



# Identifying local capacities and gaps in food security and disaster risk reduction in Nkhotakota and Karonga Districts

**Malawi**

**Field Assessment Report**

February 2021

CISP

## Table of contents

List of acronyms and abbreviation used in the report.....	3
1. Introduction .....	4
2. Methodology.....	5
3. Malawi.....	7
3.1 COVID-19 Impact.....	9
4. Nkhotakota District.....	11
4.1 Farming activities .....	12
4.2 Knowledge and capacity gaps in sustainable agriculture .....	13
4.3 Knowledge and capacity gaps in management of income generating activities.....	14
4.4 Rice production.....	14
4.5 Use and management of the irrigation system .....	15
4.6 Rice marketing .....	16
4.7 Community association’s leadership .....	17
4.8 Management of weather forecast information and disaster alerts .....	17
4.9 Environmental protection.....	19
5. Karonga District.....	21
5.1 Farming activities .....	22
5.2 Knowledge and capacity gaps in sustainable agriculture .....	22
5.3 Knowledge and capacity gaps in management of income generating activities.....	23
5.4 Rice production.....	23
5.5 Use and management of the irrigation system .....	24
5.6 Rice marketing .....	25
5.7 Community association’s leadership .....	26
5.8 Management of weather forecast information and disaster alerts .....	27
5.9 Environmental protection.....	30

## List of acronyms and abbreviation used in the report

ACPC	African Climate Policy Centre
ASWAP	Agriculture Sector Wilde Approach
CISP	Comitato Internazionale per lo Sviluppo dei Popoli
DADO	District Agriculture Development Officer
DCCMS	Department of Climate Change and Meteorological Services
DCPC	District Civil Protection Committee
DoDMA	Department of Disaster Management Affairs
DRR	Disaster Risk Reduction
DWR	Department of Water Resources
EA	Enumeration Areas
ELARD	Earth Link& Advanced Resources Development
EPA	Extension Planning Area
FAO	Food and Agriculture Organization
FBS	Farmer Business School
FEWS NET	Famine Early Warning Systems Network
FGD	Focus Group Discussion
GAM	Global Acute Malnutrition
GDP	Gross Domestic Product
GoM	Government of Malawi
GBI	Green Belt Initiative
HDI	Human Development Index
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
MASDAP	Malawi Spatial Data Portal
MGDS	Malawi Growth and Development Strategy
MPRSP	Malawi Poverty Reduction Strategy Paper
MVAC	Malawi Vulnerability Assessment Committee
NASFAM	National Smallholder Farmers' Association of Malawi
OVOP	One Village One Product
PICSA	Participatory Integrated Climate Services for Agriculture
SCTP	Malawi Social Cash Transfer Program
SDGs	Sustainable Development Goals
SFFRFM	Smallholder Farmers Fertilizer Revolving Fund of Malawi
SRI	System of Rice Intensification
TA	Traditional Authorities
UNDP	United Nations Development Programme
VAC	Vulnerability Assessment Committees
VCPC	Village Civil Protection Committee
VDC	Village Development Committee
VFMCS	Village Forests Management Committees
VNR	Voluntary National Review
VSLA	Village Savings and Loans Association
WUA	Water User Association

## 1. Introduction

CISP works in Malawi since 2000, and in particular in Karonga district since 2012 and in Nkhosakota district since 2016. In these two districts, CISP has been implementing agriculture projects with a specific focus on the development of the rice value chain. During the past 9 and 5 years in Karonga and Nkhosakota districts, respectively, CISP has been conducting several consultations and baseline studies with the target community groups, authorities and key stakeholders to identify local capacities, gaps and challenges. This assessment was conducted to deepen the knowledge and understanding of the problems and desires of the communities and government authorities in the two districts. A sample group of different community groups and key stakeholders was interviewed to identify: a) the problems that the target communities have been facing in the recent years in practicing agriculture and how these are related to the changing climate conditions and the lack of informed decisions; b) the current technical knowledge and capacities, the beliefs and practices related to agriculture, agribusiness management and disaster risk reduction of the communities in the target districts; c) the capacity gaps and challenges the target groups feel they are facing to improve their agricultural choices and productivity and enhance profits from their agribusiness activities. This assessment was conducted by CISP staff in Malawi and finalized by the research team at CISP HQs. The outcomes of the assessment are meant to inform the development of a new project proposal led by a consortium of partners CISP (main applicant), Save the Children Italy and CBM Italy, and other technical and implementing partners Scuola Superiore Sant'Anna, TriM, DZUKA and The Rice Development Trust.

## 2. Methodology

The Field Assessment was carried out from the 16<sup>th</sup> to 19<sup>th</sup> of February 2021, in the communities of Wowve and Lufyila in Karonga District, and in the communities of Chilingali and Mtalanje in Nkhotakota District, giving priority to the irrigation schemes area. In order to ensure a detailed identification of capacities and needs in the target locations, the assessment was conducted in 3 localities which have benefited from previous or ongoing CISP interventions -Chilingali, Lufyila and Wowve- and 1 locality that has not benefited from previous actions by CISP or other partners – Sasani. CISP organized 6 tools for data collection (one for each group interviewed) by aggregating suggestions, questions and requests from all the partners of the action under development, in order to achieve a coordinated and joint assessment. Focus Group Discussions were conducted in the selected locations by 5 members of CISP staff and an external officer, chosen to ensure greater impartiality in data collection and subsequent analysis. Staff were trained before the visits in the field. The training was conducted in CISP office in Nkhotakota, and staff from the Karonga office participated online.

The Assessment therefore involved:

- Target communities, with the implementation of 4 FDGs, one for each locality, involving a total of 38 members of the target communities (61% women). Topics of discussion included: a.) Weather forecasts and disaster alert systems, aiming at understanding whether community members obtain and how they use information and guidance on weather conditions, weather forecasts, disaster alert systems; b.) Knowledge, skills, level of use, issues and gaps regarding Climate Smart Agriculture techniques; c.) Knowledge and issues in income activities and gaps in business management; d.) Perception of climate change and actions taken by communities in protection of the environment.
- Rice producers' cooperatives (Rice cooperatives Chilingali, Nkaika, Wowve, Lufyila), with the implementation of 4 FDGs, one for each locality, involving a total of 33 participants (24% women). Topics of discussion included: a.) Gaps in leadership and management of cooperatives, with the objective of identifying the current and potential role of women within management and decision-making bodies; b.) Knowledge and issues in marketing and sales of rice by cooperatives; c.) Perception of climate change and coordinated actions taken in protection of the environment.
- Water Users Association (WUA Chilingali, Lifuliza,Wowve, Lufyila), with the implementation of 4 FDGs, one for each locality, involving a total of 34 participants (18% women). Topics of discussion included: a.) Gaps in WUA leadership and management, with the objective of identifying the current and potential role of women within management and decision-making bodies; b.) Procedures for irrigation schemes; c.) Challenges and issues in managing irrigation systems; d.) Knowledge, skills and gaps in rice farming techniques; e.) Perception of climate change and actions taken by WUAs in protection of the environment.
- Department of Disaster Management Affairs (DoDMA), in both Nkhotakota and Karonga districts. District level officials were interviewed, in order to examine and assess: a.) Role, activities and main responsibilities of DoDMA at the district level; b.) Problems and potentials of the platforms and databases used; c.) Problems and gaps in the mechanism of meteorological and climate data collection and of dissemination of information channels to target communities; d.) Knowledge and skills of district staff; e.) Specific roles, functioning, issues and needs of Disaster Risk Reduction committees at the local level (Vulnerability Assessment Committees - VAC, District Civil Protection Committee - DCPC, African Climate

Policy Centre - ACPC, Village Development Committee - VDC, Village Civil Protection Committee - VCPC).

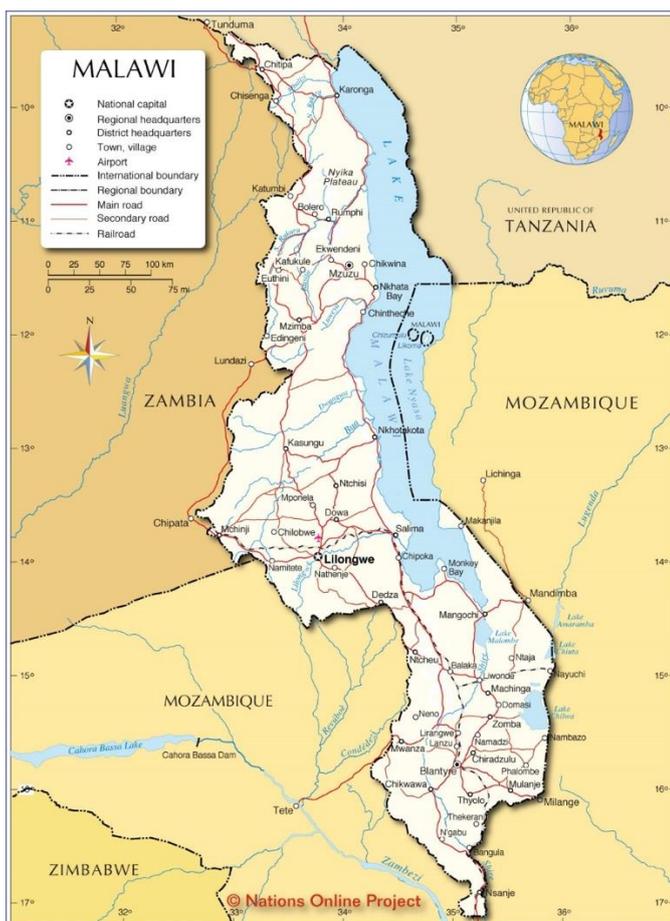
- Ministry of Agriculture at district level. Meetings were held with officials of the Extension Department and Crops Department of the Agriculture Development Office of the districts of Nkhotakota and Karonga, aiming at assessing: a.) The level of implementation, positive aspects and issued of the government's M-CLIMES program funded by UNDP; b.) The functioning and problems of the District Climate Information Center; c.) The perception of government officials regarding the effective use by communities of the weather and climate data collected; d.) Potential and issues of the PICSA (Participatory Integrated Climate Services for Agriculture) approach adopted by the Government of Malawi and implemented through NASFAM (National Smallholder Farmers' Association) in the target areas.
- The Lifuwu Agricultural Research Station, in the Salima district, which is a national rice research center that develops and produces local seed varieties with which CISP has actively collaborated. The meeting aimed to gather detailed information on the current activities of the center and on the two types of Seed Bank (Rice Breeding Section Seed Bank and Farm Seed Bank) as well as on the possibilities of improving the marketing strategy for the seed varieties produced.

Further consultations with authorities at national and local levels, stakeholders and partners took place during the preparation of this proposal between January and February 2021. In particular:

- Department of Climate Change and Meteorological Services (DCCMS) and Department of Water Resources (DWR). The meeting was held online and was attended by the Project Coordination Unit of the M-CLIMES project (funded by UNPD). It was a useful chance of confrontation to highlight potentials and gaps of the current DRR projects in the target areas, to strengthen interdependence and to avoid overlaps and duplication of actions. The competent authorities showed interest in this project proposal, specifically indicating the areas and subjects that most need support and complementary actions.
- Meetings were held with other private actors in the rice value chain, in particular the farmers involved in rice seed multiplication and those who participated between 2018 and 2020 in the CISP program for certified seed multiplication. In this case, the Assessment aimed to highlight the main issues, potentials and possibilities for replication of the certified seed multiplication experience.

