b>Title</b> Climate Change and Global Warming in Namibia: Environmental Disasters vs. Human Life and the Economy  <b>Issues/Methods</b> Overview and narratives of concepts on current practices and experiences within Namibia		-climate change concepts cannot be easily translated in all Namibian languages (language barriers) → <b>understanding of climate change</b>	-Namibia should have a unique approach to dealing with displaced farmers and farm workers and citizens of such nature by <b>looking into its issues of colonialism</b> - clear need to <b>mainstream climate change into policies</b> -policies and plans in place should <b>focus on the long-term economic development goals</b> of the country and not only short-term ones that comprise the dynamic changes - increase in <b>extensive funding for developing an inexpensive and clean energy production</b> -rise <b>awareness</b>
Taapopi et al., 2019	Local	Namibia	<b>Title</b> Perception of Farmers on Conservation Agriculture for Climate Change Adaptation in Namibia  <b>Issues/Methods</b> Assessing the knowledge level of farmers on conservation agriculture and the household factors, which influence farmers to take	- age, gender, marital status, education level, crop field size and farming period did not significantly influence the adoption of conservation agriculture - Farmers seemed to be more interested in yield improvement than the aspects of environmental management	- <b>technological know-how, limited agricultural inputs and implements for conservation agriculture</b> hindered the uptake of conservation agriculture - <b>lack of crop residues</b> for mulching purposes and <b>little understanding of the importance of crop rotation</b> were identified as barriers to practice conservation agriculture - lack of knowledge or technical know-how on how to apply the three CA principles, lack of farm	- need to <b>encourage the use of climate smart agriculture technologies</b> such as conservation agriculture, which minimizes the negative impacts of dry spells to maximize crop production and <b>increase farmers' understanding of the principles of conservation agriculture</b> - <b>strategies and policies to reduce poverty need to consider local contexts, social norms and values.</b> In this regard, engagement of local farmers and demonstration of the short and long-term benefits of conservation agricultural practices offer promising entry points



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			up conservation agriculture in the Omusati Region of Namibia Household face-to-face interviews		implements required to perform CA activities, <b>lack of incentives, poor subsidised services and inputs</b> (fertilizers, manure, seeds), <b>and expensive tillage services using a ripper</b>	- The <b>inclusion of various stakeholders such as local authorities</b> (Regional Governors and Councillors), <b>environmental agencies, farmers' organizations, government ministries</b> such as the Ministry of Environment and Tourism, equipment and farm input manufacturer and input suppliers, agricultural change agents at both regional and village levels in the promotion of CA should be encouraged as they are the most influential and people on the ground - The adoption of CA technologies should <b>not only look at the economic importance but also its socio-economic importance of the local people, e.g. by some form of incentives</b>
UMFULA, 2019	National	Malawi, Tanzania	<b>Title</b> The current and future climate of central and southern Africa. What we have learnt and what it means for decision-making in Malawi and Tanzania  <b>Issues/Methods</b> Case studies on importance of incorporating uncertainty into decision-making approaches for adaptation planning	-Political commitment to addressing climate change and achieving sustainable development in the water, energy and agriculture sectors exists within southern African countries -Short-term training workshops are most useful when they are customised to the particular needs of participants, are participatory in design and implementation, and when they are tailored using context-specific examples. -Action planning, on-the-job training and continued mentorship after training are also effective but remain rarely used	-optimal efficiency in achieving adaptation is impeded by <b>policy incoherence across sectors</b> -Ensuring coherence between policies is challenging due to <b>inconsistency in timeframes of policy development and resource constraints that limit the frequency of policy reviews</b> - <b>change in leadership</b> , and the oft-concurrent cabinet reshuffles, changes in ministerial mandates and rotation of high-level civil servants, leads to a <b>focus on short-term planning</b> that links with electoral cycles, rather than the required focus on long-term building of resilience strategies and climate adaptation investments - <b>Reliance on donor funding</b> can lead to turf wars and competition between ministries for resources (such as in Zambia) and contribute to barriers <b>to coordination for coherent cross-sectoral approaches</b> (such as in Malawi)	-Capacity-building by providing <b>autonomy and operational budget</b> to government staff - In the medium term, policy decisions require careful <b>cross-sectoral planning</b> , particularly in cases involving large investments, long life-times and irreversibility, where there is a strong argument for assessing resilience to future climate change (for example around water, energy and food in Malawi and Tanzania). - <b>co-production of knowledge by researchers and wider stakeholders</b> <input type="checkbox"/> <b>building societal and institutional capacity</b> to factor climate risks into long-term planning
Arslan et al., 2018	Local	Malawi, Zambia	<b>Title</b> Diversification as Part of a CSA Strategy: The Cases of Zambia and Malawi  <b>Issues/Methods</b> Household data from the World Bank's Third Malawi Integrated Household Survey (IHS3)	- diversification is an adaptation response as long term trends in climatic shocks have a significant effect on livelihood diversification, albeit with different implications -Malawi: predicting an increase in diversification with increases in riskiness in agricultural activity - diversification can be an effective adaptation response -access to extension agents positively and significantly	-Households with larger <b>land sizes</b> are significantly more likely to diversify their crops suggesting <b>potential barriers to diversification for smallholders</b>	- differences across types of diversification and drivers in shaping the trade-offs and synergies underline importance of <b>identifying and promoting the desirable diversification options for specific country circumstances</b> - <b>Diversification</b> has the potential to improve food security - Better <b>targeting for smallholders in crop diversification interventions</b> would be needed, especially in cases where climate variability is expected to negatively affect the subsistence crop production they heavily depend on

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				correlates with crop diversification in both countries, underlining the role of extension in promoting more resilient farming technologies in rural Zambia and Malawi		
Chinseu et al., 2018	National	Malawi	<b>Title</b> Policy Integration and Coherence for Conservation Agriculture Initiatives in Malawi  <b>Issues/Methods</b> Thematic content analysis	-inadequate integration of CA in the National Agricultural Policy (NAP), coupled with a lack of coherence of agricultural department policies, undermines farmers' CA adoption -integration of CA in the NAP is insufficient, and coherence of agricultural departmental strategies, in the context of CA in Malawi, is lacking	-inadequate CA integration and <b>incoherence of policies are institutional constraints</b> that prevent farmers' sustained adoption <b>-policy deficiencies</b> 1. <b>by narrow focus of CA in the sectoral policies;</b> 2. <b>weak political support</b> for CA; 3. <b>poor sub-sectoral collaboration and coordination;</b> 4. <b>poor knowledge-exchange</b> in planning and implementation; 5. <b>and un-harmonised departmental strategies</b> -Deficient CA integration and lack of coherence for CA in agricultural department strategies engender institutional constraints which potentially impinge adoption	-need to <b>strengthen multidisciplinary research and engagement with policy makers and processes</b> and raise <b>awareness</b> of the potential of CA, to enhance CA integration in relevant national policy objectives -To <b>facilitate long-term adoption</b> of CA among smallholders, there is need to: (1) strengthen <b>CA integration in agricultural policies;</b> (2) improve <b>departmental coordination</b> to enhance coherence of agricultural strategies and extension messages disseminated to farmers; and (3) strengthen <b>governments role in supporting multi-disciplinary research</b> to generate and disseminate best practices capable of sustaining CA adoption
Curran et al., 2018	National/ Regional	Southern Africa	<b>Title</b> Policy coherence for sustainable development in sub-Saharan Africa  <b>Issues/Methods</b> Literature and studies review	-Cross-sectoral approaches to policy development are essential to meeting the Sustainable Development Goals and the Paris Agreement across sub-Saharan Africa -Mainstreaming of climate change concerns into national policies has gained traction, but policy coherence remains weak -Developing countries generally face additional constraints due to the scale of their economic development needs, limited domestic resources and insufficient capacity to both design and implement the necessary interventions -National climate change policies, as well as sectoral policies that include or are dedicated to climate change, are currently being developed	- <b>Coherence</b> faces many challenges, particularly in sub-Saharan Africa and in the <b>critical sectors of water, energy and food</b> -lacking in the energy sector, where in general climate change is addressed with a <b>focus heavily dominated by mitigating emissions</b> (Malawi Tanzania Zambia) -policy coherence barriers: <b>inconsistency in timeframes of policy development and resource constraints</b> limiting the frequency of policy reviews <b>-Weak levels of horizontal coherence at the sector level</b> tend to create similar degrees of incoherence between national level strategies (whether broader strategic development focussed or climate change-specific plans) since they are often compiled directly from these sector policies	-Institutional structures and processes that enable <b>cross-sectoral coordination</b> need to be established, enabled and resourced to support and encourage <b>policy coherence</b> as a prerequisite to effective implementation <b>-National development strategies</b> or policies should be <b>reviewed, updated or developed</b> to explicitly recognise climate change and the SDGs as key objectives, directed by detailed roadmaps. E.g: 1. National governments, or relevant sectoral ministries with responsibility, should use the <b>updated development strategies to guide NDC submissions</b> and enable the ramping up of the 'ambition commitment' under the Paris Agreement 2. <b>Donors should explicitly recognise and place policy coherence</b> as a key element of support programmes, including for the development of NDC updates. This should include providing for sufficient time, ensuring <b>local-level participation and national political ownership in implementation</b> of programmes, and providing sufficient resources

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				<p>and implemented across sub-Saharan Africa</p> <p>-much of incorporating climate change into national and sectoral policies have focussed on vertical integration, aiming to mainstream climate change issues and actions into particular sectors and the different policy levels and scales within them, rather than horizontal, cross-sectoral linkages</p> <p>-Horizontal coherence places a focus on interactions between sectors and institutions that operate at the same level of responsibility (regional, national or local)</p> <p>-Across Malawi, Tanzania and Zambia there are signs of progress on mainstreaming climate change issues arising from broader strategic policies into some sectoral policies and plans (vertical coherence). In particular, the agricultural sector has often taken a lead through the promotion of conservation and climate smart agriculture practices (e.g. agroforestry, mulching and rotation)</p>	-Coherence is also impeded where there is <b>limited capacity or leadership to coordinate between sectors</b> , undertake <b>regular reviews</b> , or institute a process to update and align national and sectoral policies	3. Institutional arrangements that enable <b>cross sectoral coordination</b> need to be established, enabled and resourced to support and encourage policy coherence. E.g.: Donors and non-governmental organisations should actively engage and support <b>multistakeholder coordinating fora</b> and consider supporting Sector-Wide Approaches (SWAs) that enable Multi Donor Trust Funds to enable coordinated expenditure in line with nationally-determined priorities
England et al., 2018a	National	Malawi, Tanzania, Zambia	<p><b>Title</b> Climate change adaptation and cross-sectoral policy coherence in southern Africa</p> <p><b>Issues/Methods</b> Policy coherence; Policy coordination of climate change adaptation strategies</p>	<p>-Policy coordination remains weak across southern Africa</p> <p>-Climate change adaptation is not explicitly addressed in any of the water policies in the three countries, but appears in agriculture policies of both Malawi and Tanzania</p> <p>-Malawi's NDP emphasises the importance of mainstreaming climate</p> <p>-No realisation of linking (I)NDCs to District-level planning processes (vital to create a step-change in practical climate change adaptation planning)</p> <p>-Water, agriculture and climate change policies show greatest cross-thematic coherence around disaster management</p>	<p><b>-Long-term impacts of climate change poorly understood at a national level</b> and not explicitly addressed in policy formulation</p> <p>- Where coherence between sector and climate policies and strategies is strongest □ often only <b>repackaging of existing sectoral policy statements</b>, no building of new linkages due to absence of learning and critical evaluation of the success and appropriateness of sector policy efforts, <b>little attention towards mainstreaming</b> climate change adaptation</p> <p>-Limiting climate change policies to strategies listed in existing sectoral policies to improve coherence is not in itself useful and suggests that <b>recent (I)NDCs</b></p>	<p>- further support of <b>new policy instruments</b>, alongside the <b>development of financial and economic mechanisms</b> at both international and national levels</p> <p>-reconciliation between policy statements that target the long-term and the <b>short-term nature of policy planning linked to electoral cycles and the need for immediate as well as long-term economic gains</b></p>

