

MAIN REPORT

Post Disaster Needs Assessment Malawi (PDNA) 2019

ZERO DRAFT

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DRAFT

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Foreword

In early March 2019, Malawi experienced one of the worst tropical cyclone that formed in the Mozambican channel, bringing heavy rains and strong winds. Severe flooding negatively affected people's lives, livelihoods and socio-economic infrastructure, pushing more people into poverty. A total of 15 districts and two cities were directly impacted, with an estimated 868,895 people affected, 86,976 displaced, 60 killed and 672 injured.

The devastating heavy rains and floods caused substantive damage and loss across the social, productive and infrastructure sectors where the social sector was the most affected. Across sub-sectors, the housing sub-sector had the highest damage whereby 288,371 houses were destroyed. Most affected people were accommodated in classrooms, which disrupted learning and compromised access to safe water and sanitation. Furthermore, the 2019 floods affected roads, bridges, power supply lines, irrigation infrastructure and already matured crops. Power supply was interrupted for more than two days across the country.

The Government of Malawi responded swiftly with rescue and relief operations and saved many lives by rapidly mobilizing various forces such as providing shelters and other necessities. Various humanitarian actors also provided relief and short-term recovery activities; over 90,000 people have been assisted to date, and both response and recovery efforts are ongoing. On behalf of government, I am grateful to government ministries, departments and agencies, development partners, private sector, civil society organizations as well as individuals that provided support in various forms during the immediate phase of the 2019 flood response.

On March 19, 2019, the Government of Malawi (GoM), through the Ministry of Finance, Economic Planning and Development submitted a formal request for World Bank assistance to Post Disaster Needs Assessment (PDNA) of the floods. The objective of the PDNA was to quantify the damage and loss and to estimate the recovery and reconstruction needs. Furthermore, the PDNA 2019 drew lessons from the 2015 flood response to comprehensively determine and quantify the corresponding multi-sectoral needs; and build consensus for systematic recovery and resilience building. The assessment has revealed that total damage and loss is estimated at US\$220.2 million, while total needs for recovery and reconstruction is US\$368.3 million.

With the increase in the frequency and intensity of extreme weather events in Malawi, the Government reaffirms its commitment to improving resilience, to building back better, and to further integrating disaster risk reduction into development plans. The World Bank has already committed US\$120 million to support recovery and reconstruction. We look forward to working with all our partners to move Malawi towards a more resilient development path through investing in resilient recovery and reconstruction.

Nicolas DAUSI

Minister of Homeland Security

Acknowledgements

The Malawi Post Disaster Needs Assessment for the 2019 Floods was commissioned by the Government of Malawi with support from The World Bank, United Nations Development Programme (UNDP), European Union (EU) and African Development Bank (AfDB). The exercise was requested with the intention to assess the impact and needs after a tropical cyclone hit Malawi from the 6th March 2019 and left devastating effects in parts of the country.

On March 19, 2019, the Government of Malawi (GoM), through the Ministry of Finance, Economic Planning and Development submitted a formal request for World Bank assistance to conduct a systematic impact and needs assessment to understand the economic impact of the floods. The PDNA 2019 was designed to leverage systems and experiences from the 2015 flood response to develop a more comprehensive picture of the impacts; determine and quantify the corresponding multi-sectoral needs; and build multi-stakeholder consensus allowing for more systematic recovery and resilience building.

The Government of Malawi would like to thank the development partners and organisations that participated in the PDNA. The assessment team comprised of close to 70 officers from the government, (Ministry of Agriculture, Irrigation and Water Development - Department of Crops, Irrigation, Livestock, Fisheries, Forestry; Water Resources and Water Supply and Sanitation, Ministries of Finance, Economic Planning and Development, Education, Housing, Health and Nutrition, Transport, Energy, Gender, Children and Disabilities; and Natural Resources, Energy and Mining); United Nations Agencies and multilateral agencies (UNICEF, UNDP, UN Women, UNFPA, FAO, WFP, WHO, AfDB); INGOs (Care International, Save the Children, FEDOMA, MANEPO, YONECO, Action Aid), and The Malawi Red Cross Society. The dedication and sacrifice displayed to ensuring credible results within a short period of time is very commendable.

The assessment design mirrored a rapid assessment of the impact of the recent floods by utilizing existing data from similar assessments that were ongoing, as well as relied on existing data from the various local authorities offices. As such, the assessment team would like to appreciate all the support that district and city councils and office of the District Commissioners and Chief Executive Officers rendered directly and through various sectors and departments. The valuable information that was provided, including the support rendered to the teams that visited the districts to collect data and conduct verifications is treasured.