### 3. Malawi

Malawi is a landlocked country in south-eastern Africa. From the administrative point of view, the geographical hierarchy of Malawi is divided into four regions (Northern, Central, Eastern and Southern Region), which are in turn made up of districts, administratively organized as Traditional Authorities (TA and Sub-TA) in rural areas, and as Enumeration Areas in urban areas (EA). Covering 118,484 km<sup>2</sup>, it is inhabited by a population of 18.6 million inhabitants (2019), set to double by 2038 (United Nations Department of Economic and Social Affairs 2019<sup>i</sup>), according to estimates reported by the World Bank. Among the absolute poorest countries in the world, with a per capita purchasing power of \$1,100 per year (2019) and a life expectancy of 64 years, Malawi is a mainly agricultural country: 83% of the population is engaged in agriculture (WB 2019<sup>ii</sup>). Despite having a considerably growing GDP (4.369% in 2019, WB), in 2020 Malawi had a Human Development Index (HDI) of 0.483 making the country rank 174 compared to 189 countries surveyed and confirming Malawi in the category of low human development countries (despite a slight but steady increase in this value so as to reach 45% increase) (UNDP 2020<sup>iii</sup>). Malawian economy is mainly based on the agricultural sector which contributes one third to the Country's GDP. The main products for domestic consumption are potatoes, cassava, maize, rice and sorghum, while tobacco, tea and sugar contribute to exports. For this reason, Malawi's economy is vulnerable both to price shocks on the markets and to the variability of climatic conditions (drought, floods) influenced by climate change.



The intent of the Malawian government commitment in the adoption of development strategies with respect to the Poverty Reduction Strategy Paper (MPRSP) and the subsequent Malawi Growth and Development Strategy (MGDS) I and II followed by the Malawi Growth and Development

Strategy III (MGDS III) covering the period 2017-2022, was to improve productivity, to transform the Country into a competitive nation and to develop resilience to shocks and risks in line with the Africa Union Agenda 2063. In the recent Voluntary National Review (VNR) Report for Sustainable Development Goals (SDGs) (GoM, 2020<sup>iv</sup>), relating to the last 5 years of commitment to achieving the SDGs, it is highlighted how, despite the efforts made, progress on SDG 2 Zero Hunger is still moderate, although significant progress has been made in reducing and reversing trends on the indicators of child malnutrition (Stunting, Underweight, and Wasting). According to FEWS NET's MALAWI Food Security Outlook October 2020 to May 2021, even in the absence of recent nutrition surveys, the prevalence of acute malnutrition among children under five is likely to remain low (FEWS Net, 2020<sup>v</sup>). According to the most recent SMART nutrition survey conducted in November-December 2020, the prevalence of Global Acute Malnutrition (GAM) nationwide was 1.9%, higher than the 0.5% (the lowest figure recorded in recent years) and 1.3% obtained in the 2019 and 2018 rounds respectively. Cases, however, remain largely low as prevalence of Severe Acute Malnutrition (SAM) was 0.1%, as was in the last lean season assessment, (which would fall within “acceptable” levels-IPC Phase 1- (GAM<5%) according to the IPC Integrated Food Security Phase Classification<sup>vi</sup>). Provision of humanitarian aid during the 2019/2020 consumption season and above-average 2020 harvests, as well as sustained access to food and income should help sustain similarly low levels of acute malnutrition. After above-average 2020 harvests, most rural households across Malawi were still consuming food from their own production in fall 2020, seeing widespread minimal (CPI Phase 1) crisis levels. However, in areas that experienced below-average production, some poor households were running out of self-produced food, becoming dependent on market purchases. In these areas, access to income is likely insufficient to meet all essential non-food needs, given increased competition for available income opportunities, with stressed food security outcomes (IPC Phase 2) in the most affected southern areas. Even with respect to SGD 1 including its targets, Eradicating Poverty and all its forms, Malawi appears to be behind long-term progress. The percentage of the population below the international poverty line of \$1.90 per day is estimated at 71.4% in 2016. More recent data indicates that more than half of the population (51.5%) lives below the national poverty line (NSO, IHS4 2017) (FEWS Net, 2020). However, the extreme poverty rate has fallen rapidly from 24.5% in 2010 to 16% in 2017. Malawi has developed and is currently implementing the National Social Support Program II (2018-2023) through the Malawi Social Cash Transfer Program (SCTP) (Malawi's unconditional social cash transfer program), which targets the poorest 10% of households that are ultra-poor and at the same time work bound. The support from key actors and organizations to lead economic sectors, such as agriculture and natural resource management is a priority. Resource management regarding the urgent need to act in response to climate change (SDG 13: Take urgent action to combat climate change and its impacts) and in protection of forests and biodiversity (SDG 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss), see Malawi engaged in the management of Disaster Risk Reduction's strategies. In areas of adaptation or mitigation to climate change is indeed necessary to intervene in terms of capacity building, focusing on risk assessment, prioritization of projects and monitoring and evaluation, which reduce the critical issues faced at the local government level.

The Central and Southern Districts have particularly suffered the consequences of repeated floods followed by periods of prolonged drought, which have led to a contraction of the already low agricultural production. Climate change is attributable to the phenomenon known as *El Niño*. One of the consequences of the prolonged drought is the lowering of water levels, which has led to a drastic reduction in access to water, essential for land irrigation and food production (FEWS Net, 2017.<sup>vii</sup>) The main food, maize, has witnessed a decline in production of 30% per year. About 2.8 million people, 17% of the population, were unable to meet their food needs in 2015-2016 (WB, 2016<sup>viii</sup>). The results

of the Food Security Assessment conducted in May 2016 by the Ministry of Finance, Economy and Development, through the Malawi Vulnerability Assessment Committee (MVAC), showed even more worrying figures (OCHA, 2016<sup>ix</sup>). The Committee estimated that 6.5 million people, 39% of the country's population, would be unable to meet their basic food needs by 2017. In particular, the most vulnerable sections of the population - women, children, the elderly and the disabled - were at risk of malnutrition and undernourishment. Approximately 130,000 children under age 5 were suffering from severe acute malnutrition and another 350,000 were suffering from moderate acute malnutrition. The Government of Malawi (GoM) declared a state of emergency in April 2016, but the measures taken were insufficient to address the crisis and food insecurity the Country was facing.

It is necessary to adopt a strategy that links emergency intervention to a logic of long-term development, with a view to reducing vulnerability and strengthening the resilience of local populations to increasingly frequent and devastating environmental disasters.

As far as irrigation systems is concerned, the unreliability of rainfall in Malawi, combined with climate upheaval, makes it increasingly necessary to shift from rain-fed agriculture to agriculture with supplementary irrigation. To ensure that people's basic food needs are met, it is necessary to invest in small and medium irrigation schemes, sustainable water management during flood and drought periods, and sustainable management of all environmental resources.

Through sustainable field irrigation, it is estimated that production can be doubled, achieving two harvests per hectare per year. It has been estimated that farmers who use irrigation systems are more self-sufficient in terms of food security and access to food and economic conditions than farmers who rely solely on rainwater. A specific analysis of the Malawi context, showing that the average size of cultivated plots is between 0.5 and 1 hectare, underlines that irrigation generally contributes from 25 to 80% of total household income and is therefore a key element for self-sufficiency, food security and poverty reduction.

Rice provides food and income for many families in Malawi. It is an important food crop, second to maize, and is consumed mainly in urban areas. In rural communities, rice consumption is significant along the shores of Lake Malawi in Karonga, Nkhata-bay, Nkhotakota and Salima, in the Bwanje Valley in Ntcheu, along Lake Chilwa in Zomba, Phalombe, and Machinga districts. It is also an important food and commercial crop on the eastern shore of the Lower Shire Valley, Chikwawa district. Moreover, rice is grown as a cash crop to meet other household demands. The crop is grown by smallholder farmers through irrigation in rice schemes and in wetlands during the rainy season. Most of these farmers have an average landholding size of 0.5 hectares (FAO, 2018<sup>x</sup>).

According to the Ministry of Agriculture and Food Security's 2012 crop guide, rice productivity in Malawi has been declining since 1975, conversely, population is growing. Although the production area increased, rice yields decreased. Therefore, production is not sufficient to meet the market and the growth of national demand. During periods of low rice season, Malawi depends on rice imports to meet the shortage.

### 3.1 COVID-19 Impact

Following the declaration of a state of emergency back in March 2020, the impact of the Sars-Cov2 pandemic has been significant not only in terms of number of cases of COVID-19, but especially in terms of the dramatic effects of the precautionary measures in the life of its citizens, which were taken by the Government of Malawi in 2020 and reinforced at the beginning of 2021. These include closure of airports, schools, internal movements and economic activities (FEWS Net, 2021<sup>xi</sup>).

While the number of official cases of COVID-19 were limited in 2020, since mid-December 2020, the number of new cases per day has increased rapidly, with a weekly average which reached

994 new cases per day on January 25<sup>th</sup>, 2021. On December 11<sup>th</sup>, Malawi had recorded 6,055 of total COVID-19 cases, with only 31 active cases and 186 deaths. By January 25<sup>th</sup>, the number of cumulative cases had more than tripled to 19,987, with 11,976 active cases and 518 deaths. In response, the government introduced a series of control measures in December and January that are expected to remain in place in the short term (1 to 3 months). Since January 22<sup>nd</sup>, these have again included land border closures, restrictions on commercial activities, school closures, office hours reduced to essential services only, limited working hours for markets and entertainment activities, and public gatherings limited to 50 people. Unlike the mid-2020s restrictions, these were strictly enforced. Malawi's economy had not fully recovered from the first wave of COVID-19 in mid-2020, and the renewed and stricter control measures are constraining economic activity and income at a time when income opportunities are already at seasonally lower levels (FEWS Net, 2021, b.<sup>xii</sup>).

On February 12<sup>th</sup>, 2021, the Malawi Data Portal reported that there were 24,365 confirmed cases distributed 54% in the South, 32.9% in the Center, and 13.1% in the North. According to the Malawi Ministry of Health updates on March 1<sup>st</sup>, 2021, there are 32008 total cases, with a positivity index of 7.7%.