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				and planning, linked to flooding and droughts -Outlining of strategies in analyses policy documents that could be considered long-term adaptations, such as integrated water management and efforts to increase crop production efficiency -All of the documents presented climate change adaptation as a challenge rather than an opportunity for development -Little evidence that social and cultural contexts and the wealth of indigenous knowledge in the region were considered	<b>are not acting as a catalyst for national climate actions</b> -Current <b>reliance on external</b> (often international) <b>consultants</b> to develop policy documents <b>reduces opportunities for consultation across government ministries</b> , meaning that opportunities for greater coherence are being missed -Focus on water, agriculture and climate change policies permit the <b>uncertainty associated with climate change impacts to be used to justify reactive rather than pro-active responses</b>	
England et al., 2018b	National/ Regional	Southern Africa	<b>Title</b> How do sectoral policies support Climate Compatible Development? An empirical analysis focusing on southern Africa  <b>Issues/Methods</b> Qualitative content analysis of SADC countries' national sector policies	- for ten southern African countries' sector policies as yet only partially align towards a climate compatible development (CCD) trajectory, with approaches that both complement and detract from CCD being prioritized by national governments - South Africa's policy approaches are the most aligned with CCD and Malawi's the least -SDGs and the Paris Agreement offer all countries an important opportunity for (further) mainstreaming climate planning into national sectoral policies -water sector remains largely adaptation focused, whilst the energy and forestry sectors are more aligned with mitigation activities	-Partially, <b>sector approaches with associated negative impacts on climate adaptation and/or mitigation are being advocated by study countries</b> → impeding development and progress towards meeting the SDGs, exacerbating climate change impacts, reducing the effectiveness of adaptation measures, and negatively affecting mitigation efforts	- National governments should focus on <b>developing coherent, cross-sector approaches</b> that deliver such potential triple wins to promote <b>new forms of inclusive and sustainable economic and social development</b> , whilst facilitating adaptation to climate change impacts and supporting mitigation activities
Spear and Chappel, 2018	Local	Namibia	<b>Title</b> Livelihoods on the Edge without a Safety Net: The Case of Smallholder Crop Farming in North-Central Namibia  <b>Issues/Methods</b> Semi-structured interviews Focus Groups of farmers in Omusati region	- mentioned concern by farmers over being able to continue farming if there was an increase in dry years - Local norms, customs and beliefs influence adaptation to climate change by influencing conceptual understanding of the reason for hazards as well as whether people decide to make changes to minimize current and future risks	- lack of <b>understanding of future risks</b> posed by climate change □ less motivation to change -lack of <b>access to finances</b> -limited <b>access to technologies</b> such as drought resistant seed or the time, labour and effort required - <b>traditional norms and religious beliefs</b> are preventing people from making changes, thereby making them more vulnerable to climate change ("waiting for God" or the government to resolve situation)	-need to adopt more climate-smart agricultural practices and they need <b>access to alternative livelihoods</b> -building up <b>autonomous capacity</b> - <b>change in perspective</b> would help in bringing forth action - <b>promotion of already existing government agricultural projects</b> (e.g. FAO (Food and Agriculture Organisation) and EU (European Union) funded MAWF (Ministry of Agriculture, Water and Forestry) Learning and Information Sharing for Agriculture SMS (Short Message

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						Service) line, where farmers can communicate with extension officers) →through <b>radio</b> <b>-more access for smallholder farmers to extension services</b> , especially where there is no radio and cellular phone network
Spear et al., 2018	National	Namibia	<p><b>Title</b> Vulnerability and responses to climate change in drylands: The case of Namibia</p> <p><b>Issues/Methods</b> CARIAA-ASSAR Working Paper</p>	<p>- mostly short-term autonomous responses, while long term strategic planning for adaptation to climate change remains limited</p> <p>- most of the responses to climate change reported for Namibia are focused on agriculture and are incremental and project-based, rather than being transformative and focused on the system level</p> <p>-Although relevant policies and programmes exist in many cases, interventions at different levels from policy to the ground have been financed from outside of the country and implemented by non-governmental bodies</p>	<p>-lack of <b>information, awareness</b> and sufficient <b>networks</b> of communication provide substantial gaps in responding to climate change</p> <p>-lack of <b>understanding</b> of solutions at a system scale, such as watershed management and fisheries management, for which an ecosystem-based approach should be taken</p> <p>- <b>Financial capital, technical resources and infrastructure</b></p> <p>- <b>Knowledge</b> of coping mechanisms that have historically been used are also being <b>lost</b> through rural to urban migration, <b>poor oral transfers of traditional knowledge</b> across generations and, as a result of changes in government, stricter land management regulations</p> <p>- In Namibia, climate change generally has a <b>low priority</b> relative to other issues</p> <p>- limited <b>service provision</b></p> <p>-lack of <b>decentralisation</b></p> <p>- limited <b>public participation</b> in policy development, limited implementation of policy, strategic and institutional uncertainty, institutional fragmentation and political factors</p> <p>- Examples: limited implementation of the Decentralization Policy (1997), a lack of integration of land management policy and land management at the local level, reluctance to make unpopular decisions such as limiting stocking rates and inadequate effort towards developing guidelines for town and settlement planning, enforcement of regulations and raising awareness about the risks and impacts of floods</p> <p>-positioning of climate change as a <b>mere environmental issue</b></p> <p>-attitudes, beliefs and norms □ e.g. <b>reluctance</b> to reduce</p>	<p>Service) line, where farmers can communicate with extension officers) →through <b>radio</b> <b>-more access for smallholder farmers to extension services</b>, especially where there is no radio and cellular phone network</p> <p>- <b>Acknowledging uncertainties</b> in climate change projections</p> <p>- <b>Traditional knowledge</b> provides another source of information that should be used to inform agricultural extension work</p> <p>-shifts in adaptation <b>governance structures, which are currently centralized at the national level</b></p> <p>- existing governance systems and their associated government programmes will need to be re-envisioned such that they enable the <b>development of alternative livelihoods, as opposed to focusing predominantly on the promotion of climate-sensitive sectors such as agriculture</b></p> <p>-<b>transformation of livelihoods</b> by mobilisation of financial, technical and infrastructural resources and flow of information, raising of awareness and changing of attitudes</p>



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					livestock numbers leads to traditional livestock owners not selling their herds and experiencing huge losses during extreme hot dry periods	
Davies, 2017	National/ Local	Namibia	<p><b>Title</b> Barriers and Enablers to Climate Change Adaptation in North-Central Namibia</p> <p><b>Issues/Methods</b> Findings from ASSAR's key informant interviews, focus group discussions &amp; stakeholder engagements</p>	<p>-local communities are unable to deal effectively with problems such as bush encroachment and the eradication of invasive species → This negatively impacts water resources</p> <p>-limited access to potable water due to a lack of basic service delivery and the absence of any free water allocation</p> <p>-Poor communities are also negatively impacted by inflexible government budgeting structures, and with a lack of collateral are often unable to secure loans from financial institutions such as Agribank</p>	<p>- at an operational level, the <b>mandate for adaptation is unclear</b> (formal mandate sits with the MET)</p> <p>- <b>adaptation</b> is positioned <b>as an environmental issue</b>, rather than as cross-cutting</p> <p>-<b>silos of ministries and departments</b> → planning occurs in a fragmented, <b>top-down manner</b></p> <p>- A lack of <b>coordination</b> between <b>sectors</b> has led to critical oversights, not least the <b>failure to mainstream adaptation</b> into national policies</p> <p>- adaptation objectives are incompatible with the focus of policies, including the National Development Plan → <b>Poor vertical and horizontal integration and insufficient sharing of information</b> → causing conflict due to <b>inter-ministerial power struggles</b> and the politicisation of non-political (e.g. technical) issue</p> <p>- absence of sufficiently <b>detailed legal guiding frameworks</b> for adaptation</p> <p>-insufficient <b>financial resources</b></p> <p>- lack of <b>access to alternative employment opportunities</b> and resource deficits → authorities do not have the means to conduct ongoing stakeholder engagements or to hire more technical support staff</p> <p>-Whilst drought relief helps to meet the immediate needs → <b>dependence on government hand-outs which, in the long-term, reduces people's capacity to adapt autonomously</b></p> <p>- poor <b>infrastructural capacity</b> (access to markets to sell farm produce, access to</p>	<p>- <b>Housing climate change in a more strategic ministry</b> (such as Finance, Planning or the Office of the President) could increase the likelihood of it being considered a more urgent priority, and thus being allocated a sufficient budget</p> <p>- <b>Greater access to funding for adaptation projects</b> should be coupled closely with ongoing <b>stakeholder engagement and education</b> about climate change at the <b>grassroots</b> level</p> <p>- requirement of champions to drive climate change agenda and to leverage opportunities for adaptation funding and support</p> <p>-Building relationships and networks, engaging stakeholders at all levels, aligning policy priorities and integrating science with traditional knowledge</p>