The PDNA team would also like to extend gratitude to the Directors of Planning and Development and the Assistant District Disaster Risk Management Officers / Desk Officers from all the 17 Councils, who participated in validating the results of the assessment. Your reflections and contributions assisted in the quality, timeliness and credibility of this report.

Our gratitude also goes out to all the people interviewed who have contributed to defining a strategy for recovery, including its financial implications, while making practical recommendations to improve resilience to future floods. The 2019 floods PDNA carries a human face because of all your contributions.

Wilson Moleni

Secretary and Commissioner of Disaster Management Affairs

Acronyms

DRAFT

AfDB	African Development Bank	DRR	Disaster Risk Reduction
APES	Agriculture Production Estimates Survey	DSWO	District Social Welfare Office
BBB	Building Back Better	EAD	Environmental Affairs Department
BOP	Balance of Payments	ECD	Early Child Development
CAADP	Comprehensive African Agricultural Development Programme	ECLAC	Economic Commission for Latin America and the Caribbean
CBCCC	Community Based Child Care Centre	EFSA	Emergency Food Security Assessment
CBO	Community Based Organization	ENN	Emergency Nutrition Network
CFSVA	Comprehensive Food Security and Vulnerability Assessment	EOC	Emergency Operations Centre
CHAM	Christian Health Association of Malawi	EPA	Extension Planning Area
CMAM	Community Management of Acute Malnutrition	ESCOM	Electricity Supply Commission of Malawi
COMESA	Common Market for Eastern and Southern Africa	EU	European Union
CPC	Civil Protection Committee	EWS	Early Warning System
CRED	Centre for Research on Epidemiology of Disasters	FAO	Food and Agricultural Organization
CSO	Civil Society Organization	FBO	Faith Based Organisation
DAHLD	Department of Animal Health and Livestock Development	FEWS	Flood Early Warning System
DaLA	Damage and Loss Assessment	FEWSNET	Famine Early Warning System Network
DCCMS	Department of Climate Change and Meteorological Services	FISP	Farm Input Subsidy Programme
DCPC	District Civil Protection Committee	GAM	Global Acute Malnutrition
DDPs	District Development Plans	GBV	Gender Based Violence
DEM	District Education Manager	GDP	Gross Domestic Product
DFID	Department for International Development	GFDRR	Global Facility for Disaster Reduction and Recovery
DHMT	District Health Management Team	GHI	Global Hunger Index
DHS	Demographic and Health Survey	GIS	Geographical Information System
DIS	District Information Systems	GoM	Government of Malawi
DNA	Damage and Needs Assessment	GSD	Geological Survey Department
DNCC	District Nutrition Coordination Committee	GVH	Group Village Headmen
DODMA	Department of Disaster Management Affairs	HCT	Humanitarian Country Team
DRM	Disaster Risk Management	IDP	Internally Displaced Persons
		NRS	National Resilience Strategy
		IDSR	International Strategy for Disaster Reduction
		IEC	Information Education and Communication
		IFAD	International Fund for Agricultural Development
		IFPRI	International Food Policy Research Institute

IHS3	Third Integrated Household Survey	ODSS	Operation Decision Support System
ILO	International Labour Organization	OPC	Office of President and Cabinet
IOM	International Organization for Migration	PDNA	Post Disaster Needs Assessment
IPCC	Intergovernmental Panel on Climate Change	PLWA	People Living with Aids
IRAP	Integrated Rural Access Planning	PLWHIV	People Living with HIV
LDF	Local Development Fund	PWP	Public Works Program
LFS	Labour Force Survey	REOC	Regional Emergency Operations Centre
MCH	Maternal and Child Health	SAM	Severe Acute Malnutrition
MDF	Malawi Defence Force	SARCOF	Southern Africa Regional Climate Outlook Forum
MDG	Millennium Development Goals	SEP	Social Economic Profile
MGDS	Malawi Growth and Development Strategy	SGBV	Sexual and Gender Based Violence
MoAIWD	Ministry of Agriculture, Irrigation and Water Development	SME	Small and Medium Enterprise
MOEST	Ministry of Education Science and Technology	SOP	Standard Operating Plan
MOGCSW	Ministry of Gender, Children, Disability and Social Welfare	SRH	Sexual Reproductive Health
MOH	Ministry of Health	SRHR	Sexual Reproductive Health and Rights
MoLGRD	Ministry of Local Government and Rural Development	STI	Sexually Transmitted Infection
MRCS	Malawi Red Cross Society	SWAp	Sector-Wide Approach
MVAC	Malawi Vulnerability Assessment Committee	SWG	Sector Working Group
NCIC	National Construction Industry Council	TA or T/A	Traditional Authority
NDPRC	National Disaster Preparedness and Relief Committee	TWG	Technical Working Group
NECS	Nutrition Education and Communication Strategy	UN	United Nations
NEOC	National Emergency Operations Centre	UNDP	United Nations Development Programme
NEP	National Environment Policy	UNFPA	United Nations Population Fund
NHP	National Housing Policy	UNICEF	United Nation Children's Fund
NNPSP	National Nutrition Policy and Strategic Plan	UNRCO	United Nations Office of the Resident Coordinator's Office.
NRU	Nutrition Rehabilitation Unit	UN Women	United Nations Women Entity for Gender Equality and Empowerment of Women
NSO	National Statistical Office	USAID	United States Agency for International Development
		VDC	Village Development Committee
		VSL	Village Savings and Loans
		WASH	Water, Sanitation and Hygiene
		WATSAN	Water and Sanitation
		WB	World Bank