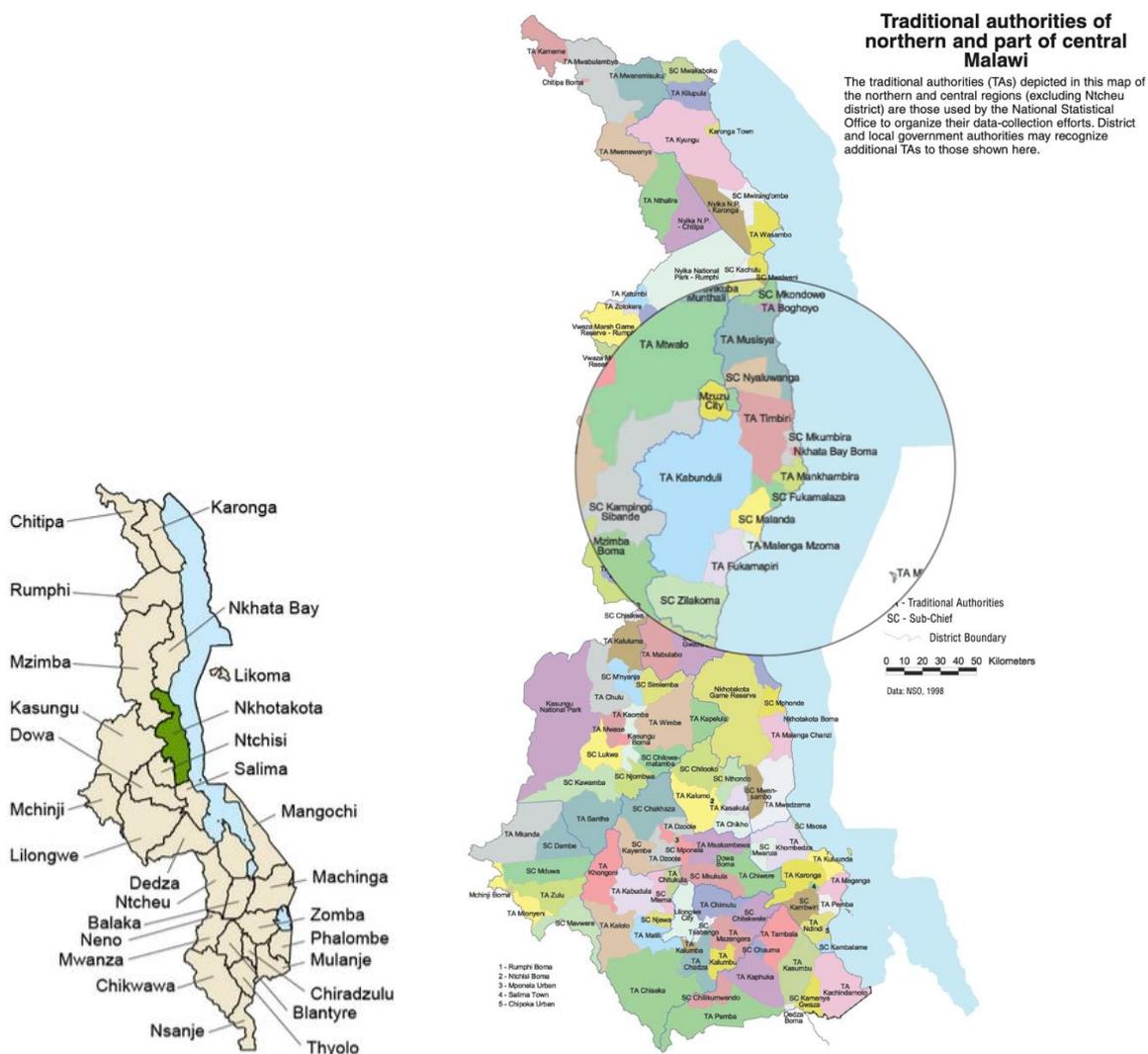
Preventive measures to reduce the spread of the virus, such as the interdiction of regular meetings, caused a decreasing impact on the performance of VSLA groups.

From 26 May to 5 June 2020, a survey was conducted in Karonga and Nkhotakota districts to investigate and measure the effects of the pandemic on the activities of VSLA groups. The survey involved 20 VSLA groups (12 in Karonga and 8 in Nkhotakota district) with the aim of obtaining comparative information on the activities of VSLA groups before and during the pandemic, through the collection of both qualitative and quantitative data, reported below:

Regarding meeting frequency and participation, both decreased: in Karonga, on average 58% of VSLA groups reduced their meeting frequency and member participation decreased; in Nkhotakota only one in 8 of the groups surveyed continued to meet regularly. 7 groups reduced their meetings by 50%. In addition, attendance at VSLA meetings decreased by an average of 15% from the usual 60% and meetings, although in their usual locations, were held outside the building, in line with the recommendations of physical spacing and good ventilation.

In terms of savings, as the months of March and April 2020 were characterised by heavy rains and the prevalence of hunger in many households, VSLA groups faced a general decrease in savings in both districts. In Nkhotakota, the percentage of VSLA groups able to save decreased from 87.5% in March (7 groups) to 75% in April (6 groups). The amount of savings decreased for every group with the exception of the VSLA group in Mgwero and the suspension of VSLA activities was reported as another cause of this decrease. Similarly, the loan mechanism was changed in terms of access to loans limited to their own savings and in turn and the use of loans was mainly dedicated to labour costs (harvesting, transportation, drying of rice) and purchase of food for their families. Nevertheless, VSLA groups have proven to be a reliable, accessible and readily available source of loan-money, and to indirectly increase the socio-economic well-being of the beneficiaries.

## 4. Nkhotakota District



Malawi Data Portal, <https://malawi.opendataforafrica.org/>

Todd Benson "Malawi: An Atlas of Social Statistics", 2002

Nkhotakota District is in the Central Region of Malawi. The district has a population of 393,077 people (Malawi National Statistical Office, 2018<sup>xiii</sup>). According to the 2018 census, the rate of population with disabilities represents 2.3% at the national level and 5.6% at the regional level, representing 4,634 people (2,125 men and 2,509 women) out of a regional total of 82,134. The district has an area of 4,259 km<sup>2</sup> and a population density of 91 people per km<sup>2</sup>. The cultivable area is estimated at 237,200 hectares. Of this, less than half is actually cultivated for an essentially subsistence agriculture.

Between the end of the 1960s and the mid-1980s, the Government of Malawi built 16 small and medium irrigation systems on public land, using water from the rivers through a gravitational system. The total area irrigated with these systems was 3,200 hectares, occupied by farmers and small landowners from surrounding areas (each on a plot of land between 0.1 and 0.3 hectares). The irrigation schemes were built without the participation of the farmers who used them, and without involving local people in their design, implementation and maintenance. As a result, the Government

failed to exploit the full potential of the intervention. Indeed, the irrigation systems are currently in very poor condition, and the peasants have remained dependent upon government, without developing management skills and resilience to adverse weather conditions. The government would currently like to hand the management of irrigation schemes to farmers' organizations, but it is first necessary to rehabilitate these systems and to train farmers.

In the 1950s, the GoM built the Chilingali Lake Dam, which spills into a series of small lakes within the District. During the 1970s, the Kaombe-Thiwi irrigation system was constructed about 800m downstream of the Chilingali Dam, which has an estimated capacity of about 3,800,000 m<sup>3</sup> at full capacity. The irrigation scheme was designed to irrigate about 470 ha, located to the right of the Thiwi River and to the left of the Kaombe River. In 1975, the scheme was damaged due to the great floods that hit most parts of Malawi. The Government of Malawi could not rehabilitate the scheme and after a couple of years, members of the surrounding communities occupied the scheme command area. These community members used the command area to grow different crops for their subsistence. It was in 2016 that the Government of Malawi through the Agriculture Sector Wide Approach (ASWAP 2) and the Green Belt Initiative (GBI) component 2: Development of medium scale irrigation and expansion of existing or creation of new out-grower schemes in the sugar sector in Malawi project, that contracted CISP to rehabilitate the scheme. In 2019, CISP through the project "Enhancing food security through small-scale irrigation in Malawi: The Case of Chilingali Irrigation Scheme" rehabilitated the scheme by constructing a spill way at Chilingali Dam, the secondary, tertiary and distribution boxes. Through the project, CISP also constructed staff houses, warehouses, offices and the laboratory. As soon as the project phased out, community members from the surrounding areas, especially those that did not secure plots within the scheme, started vandalizing its infrastructure, in particular the distribution boxes and the main pipe. Afterwards, the WUA has started to rehabilitate the damaged distribution boxes. At the present time, the farmers are producing rice, maize and cassava for subsistence through rain-fed agriculture and the surplus production is sold in small local markets or to intermediaries nearby the fields. However, availability of water is not in itself sufficient to improve agricultural productivity. The low productivity of subsistence agriculture is especially related to the following factors: lack of adequate infrastructure, particularly water infrastructure; high costs of inputs, such as seeds and fertilizers; high transportation costs, related to low production; lack of coordination at the community level; use of backward agricultural practices and tools; difficulty in treating soils (risk of erosion, infertility); poor crop management skills; poor management and economic capacity; difficulty in accessing credit.

#### 4.1 Farming activities

According to the communities of Malengasanga and Sasani, during the rainy season from November to April in Malengachanzi TA, farmers grow maize, cassava, groundnuts, rice, soya beans, pumpkins and potatoes and, mostly in Sasani, they also grow hot chilli peppers. In dry season, from May to October, they grow rice (short varieties) in some shores of water bodies, maize, potatoes, tomatoes, and vegetables. Maize, rice, cassava, potatoes and pumpkins are mainly for consumption, even though they are sold at times. On the other hand, tobacco, hot chilli are solely cash crops. The market for these crops is locally available within and outside the district of Nkhotakota, while tomatoes and vegetables are sold within the community. Hot chilli is sold to some chilli sauce making companies through agents from within and outside the district. Finally, rice and maize are sold to vendors from within the community and outside the district of Nkhotakota.

Maize seeds and some vegetable seeds are bought from agro-dealers within the district, while for cassava, potatoes, and pumpkins are recycled. In some instances, potatoes vine, cassava truncheons and soya bean together with other seeds have been supplied by institutions. For example, National Smallholder Farmers' Association of Malawi (NASFAM) and Mtalimanja Rice Company were used to supply the community with rice seeds on loan and to buy from them the paddy rice after harvest, but then they stopped. In 2020/2021 growing season, farmers bought the Malawi government subsidized farm inputs which included maize seeds. Although the deal included rice seeds for rice growing areas like Nkhotakota, the rice seed was not available at the agro-dealers' shops contracted by the government. As a matter of fact, in the past 2 years no institutions have supplied the two communities with any rice seeds. Therefore, the communities use the recycled rice seed.

Pesticides are used in the growing of tomatoes and other vegetables. In the growing of maize, they are used in the garden and during storage. The pesticides are available in most of the agro-dealers in Nkhotakota district. However, in the past 3 years maize was attacked by army worms and pesticide were not available for usage.

#### 4.2 Knowledge and capacity gaps in sustainable agriculture

In the Malengasanga village, conservation agriculture is practiced through different methods such as the use of mulch in the maize field, the conservation of water and soil through box ridges, marker ridges, the planting of vertiva around field, and the practice of crop rotation. Moreover, the *sasakawa* method of growing maize (1 seed per planting station at 30 cm interval between stations) is used to increase productivity. These techniques were learnt from agricultural extension workers in the area and various organizations like Total land care, GIZ in partnership with CISP which formed Farmer business Schools (FBS). In order to endure climate change effects, hybrid crops which are fast growing, and high yielding have been planting. Conservation agriculture technics are used especially by those farmers who lack inputs like fertilizers. Communities make manure for their gardens, even though there is still a high reliance on inorganic fertilizer for their crops of maize and rice. Over the time, these techniques have proven to be beneficial because the communities have experienced an increase in productivity despite climate change. However, the full adoption is still a challenge. Indeed, communities claimed that the collection of enough material for mulching a considerable size of garden is challenging, thus leading them to abandon it. Moreover, other conservation agriculture techniques as pit planting and non-soil disturbance methods, are not usefully applied.

In the Sasani Village, one of the villages in TA Malengachanzi, community members claimed that they did not practice any conservation agriculture because they are not aware of it. Notwithstanding, external observers declared that the community has started using *sasakawa* in growing maize. With the assistance of CISP, they have also been practicing System of Rice Intensification (SRI) method of growing rice since the 2020/2021 growing season. They have learned the use of herbicide for removing weeds in the garden, the mechanization in the rice farming, cono weeders and the use of certified rice seed of Kilombero. Moreover, they were particularly interested in many other techniques of conservation climate agriculture such as pit planting and manure making.

In the growing of rice, both Chilingali and Lifuliza WUA do not use pesticides but they apply fertilizer. Nevertheless, both inorganic fertilizer and manure are used in growing of maize. The inorganic fertilizer is bought from agro-dealers in the district, i.e. Farmers world, Smallholder Farmers Fertilize revolving Fund (SFFRFM), Bika Investments and ETG exports.

Nkhotakota Agriculture Development office has been implementing the Promotion of Integrated Climate Smart Agriculture (PICSA) interventions throughout the district; Conservation Agriculture with

its three pillars - soil cover, minimum/zero soil disturbance and crop rotation or association; and Climate Resilient crops - drought tolerant crops such as cassava, sweet potato, bananas and early maturing varieties of maize, sweet potatoes, groundnuts etc.