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					technologies such as drought-resistant seed varieties and rainwater-harvesting tanks etc.) -lack of <b>knowledge and understanding especially at the local level</b> - perceptions of climate change as a <b>purely environmental issue</b> -sometimes traditional knowledge favoured over science while some indigenous communities <b>believe that climate change is 'God's work'</b> -widespread <b>migration</b> has led to increased competition and <b>conflict between herders and cultivators</b>	
Mulwa et al., 2017	Local	Malawi	<b>Title</b> Response to climate risks among smallholder farmers in Malawi: A multivariate probit assessment of the role of information, household demographics, and farm characteristics  <b>Issues/Methods</b> Household and plot level data (2011); multivariate probit model to assess the determinants of farmer adaptation behavior to climatic risks and the relative contribution of information	-access to climate information can be a major driver of the decisions to adopt the adaptation practices -Various sources of extension information significantly inform adoption decisions → Key among these is government extension and information accessed through the media -Policy implications are that the deepening of extension access with information on the appropriate adaptation strategies is crucial to help farmers make adaptation choices -credit constrained households are still able to adopt these beneficial practices when provided with climate change related information -even when financial limitations are binding, making climate-related information available can still motivate farmers to adapt	- <b>Awareness of climate change and measures to mitigate its effects</b> is depicted as a key hurdle in the adaptation process - <b>credit constraint</b> as a key impediment to adaptation - <b>lack of information</b> as the most important deterrent to climate change adaptation by the farm household	-need to <b>foster credit markets for easy accessibility and affordability by farmers</b> or otherwise strengthen access to assets is also important -need for <b>clearly designed policies to disseminate climate change information to farmers</b> -incorporate <b>deepening of extension access with information on the appropriate adaptation strategies</b> → specific policies geared towards overcoming information and resource constraints would lead to high adoption of crop varieties adapted to changing growing conditions and the implementation of agricultural practices that stabilize yields, thus enabling farm households to successfully respond to climate change -The positive impact of kinship ties in predicting adoption of some adaptive practices suggests that policies that <b>encourage social capital formation among rural communities</b> should be considered. These can include <b>encouraging formal and informal farmer and community groups through training and formalization</b> . These can be important vehicles for information dissemination and mutual support to help farmers acquire information and resources needed for implementing practices that enhance adaptation -need for <b>policies that support microfinance to make credit available</b> to farmers to finance the many improvements in practices needed to make them adapt successfully.
Vincent et al., 2017	National	Malawi	<b>Title</b> Identifying climate services needs for national planning, policy analysis, stakeholder interviews, and a	-no evidence of departments using short-, medium- or long-term climate projections in their current decision making, despite the availability of regionally downscaled	-challenges of existing climate services (scale, accessibility and credibility, policy planning cycles, and timing) → impeding the <b>incorporation of climate and weather information into</b>	- <b>climate scientists working with boundary organizations</b> can address issues in a more targeted, sector-facing manner -Initial investments need to target <b>awareness raising and capacity building</b> so that <b>decision makers</b> can first gain a better understanding of

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			<p>national workshop utilizing serious games</p> <p><b>Issues/Methods</b> Policy Analysis in national level plans and policy documents</p> <p>Semi-structured interviews</p> <p>Workshops with representatives from seven government departments</p>	<p>information from various sources</p> <p>-only sub-annual weather forecasts (from daily up to seasonal) provided by DCCMS are used</p> <p>-there is scope for climate information to be more appropriately interpreted, packaged, and communicated for users to be able to apply it so that it can deliver adaptation benefits across sectors on a national scale in SSA</p> <p>-there is a potentially high user demand for climate information that currently does not exist → including short-term multi-annual climate information that can be used in planning up to a 5-year timescale, and spatially explicit information on likely extreme events</p> <p>-Many departments identified a need for multiyear (up to 5 years in advance) forecasts for parameters including temperature, intensity, amount and distribution of rainfall, and drought</p> <p>-investments at the national level are also needed to make more effective use of current scientific capacities to provide climate information at higher resolution</p>	<p><b>national policy planning</b> and decision making</p> <p>-Without building capacity, donors run the risk of investing in the generation of vast <b>amounts of information that remains unused</b></p>	<p>what <b>climate information</b> is and <b>how best to interpret</b> and use it in planning processes</p> <p>- Once government personnel are aware of what they could have in the way of projections, they then need to be shown <b>how to use</b> them, and how such <b>information</b> can be incorporated into planning processes</p> <p>-support to climate services would mean <b>assistance to the DCCMS to better communicate existing locally and internationally generated climate information</b> and to play a role in developing the science to meet the needs identified by decision-makers</p>
Jørstad and Webersik, 2016	Local/ fish- processing groups	Malawi	<p><b>Title</b> Vulnerability to climate change and adaptation strategies of local communities in Malawi: experiences of women fish-processing groups in the Lake Chilwa Basin</p> <p><b>Issues/Methods</b> Semi-structured Interviews</p>	<p>-empirical evidence of fishing communities' experiences with changing climate patterns around the Lake Chilwa Basin in Malawi</p> <p>-cc threatens livelihood and subsistence farming and thus exacerbating poverty and food insecurity in the region</p> <p>-changing climate is having a significant impact on smallholder farmers' human security → pushing the people living in the Lake Chilwa Basin further into poverty by affecting the natural resources they depend on</p>	<p>-if <b>adaptation strategies fail</b> → local communities are forced to resettle → In such cases the participants' adaptive capacity may decrease as they have invested their time in a project that failed, pushing them further into poverty and making them more vulnerable to climate change</p>	<p><b>-Livelihood diversification as an effective strategy for smallholder farmers</b> to decrease their vulnerability towards environmental and economic shocks and hence climate change</p> <p><b>-local knowledge can be a crucial element in enhancing climate change adaptation programmes</b>, also for other vulnerable groups→ Utilising local knowledge is not about extracting valuable knowledge from communities and utilising it elsewhere</p> <p>-for adaptation strategies to work in the long term as well as the short term, it is essential that they <b>consider the effect of climate change on the natural resources that the communities rely on</b> (e.g. dry up of lakes)</p> <p>-Though there is nothing wrong with learning from or adopting successful practices, either based on "local knowledge" or "scientific</p>

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				-local communities vulnerable to climate change can at least to some extent adapt to climate change impacts using low-cost strategies based on local practices -Adaptation is key		knowledge", it is crucial that <b>adaptation strategies are identified together with the communities and further adapted to fit into the local context</b>
Joshua et al., 2016	Local/ Rural communities	Malawi	<b>Title</b> Climate change in semi-arid Malawi: Perceptions, adaptation strategies and water governance  <b>Issues/Methods</b> People's perceptions of climate change and variability and their desired interventions by Participatory Rural Appraisals, employing focus group discussions, key informant interviews, rainfall and temperature data for stations, and historical records of natural droughts and flood events	-adaptation to climate change and climate variability remains a challenge in many semi-arid areas - area is experiencing interannual climate variability and the effects of climate change and climate variability -People's perceptions suggest that winds are becoming stronger, daily temperatures are warming, rainfall amount is declining and its pattern has become unpredictable and unreliable -irrigation seen as major adaptation strategy	- <b>villagers have limited capacity</b> to improve their adaptive capacity -despite intensified production of drought-resistant crops such as sorghum → <b>limited access</b> to good seed and profitable market - <b>Access to irrigation water</b> is limited because of water governance or latent conflicts - farmers have <b>limited access to improved livestock breeds</b> (particularly of resilient types such as goats and local chickens as better adaptive strategy) -Water Resources legislation provides no clear guidance with regards to such water transfer arrangements (For example, section 65 of the National Water Resources Act does not include licence holders who abstract water from water courses for commercial purposes) - <b>local governments have inadequate legal support to operate</b> in their local areas.	-relevant policy must be developed and/or enforced -relevant <b>irrigation infrastructure</b> needs to be <b>provided</b> - need to <b>reduce water use demand</b> for irrigation through supporting of other local desired interventions that are not directly linked to irrigation → climate projections and water demand for the study area suggest increased water shortages or water stress by 2025! - <b>external support</b> on improved sorghum and livestock production -links to <b>profitable markets</b> -need to build farmers' capacity on <b>climate SMART agriculture</b> , an integrative approach to address interlinked challenges of food security and climate change
Remmert, 2016	National	Namibia	<b>Title</b> Water Governance in Namibia: A Tale of Delayed Implementation, Policy Shortfalls, and Miscommunication.  <b>Issues/Methods</b>	-“Policy vacuum” in the water sector due to opposing policies and laws -certain policies hampered by legal challenges - inadequate governance structures/weak institutions in the water sector	- <b>unclear policy environment</b> hampers investment in Namibia -poor <b>implementation</b> of policies due to severe underinvestment, limited capacity and technical skills, poor coordination among stakeholders and weak regulation and enforcement -poor human resources capacity → skill and staff limitation	-Water Resources Management Act No.11 of 2013 should be finalised and promulgated -establish key governing institutions such as the Water Tribunal -modernisation of existing infrastructure in the water sector and fast-track finance - explore <b>funding models for long-term water and sanitation infrastructure needs</b> , considering national development goals such as <b>industrialisation and agriculture schemes</b> and threats, particular climate change and pollution
Sutcliffe et al., 2016	Local	Malawi	<b>Title</b> Evidence and perceptions of rainfall change in Malawi: Do maize cultivar choices enhance climate change adaptation in sub-Saharan Africa?	-preferences for short-season maize cultivars are increasing based on perceptions that season lengths are growing shorter due to climate change and the assumption that growing shorter-season crops represents a good strategy for adapting to drought	- dangers of oversimplified climate information in guiding changes in farmer decision-making about cultivar choice - imbalance of market power within the seed system, with short-season hybrid corporate cultivars predominating and drought-tolerant public goods cultivars being scarce	-need for seed providers, farmers and meteorological and climate change specialists to engage in <b>clear dialogue about how local weather is changing and what crop traits will cope best</b> - <b>Partial knowledge and power imbalances</b> within seed systems <b>need to be addressed</b> to enable the enhanced communication and understanding that will underpin successful agricultural adaptation to climate change