WFP
WHO

World Food Programme
World Health Organisation

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1 Executive Summary

1.1 Disaster Profile

1. **Malawi is highly vulnerable to the impacts of extreme weather events given its location along the great African Rift Valley, rapid population growth, unsustainable urbanization, climate variability and change, and environmental degradation.** The most common weather-related shocks affecting Malawi include floods, drought, stormy rains and hailstorms. Over the past five decades, Malawi has experienced over 19 major incidences of flooding and seven droughts which have increased in frequency, magnitude and geographical scope. In early March 2019, heavy rains developed from a tropical Cyclone Idai and inundated parts of Malawi, causing severe flooding in the Southern and some Central parts of the country. These disaster events negatively affected people's lives, livelihoods and socioeconomic infrastructure, pushing more people into poverty and food insecurity. The impact on the affected population is cumulative considering the magnitude of the 2015 floods and the 2016 drought. In the lead up to the 2018-19 lean season, about 3.3 million people in flood affected districts were already food insecure. In 2017, the poverty head count stood at 51.5 percent, with most of the poor (59.5 percent) living in rural areas. Inequality is high in Malawi, with a Gini coefficient of 0.433 as of 2017, suggesting that any disruptions in livelihoods due whether due to foreseen and unforeseen events such as natural disasters widen the gap between the poor and the rich.

1.2 The Disaster Overview

2. **On 8 March the Government of Malawi declared a State of Disaster due to heavy rains, floods and strong winds in the 13 districts and two cities in Southern Region and 2 districts in the Central Region following Tropical Cyclone IDAI, which drifted from Mozambique to Malawi during its initial formative stages.** Approximately 975,600 people were affected by the 2019 floods (Figure 1) with 60 deaths and 672 injuries reported. The affected districts and cities are Balaka, Blantyre, Chikwawa, Chiradzulu, Machinga, Mangochi, Mulanje, Mwanza, Neno, Nsanje, Phalombe, Thyolo, Zomba, Zomba City and Blantyre City in the Southern region and Dedza as well as Ntcheu in the Central region. Close to 90,000 people were displaced and sheltered in 174 Internally Displaced Persons (IDP) sites. Although there was limitation of disaggregated data, an inter-agency assessment baseline finding shows that 63% female and 37% male affected by the disaster in the districts Machinga, Mangochi, Balaka and Zomba) sites.

3. **The Government of Malawi and development partners responded swiftly with rescue and relief operations and saved many lives by rapidly mobilizing resources to provide food and non-food items such as shelters and other necessities.** However, most sites remained without shelter such that many people were accommodated in school classrooms, which disrupted learning and compromised access to safe water and sanitation. Furthermore, to fully understand the effects and impact of the event the Government of Malawi in line with international best practices, initiated a Post Disaster Needs Assessment (PDNA) to inform recovery and resilience intervention and priorities.