#### 4.3 Knowledge and capacity gaps in management of income generating activities

The main sources of income in the community are cash crops and small business as they are affordable to run and require small start-up capital. Indeed, the strength of farming is the availability and abundance of natural resources. Among these, soils, water and farming spaces represent fundamental assets. It is therefore easy to grow crops and sell them for income at household level. The small businesses do not require advanced skills to run them. However, although they are based on readily available commodities which do not require much capital, they are not always sustainable and may incur to losses.

As a matter of fact, the main challenge of agribusiness and other small businesses is the lack of enough capital and specialized skills. Farming is taken as an income generating activities but the technical skills of growing a particular crop are scarce. The business of farming requires steady funds throughout the growing season for labour during land preparation, weeding, application of inputs, transportation, pesticide control and harvesting. Moreover, small business lacks those technical skills to access markets and grow. From 2018 to 2020, in the Sasani village, some community members were trained in System of Rice Intensification (SRI) and management of Village Savings and Loans Association (VSLA) by CISP. The groups in Sasani continue to be monitored and mentored by CISP. The training resulted to be very useful to the farmers who experienced the practice of doing business. They learned about keeping records and measuring different items in business which helped them in the calculation of profitability of their farming business. However, to better manage the business, the community demanded to acquire more skills in marketing and a better financial source. The community would also like to have easy access to better seeds. Moreover, they hope for enough extension services and mechanization of farming (e.g. hauling tractor in the rice growing business) so as to improve their activities. It should be also recalled that COVID-19 have posed important challenges to the businesses in 2020 owing to mobility restrictions.

#### 4.4 Rice production

Although rice is grown both for selling and consumption, it is mainly exploited for selling. The Lifuliza Water User Association (WUA) produces Kiombero rice once a year (November to March) mainly for sell through the use of the traditional method of cultivating rice where rice seed is broadcasted within the field. However, the rice yield produced through this traditional method of planting is less than they could have with new techniques, such as Systems of Rice Intensification (SRI). The farmers in this area continue to face other challenges in their rice production, including lack and unavailability of certified rice seeds which result in the use of recycled rice seeds. Other challenges include need of funding mechanism for their rice farming, extension services and established rice markets.

In the case of Chilingali irrigation scheme, rice is grown mainly for cash and little is kept for food. It is grown twice in a year and it is widely demanded, thus being an important source of income. Rice is grown in both winter and rainy season. During winter, they grow rice varieties that do not require much water such as senga, and faya. On the other hand, the famous Kirombero rice is grown mainly in rainy season as it requires more water. Some members of the Chilingali Rice producers were trained in Systems of Rice Intensification (SRI) by CISP. However, it should be noted that many farmers

within Chilingali have not adopted the system. Chilingali producers like many other farmers in Malawi are facing a number of challenges in their rice production. Some of the challenges include finance for rice farming, lack of mechanisation and difficulties to access inputs like the certified rice seeds. The scheme still requires to be worked on some part. The third block does not receive enough water. Indeed, the block requires some levelling, reworking on the pipeline and WUA training on the Operation and Maintenance. Most of the field work, such as Land preparation and Tilling is implemented manually. This affects the productivity and quality, thus requiring tractors to increase and ease the production of rice. During the 2019/2020 rainy season, the Chilingali WUA received the rice seeds on loan from Mtalimanja Holdings Limited company. During the 2020/2021, CISP facilitated the purchase of rice seeds for Chilingali WUA growing season from the local certified Kilombero rice seed multipliers. However, according to the farmers, the cost of these certified seeds is still high, leading to the use of recycled rice seeds of Kilombero. The Chilingali WUA members wish to produce the seeds by themselves for Chilingali Cooperative. Lifuliza WUA seemed not to be aware of the local availability from seed multipliers of certified rice seeds. Lifuliza WUA received their Kilombero seed for 4 years from the government and they have been recycling it every year since then. The Lifuliza WUA stated that they preserved some Kilombero rice seeds from the previous harvest every year or bought and shared from relatives and friends.

Overall, the community claimed that procuring rice seeds is challenging owing to the unavailability of certified rice seeds even from agro-dealers. However, even in the case where there are available, rice seeds are expensive, and people cannot afford them. The farming experts stated, however, that farmers lack skills in growing certain rice varieties, in particular, the certified Kilombero rice seeds. It is for this reason that they need new technicality. As a matter of fact, their method of planting rice necessitates a considerable amount of certified rice seeds.

Since 2017/18 agricultural season, during five growing seasons, CISP has trained and supported some farmers to become certified seed multipliers. The group of seed multipliers stated that there are several local varieties being used by farmers. Seed varieties were introduced when Malawi obtained the independence from the colonial power. Farmers choose local varieties because they have high aroma/scent, are resistant to diseases and pests and the seed is cheaper compared to certified seed. Crop seedbank is available in Nkhotakota. The seedbank is meant for certified seed and not local varieties. Local rice varieties seeds are kept in individual farmers' storerooms. Chilingali cooperative society is managing the rice seedbank. During 2019/2020 season 17.0 metric tons of Certified Kilombero seeds were produced and 10.0 metric tons were stored in the seedbank.

Seed multiplication is done in clusters (a group of seed multipliers producing rice seed on one piece of land or within short distances). From transplanting of rice seedlings to harvesting of the product, Seed Inspectors from Lifuwu Research Station visit the gardens 3 times (immediately after transplanting, at vegetative growth and at milking stage of rice seed) to inspect the field practices. The harvested seeds are stored in the seedbank where officers (Seed Inspectors) from Lifuwu Research Station come to collect seed samples for laboratory testing on their viability and purity. Thereafter, they analyse the findings and then certify or reject the seed. After certification, the seed is sold to buyers and some kept for planting during the forthcoming growing season.

#### 4.5 Use and management of the irrigation system

Both Chilingali and Lifuliza irrigation schemes currently use the irrigation scheme during rainy season. In the case of Chilingali, in October 2020 the water level was lower than the intake level and by being the scheme not properly levelled, the distribution boxes were hindered to carry water

through the rice fields. During the dry season, another issue is the land conflict which had led to the destruction of water distribution boxes in the other sections of the command area, especially in block 3. Some farmers have also deliberately blocked the main pipe line in some places in order to divert the water to their farming activities. It should be noted that the new WUA Executive committee has been instituted. However, the challenge remains that not all of the new WUA members has undergone the Operations and Maintenance training and SRI Training. For the Chilingali system to be efficient and sustainable, the distribution boxes must be repositioned, the land conflict have to cease, the irrigation system has to be secured with flood protections, and the land has to be levelled. Moreover, it is imperative to set training for the WUA and the users in the system management.

Concerning the Lifuliza WUA, the irrigation system was meant to draw water from a reservoir which is 8 km away. It should be recalled that the water has never reached the command area ever since laying down the pipes into the system. Indeed, the issue is that the water from the reservoir cannot reach the irrigation command area because the pipes channelling water were not properly set according to gradient from the source. As a matter of fact, the system was not even properly levelled, and the water reservoir dries up during dry season. The project implementers were held responsible for not having consulted the community about the construction. Indeed, the community would have advised them to take water from the closer Lake Malawi (3km). Therefore, they have to depend on rainfall. The Lifuliza WUA lacks expertise since they have never been trained in management and operation skills. Different organizations, including those surveyed such as Land O Lake and IRAD, approached them but none has supported them. They hope to be trained in new techniques of growing rice, facilitation of availability of better rice seeds, repositioning of pipe in order to get water from Lake Malawi, and levelling of the scheme. They hope to be provided with extension services and facilitation of market linkages.

#### 4.6 Rice marketing

Some of the farmers within Chilingali and the surrounding areas have registered Chilingali Producers and Marketing Cooperative. The Cooperative aggregates the rice produced by its members and solicit a market there of. During the 2019/2020 harvest, the cooperative managed to ensure a market with GGEM trading company. The cooperative sold to GGEM over 30 metric tons. Other farmers whose rice was not aggregated sold their rice on their own, mostly through the vendors. Nkaika cooperative has a different approach. It buys the rice from different sources including 100 farmers who are not members of the cooperative. Then, it processes the rice to add value for selling it at retail and in bulks to Maluso Union Cooperative where it has its membership established under One Village One Product (OVOP) program. However, in the recent years, Maluso Union Cooperative has had management and financial issues which hindered the bought of rice from Nkaika cooperative. This situation has forced Nkaika to search for alternatives which have not been found yet. Nkaika cooperative would like to enhance the value of their rice by packing in small size packets of 500g, 1kg and 5kg so that they can more easily access the local and international markets. Their potential buyers are chain stores within Malawi such as Shoprite and Chipiku. However, this intent was halted because they failed to meet the requirements of the Malawi Bureau of Standards certification. Although Nkaika cooperative has milling machine and warehouse for storage, its capacities are minimal to manage bigger supplies. Moreover, its premise is not well fenced as per the Malawi Bureau of Standards requirements and other associated standard processing parameters. The cooperative has also transportation issues that is preventing the formation of local market. To improve the services, Nkaika producers and marketing cooperative need marketing skills, cooperative governance and business management, enhanced mechanization such as acquiring larger capacity milling machine with grading and stone remover components.

Currently, Chilingaali Cooperative relies on GGEM farming and Mtalimanja holdings as potential buyers for their rice. Chilingali Cooperative is still in negotiation phase with the mentioned companies to formalize the agreement. Moreover, it believes it could improve the marketing through various means: the participation in national trading fairs; the connection with a secondary cooperative which operates at national level; the promotion of their products on radios and television media; and the mechanization of rice farming by using tractors for hauling and tilling the rice fields. Moreover, the cooperative wants to add value to its rice by establishing a complete rice milling machine and by creating sizable packages. For the entire process of growing rice, funds are required for preparing land, hailing, planting, weeding, and harvesting which could be obtained through the establishment of revolving fund.

#### 4.7 Community association's leadership

The Field Assessment analysed also the role of women in the management of the irrigation systems and the rice cooperatives. The Chilingali Irrigation Scheme in Malengachanzi TA and Lifuliza Irrigation scheme in Mwansambo TA have each 10 members in their executive committee of WUA. In Chilingali WUA there is 1 woman in the committee who is the Treasurer and there are 4 women in the Lifuliza WUA executive committee whose roles are Treasurer, Vice Secretary, Finance Chairperson and Finance Vice Secretary. Total membership of the Chilingali WUA is 200 and for Lifuliza is 221. The associations were in agreement that having a higher women representation in the WUA would make them to be more effective. However, for Chilingali WUA most women were not willing, and some were even turning down when they were nominated for election. Elections are conducted every 5 years and the office bearer can be re-elected to service a maximum of 2 consecutive terms.

Concerning the rice cooperatives, the Chilingali Producers and Marketing Cooperative has a total membership of 91 farmers. Nkaika has total active membership of 19. In Chilingali the cooperative executive committee has 4 women out of the 9 members. In Nkaika, the executive committee has 2 women out of 9 members. Within these cooperatives, women have assumed decision-making roles by being Vice Secretary and committee members of the executive committee. Besides the executives committee, the Cooperative in Chilingali has subcommittees such as Internal Audit Committee, Procurement Committee, Marketing Committee, Health and Quality Committee, Environment Committee, Finance Committee, and Disciplinary Committee. However, most of these subcommittees are not functional. Both Chilingali cooperative and Nkaika cooperative have low membership of women. However, the increase of women participation is a cooperatives' goal. Women are recognized to be crucial in the making of quality products. The assessment has also shown that most women are still hesitant about taking higher roles. Different positions in the executive committee have varying lengths of terms of service with maximum term being 3 years: there are some terms which expires after 1 year and others after 2 years. Elections are held at the annual general assembly and the re-election is allowed for a maximum of 2 terms.