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			<b>Issues/Methods</b> Fieldwork with smallholder maize producers and national seed network stakeholders in Malawi from 2010 to 2011 - Maize cultivar change as an incremental adaptation strategy	- meteorological records for the two study areas present no evidence for shortening seasons (or any significant change to rainfall characteristics), suggesting that short-season cultivars may not be the most suitable adaptation option for these areas - disagreement revealed between seed providers about how far short-season cultivars enable successful adaptation to drought - smallholders are more likely to access short-season cultivars than drought-tolerant ones because of the market dominance of corporate brands	- <b>corporate dominance within the seed system may mean that public sector adaptation goals fail to be effectively realised</b>	
<b>Bakuwa, 2015</b>	National/ Public Adults/ Rural and Urban	Malawi	<b>Title</b> Public understanding of global climate change in Malawi: An investigation of factors influencing perceptions, attitudes and beliefs about global climate change  <b>Issues/Methods</b> quantitative and qualitative methods, semi structured interviews, questionnaires	-different understandings of the climate change issue among the Malawian public which are reinforced by various factors → implications for public policy formulation as well as communicating climate change information -urban residents have access to more reliable and trusted sources of information about climate change when compared to rural dwellers - the most vulnerable groups to climate change (i.e., farmers and fewer income earners) are the least knowledgeable about the issue, mostly coming from rural communities	-no homogenous society → <b>different understandings</b> of the climate change issue → difficult to formulate and communicate cc information - <b>access to information and education</b> - <b>urban/rural differentiations</b>	- <b>providing</b> village headmen with <b>accurate information about climate</b> for onward transmission to their communities. -recommendation to <b>sensitize Malawian public</b> about climate change -the Government of Malawi, through the Ministry of Education, Science and Technology should include climate change issues in the <b>school curricula</b> across all levels of education (as formal education is the most reliable and trusted source of information about climate change) - need for non-governmental organisations to <b>support the government in educating</b> the public about climate change issues
<b>Shackleton and Ziervogel, 2015</b>	Local/ Community Focus	Sub-Saharan Africa	<b>Title</b> Why is socially-just climate change adaptation in sub-Saharan Africa so challenging? A review of barriers identified from empirical cases  <b>Issues/Methods</b> Synthesis of empirical literature from sub-Saharan Africa focusing on vulnerable, natural resource dependent	- local level studies that reveal barriers to adaptation are diverse, although there is a propensity for studies on small-holder farmers - many of the studies identify several barriers to adaptation, but appreciation of their interactions and compounded impacts remains scarce - most of the barriers uncovered relate broadly to biophysical, knowledge and financial constraints on agricultural production and	- Malawi: <b>social</b> (access and linkage to seed exchange networks), <b>informational</b> (access to information and local knowledge of locally adapted varieties), <b>biophysical</b> and <b>technical</b> (availability of germplasm resources, quality of germplasm resources), <b>financial</b> (assets to acquire new germplasm), and <b>infrastructural</b> (poor transportation links to seed markets) <b>lacks</b> -Cognitive and psychological barriers: e.g. semantics and	- research on barriers needs to start asking why these barriers emerge, how they work together to shape adaptation processes, who they affect most, and what is needed to overcome them - need to <b>understand the heterogeneity of impacts from barriers</b> on different sectors of society (gender, age, class, and ethnicity) - <b>role of trade-offs</b> in adaption decision making, and how choices of options are influenced by knowledge or lack thereof (e.g. severity of change, types of risks, uncertainty and lack of information), cognitive factors (preferences, aversion to certain options, priorities), institutional factors (who has a voice) and financial factors (costs)



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			communities and livelihoods	rural development. More hidden and under-acknowledged political, social and psychological barriers are rarely mentioned unless captured in studies that specifically set out to investigate these	language about climate change concepts ( -institutional barriers, informational barriers -Namibia: economic and trade barriers, justice, equity	- relevance of <b>considering cultural, justice, institutional, discursive and cognitive barriers</b> , especially before designing and implementing planned adaptation
Joshua et al., 2014	Urban	Malawi, South Africa, Zimbabwe	<b>Title</b> Review of Research and Policies for Climate Change Adaptation in Urban Areas in Southern Africa  <b>Issue/Methods</b> Focus on literature review of various documents including scientific and grey literature covering the past 15-20 years, and interviews with selected key informants	-current national policies and research activities are predominantly rural focused - In Malawi, out of 20 documented research or project activities, only one project focuses on urban adaptation - empirical information is inadequate for informed policy due to lack of technical capacity and unavailability of data - Stakeholder involvement can be improved through facilitation of multi-stakeholder collaboration in planning and implementing activities, production of reliable products (which can help to get donor support) and regular meetings.	-CCA in urban areas is made difficult through climate information and data deficiencies - low coverage of climate science at all levels of the education system - tendency to focus adaptation activities in rural areas at the expense of the urban sector - low political support for adaptation programmes in urban areas -structural barriers within governments and donor agencies and low sustainability of donor-funded projects affect mainstreaming - limited standing of local governments in international climate change negotiations	- provide an appropriate institutional framework that forms a strong basis for mainstreaming adaptation into urban planning - integration of urban adaptation to climate change into national climate change policies, where the local municipalities and authorities are mandated - Southern African countries should also adopt a more holistic approach to climate change focusing on both rural and urban areas' vulnerability and adaptation to climate change.
Montle and Teweldemedhin, 2014	Local/Rural	Namibia	<b>Title</b> Assessment of farmers perceptions and the economic impact of climate change in Namibia: Case study on small-scale irrigation farmers (SSIFs) of Ndonga Linena irrigation project  <b>Issues/Methods</b> Application of Multinomial Logit (MNL) and Trade-Off Analysis Model	Identified adoption strategies: 1. Switching the farm system (e.g. to livestock) and adopting a mixed farming system 2. Conservation 3. Early planting - level of understanding and awareness amongst farmers is lacking	Constraints of adaptation identified by participants: <b>1.Poor extension service</b> <b>2.Inadequate meteorological services</b> <b>3.Lack of climate change policies</b> <b>4.Access to credit</b> <b>5.Access to improved crop varieties</b> <b>6.Inadequate knowledge on climate</b> <b>7.Market access</b>	-Improve and enhance farmers' productivity through the adoption and adaptation of technologies - <b>technological innovation</b> is not a unilateral activity and must be amplified across the entire agricultural supply chain in Namibia - <b>conduction of experimental sites</b> for better estimation and determination of production costs - <b>social learning</b> - <b>Training of farmers</b> - <b>Early warning system</b> - <b>Credit to farmers</b> - <b>Information availability</b>
Villholth et al., 2014	National	Malawi	<b>Title</b> Actual and Potential Weather and Climate Information Needs for Development Planning in Malawi: Results of a Future Climate for Africa Pilot Case Study	- findings of this FCFA Pilot Case Study show that the longest current timeframe for political decision-making in Malawi is over a 10-20-year time horizon and that this is solely led by the Department of Economic Planning and Development	-perceived limitations: <b>scale, accessibility, policy planning cycles and timing</b> , which act to impede the use of climate and weather information in decision-making	- need for <b>spatial information on likely extreme events</b> – especially floods and droughts but also strong winds and hail - need for a <b>better understanding of what climate change is and the risks it poses</b> - Additional <b>capacity building and training on climate change</b> , its potential impacts and how to integrate short and medium-term climate

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			<b>Issues/Methods</b> Usage of climate information to better inform decision-making across a range of sectors and socio-political and environmental settings  Semi-structured interviews, policy analysis by desktop review, stakeholder workshops	- There is no evidence of ministries using any climate projections or climate scenarios in their current decision-making, despite the availability of regionally-downscaled projections (objective two). (seasonal and 5-day) forecasts are used - Existing coordination structures for weather and climate information exist in Malawi, and function at national level between the DCCMS and other line ministries - The combination of the policy and institutional framework for addressing climate change issues in Malawi devises a structure in which improved use of weather and climate information is not only recognised as important but can feasibly be actioned to improve medium-term decision-making and planning that will be robust in the context of a changing climate		information into existing policies and decision-making processes remain needed
David et al., 2013	Local	Namibia	<b>Title</b> Building adaptive capacity in rural Namibia. Community information toolkits on climate change  <b>Issues/Methods</b> -community based initiative -development of resilient farming practices and improved natural resource management in the face of climate change, development of toolkits	Main outcomes: compilation of the climate change toolkits, as well as outreach materials such as a video for training of trainers events on climate change adaptation, posters, and radio talks in the different regions. → toolkits are applicable to the rural communities, peri-urban and communities across Namibia  Specific adaptation options (proposed in the toolkits): 1. Land-use planning and promotion of climate-compatible land uses and associated production systems 2. Adaptive livestock management (learning from nomadic Ovahimba people, traditional livestock herding) 3. Wildlife management, tourism and conservation	- <b>lack of scaled down information</b> on impacts at a local level - <b>inadequate data and information on weather and climate predictions</b> - reliance on <b>indigenous knowledge</b> which is <b>not considered</b> when planning for CCA	- people <b>need information</b> that they can <b>relate to and understand</b> (i.e. vernacular languages) - <b>Awareness</b> raising of climate change at grassroots level - <b>Building local capacity</b> through community outreach program on climate change adaptation actions - <b>Strengthening of extension services</b> in the regions through training of trainers events - <b>Implementation</b> of sustainable climate change adaptation projects and CBA funding mechanisms

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				4.Promotion of biodiversity products 5.Water conservation 6.Prevention of land degradation and rehabilitation 7.Improved food security and nutrition 8.Fire management 9.Alternative energy and water sources 10. Improved early warning systems (EWS) and information on CC and CCA		
Ifejika Speranza and Scholz, 2013	Regional	Southern Africa	<b>Title</b> Special issue "Adaptation to climate change: analysing capacities in Africa"  <b>Issues/Methods</b> Review of studies	-review shows how an incremental normalization of states of emergency may hinder long-term development strategies - highlights the potential of low-cost policy options that are not fully explored so far	- Management and adaptation challenges are exacerbated by the legacy of Apartheid (South Africa, Namibia): pressures on scarce water resources increase due to the need to socially and economically include the black majority, which in the short-term makes water management appear to be an engineering and financial challenge, obfuscating the need for environmental foresight	<b>-development policies, disaster risk reduction and humanitarian interventions</b> may reduce vulnerability to flood events -need to <b>identify the social, economic, political and institutional causes of non-adaptive social systems</b> - <b>knowledge</b> on regional climate changes needed
Magombo et al., 2012	Local	Malawi	<b>Title</b> Incidence of Indigenous, Emerging and Innovative Climate Change Adaptation Practices for Smallholder Farmers' Livelihood Security in Chikhawa District, Southern Malawi  <b>Issues/Methods</b> Cluster sampling analysis of smallholder farmers, traditional authorities, group villages, villages	- In the past ten years, households in the study area have been affected by climate change impacts such as floods, droughts and erratic rainfall →negatively affected farm families' livelihoods which are mainly based on agriculture - Crop diversification, eating a wild tuber plant called nyika, applying organic manure to agriculture fields, mixed crop and livestock farming; small scale irrigation and nonfarm income generating activities were identified to be the indigenous climate change adaptation strategies being adopted by households - maize and sorghum variety diversification is one of the climate change adaptation strategies that smallholder farmers use in Chikhwawa district		<b>-improving access to</b> early maturing and drought tolerant maize and sorghum seed -need to <b>conduct action research on domestication of nyika</b> and find ways on how to improve its productivity at the farm level -need to <b>intensively promote afforestation programs</b> in Chikhwawa and Malawi at large and conduct intensive <b>civic education programs aimed at sensitizing communities</b> on the danger of careless cutting down of trees, cultivating along river banks and continuous cropping to influence behavior change towards climate change impacts mitigation and adaptation at individual, community and national levels -The government of Malawi through Ministry of Agriculture and Food security should <b>improve on the agricultural extension services delivery system</b> and develop messages that aim a promoting adoption on climate change adaptation strategies being identified at individual community and national level → <b>Access to agricultural extension services</b> proved to be one of the important factors that influence household to adopt climate change adaptation strategies
Brown, 2011	National	Malawi	<b>Title</b> Making the linkages between climate change	-Widespread urbanization in Malawi coupled with the projected impacts of climate	<b>-policy gaps, the acute shortages of trained land professionals and arrested</b>	<b>1. Identify urbanization and the urban disaster risks</b> associated with climate change as priority areas in the MGDS and NAPA.