4. **The Government of Malawi together with development partners conducted the PDNA in all the affected 15 districts and 2 cities in April 2019 to jointly assess the impacts of heavy rains**

and floods. The assessment process involved orientation of the PDNA Team (comprised of over 50 government staff, World Bank and UN and other non-state actors' staff) to the PDNA process, data collection, review, analysis and report compilation. The assessment used both primary and secondary data which was triangulated through field visits to selected affected districts, key informant interviews with relevant stakeholders, desk reviews and use of expert review. The PDNA evaluated the effects of floods through total or partial destruction of infrastructure and physical assets and changes in economic flows of arising from the disaster. The economic value of effects was calculated based cost to replace or repair infrastructure and physical assets, forgone income opportunities, higher operating costs, unexpected expenses, additional costs for coordination, provision temporary facilities and staff, restoration of governance capacity, and Increased expenditures to manage increased/new risks arising from the disaster

5. The 2019 Flood PDNA estimated that the total effects of heavy rains and floods amounted to US\$220.2 million and the Government of Malawi will require about US\$ 370.0 million to help affected people and communities to recover (see Table 1). The assessment was conducted from 4 to 18 April 2019 which involved data collection, analysis, interpretation and visit the selected affected districts.

Table 1: Damage, Loss, Needs for Recovery by Sector and Cross Cutting Issues (in million US\$)

Sector	Sub-Sector	Damage	Loss	Total Effects	Total Needs
Social	Housing	82.7	23.9	106.6	105.9
	Health	0.2	2.4	2.6	30.6
	Education	20.3	0.8	21.1	62.6
Productive	Agriculture				
	Crops	0	11.1	11.1	19.4
	Livestock	0.5	7.7	8.2	2.4
	Irrigation	4.2	9.6	13.8	17.9
	Fisheries	1.8	1.4	3.2	1.4
	Trade	0.3	1.7	2.0	3.3
Infrastructure	Transport	36.1	0.9	37.0	42.6
	Energy	2.8	0.3	3.1	4.3
	Water and Sanitation	3.7	2.7	6.4	12.3
	Water Resources	5.1	0	5.1	17.0
Cross Cutting Issues	DRR				10.9
	Environment				1.0
	Governance				1.3
	Persons with Disabilities				0.3
	Social Protection				28.9
	Gender				4.0
	Older Persons				0.4
	Child Protection				3.4
Total		157.7	62.5	220.2	370.0

1.3 The Effects

6. **The devastating heavy rains and floods resulted in substantive Damage to infrastructure and physical asset and changes in economic flows in both the public and private domains.** The assessment revealed that the total effects of the disaster in the 17 affected geographical areas amounts to US\$220.2 million of which US\$ 157.7 million (72 percent of the total effects) represents the value of destroyed physical assets and US\$ 62.5 million (28 percent of the total) refers to production losses. The total effects of floods were concentrated mostly in the Social Sector (US\$130.3 million – 59 percent) followed by infrastructure (US\$51.5 million – 23 percent) and productive activities (US\$28.4 million – 17 percent) (see Figure 1).