#### 4.8 Management of weather forecast information and disaster alerts

The Assessment explored if and how community members get climate history, weather forecasts and disaster alerts and how they use this information. It also explored the roles of Department of Disaster Management Affairs (DoDMA) in alerting communities of upcoming disasters and of the Meteorological Department in collecting data and disseminating weather forecasts.

The community of Malengasanga Village experienced both drought and flooding in in the past 3 consecutive years. The amount of rain became severe at the beginning of January and stopped

drastically before the end of the rainy season. In 2019/2020 growing season the people of Sasani Village experienced drought and their rice dried up before maturing. They were also affected by the destruction of crops by elephants which broke the electric wire fence of Nkhotakota game reserve to get into the nearby villages including Sasani. Through the radio, Malengasanga Village received the information about the upcoming drought, but it was not specific. In response, they planted and prepared early their fields when the rains started to reach the limited expected threshold. Specifically, they planted early maturing varieties of maize and cassava, known as drought resistant. There was no specific guidance from the Department of Agriculture or DoDMA on what to do. Nevertheless, the information was very useful as it helped some members of the community to react in advance.

According to the community members, currently the growing of crops is not determined by specific information or advises provided by the Ministry of Agriculture or DoDMA. Through the radio or agriculture extension officers, people may receive weather forecasts related to a particular day or season, but they are at regional or country level. People from Malengasanga Village have never had any specified weather information and forecasts for their area. In 2017 and 2018 the community of Sasani was informed on specific weather updates by WISA Malawi through the local radio, however, they are no longer getting this information. Although the few information they had were functional to act in advance, the community expect to receive specific guidance from some institutions or government departments about how to react to the catastrophes, i.e. where, when or which crops to plant according to the amount of rain and its duration. On several occasions, the information is too general. Indeed, specific information on impending weather on a monthly basis would help the community to adjust and get prepared. Knowing if the rainfall would be stormy, for example, can help farmers find means of reinforcing their structures or houses.

According to the community of Malengasanga and Sasani, in Malengachanzi TA they do not have Vulnerable Assessment Committees at community level nor any other committees that deal with coordination of information about disasters. According to the community, during the several disasters that they have experienced, (such as blowing off of roofs due to cyclone, devastation of crops by pests, flooding and drought) no one responded. According to them, they can only report to their chiefs but even in that cases, nothing was done for their relief. From 2019 to 2021 growing seasons many houses were blown off by the cyclone *Edai* and by the winds of *El Niño* but no institution or government department came to their rescue. People have never received any relief items despite experiencing drought, floods, pests and stormy rainy winds which destroyed their houses. Some relief items like maize were distributed in 2020 by a politician for a party campaign during elections.

In summary, the community wish to be alerted of upcoming natural disasters and be advised on how to get prepared. Similarly, they wish they could receive timely information about localised weather forecasts and expected rain to decide on the type of crops to plant. They claimed that they have wasted time and resources on rice grown which requires a large amount of water, witnessing then the drought before maturing. If only they have had been alerted by specific weather warning, they would have considered planting more resistant crops like cassava.

According to the DoDMA officials, the main activity at district level related to weather /climate is to disseminate the rainfall forecast for the season to the African Climate Policy Centre (ACPC) and Village Development Committee (VDC) once the downscaled district forecast is shared by meteorological services. In addition, the disaster office shares any other related weather reports to Village Civil Protection Committee (VCPC), ACPC and all other sectors in disaster prone area. DoDMA offices receive seasonal rainfall forecast and any other related warning, mostly cyclones. Concerning the rainfall forecast, the meteorological services officials together with DoDMA officials provide the district with the downscaled district rainfall forecast and disseminate the information to the DCPC and agriculture officers. DoDMA uses radio announcements, WhatsApp messages, agriculture area staff and community meetings through engagement of VCPC as common platforms for weather

information dissemination. Floods and cyclones are the most common weather hazards that are shared.

According to a DoDMA district officer, a multi-hazard risk assessments and vulnerability mapping which are essential elements of disaster risk reduction would be instructive. It would identify the spatial distribution of climate-related hazards and geological hazards at different scales, and assess the exposure to and vulnerability of farming systems, and evaluate the overall level of risk.

In order to increase the alerting system's capacity to reach and to better prepare the communities to any upcoming disaster, the officers suggested to strengthen the resources for information and alert dissemination to the communities, i.e. use of megaphone; strengthen those early warning systems accessible to the communities and conduct intensive community meetings and training for people to address disasters.

According to the Agriculture Development officers, there are no District Climate Information Centres instituted in Nkhotakota district. For weather information, the Agriculture Office relies on the Meteorological officer and infrastructure which are at the DADO's office. The setback is that the information gathered at the meteorological station at district level cannot be interpreted and used instantly. It is supposed to be transmitted to the headquarters for aggregation and interpretation and then conveyed on the national platform. It would therefore be very important to have a District Climate Information Centres. These centers can be instituted at schools for rapid dissemination of weather and climate information to the communities and the communities may take action based on the information they receive.

Although the Climate Data dissemination is a long process, the communities use the information. During 2020/2021 agriculture season, meteorological officials from their headquarters (Blantyre) held a meeting in the district with Agriculture Technical staff on the season's weather conditions. Disseminating the meeting's information to the communities that they were serving was mandatory. The communities would have used the information from their extension workers. The advantage of communities using information from technical officers is that such information is already interpreted, considering that unprocessed information which be difficult to use at household or community level.

Their advice is to fill the following gaps: the district should have a well-established office for M - CLIMES Project; the district should have an automated early warning system device in all Extension Planning Areas (EPAs) as this would ease the dissemination of information to communities; capacity building would be relevant to technical staff member for collecting, analysing, and interpreting data; the information should be gathered and interpreted in the district for area specific action.

#### 4.9 Environmental protection

In the past 5 years there have been different environmental changes. The communities have experienced loss of vegetation, change in rainfall pattern, rives drying up faster than before, increased cyclone, increased runoff and erosion and increased pests for maize. These changes have caused different challenges, e.g. women have to walk longer distance to fetch firewood, thus hindering energy sources. In response to the energy challenges, the government has increased electricity grid in some rural areas like Malengachanzi TA. The rice cooperatives have witnessed a worsening of environmental degradation effects caused by deforestation for charcoal making and firewood, drought, and irregular rainfall. The runoff and soil erosion has caused the draining of many rivers. The Lifuliza river in Mwanambo TA changes its course every year due to massive sedimentation load on the riverbed, causing flooding and the consequent destruction of crops. The communities have indeed experienced several stormy winds and rainfall, drought, increased river flooding and draining because of the loss of riverbank protection of trees which were wantonly cut down for firewood. In Malengachanzi TA, the Kaombe river which has more frequently and easily flooded and destroyed the crops in the

Chilingali Irrigation scheme. Different kinds of fish and other species have disappeared in Chia Lagoon and rivers because of an over loading sedimentation.

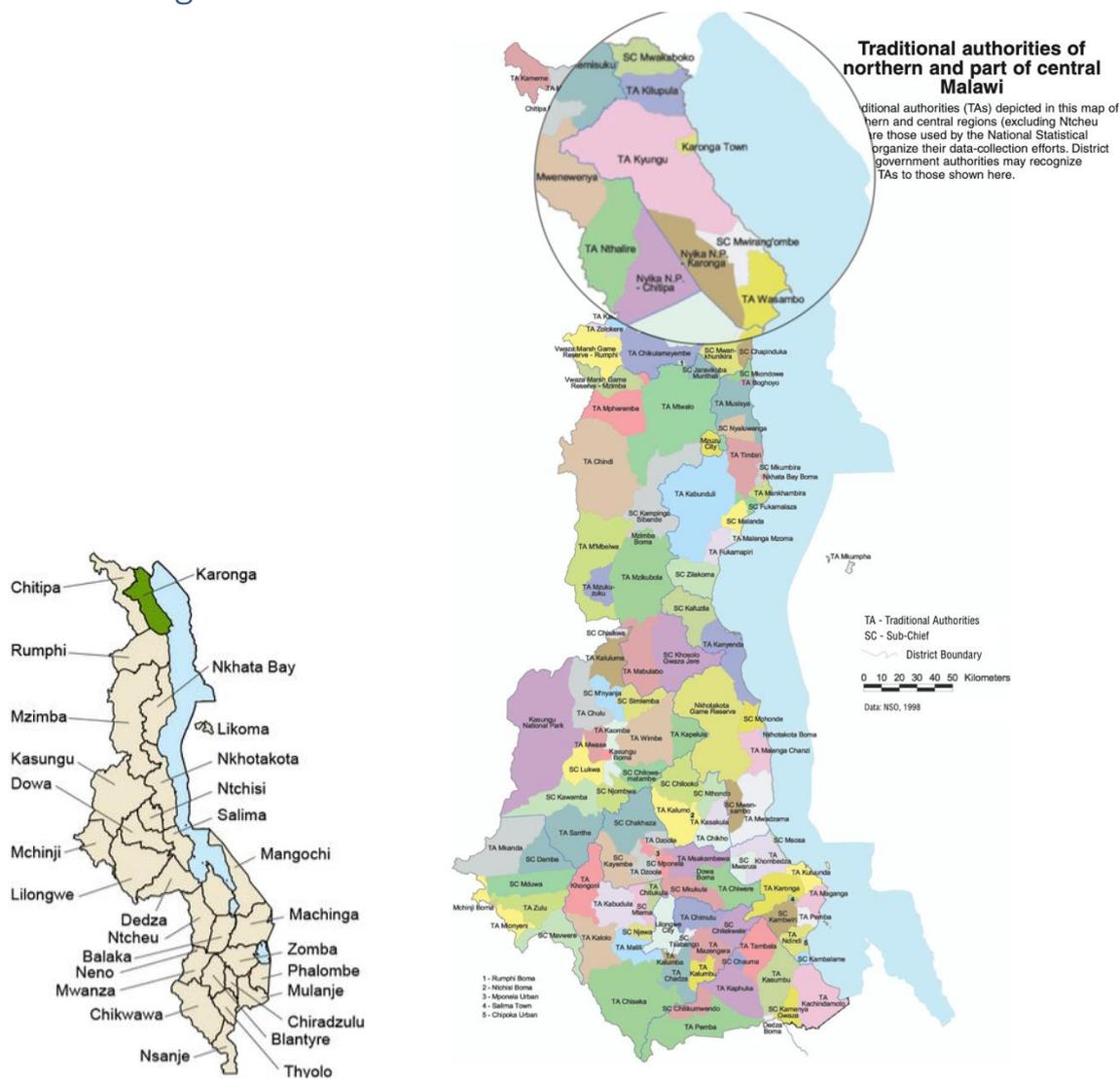
Individually, some people have practiced conservation agriculture and planted indigenous and non-indigenous trees in their homestead and in field boundaries. Some people are practicing crop rotation, while others have changed the method of cultivating cassava from heaping the soil for growing cassava to contour ridges which conserve water and soil. Others have created orchards and woodlots, while some have been engaged in soil and water conservation through planting of vertiva grass surrounding their homes and their maize fields. Finally, some individuals have been involved in the establishment of tree seedling nurseries for business.