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			adaptation and spatial planning in Malawi  <b>Issues/Methods</b> Literature Review and Recommendations Focus on urban areas	change presents a clear and immediate need to incorporate climate change adaptation into urban development processes -spatial planning should be identified as a climate change adaptation strategy in Malawi and densification and disaster risk management should be investigated as potential adaptation measures	<b>political decentralization</b> remain significant challenges for policy implementation -problematic: <b>preoccupation of the MGDS with economic growth</b> , which fails to recognize that sustainable development in Malawi fundamentally hinges on the environment -The NAPA fails to address <b>rapid urbanization and the growing vulnerability of the urban poor</b> to the increasing frequency and intensity of floods □ this could exacerbate Malawi's vulnerability to climatic variability, ultimately undermining broader development goals	2. Conduct <b>adaptation research in urban areas</b> to investigate the nature of vulnerability/risk to inform appropriate adaptation options for policy. 3. <b>Mainstream climate change adaptation</b> into the broader policy framework 4. Review the suitability of standard residential plot sizes relative to population growth projections and the availability of developable land to inform reductions to standard plot sizes. 5. Continue to <b>support the partnerships</b> between the Ministry of Lands, Housing and Urban Development and Mzuzu University, Natural Resources College and the University of Malawi to develop locally relevant and demand-driven land management curriculum.
World Bank Group, 2011	National	Malawi	<b>Title</b> Vulnerability, Risk Reduction, and Adaptation to Climate Change. Malawi  <b>Issues/Methods</b> Climate Risk and Adaptation Profile of Malawi, part of a series of 31 priority country briefs developed by the Global Facility for Disaster Reduction and Recovery (GFDRR) as part of its Disaster Risk Management Plans		- Limited <b>financial capacity</b> at the national level - <b>extreme poverty and low levels of education</b> amongst the most vulnerable groups → difficulties for the transfer of new technologies and meaningful long-term planning -poor <b>infrastructure</b> → many rural areas isolated and unable to receive farm inputs and access to markets -limited <b>credit opportunities</b> for rural communities -widespread <b>food insecurity</b> at the regional level, preventing acquisition of food from neighbouring countries and exacerbating existing low levels of adaptive capacity - <b>prevalence of HIV/AIDS orphans</b> , who drain family energy, cash, and food supplies and reduce productivity rates of those suffering from the disease -substandard <b>health conditions</b> of resource-poor rural communities, directly related high rates of malnutrition - <b>shortfalls in the ability of personnel</b> to accurately analyse the threats and impacts of climate change to inform adaptation interventions -Institutions addressing disaster risk management (DRM) and climate-related activities □ lack of <b>inter-sectoral coordination</b>	

Source	Level/ Focus/ Area	Country/ Region	Title   Issue/Methods	Findings	Challenges/ Barriers of cc adaptation	Advice
					<ul style="list-style-type: none"> <li>- limited <b>involvement of relevant stakeholders, including local community</b> members</li> <li>- limited <b>skills and resources</b> at the local level <b>to implement</b> new policies</li> <li>-institutions suffer from a lack of inter-sectoral coordination</li> </ul>	
Bauer and Scholz, 2010	National/ Local	Southern Africa	<p><b>Title</b> Adaptation to climate change in Southern Africa: New boundaries for sustainable development?</p> <p><b>Issues/Methods</b> Provision of conceptual and environmental background on climate change in SA (e.g. vulnerability, adaptation) and its impacts, reference to existing research/authors</p>	<ul style="list-style-type: none"> <li>-Picture of adaptation to climate change and for sustainable human development in Southern Africa is still fragmentary</li> <li>-reducing people's vulnerability by strengthening adaptive capacity is necessary to enhance human development</li> </ul>	<ul style="list-style-type: none"> <li>-Adaptation is hindered by the prevailing <b>uncertainty over specific future impacts</b> of climate change across Southern Africa</li> <li>- impossible to make unambiguous predictions about sub <b>regional precipitation patterns</b></li> </ul>	<ul style="list-style-type: none"> <li>-build adaptive capacities and <b>effective institutions at all sectors</b> and levels</li> <li>- focus on 'no-regret' policies when pursuing sustainable human development under changing climatic conditions</li> <li>- <b>reducing the immediate dependency of production systems on environmental conditions</b></li> <li>-<b>diversifying</b> livelihood strategies and income sources at the household level</li> <li>-for rural development in dryland environments: <ul style="list-style-type: none"> <li>* <b>rainwater harvesting and</b> construction of water storage and irrigation systems to reduce rainfall dependency and to secure water access over longer periods</li> <li>*<b>diversification of crop</b> production (e.g. food and cash crops, annual and permanent crops) and the use of <b>off-farm income</b> sources (e.g. wildlife tourism)</li> <li>* <b>micro-insurance</b> schemes for extreme weather events to help poor households cope with droughts and floods</li> </ul> </li> </ul>
Stringer et al., 2010	National/ Local	Malawi	<p><b>Title</b> Adaptation to climate change and desertification: Perspectives from national policy and autonomous practice in Malawi</p> <p><b>Issues/Methods</b> Examining adaptations outlined in national policy to address desertification and climate as well as the local autonomous adaptations being undertaken at household level</p>	<ul style="list-style-type: none"> <li>-fail of dual challenge of adapting to climate change and desertification to further a comprehensive approach to national development despite strong connections between both agendas</li> <li>- many agricultural and livelihood adaptations outlined in national policy focus primarily on rural areas rather than embracing the rural-urban flows of people and money</li> </ul>	<ul style="list-style-type: none"> <li>-despite policy efforts to address desertification and climate change sharing some common ground, they appear to be <b>poorly mainstreamed into broader development processes at the national level</b></li> </ul>	<ul style="list-style-type: none"> <li>-accommodating the <b>interlinkages between rural and urban</b></li> <li>-a <b>more integrated approach</b> is necessary <b>within national policy to consider rural and urban areas</b> and their interlinkages, and play a stronger facilitating role in supporting local autonomous adaptations</li> </ul>
Stringer et al., 2009	National/ Local	Malawi	<p><b>Title</b> Adaptation to climate change and desertification: local insights to enhance policy in southern Africa</p>	<ul style="list-style-type: none"> <li>-the national policy and autonomous household-level adaptive strategies show some degree of common ground</li> </ul>	<ul style="list-style-type: none"> <li>-<b>not all adaptation options are compatible with one another</b></li> <li>-<b>in-country migration and urbanisation</b> are partially <b>overlooked</b> in national policies</li> </ul>	<ul style="list-style-type: none"> <li>-need to <b>define a clear role for local governments in urban areas</b> to better engage them in the adaptation process</li> <li>-better <b>horizontal alignment of policy adaptation strategies at the national level</b> could help facilitate local autonomous</li> </ul>



Source	Level/ Focus/ Area	Country/ Region	Title   Issue/Methods	Findings	Challenges/ Barriers of cc adaptation	Advice
			<b>Issues/Methods</b> Examination of differences and similarities between national policy efforts to address climate change and desertification, and between national policy and examples of local-level households' autonomous adaptive practice	-further support for and refinement of many of these adaptations have emerged in Malawi's National Communications and Reports to the UNFCCC/UNCCD -subsistence and cash crop diversifications are adaptations already being used -rural and urban populations are interlinked through flows of migrants and remittances → both the NAP and NAPA retain a bias towards rural areas as the focus of their efforts		adaptations and improve vertical integration, particularly if cooperation and communication can be enhanced horizontally among relevant ministries -in addition to supporting local autonomous adaptation, national policy may also need to <b>develop larger-scale adaptation strategies</b> (nationwide early warning, food security systems...)
ActionAid, 2006	Local/ Rural smallholder farmers	Malawi	<b>Title</b> Climate change and smallholder farmers in Malawi Understanding poor people's experiences in climate change adaptation  <b>Issues/Methods</b> Group discussions among farm holders	-Exposure of farm holders to increased droughts and floods, tremendously affecting food security -Several adaptation strategies, including changes in crops grown and changes in growth patterns, have been undertaken -Development factors exacerbate climate change impacts -Climate change exposes the underlying causes of food insecurity	-Current government policies on hybrid maize and <b>privatisation of seed companies</b> have made agriculture <b>unprofitable for smallholder farmers</b> -implementation of NAPA faces <b>capacity constraints at the district levels</b> and lack of <b>coordination among various sectors</b> -NAPA seems to exist in <b>isolation</b> of other sector policies -Inappropriate government policies have <b>undermined attempts to diversify</b> -Existing local government capacity cannot support the challenges smallholder farmers face in adapting to climate change	-take on <b>multisectoral approach</b> , starting at the community level -need of <b>skills, knowledge</b> and access to credit for addressing short and long-term needs of diversifying from maize into other crops → The Hyogo Framework for Action, adopted at the World Conference on Disaster Reduction in Japan 2005, offers comprehensive disaster reduction policies, that should be implemented at local and national levels as an urgent adaptation measure

## Key issue “Implementation”: Governance, Responsibility and Role Distribution in Adaptation Processes

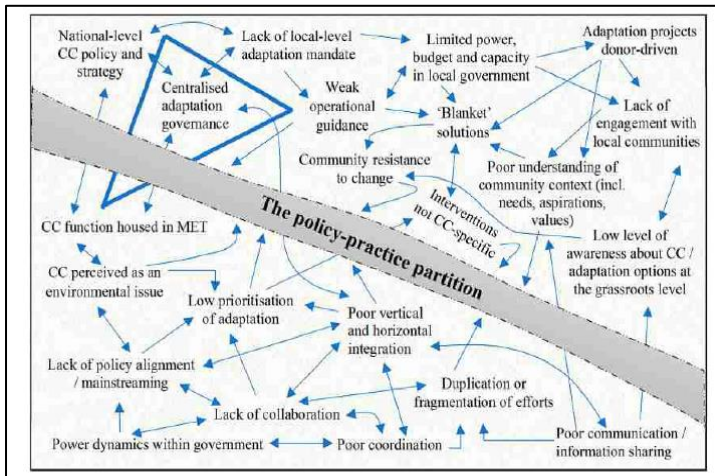


Figure 15: The policy practice participation (Davies et al., 2020: 273, Fig.2).

of previous programmes, policies and works that both a buy-in of the national governments and private actors is essential in the process of adaptation and implementation. The latter can also be realised by successfully conducted projects that in turn can convince other groups in replication. More exchange, as well as field visits of the various hierarchies (farmer, extension service, ministerial experts) and between regions, is required to further succeed in implementation processes. Besides, policy frameworks, climate financing and strong commitment, as well as community engagement on a sub-regional local, is needed (Schaller et al., 2020). In addition, transdisciplinary could help prevent working in (technical/professional) siloes and facilitate a better exchange of information.