As a community, in Malengasanga they have tried to collect water in dam, but it was unsuccessful because of a lack of support. Community members have been involved in planting of trees along Kaombe River with the financial assistance and facilitation from CISP. People have been engaged in the formulation of by-laws for the management of the indigenous forests in Kaombe River and Lake Chilingali buffer zone. Similarly, at Sasani the community are involved in protecting village forests and in planting of trees. The community have been engaged in the afforestation program of the Forestry Department. With the support of the government, the Village Forests Management Committees (VFMCs) has been established in a number of communities. These committees are mandated to oversee the village forests, ensuring that there is no vandalism or natural trees in their localities. In the area of Nkaika Cooperative, the Village Natural Resources Committee is responsible of the village existing forests. The communal activities are mostly coordinated by village headpersons. However, to ensure the sustainable management of the rivers and Chia lagoon, the cultivation of crops in the riverbank and buffer zones must be banned by the government. The river Lifuliza must be protected from the destruction of its riverbank all the way from its source in Ntchisi District. The above-mentioned actions have been motivated by the sensitisation of various organisations and institutions on the effects of environmental degradations, nowadays evident to majority of the communities.

The interviewed community members would endeavour the use of energy efficient stoves like the mud stoves which requires the use of very few sticks of firewood or the Chitetezo mbaula stove which is promoted on the radio programs. The community would be committed to plant more trees along the riverbanks. As a community therefore, they demand for: more sensitization on the common practices causing environmental degradation and functional alternatives; support to protect and manage indigenous tree forests and reforestation initiatives; promote the usage of more efficient stoves; support with crop intensification programs to reduce deforestation; sensitize tobacco farmers to stop using sticks in drying it in the sheds and instead use ropes. These activities would require the availability of efficient stoves, the supply of tools for establishment of tree seedlings nurseries, training in environmental protection, financial support in the management of village forests and linkages with the department of forest.

To see the initiatives implemented, the rice cooperatives and the WUA suggest the following actions: law enforcement; sensitization of communities on riverbank management and general environmental protection activities; provision of tree seedling materials; increase the environmental extension services; provision and enablement of alternative energy sources and availability of energy efficient stoves; and incentives for well managed household forests and village forests. Moreover, Kaombe Rive the Chilangali Irrigation Scheme would need the support to construct a protection band to prevent regular flooding.

## 5. Karonga District



Malawi Data Portal, <https://malawi.opendataforafrica.org/>

Todd Benson "Malawi: An Atlas of Social Statistics", 2002.

Karonga District occupies an area of 3,355 km<sup>2</sup> and has a population of 365,028 (Malawi National Statistics Office, 2018<sup>xiv</sup>). Among the 7 Districts of the Northern Region of Malawi, Karonga District borders Tanzania to the North and Lake Malawi. Karonga District is administratively made up of five Traditional Authorities (TA) (Kilupula, Mwakaboko, Kyungu, Wasambo, Mwirang'ombe) plus a district headquarter, namely the central township of Karonga Boma. The region has a population of 365,028 people according to the 2018 census of which 176,197 are men and 188,831 are women, with an increasing density, from 77 (2008) to 107 inhabitants per km<sup>2</sup>. The urban population is 61,609 people, of which 29,920 are men and 31,689 are women while the rural population is 303,419 people of which 146,277 are men and 157,142 are women. Compared to the national annual growth rate from 2008 to 2018 of 2.64% (WB, 2019<sup>xv</sup>), the Karonga rate is 3.2%. The poverty and ultra-poor rate are 57.1% and 22.7%, respectively at national and district level (WB, 2018<sup>xvi</sup>). In 2018, out of a 15-64 year-old population of 190,296 people, the economically inactive persons were 67,155 and the active population was 123,141. Among these latter, 87,139 people were employed and 36,002 were unemployed (Malawi National Statistics Office, 2020)<sup>xvii</sup>. Karonga developed as a commercial centre and entrepôt for local agriculture. The economy is mainly based on rice production along the lake and

on coffee, maize, beans, fishing, and livestock in the west. The frequent flooding of the North Rukuru river has reached different areas of Karonga causing significant losses of property for its community.

## 5.1 Farming activities

Rice, maize, cassava, groundnuts, sesame, cotton, pigeon peas, tobacco and sweet potatoes are the crops that are grown during the rainy season. Maize, tomatoes and in particular rice are the crops mostly grown during winter (May to October) through the irrigation schemes which are both for consumption and income. Cotton is sold to Agricultural Development and Marketing Corporation (ADMARC), tobacco is sold to auction floors and vendors, while rice, sweet potatoes and cassava are sold to vendors. Some farmers choose to buy seeds from agro-dealers and Lifuwu research station, but others prefer using local seeds. Concerning sweet potato vines and cassava cuttings, farmers use those from their farms. Seeds and other provisions such as pesticides are purchased from Farmers World, Chipiku, Kulima Gold, Chilingali Seed Multipliers (in Nkhotakota) through CISP, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and other agro-dealers. The purchase of seeds is quite challenging for the farmers because of the high price of seeds, the availability of certified seeds (seeds might be sold as certified when in fact they are not), and the long distance to reach the research station where they are sold.

## 5.2 Knowledge and capacity gaps in sustainable agriculture

Community members practice climate sustainable agriculture by planting vetiver grass, making box ridges, crop diversification, planting early maturing varieties and seeds that are resistant to pests and diseases, pot-hole system, using manure and other conservation agriculture techniques. The techniques are acquired through agricultural extension workers, farmer to farmer trainings, meetings, and demonstrations. According to the farmers, these techniques help in maintaining moisture in the soil, avoiding soil erosion and increasing crop production. Indeed, through the pothole system, for example, it is possible to produce crops during droughts, and the use of System of Rice Intensification (SRI) helps to obtain more yields using less inputs. Moreover, through intercropping there is an increase in the production of yields in a small size land, and the use of crop rotation helps to improve the soil fertility.

According to the rice cooperative members, the use of manure and fertilizer is essential to increase production. To protect the environment, rice cooperatives members at individual level are not only practicing SMART agriculture such as spreading manure to their fields, planting vetivar grass, planting early maturing varieties and crop diversification, but also using local methods such as spreading sand to the maize crop to suffocate the army worms, as well as reporting any pests and diseases in their crop fields to agricultural extension workers in their area.

However, by being labor intensive, these techniques are all particularly challenging. In these communities, organizations like CISP, International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Ministry of Agriculture, Total Landcare, COMSIP, Kulima Miera Project, Lusuwiro, Afikepo nutrition project, and Self Help Africa (SHA) teach innovative agriculture techniques to the community. In addition, there is also National Smallholder Farmers' Association of Malawi (NASFAM) which is working outside the scheme. CISP's work is implemented by visiting farmer clubs, providing trainings and using also notable persons when disseminating the techniques. Lusuwiro uses lead farmers to disseminate the techniques. The other organizations communicate the techniques through community-based facilitators. Most of these organizations are very active from the month of September when preparations for next farming season are in progress. Farmers are interested in

adopting techniques such as making deep trenches, swales, tree nursery production and post-harvest handling.

### 5.3 Knowledge and capacity gaps in management of income generating activities

The main sources of income in the community are farming, small businesses like beer brewing, charcoal burning, mandasi (banana flitters), and fish selling. Concerning farming, the availability of land and water helps in the growing of different crops and community members have already experienced farming as a business through different trainings from parents, organizations and the Ministry of Agriculture. Another common activity is charcoal burning which does not require additional capital owing to the presence of natural trees that can produce quality charcoal. Community members have also knowledge in fishing industry, available fishing gear and the lake not far from the area. Finally, the beer brewing represents a source of income owing to the availability of customers and community's knowledge of beer brewing.

Community members attended trainings on Systems of Rice Intensification (SRI), Village Saving and Loans Associations (VSLA), Farmer Organization (FO) cycle and Farmer Business Schools (FBS). The FBS have helped the farmers to realize the reason of their cooperative's downfall. Village Saving and Loans Associations, has helped farmers to secure loans for production. Trainings have also supported them to plan in advance their farming activity, to know how much they have invested, the profits gained.

However, community members lack the capacities to better manage their activities. In farming, they are used to sell farm products by using pails as a measure of selling instead of weighing scales which hinder the possibility of making profits. Generally, farmers are facing different challenges, such as: unavailability of capital to increase productivity of rice production; poor roads conditions especially during rainy season; shortage of pure certified seeds to increase production of rice; scarcity of farm equipment like machinery to help in cultivation; crop pests and diseases control; absence of ready markets for crops; lack of trainings in business management /entrepreneurship skills. The sorting out of these challenges would be helpful to improve productivity and income from the activities. Moreover, to better manage their agribusiness activities, farmers require a better maintenance of the intake and canals of the irrigation scheme so that there is adequate supply of water within the irrigation command area, kit for the management of Village Savings and Loan groups (such as Cash Box, Ledger books, etc), and cooperative education for the farmers to understand the purchasing of shares and issues of dividends. The farmers mentioned that availability of tools including ploughs, Agrima, rice harvesters, tractors and sprayers are essential in improving farming activities.

### 5.4 Rice production

Rice is grown for consumption and income generation. The profits from rice sales are used to pay school fees, build houses, buy farm inputs like fertilizer and others. Rice is grown in both rainy and dry season. In rainy season, they grow Kilombero, faya, Nanyundo, Singa, IET, Pusa, TCG 10, Daud, Diffa, Masungu, Zambia, Mapiko. In dry season, they grow all the mentioned varieties of rice except for Kilombero and Faya. Kilombero requires plenty of water and it takes about 120 days which impede its grown during dry season. The farmers learnt rice growing techniques not only from the System of Rice Intensification (SRI) trainings but also from their parents who learnt them from Chinese that controlled the scheme during the one-party system of government.

Most farmers use recycled local seeds which they preserve after harvesting, while others buy from fellow farmers. Some certified seeds are bought from Lifuwu Research station in Salima, which

however is hardly reachable because of the long distance. Moreover, the seeds are expensive, of poor quality and not always readily available. Farmers use pesticides and fertilizers in the cultivation of rice which are purchased from Agro dealers, Farmers World, Kulima Gold, Smallholder Farmers Fertilizer Revolving Fund of Malawi (SFFRFM) and Export trading.

The challenges that the rice farmers are facing include frequent outbreaks of pests and diseases that attack the crops; water shortage especially during the dry season; lack of certified seeds, of fertilizers and of machinery like Agrima and tractors to help in cultivation; long distance to research station where certified seeds are sold. Most farmers do not use fertilizer and certified seeds due to high prices which impede farmers to produce rice in large quantities. The only types of machinery that they have ever exploited in rice cultivation are plough and cono weeder that is used for wedding, on which they acquired skills from CISP's training. However, only few farmers are currently using the cono weeder because of inadequate supply of the equipment.

## 5.5 Use and management of the irrigation system

The irrigation system is used throughout the year both during rainy season and dry season. Through the irrigation system, rice which is grown for consumption and for sell, is cultivated during both seasons. The other crops grown are leafy vegetables and maize. The only available market for these farmers is vendors. The farmers use local seeds which they keep after harvesting, while those who do not have preserved them, buy the seeds from fellow farmers. Certified seeds are expensive, and they are sold in Salima at Lifuwu research station and Hara rice scheme which are not easily reachable owing to the long distance. Moreover, even in the research station, seeds might be difficult to find. Sometimes the seeds take a month or more to be available, thus leading the farmer to plant late. According to the WUA members, it would be preferable if the cooperative was also selling seeds to their members. Given the long distance from Lifuwu, farmers have to rely on International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and CISP to bring the certified seed closer to them. Seeds are also purchased from other agro-dealers like Chipiku and Farmers world. Farmers use pesticides and fertilizers which they buy from Smallholder Farmers Fertilizer Revolving Fund of Malawi (SFFRFM), agro-dealers, Kulima Gold, Farmers World, Export trading, paramount general dealers. Some farmers from the community buy the pesticides in large quantities in order to sell them to people within the area. On the other hand, some vendors sell the pesticides in exchange of rice during harvesting time.

To better manage the Wowve irrigation scheme, the WUA members were trained by CISP on Farmer Business Schools (FBS), Farmer Organization (FO) cycle, Village Saving and Loans Associations (VSLA), Digital marketing, System of Rice Intensification (SRI). The trainings have been useful because they have improved the social cohesion among the farmers by making them realize the importance of subscribing to farmers organizations (WUA and Cooperative) membership. The training also helped improving the social capital among the Farmer Organizations (FOs). The Farmer Organizations (FOs) are able to procure inputs in bulk and also facilitating loans for its members. However, there are several challenges that WUA is experiencing in the Wowve irrigation scheme. Among these, the siltation at the intake affects the flow of water to the fields. At first, during the reign of late Dr Hastings Kamuzu Banda, the intake was constructed in a meandering way which helped the water to be sieved in the process hence separating the silt and other debris. Then, the scheme was reconstructed without complying with the standards. It should be added that the dam capacity is too small to supply water to all the fields in the scheme. Moreover, deforestation as well as the bad conditions of the canals are impacting on the flow of water to the fields, thus allowing during dry season the cultivation only of a part of the scheme. Furthermore, members are struggling in paying water fee which depends on the size of plot (MKW 6000 per 0.1 hectare), thus affecting the general WUA activities. The WUA is also

experiencing poor hygiene issues caused by the lack of toilets within the scheme. The lack of rehabilitation of the intake and the canals as well as of a water harvesting dam are challenges that are affecting the efficiency and sustainability of the entire scheme. According to the members, they lack capacity to manage WUA although they were trained in Farmer Organization (FO). When new office bearers for the WUA are elected, they are often not trained. The roles and the responsibilities are often confused within the WUA and some members in the finance committee do not know how to manage the funds of the association.

Capacity building is essential to improve the operation of Wowve WUA, especially in water management. WUA is interested in increasing membership from 1293 to 1500 which can also result in the increase of rice production in the scheme. If WUA has the possibility to enhance the irrigation scheme, it would not only maintain water canals, drainage system and the roads within the scheme, but also construct a warehouse, have an office and a rice mill.

Lufyila scheme benefits from a participatory agreement between the government and Lufyila WUA, which stipulates that maintenance of head works, main canal, roads and some bridges are under the government control. Since WUA has no authority in the maintenance work, any complaint has to be notified to the government through the DADO. The WUA members were trained in water management, leadership, finance management and group dynamics by the Earth Link & Advanced Resources Development (ELARD). Although it did not end positively, the training was very useful because the association was able to conduct renovations of the scheme. In addition to the challenges related to the lack of maintenance of the scheme (i.e. siltation of intakes, scarcity of secondary canals, poor protection bands) the Lufyila irrigation scheme is experiencing also outbreak of rice diseases due to chemicals and of farmers diseases (farmers get sick more often since they are no longer receiving drugs for bilharzia every six months as in the past). In Lufyila, some renovations of the scheme have been made by construction companies which however, worsened its conditions. Indeed, they would necessitate of an irrigation engineer to help them. As in the case of Wowve WUA, members need not only extra funding to renovate the scheme, but also capacity building skills to enhance the management of responsibilities and funds within the association. In order to improve the irrigation scheme, with financial support the WUA would continue the maintenance work from secondary to tertiary canals, plant trees at the intake, plant vertiver grass to avoid soil erosion, and advise farmers to plant with the first rains.

## 5.6 Rice marketing

The TBC rice cooperative is unable to aggregate all the rice produced because of lack of competences and finances. Indeed, the cooperative members confirmed the possibility of aggregating the harvest after a training on cooperative management. However, most of the rice is sold by the single farmers according to her/his own strategy taking into account the lack of a reliable market and of capital for the cooperative. Indeed, one of the major challenges for the cooperatives is the scarcity of a reliable market. In the past, they were used to sell the rice produced to local vendors, but this no longer happens. They were also used to sell the rice to a certain company in Lilongwe but the relationship with the buyer was discontinued and despite a formal agreement there was lack of trust. When they were used to sell the product to the company in Lilongwe, the cooperative itself had to hire a vehicle to carry the rice to Lilongwe and to incur all related the costs. Most cooperatives in Karonga sell rice nationally, mostly in Lilongwe and Mzuzu. Cooperatives have often informal/ verbal agreements with the buyers which are mostly middlemen/ vendors. To find potential buyers, they make advertisement on the radio or use digital marketing through smart phone and market committees. Digital marketing, which is fast, cheap and easily exploited to find customers, was

introduced by GIZ. However, it requires the use of smart phones or computers which are relatively expensive as compared to other mobile phones. Moreover, digital marketing requires data bundles, a good internet network to communicate with possible customers, and a lot of time. Through the Facebook page, they are in contact with Lymbe Rice Cooperative that they met in person to discuss market issues, and other 5 groups with which they have agreed to sell them rice since they do not have a rice mill. As a matter of fact, at the present time, they do not have many additional Facebook friends because they do not have rice to advertise on the page. The administrator together with the marketing committee is the one who posts on Facebook the information of rice stock. At present, only 7 posts have been shared. The current cooperative executive committee requires digital marketing training in order to appreciate the importance of it. The training should also include a review of Facebook page management with the administrator. Finally, in order to improve the marketing of the rice, they need an available market and a deeper awareness about who are the potential customers, where are they and what is the price that the buyers may be willing to pay.

### 5.7 Community association's leadership

The Field Assessment also analysed the role of women in the management of the cooperatives and Water User Associations (WUA).

In Lufyila cooperative there are women in the executive committee and subcommittee. In particular, there are 3 women in the executive committee out of 10 members, which include the Secretary, the Treasurer and a committee member. In Wowve cooperative, there are 3 women out of 9 members of the executive committee, including the Treasurer. Therefore, 40% of cooperative executive committee and sub-committee members are women. According to the respondents, having more women farmers' representatives in the cooperatives would enhance effectiveness and trustworthy. Women farmers interact more easily than with male counterparts. Moreover, women involvement helps households to be food secure since women are the ones who preserve food for consumption and save crops for sale. Women play a key role in ensuring transparency and accountability in all the activities in which money is involved. Finally, they are quicker than men in fulfilling tasks, therefore most of the activities would be accomplished without delays.

Traditional leaders, young men, women, and members attend the general assembly within which representatives are elected. Representatives are voted by fellow farmers at the general assembly conducted every 3 years. In Wowve, each farmer can be in the executive committee for maximum 2 terms, and the term end may be anticipated in case of conflict.

Concerning the WUAs, there are 4 women representatives out of 17 in Lufyila, while in Wowve there are 4 women out of 18 executive members. In Lufyila, the executive committee is elected for 4 years, but the non-performer representatives might be removed earlier. The committee is elected by the traditional leaders. In the past, during the elections, aspirants used to bribe people with alcohol and other products to vote for them. This causing chaos. Now, the scheme is under 5 Group Village Headmen controlling 18 villages. During the elections, the traditional leaders are asked to provide names of persons from his area who would be in the committee. In Wowve, the executive members are supposed to serve for a maximum of 3 years, with the possibility of being replaced before the end of the term. Having women representatives in the association helps not only to support fellow women within the association but also to ensure a gender balance in the sub committees. Whenever the association receive visits, women are the ones who would prepare food, organize the logistics and welcome the visitors with songs. For the WUAs, it would be an advantage to have a higher women involvement to help persuading their fellow members to contribute to water fees and ensure accountability and transparency of the executive committee. Women involvement would motivate

other women in farmer's clubs and groups to join the rice scheme, actively participating by giving their opinion and proposing new ideas and guarantying justice in the WUA court.

## 5.8 Management of weather forecast information and disaster alerts

The Assessment explored if and how community members get climate history, weather forecasts and disaster alerts and how they use this information. The decision of when to plant but also which type or varieties of rice and other crops depends on the availability of rainfall and of water in the scheme during the dry season. Clearly, also the availability of working capital is a factor that is considered.

According to community members, they have access to whether information and forecast through daily radio programs and/or weekly basis visits from agricultural extension workers and National Smallholder Farmers' Association of Malawi (NASFAM). Agricultural extension workers and National Smallholder Farmers' Association of Malawi (NASFAM) visit their communities to recommend to them about when and what kind of crops is better to plant in the season. The Ministry of Agriculture provide information about the amount of rain in the area, as well as the suitable varieties and agriculture practices such as preferred manure to be implemented in the area. National Smallholder Farmers' Association of Malawi (NASFAM) provide information about the preferred rice varieties at the market as well as the best agriculture practices. Finally, Village Civil Protection Committee (VCPC) contributes with recommendations about early maturing varieties, time to plant and crop diversification practices. All the institutions endorse the grown of early maturing varieties and crop diversification. This information helps them to make informed decision in their farming plans. On the local radio station (Tumtufye) the information is spread during weather bulletin and even during other climate change focused programmes. Funeral ceremonies and village meetings represent also moment for disseminating information. It is indeed important that the lead farmers are notified about weather information so as to discuss about it during every meeting.

In this area people have access to historical weather data at the Extension Planning Area (EPA) but most of the farmers prefer not to use it. However, those farmers who monitor Extension Planning Area data, find the information very useful since it helps to know the type of crops and varieties to plant in that season. In the past 2 years (2018/19 and 2019/20 growing seasons) the area experienced both drought and floods. About the expected drought experienced in 2019/2020, people were informed in advance by the Village Civil Protection Committee (VCPC) and the Ministry of Agriculture through meetings and radio programs. People were advised to plant early maturing varieties to cope up with the drought. During period of flooding, they were advised to cultivate on higher areas, to grow early maturing varieties, to plant crops like tomatoes and sweet potatoes that would have resisted the floods, and to construct ridges and planting reeds in swampy areas. The information clearly indicated that people living along rivers or lower areas should move to higher areas. Despite the disaster alert information, people refused to move in the long term, but temporarily evacuated to evacuation centres in times of floods, to then go back to lower areas right after. To cope with the floods, orphans, elderly, and those who are particularly affected by floods received food aid, cash (K23000 per household), mosquito nets and pails. Red Cross Society distributed mosquito nets, World Food programme distributed maize and the government through the WFP distributed cash. According to the community members, it is useful for them to receive weather alerts so as to plan the type of crops and varieties to plant or to move to upland areas. Other people, despite the alerts, opt not to move because they rely on the help provided by organizations such as Red Cross and WFP after the disaster. The community members need to be trained on how to deal with natural disasters, especially floods as such training would prepare people differently, by planning seeds and varieties of crops to grow or the size or type of the land to cultivate.

The Vulnerability Assessment Committee (VAC) is active only in one area (Wowve) and passive in the other area (Lufyila). The Vulnerability Assessment Committee (VAC) in Lufyila does not provide any updates or collect data. On the other hand, the Village Civil Protection Committee (VCPC) activities are similar to those that VAC is supposed to implement. Communities still get information from DoDMA through Village Civil Protection Committee (VCPC). The Wowve VAC is composed of 5 females and 5 males elected with the support of traditional leaders and Area Development Committee by members of the community. Those elected are literate, with good behaviour and enthusiastic. The committee notifies the government on challenges being faced in the community. They also provide data on orphans and vulnerable groups that are in the community. The Vulnerability Assessment Committee was established by the Red Cross Society together with Self Help but does not receive support from any organization. The Police just assist the committee by providing it with some information related to its activities. The VAC submits monthly reports to the District Agricultural Development Officer (DADO). The Vulnerability Assessment Committee provides updates to the community by disseminating weather information through the Tuntufye community radio on a regular basis. The updates are useful because they alert the community members to be prepared of natural disasters and to make plans. However, it lacks work materials such as work suits, gum boots, transportation to move to rain gauge and river gauge spot or during night, life jackets that they use to rescue drown people, and smart phones used to rapidly send information to community radio.