Also explicitly noteworthy, is a recent study by Davies et al. (2020) who considered barriers to (climate change) adaptation in Namibia, especially barriers identified between policy and practice. By utilising the theoretical framework of “adaptation activity space”, firstly, hurdles could be figured out when it comes to adaptation → **Fig. 17**, and ensuing “avenues” of intersecting barriers in Namibia, that is the policy-practice participation and the adaptive capacity challenge, were depicted. → **Fig. 15** → **Fig. 16**. Importantly, the authors underline the cooperation among adaptation practitioners in Namibia, and highlight the need for incorporation of adaptation initiatives into existing development agendas and to build on existing strengths (such as community trust in leaders), and lastly “to make use of existing resources, including traditional agro-ecological knowledge, the presence of individuals committed to the climate change agenda and the strong NGO and donor support base” (Davies et al., 2020: 278).

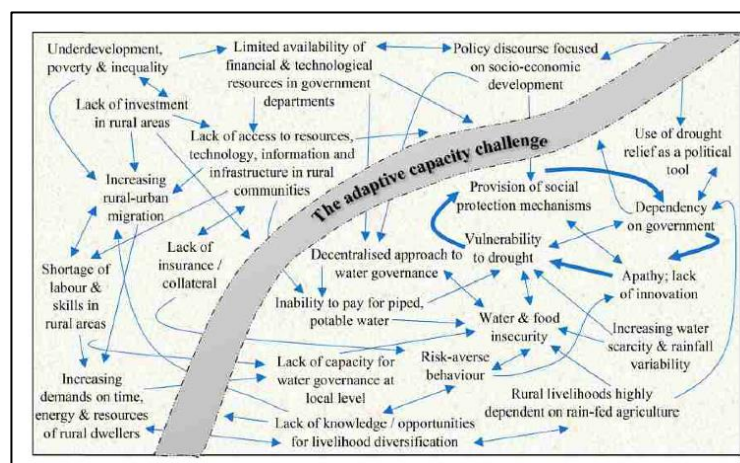


Figure 16: The adaptive capacity challenge (Davies et al., 2020: 276, Fig.4).

Overview of Namibian context		Examples of adaptation responses	Barriers to adaptation identified in this study
Environment (biotic and abiotic)	Namibia has an arid to semi-arid climate, with natural water scarcity, poor soil fertility and hot, dry conditions year-round. The country is home to sub-humid woodlands, true desert and savanna biomes. The harsh environment supports a range of terrestrial and marine wildlife (Mendelsohn, Jarvis, & Robert, 2002). Drought is a common occurrence and the northern region of the country is also subject to frequent flooding during the high rainfall season, when water collects in ephemeral watercourses known as <i>ishana</i> .	Drought policy and drought relief programme Awareness campaigns for water saving Drip irrigation and earth dams Emergency flood response Seed policy (provision of hybrid seeds and certification to meet quality standards) Green Scheme Policy (established to maximise irrigation opportunities for food production) Namibia Agriculture Policy (for increased and sustained agriculture production and productivity) Debushing advisory service The EIF was accredited as the National Implementing Entity (NIE) for the Green Climate Fund in 2016 The DRFN was accredited as the NIE for the Adaptation Fund in 2015 Debushing Advisory Service Community Water Point Associations introduced as a means to decentralize water governance	Communities lack the capacity, knowledge and resources needed to adapt effectively to droughts and floods. Government lacks the resources needed to deal effectively with problems such as bush encroachment and the eradication of invasive species. This limits the productivity of agricultural lands and negatively impacts the availability of water resources.
Institutions (regulatory and cultural)	Namibia's National Climate Change Policy (NCCP, 2011) is complemented by other relevant policies, including those for water management and disaster risk reduction. The Ministry of Environment and Tourism (MET) is responsible for the implementation of the NCCP as well as the 2013 National Climate Change Strategy and Action Plan. The climate change agenda is supported by the Desert Research Foundation of Namibia (DRFN) and the Environmental Investment Fund (EIF). Most of the adaptation work that takes place in Namibia is donor-driven. In parallel to a democratic government system is a traditional chieftainship system.		Adaptation is centralized at the national scale while the local-level mandate for adaptation is unclear. A lack of coordination, poor vertical and horizontal integration and insufficient sharing of information has led to policy misalignment and inter-ministerial power struggles. Whilst traditional authorities are formally recognized by government, they are not adequately empowered. There is also a lack of long-term planning and upscaling of donor-funded projects, which are usually in the form of short-term pilot interventions. This, coupled with high staff turnover in government, means that sustaining adaptation projects is difficult.
Technology (material and organizational)	Namibia has limited financial and technological resources, one consequence of which is a lack of investment in education and skills development. There is poor transport and communications infrastructure in the rural north of the country, and access to basic services like sanitation, healthcare, electricity and potable water is insufficient. Community leaders, such as traditional authorities, local councillors and village chiefs, are generally trusted and well-respected within communities.	Government subsidizes inputs like seeds, fertilizer and tractors through the Dryland Crop Production Programme Newly formed agro-marketing and trade agency Establishment of rural markets (e.g.: Otamanzi multi-purpose community centre where produce / products can be sold or traded) 'Learning and Information Sharing for Agriculture' (LISA) – SMS service for farmers Support groups for people affected and infected by HIV/AIDS	Major infrastructural deficits include a lack of: roads and bridges; hospitals (in Onesie Constituency); stormwater drainage systems (in informal settlements); grain storage facilities; tractors; water pumps and government vehicles. There is also insufficient access to technologies such as drought resistant seeds and rainwater harvesting tanks, and limited access to climate change data and adaptation options. Most rural farming communities not aware of initiatives that are meant to assist them with information. Many of these barriers are linked to financial resource and capacity deficits.
Discourse (popular and policy)	Much of the national policy discourse in Namibia is pro-poor and development-driven. Government agendas thus tend to prioritize issues such as poverty and inequality over environmental concerns. There is a significant focus on upscaling agricultural production, while strengthening and coordinating Disaster Risk Management is a strategic priority. At the community level there is a strong sentiment that government is responsible for improving the lives of local people.	Government provides grants for vulnerable children and orphans, pensioners and people with disabilities. School feeding programme Drought relief programme	Adaptation is not adequately mainstreamed into development planning and there is a lack of specific adaptation interventions. Climate change is positioned as an environmental rather than cross-cutting issue. Rural communities remain marginalized and many households are food insecure. Vulnerable communities tend not to take any action until climate-related impacts are experienced – and even then, people tend to wait on government for help. Many farmers are risk-averse and reluctant to try new farming practices. Above-average rainfall in recent years has made some people sceptical of climate change. Government's response to climate-related disasters are largely reactive rather than proactive.
Livelihoods (production and labour processes)	The principal livelihood activity in northern Namibia is rain-fed, small-scale and subsistence cropping and livestock farming. Other natural resources such as wood, fish, medicinal plants and raw material for crafts are also important. Some people earn an income from off-farm labour or from trade, basketry or beer-making. Others own small businesses such as 'coca shops' or car washes.  Many rural dwellers depend on in-kind sources of food and income, such as donations of millet from wealthier farmers or cash remittances that are sent from their relatives working in urban areas. State pension grants are also a key form of income for the elderly, whilst extremely vulnerable groups rely on social grants from the government (Spear et al., 2018; Spear & Chappel, 2018).	Green Scheme Projects, e.g.: Etunda irrigation scheme Omahenene Project (breed drought-resistant varieties of pearl millet and sorghum) Community-based tourism initiatives, e.g.: conservancies and a wildlife loan scheme Community forestry projects (sustainable forest management)  Community-based freshwater aquaculture facilities Training of farmers through agricultural extension programme Community gardening projects Construction of earth dams	An economic dependence on natural resources, coupled with a lack of access to alternative employment opportunities, makes communities vulnerable to climate change. While most people have experienced droughts and floods and are aware of seasonal changes in weather and climate, there is limited understanding of climate change itself. There is a lack of infrastructure to support rural livelihoods, for example access to markets to sell farm produce. Whilst drought relief helps to meet the immediate needs of vulnerable communities it can lead to a dependence on government hand-outs which, in the long-term, reduces people's capacity to adapt autonomously.
Individuals (values and identity)	Farming is at the core of the Oshiwambo and Ndongona cultures. People find their identity in farming and are strongly attached to this way of life. Mahangu (pearl millet) has strong cultural significance and the ownership of cattle is linked closely to the male identity, as well as being valued as a measure of wealth, prestige and social status. Many people also have strong religious beliefs and their values are thus tied to the principles of Christianity. Traditional values remain prevalent in Namibian society, particularly in rural areas of the north where there is a dominant Oshiwambo culture (Davies et al., 2018).	Government subsidies for sale of livestock in drought years Agricultural extension officers advise farmer's on using improved crop varieties and livestock breeds Provision of loans from Agribank for farming inputs, including drought-resistant seeds and fertilizers	There is a strong belief among some communities that God will provide and that only God knows the future. This can be a barrier to the use of meteorological climate information. Strong cultural attachments to farming with pearl millet (mahangu) and livestock without diversifying limits farmer's ability to adapt to climate variability and change. Older, more traditional farmers are often unwilling to sell off their livestock in times of drought despite severe food and water deficits.
Behaviour (practices and routines)	Traditionally, women are responsible for household chores, child rearing, caring for crops and collecting non-timber forest products, and approximately 55% of households in the Omusati Region are female-headed. Men are usually responsible for rearing livestock and patriarchy influences decision-making, agency and control over resources at the household level.	SCORE project: Scaling up community resilience to climate variability and climate change in Northern Namibia, with special focus on women and children Government provides rippers for elderly farmers and female-headed households Establishment of women's cooperatives (collect marula nuts)	There is an increasing pattern of migration to towns and cities among males and the youth, which is leading to labour shortages in rural areas. Women and the elderly, who are already among the most vulnerable groups, are increasingly being left to tend livestock and crop fields, as well as maintain the household.

Figure 17: Barriers to adaptation in Namibia's adaptation activity space (Davies et al., 2020: Table 1).



Further, referring to Namibia, Remmert (2020) carried out some cross-sectoral analysis on three crucial key domains in Namibia – this is, the interlinkages of drought, water security, and climate change. The author stated the previous (financial) negligence of the sectors by both stakeholders and government and thus the grievance occurring from little implementation. Besides, even if there are policies and strategies (and in Namibia, there is an impressive compendium of those), they hardly become realized (Remmert, 2020: 20). Additionally, some of the legal frameworks appear to be outdated, for instance, Namibia's Water Act No. 54 of 1956 which is from pre-independent times and thus actually obsolete (Remmert, 2020: 14). Lacks do also exist in the NAP or Namibia's NDP5, in which climate change is hardly or way too less considered, especially in highly vulnerable sectors like water supply and agriculture (Remmert, 2020: 16,17). What aggravates the political landscape additionally, is an observable number of uninformed policy-makers about scientific prognosis; moreover, the alignment to expansion in agricultural production, economic growth and development stated in election manifestos by parties such as the SWAPO (Remmert, 2020: 17). As Remmert (2020) emphasizes, all sectors or rather great investments within these (building infrastructure etc.) are closely linked to political dimensions and decisions, which is why policy-makers need to take on actions imperatively. Therefore, the author recommends to urgently enact of a legally binding water regulatory framework, to consider most recent international and regional findings around climate change and incorporate these into policies, to go into an earnest and informed dialogue between officials, experts, private sector and communities, to allocate resources carefully and reasonably and to demonstrate political will with regards to the respective implementations, and "to refrain from ad-hoc policy responses or such measures that are overly dependent on international donors, without having a demonstrable understanding of the complexities involved, and which lack buy-in from local communities" (Remmert, 2020: 21,22).