Department of Disaster Management Affairs (DoDMA), district office is responsible for coordinating, developing, and implementing disaster risk management (DRM) programmes, contingency, response, and evacuation plans. DoDMA also controls the disaster management information system, the identification of priorities in disaster risk management measures, beneficiaries, volunteers at local level, programs budget. The DoDMA collects information about seasonal rains, food situation, water level in order to share them through community meetings, WhatsApp group messages and emails to District, Area and Village Civil Protection Committees. These committees have then the role to timely disseminate such information to the community members. The DoDMA uses online platforms to disseminate information about disaster risk management (historical profile, impacts, preparedness, response and recovery measures) from the Central (Country) level to the district Level. DoDMA District officers translate the information and use usual means such as emails and Bulletin to pass the information to Extension Planning Areas (EPAs) who passes the information to the communities through meetings. The internet platforms used at Country level included: Malawi spatial data platform (MASDAP), licensed by Geographical survey, which through an entry code nets for an area and provides the map of the area; Disaster Risk Management Information Management System. At district level, the Disaster Risk Reduction experts are responsible for proper planning, consultations, referrals, and weather and climate data interpretation. DoDMA collaborates also with the Malawi Vulnerability Assessments Committee (MVAC), which is a national committee comprising of government departments, UN agencies, NGOs, Civil Society organization, Academia which conducts assessments across the country and share findings and recommendations for implementation. The districts implement then the Malawi Vulnerability Assessments Committee humanitarian programs.

According to DoDMA, the best way to improve its alerting system so as to reach and prepare better the community to any upcoming disaster, is to strengthen early warning and capacity building of area, villages civil protection committees and other early warning teams, as well as to procure and distribute early warning materials to community structures.

Through the UNDP-funded M-CLIMES project (Saving Lives and Protecting Agriculture Based Livelihoods in Malawi: Scaling Up the Use of Modernized Climate Information and Early Warning Systems), the Department of Climate Change and Meteorological Services (DCCMS) is working in agriculture, climate resilient crops, community engagement and use of climate data at community

level. This is done in collaboration with the Department of Agricultural Extension Services, in various areas, including Karonga, using the PICSA manual of the University of Reading. This was a program introduced by the government with funding from UNDP. The aim is to integrate the meteorological services with agricultural activities. Through the program, the District Agriculture Development Officer (DADO) collaborates with the Department of Climate Change and Meteorological Services (DCCMS) to gather data, analyze and pass the information to government sectors and NGOs involved in crop production. The District Agriculture Development Office (DADO) passes the information and messages or material pertaining to climate and weather forecasts to the Extension Planning Area (EPA). Once materials and information reach EPA, extension officers form groups among farmers and through lead farmers communicate with community. The activities include training of lead farmers on climate and weather issues related to agriculture, interpreting climate /weather information to community. The lead farmers then not only pass the message and discuss with local farmers in their locality but also collect data on weather in their area and report it to extension workers who then pass further. Extension officers assist farmers to plan crop production with reference to the climate/weather forecast. There used to be a center at the district where farmers watch weather pattern and other climate/weather related issues through a TV set. However, the service is not functioning due to lack of resources and it has been integrated into another program, namely Participatory Integrated Climate Services for Agriculture (PICSA). The District Climate Information Centers works according to a specific approach. Each Extension Planning Area (EPA) acts a Climate Information Center in that area. Extension workers collaborate with lead farmers who were trained and registered in WhatsApp group. EPA has equipment through which DCCMS sent information and messages. Every EPA set rain gauge in selected area/zones to capture data on rain fall and/or river gauge to trace water level and runoff. Formed clubs and trained farmers use then their phones to send messaged to EPA. Participatory Integrated Climate Services for Agriculture (PICSA) teaches farmers to use climate information to make decisions on crop production in a particular season. Indeed, it forms farmer clubs in the community, trains lead farmers to get familiar with climate /weather literature for them to lead others (climate warning systems, weather forecasts, early warning systems etc.), encourages farmers on preparation and use of farming tools (e.g. seasonal calendar, food calendar resource maps, crops planning), and organize awareness campaigns on risk mitigation strategies including COVID-19. Participatory Integrated Climate Services for Agriculture (PICSA) is run as a project by NASFAM involving government agriculture department and DCCMS in Karonga. On a larger scale it integrated activities in the former M-CLIMES and added more like crop production, farming as business, nutrition, home economics and income generating activities. PICSA is operating in 6 EPAs across Karonga i.e. Kaporo North EPA; Kaporo South EPA; Mpata EPA; Lupembe EPA; Nyungwe EPA and Vinthukutu EPA. PICSA as a pilot project is expected to end in 2022. It will later be handed over to District Agriculture Development Office to adopt and continue. However, PICSA faced some challenges. Indeed, weather forecasts tended to be general and focused on national level rather on a specific area, thus limiting the possibility to make plans. The data analysed in one area is assumed to include information also other areas, which sometimes does not apply. It had inadequate materials for community to gather data on rainfall (e.g. rain gauges and river gauges). Moreover, the weather reports were often difficult to read and understand. There was also incompatibility between weather calendar and other services like inputs/seed availability in some areas. It lacked project monitoring mechanism as field assessments and review meetings. In addition, there was absenteeism during training or meeting with farmers. Finally, it had inadequate equipment to assist in operations (e.g. smart phones, printers and other resources).

## 5.9 Environmental protection

Careless cutting down of trees by charcoal burners, unreliable rains and frequent floods, soil erosion, heavy winds, increase in crop pests and diseases, outbreak of human diseases like COVID-19, are all changes that the community members of the area have witnessed. Clearly, these environmental changes have caused important consequences in community members' life. As a matter of fact, they have been experiencing low crop production, hot temperatures, unreliable rains and the outbreak of pests and diseases.

It should be recalled that people in this area are taking actions both at individual and community level. Everyone, individually, has planted trees and early maturing as well as drought tolerant varieties, and practice crop diversification, and contour ridges. On the other hand, actions such as awareness meetings on the effect of careless cutting down of trees, afforestation programs by having community woodlots, prohibition from cultivating along the river, making by-laws to protect trees are implemented at community level. The actions are taken as a group and being coordinated by a committee that was set for this purpose, including traditional leaders, farmer club leaders and agricultural extension officers. There is no funding, it is just voluntary work. Planting trees, awareness meeting on the effects of deforestation, tree nursery and the setting of a committee (with new by-laws) that will deal with those found burning charcoal, are all actions that the community would do to improve the environment. Clearly, these actions need a concrete endorsement. The government should be supportive and provide those people involved in charcoal burning with business loans so that they can venture into different income generating activities and stop cutting down of trees. Government should subsidize cement so that people can be encouraged to use concrete blocks when constructing buildings instead of burnt bricks, which is also an environmental hazard. For this, a training on how to make the concrete blocks is needed. Finally, capacity building and provisions of business loans through groups are the kind of support that would be needed to implement environmental protection activities.

Concerning the rice cooperatives, due to the environmental degradation they are facing low production, adverse wind, gullies that have developed in the fields, and loss of soil fertility caused by soil erosion. With the guidance of traditional leaders and Village Civil Protection Committees, at community level, they are supporting afforestation programs, planting reeds and elephant grass along the riverbanks, and establishing by-laws to deal with those who are involved in deforestation. There are other measures that they would do as a community including establishing committees at village level to take care of the planted trees, conducting awareness meetings with the community through the Village Civil Protection Committee (VCPC) on the importance of environmental protection, planting tefrosia and other trees to help improving soil fertility, avoiding the use of chemicals in crop fields and encouraging farmers to use manure, encouraging crop diversification, digging deep trenches, and having woodlots both as individuals and as a community making sure that there are firebreaks to avoid bush fires. However, it should be recalled that no funding is provided for these actions or future projects such as bee keeping. Moreover, capacity building in the use of mud stoves in order to use less firewood as well as the construction of a dam for water harvesting and irrigation in the dry season are the kind of support they need.

In addition to the environmental challenges that the community and rice cooperatives are experiencing, the WUA members are facing the increase in the prices of fish and other farm products, damages by debris of head works in the scheme and of protection bands. In the same manner as rice cooperatives, the WUA members are implementing environmental protection activities both at individual and community level. Two years ago, Lufyila WUA employed people to plant trees in the new scheme and it was coordinated by the president of the association, but it was not funded. The WUA need funding so that there can have capacity building, civic education on environmental

protection (e.g. importance of preserving trees and of avoiding the use of plastic papers), an open day, and materials like wheelbarrows and polythene tubes or seedlings for the woodlot.

- 
- <sup>i</sup> United Nations Department of Economic and Social Affairs “*World Population Prospects*” 2019.
- <sup>ii</sup> The World Bank Data IBRD-IDA “*Malawi*”, 2019.
- <sup>iii</sup> United Nations Development Programme “*Human Development Reports: Malawi*”, 2020.
- <sup>iv</sup> Government of Malawi, “*Voluntary National Review (VNR) Report for Sustainable Development Goals (SDGs)*”, 2020.
- <sup>v</sup> Famine Early Warning Systems Network “*MALAWI Food Security Outlook: October 2020 to May 2021*”, 2020.
- <sup>vi</sup> Integrated Food Security Phase Classification ““The Malawi Vulnerability Assessment Committee (MVAC) and integrated Food Security Phase Classification (IPC) Projection Update - Bulletin No. 16/19 Volume 2”, 2020.
- <sup>vii</sup> Famine Early Warning Systems Network “*MALAWI Livelihood Baseline Profiles, March 2016*”, 2017.
- <sup>viii</sup> The World Bank IBRD-IDA “*Fourth Integrated Household Survey 2016-2017*”, National Statistical Office, 2017.
- <sup>ix</sup> United Nations Office for the Coordination of Humanitarian Affairs “*Malawi: Vulnerability Assessment Committee Results 2016*”, 2016.
- <sup>x</sup> Food and Agriculture Organization “*Family Farming Knowledge Platform: Smallholders data portrait*”, 2018.
- <sup>xi</sup> Famine Early Warning Systems Network “*MALAWI Food Security Outlook October 2020 to May 2021*”, 2021.
- <sup>xii</sup> Famine Early Warning Systems Network “*New COVID-19 restrictions drive re-emergence of Crisis (IPC Phase 3) outcomes in urban areas, January 2021*”, 2021, b.
- <sup>xiii</sup> Malawi National Statistical Office “*Population and Housing Census Main Report*”, 2018
- <sup>xiv</sup> Malawi National Statistical Office “*Population and Housing Census Main Report*”, 2018
- <sup>xv</sup> The World Bank Data IBRD-IDA “*Population Growth (annual %) Malawi (2008-2018)*”, 2019.
- <sup>xvi</sup> The World Bank Data IBRD-IDA “*Methodology for Poverty Measurement in Malawi (2016/17)*”, National Statistical Office, 2018.
- <sup>xvii</sup> Malawi National Statistical Office “*2018 Malawi Population and Housing Census: Economic Characteristics of the Population Report*”, 2020.
- [http://www.nsomalawi.mw/images/stories/data\\_on\\_line/demography/census\\_2018/Thematic\\_Reports/Economic%20Characteristics%20of%20the%20Population%20Report.pdf](http://www.nsomalawi.mw/images/stories/data_on_line/demography/census_2018/Thematic_Reports/Economic%20Characteristics%20of%20the%20Population%20Report.pdf)