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*"This divide around skills among public and private spheres is proving detrimental for Namibia. While the available expertise is not lost to the nation as such, it is misaligned and cannot be brought to bear fully to the areas in greatest need of it" Remmert (2016: 7) about the governance in the water sector in Namibia.*

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Another difficult matter is the governance of institutions, which is a "key factor" and broadly encompasses the competence and ability to implement policies and regulations effectively. As Remmert (2016) notes with the example of Namibia's water and sanitation sector, the governance structure is extremely complex, which is not necessarily a disadvantage, but it does create additional hurdles given Namibia's status as a developing nation. This complexity, for example, can be observed in "the incessant focus by government on formulating complex policy invariably impacts negatively on the application of the same by already overtaxed state agencies" (Remmert, 2016: 4). Moreover, it can also be noted that many responsibilities of different institutions might then simply not be met. According to the Second National Integrated State of Environment Report for Namibia, "(t)ogether with partners, the Namibian Government has taken both a bottom-up and a top-down approach to address water-related challenges at national and regional level" (MEFT, 2021: 24), but again, implementation is being constrained. As Remmert elaborates, another aspect that must be considered when assigning and holding responsibility and governance is, depending on the subject area, the consideration of other non-state actors, such as the public sector. In the example of the water sector, the public sector has an implementation and management role, since "almost all bulk water supply infrastructures as well as local authorities' water supply, reticulation and sanitation systems are owned and managed by public institutions" (Remmert, 2016: 7). The separation of roles and responsibilities

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*"Apart from being subjected to cumbersome and often ineffective bureaucratic review and approval processes, the culture of many ministries often seems to discourage civil servants from proactively exploring and implementing practical problem-orientated solutions. The multi-layered, complicated organisation of the civil service structure and the segmentation and sharing of roles and responsibilities with many SOEs also makes it difficult to address sector issues in a harmonised, persistent and coherent way. Moreover, senior staff operating in such a structure might find it easier to defer critical decisions or push them to another institution to avoid potential blame" (Remmert (2016: 15) about the Water Sector in Namibia.*

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between the institutions and levels of government in the water sector in Namibia has been emulated in this case from international practice. What further hinders the implementation of (climate change-related) policies and measures at an institutional level are, according to Remmert (2016), issues and lacks of coordination/communication, decentralisation and key-governing instruments (e.g. missing official forums for government officials, experts, and other stakeholders). (Remmert, 2016).

To strengthen the implementation of policies, particularly in Namibia, Kalt (2020: 93) suggests to stronger set the focus on the state-community approach, and overall, to establish an

inclusive, cooperative governance approach, which involves all three different governance forms (hierarchical, market and network governance).

### Community-Based Adaptation Approaches

Another example concerning decentralization and participatory approaches in Namibia states the "community based management" which has already been set up since the 1990s (Remmert, 2016; David et al., 2013). The problem hereby is that this form of management resulted in a partially complicated governance framework with uncoordinated mandates, as well as in tensions among institutions, which in turn could lead to the erosion of power and influence of traditional authorities. As a consequence, as Remmert (2016: 8) points out some critical (but difficult to verify) voice, this approach would be seen "as a centrally imposed measure to foist responsibility and cost of local water infrastructure on unprepared and poor rural communities".

Based on the example of the Cuvelai people in Namibia, the Institute for Social-Ecological Research (Luetskemeier and Liehr, 2019) also stresses the traditional community solidarity, which, coupled with governmental bodies and traditional authorities, appears to be an effective strategy to pursue both a pro-poor and collective action approach (Luetskemeier and Liehr, 2019: 4–5).

Those community-based management processes were not only introduced in Namibia but also in eight other African countries (Sudan, Tanzania, Uganda, Zambia, Malawi, Kenya, Zimbabwe, South Africa) by implementing "Community-Based Adaptation in Africa"- initiatives (CBAA), among others (Nian and Ruppel, 2014: 1229).

In Malawi, a further integrated community-based-approach is the so-called "**Participatory Scenario Planning (PSP)**", an information technique that aims at strengthening adaptive capacity and supporting planning and implementation of Disaster Risk Reduction and climate-resilient development for farmers (Tembo-Nhlema et al., 2021: 79; Bezner Kerr et al., 2019).

To sum up, implementation **barriers** often emerge in sectors in similar ways, **despite** having multiple, sophisticated or **ambitious policies**. Reasons for those implementation **difficulties** are various factors, such as **severe underinvestment, limited capacity** and **technical skills, poor coordination** among

stakeholders, **weak regulation** and enforcement, **bureaucratic efforts, mistrust** between public and private institutions as well as a **lack of monitoring** (Remmert, 2016; 2020). As mentioned in the IPCC report from 2014, adaptation responses and capacities could be enhanced by **replacing hierarchical governance systems** and

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*"If rural adaptation is to be effective, then it cannot take the form of prescriptive actions determined by outsiders and subsequently imposed upon rural communities. Even if all the evidence suggests a certain course of action should be taken, without input from the rural communities themselves, there is the danger that adaptation merely expands marginalisation through the reproduction of historical power imbalances resulting from remote decision-making and the elite custodianship of information" (Cornforth et al., 2021: 142).*

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accompanying siloes within these structures **with integrated, multilevel and flexible governance approaches** (Nian and Ruppel, 2014: 1228).

### **Towards “smart implementation”**

In their guidance on transformational projects, the GIZ mentions, based on the outcomes of many projects undertaken, to rather take the path of “smart implementation” then adopting conventional “best practice”-blueprints. This is to be realized by adopting iterative and adaptive management for local solutions “on a base of mutual trust and eyelevel between parties around development interventions”. (Kehrer et al., 2020: 34). Problematic is, however, that

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*“the growing ambitions for transformation do not seem to change much in the self-reinforcing linear cycles of output orientation, impact promises and desired control. One reason for this might be a vicious circle in which ‘business as usual’ management practice tries to stick with predefined goals and indicators, ignores complexity, does not get further or produces results other than expected which triggers the impulse to steer and control even more and differentiated the achievement of rigid goals and indicators. One challenge here can be a mistaken assumption of why things may go wrong. It is the assumption that rules, routines, M&E methods and formats are not firm and differentiated enough to ensure desired outcomes. Ironically, these assumptions are part of the problem. More and more rigid structures can lead interventions to work in ‘shadow systems’ (High, Pelling, and Rengasamy 2004; P. Shaw 1997) which are more adapted to the complex reality and ignore some of the formal structures” (Kehrer et al., 2020: 34).*

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## **8. The Role of International Development Cooperation (in ACC)**

Climate change adaptation processes in Southern Africa are being shaped by a large number of actors. International donors play an important role in this regard, for example in the areas of input and collaboration as well as implementation (Curran et al., 2018).

An example of international (bilateral) agencies in Malawi is the German International Cooperation Agency GIZ, which has been advising the Malawian government on several issues since 2010 on behalf of the German Federal Ministry of Economic Cooperation and Development (BMZ) (Hiller, 2012). The aim pursued is to support Malawi’s domestic modernization particularly in education sectors on an institutional and organizational level. Hereby, the work of GIZ is considered to be a *classical* policy advising of governmental institutions, interfacing between second-order governing and first-order governing (both institutional and organizational levels) (Hiller, 2012: 185; Schaller et al., 2020). Policy advising in Malawi goes along with issues, such as economic factors (high costs, strong dependency on donor countries), insufficient corporation (non-transparent administrative processes, insufficient organizational clarity, lack of declarations of competence), and informal economy (susceptibility to corruption) (Hiller, 2012: 185,186).

Regarding climate change-related issues, research has already found out that there is generally an implementation gap in policy concerning climate change measurements (Pardoe et al., 2020). However, as Pardoe et al. (2020) emphasize, less focus has been applied to how politics including institutional and governmental structures affect the evolution of policies as well as to the role of external influences, which are “a prominent feature of political economy analysis due to the framework provided by international policy processes (including negotiations and the promise of climate financing) on national climate change policy development and the different demands on developed and developing countries” (Pardoe et al., 2020: 3).

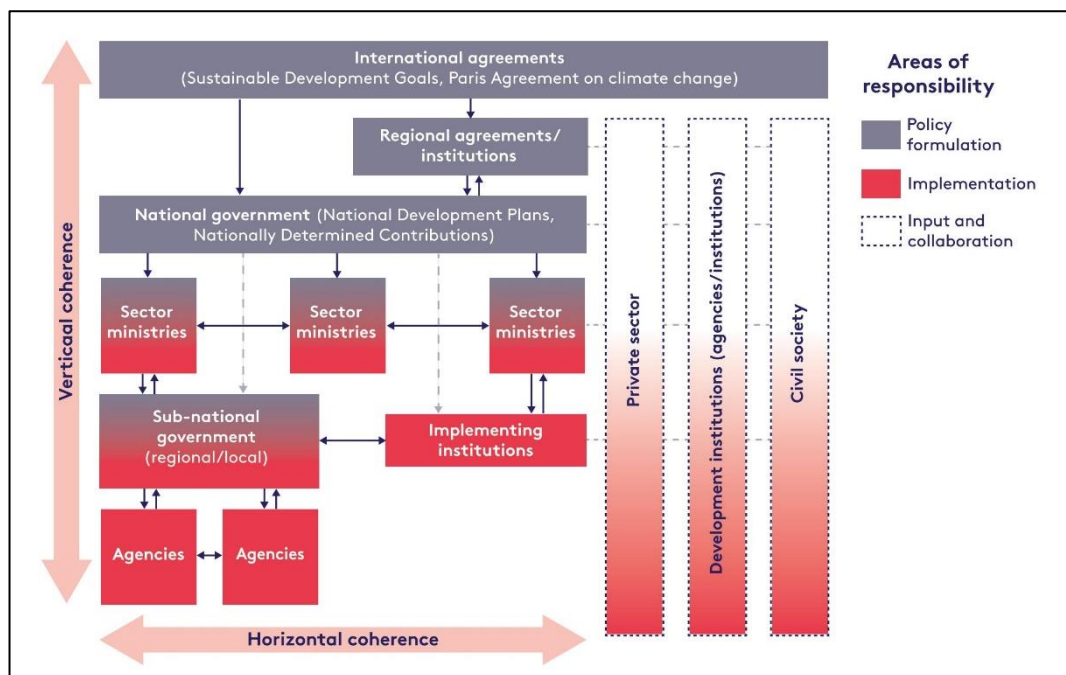


Figure 18: Elements of policy coherence (Curran et al., 2018: Fig. 1).

Thus, in a recent study by Pardoe et al. (2020), it was shown that political leadership and international donors are the key aspects in the evolution of national climate change agendas. In Malawi, a leadership transition at the highest level brings changes to policy priorities; for instance, under former president Arthur Peter Mutharika the adopted Malawi Growth and Development Strategy 2017-2022 puts less consideration on climate change (Pardoe et al., 2020: 9). Furthermore, a certain alignment to short-term benefits (which are supposed to be immediately visible) was observed on the political agenda. As a consequence, agriculture and disaster management are often prioritized over climate change since climate change adaptation is geared toward long-term implementation and the relatively short political election cycles of politicians do not benefit from it. Moreover, changes in political leadership can be problematic as they “are also typically accompanied by cabinet reshuffles, changes in ministry mandates and, frequently, rotation of high-level civil servants that are often political appointees (...) Such institutional rearrangements create grey areas around operational mandates and impede implementation and project management” (Pardoe et al., 2020: 10). Additionally, in the Malawian context, it could be stated that inertia and incrementalism, and bureaucratic, prolonged processes impede respectively slow down the evolution of the national climate change agenda.

International donors often step in when governmental structures fail; on the one hand, they can be a positive force (supporting supplement domestic budgets), on the other hand “such support can divert and stretch staff resources, as donor recipients are required to fulfil reporting requirements and allocate staff as local contact points and facilitators” (Pardoe et al., 2020: 3).

Also problematic is the common tendency of donors to provide technocratic approaches to adaptation, which do not tackle structural causes of risk (Church and Hammill, 2019: 2).

As Curran et al. (2018) outline, policy development in Southern Africa is highly influenced by the external financial and technical support by multilateral institutions, which in turn affects the coherence of national and sector level policies. → **Fig. 18.** “These external actors are usually tasked with supporting the development of a particular policy at a particular time, in line with the requirements of wider international agreements” (Curran et al., 2018: 6). However, some barriers can hinder vertical and horizontal coherence, for instance, due to time pressures for delivery against the background of international and domestic agreements. This would diminish the effort of taking on a holistic perspective and way to act. Although many sub-Saharan African countries have been established cross-sectoral platforms, as Curran et al. (2018) point out, there is a clear lack of coordination including regular meetings, but also the strong

reliance on donor funding and hence, the lack of control capacity blocks effective coordination and cooperation. Besides, turnovers of representatives and thus a loss of institutional knowledge (among others, in sectoral ministries) complicates a buy-in and the effective functioning of these platforms (Curran et al., 2018: 7).

Therefore, the authors recommend donors to “recognise and place policy coherence as a key element of support programmes, including for the development of NDC updates” (Curran et al., 2018: 7) by enhancing local-level participation and national political ownership in programs implementation, by the provision of resources, and by engaging and supporting multistakeholder as well as Sector-Wide-Approaches (SWAps).

As the OECD (2009) reports in its policy guidance, aid delivery has shifted from project interventions to more programmatic forms in the past decade: “In line with the objectives and principles of the Paris Declaration, the role of donors will mainly be to provide support to partner countries’ own priorities and national processes and through partners’ own systems” (OECD, 2009: 84). Where budgetary support has been used by multilateral agencies in the early 2000s, nowadays this approach is also being adopted by bilateral donors and programmes in order to foster adaptation to climate change (OECD, 2009).

Yet, a strong reliance on external (foreign) donors goes along with a high dependency and therefore, could undermine autonomy and agency to act among staff in the ministries despite possible existing technical capacity, as Pardoe et al. (2020) and England et al. (2018a) underline. Donor-determined development projects and programmes can, in some cases, be selective and could, depending on the respective project, even bring a focus shift apart from governmental priorities or, due to different donor preferences, lead to uncoordinated planning, design and implementation. In turn, gaps could arise between the national and regional levels, “resulting in duplication of efforts and a waste of resources” (Makinde et al., 2018: 3), and hence, avoidable increased cost. Providing autonomy and optional budget to government staff for effective implementation of adaptation strategies should therefore be an important future alignment for donors in international development (Mataya et al., 2020).

Similarly, Kalt (2020: 65) points out the dependency and the obligation to adapt to the donor’s requirement that comes along when implementing donor-driven projects. However, donors must also be seen as a big asset as they also provide knowledge, financial support and tackle climate change by pushing forward projects. Regarding Namibia, donors, “especially their financial support, must be subject to more stringent conditions in order to achieve genuine long-term improvements” (Kalt, 2020: 65).

Explicitly mapping out the challenges for sustainable development, and the role of international cooperation when it comes to climate change adaptation in Southern Africa has been undertaken by (Rompel, forthcoming). In the paper forthcoming, the author points out that due to grievances and hurdles occurring within the entire climate change adaptation processes, such as lack of climate-relevant planning and sufficient mainstreaming of climate change adaptation in government policies, programs and investments, as well as rather low adaptation capacities and high vulnerability to climate change impacts, international cooperation takes on an important role in policy advice, change management, and capacity support (Rompel, forthcoming: 1–4). Using the example of GIZ, Rompel (forthcoming) lines out which focuses some projects have in this bilateral cooperation, and how these are agreed and implemented. In the case of GIZ, the focus predominantly lies on capacity development, and the cooperation is usually aligned technically. This technical advice/cooperation only entails **support for the project implementation** and not the implementation by the agency itself. (Rompel, forthcoming: 12). Noteworthy is also the areas on which GIZ intervenes: Due to a “multi-layer”-approach different levels (macro-, meso-, micro-level) are being addressed simultaneously (Rompel, forthcoming: 12). Specifically, these different levels are accessed, for example, through the support of governments (when implementing coherent strategies, policies, and programs); by supporting to build resilience amongst players in the agricultural sector and the food industry; by mobilizing private sector players to develop climate risk insurance; or

through the support of building regional platforms for knowledge exchange and strengthening regional value-chains. (Rompel, forthcoming: 11–19).

Particularly in Namibia, bilateral donors have lately been increasingly mainstreaming climate change into their projects and activities (Remmert, 2020: 10). Nevertheless, as Remmert emphasizes, there is a need “to refrain from ad-hoc policy responses or such measures that are overly dependent on international donors, without having a demonstrable understanding of the complexities involved, and which lack buy-in from local communities” (Remmert, 2020: 21,22).

Hegga and Siyambango (2015) described the findings of a workshop that happened in Windhoek, Namibia identifying and measuring stakeholder influences and important actors in the CCA agenda. From a national government stakeholder’s perspective, local communities were considered as passive receivers of decisions and as having the least influence, whereas national ministries were perceived as being the most influential actors followed by multi-lateral organizations (UNDP, GIZ etc.). Despite other stakeholders (NGOs and researchers) put a different order of influence, all stakeholders agreed that the national ministries hold the most influence, showing a top-down approach in terms of implementing the CCA agenda, whereby local communities were located in the periphery (Hegga and Siyambango, 2015: 31).

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*“Many projects are driven by donor funding (...) which are results oriented and time limited in most cases. Often the local NGOs and CBOs are challenged to continue with the implemented activities when the donors pull out. Thus, the sustainability of donor funded projects is questionable”*  
(David et al., 2013: 228).

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To summarize, the above-mentioned findings illustrate some still existing research gaps: Firstly, a more transdisciplinary approach would help include many more actors, stakeholders, and issues occurring within the complexity of climate change discourses which, in turn, provides more space for multiple and innovative initial stages for solution. Secondly, linking research from different levels (local, national and regional levels) can identify potentially still hidden power hierarchies and offer a better implementation of the already intended transformations from top-down to bottom-up processes evolving empowerment from the community level. Eventually, this would lead to a more successful implementation in all sectors and to a prolonged (or speaking in SDGs terms “sustainable”) transformative change in terms of climate change adaptation.

## 9. Conclusion

Taking stock of existing research, this literature review has examined that there is particularly one factor on which successful adaptation processes on climate change depend. The factor is mirrored in the literature on Malawi and Namibia, and is illustrated in many sectors (agriculture, water etc.) and levels (regional, national, local) alike, namely *implementation*.

While, particularly in Namibia but also in Malawi, there are a plethora of policies on climate change, and commitment to tackling climate change issues is documented, this commitment is either still not sufficient, or climate change frameworks are not being leveraged efficiently.

Implementation barriers often emerge in sectors in similar ways, despite having multiple, sophisticated or ambitious policies. Reasons for those **implementation difficulties** are various factors, such as severe underinvestment, limited capacity and technical skills, poor coordination among stakeholders, weak regulation and enforcement, bureaucratic efforts, mistrust between public and private institutions and a lack of monitoring. Besides, **other factors** such as risk perception and awareness contribute to **an enormous complexity concerning climate change and which in turn, makes the implementation of climate change adaptation and mitigation measures rather sophisticated**. Many authors stress the need for local engagement within adaptation processes respectively to always consider the local contexts and to tailor adaptation strategies, programs and projects to the respective community, area or group in order to achieve the best effects possible.

The reviewed authors pointed out the great complexity of climate change: beginning with climate change (risk) perceptions, which are **extremely heterogenous** concerning space (rural/urban), worldviews (religions, beliefs), values (social and traditional norms and values), different knowledge forms (traditional, local, scientific) and other socio-economic aspects (age, gender, education, profession), and which must be taken into account on the political level, to further the numerous stakeholders and actors being involved in shaping and implementing measures. Additionally, the involvement of international donors, the linked nexus to SADC as well as the compliance to international climate change frameworks make the adaptation processes not necessarily easier and further indicate the deeply interwoven societal, social and political dimensions of climate change in Southern Africa.

**And, although research with a focus in social, societal and political aspects in the climate change discourse has been growing particularly within the last three years, there is still the importance to deepen these findings as well as new arisen questions and problems. This includes:**

- The inclusion of more transdisciplinarity in climate change adaptation processes in order to provide a broader range of solution approaches for the implementation of climate change policies and strategies
- The consideration of all levels (regional, national and local) and different factors (political, societal, economic, ...), and how they are interwoven with each other and what implication this entails for climate change adaptation processes
- Further research with focus on the Global South since, in relation to the Global North, the Global South is regarded less (in terms of quantity and scope of research). If research in the Global South is also being conducted by researchers and institutions from the Global North, it requires a stronger inclusion of **collaborations** with actors from the Global South
- The suggestion that more researchers should engage in this topic, as so far often a few researchers contribute much, but a broad range of researchers is both necessary and reasonable in order to incorporate more scientific views and perspectives

Again, it must be stressed that in this literature review not all studies, articles and reports published could be considered. However, we assume that the review provides a good overview on the mapped issues.

We hope it might be useful for other researchers and for gaining insight into the current state of research, including its gaps.

The review is part of a research project that aims to inform policy advice strategies for climate change adaptation in international cooperation with selected SADC member states (Malawi, Namibia). By applying qualitative methodology, the project will take on the above-mentioned outlined issues to enrich the existing research and search for innovative solutions in the climate change adaptation processes.



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