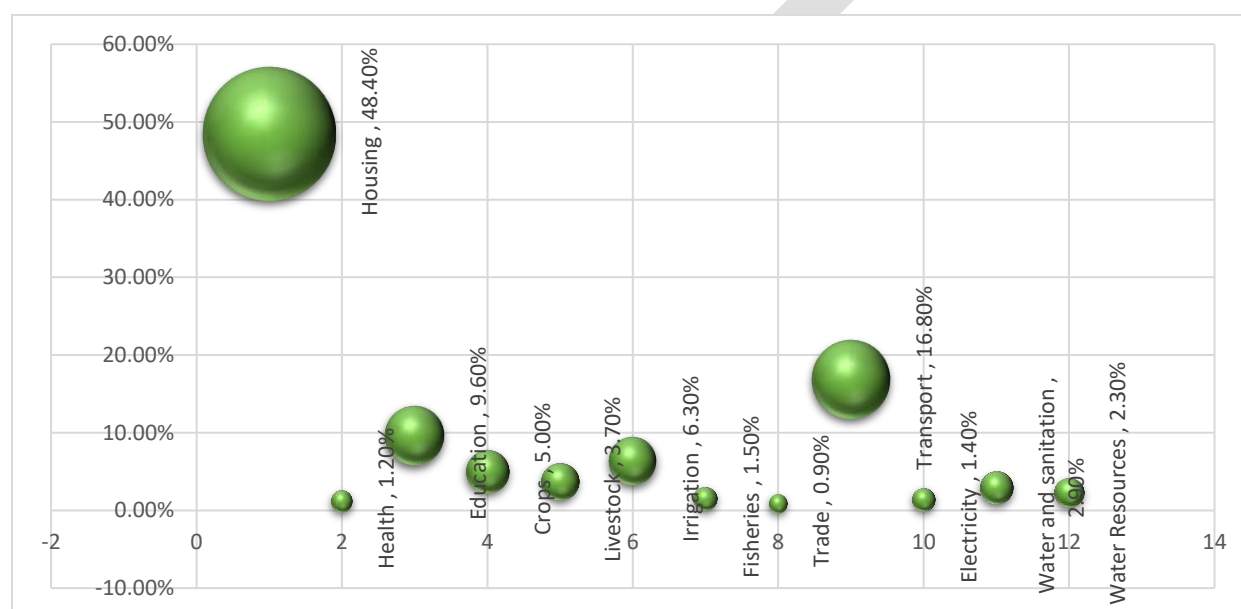


Figure 1: Share of total effects of floods by sub-sectors across social, productive and infrastructure sectors.

7. **The disaster impact was highest in terms of Social Sector driven by the effect on Housing which suffered the highest proportion of damage in the sector. Damage to Education and Health facilities was smaller.** The floods extensively washed away infrastructure (roads, bridges, power supply and irrigation and water supply equipment, intake structures, conveyance and distribution systems), which accounts for the Infrastructure Sector evincing the next highest value of damage. Loss in the productive Sector may be attributed mainly from income lost to farmers due to the submerged and washed away of crops which were at maturing stage, fishermen in the agricultural sub-sector; small traders in the Commerce and Industry sub-sector; and to higher expenditure in the Health Sector. Some places could not access social services due to damaged roads and drainage structures. For instance, the flood disrupted hydro-power supply as flooding debris which blocked and dislodged the screens, resulting into shutdown of the power plants for more than 48hrs (see Table 2). Commodity prices went up by 50 percent in the aftermath of the disaster and remain volatile suggesting that the affected households were prone to food insecurity.

Table 2: Summary of Key Physical Assets Damaged by the 2019 Floods in Malawi

Physical Assets Damaged or Destroyed		
Sector	Items Description	Quantity
Agriculture	Crop Land Destroyed (Ha)	91,638
	Livestock (No)	47,504
	Quantity of Fish Lost (No.)	??
	Irrigation Systems Head works (No.)	64
	Irrigation Canals (m)	67,734
	Irrigation Flood Embankment (m)	19
	Solar Based Schemes (complete Sets) (No)	14
	Irrigation system pumping station (No.)	134
	Irrigation wells (No.)	607
	Irrigation drainage canals (m)	47
Education	School Blocks (No.)	154
	Teachers Houses (No.)	81
Health	Health Facilities (No.)	25
Housing	Houses (No.)	307,366
Social Protection	Number of Community-based Structures (No.)	???
Water and Sanitation	Boreholes (No.)	396
	Shallow Wells (No.)	81
	Boreholes Contaminated (No.)	332
	Shallow Wells Contaminated (No.)	19
	Water Intake Structures (No.)	27
	Water Supply Conveyance pipeline (m)	30
	Collapsed Latrines (m)	258,000
	Healthy facility latrines	140
	Hydrological Stations (No.)	11
	Dykes (No)	10
	Dams (No.)	7
Transport	Roads (km)	1841
	Bridges (No.)	129
	Culverts (No.)	68
	Drifts (No.)	68

1.4 The Impact of the Disaster

1.4.1 Macroeconomic Impact

8. The 2019 floods are estimated to have caused about US\$ 9.96 million of production losses to the economy in 2019, equivalent to 0.13 percent of Gross Domestic Product (GDP). The real GDP in 2019 is expected to slow down by 0.1 percent representing a downward shift from 5.0 percent before the floods to 4.9 percent after the floods. This impact is driven by losses in agriculture, construction, electricity, wholesale and retail trade, transport and accommodation and food services sectors. In addition, the current account deficit as a percentage of GDP is expected to slightly change as exports and imports respond to the effects of the disaster during the year. Similarly, expenditures towards relief and post floods recovery will exert extra pressure on the fiscal position of the Government. However, the effects of floods on the overall economy

could be mitigated by the multiplier effects of recovery efforts through an increase in (i) public expenditures and (ii) private consumption expenditures on account of remittances. The loss of income and slowing down of economic growth are likely to reduce government revenue collections. At the same time, public expenditures on disaster relief, reconstruction, and recovery are likely to rise substantially. Typically, the effect of a natural disaster on Gross Domestic Product is usually a fall in the year of the event and/or the subsequent year with a rebound expected in successive years resulting from recovery efforts.

1.4.2 Human and social impact

9. The March 2019 flood disaster has left deep and wide impacts on individuals, families and their communities and the implications of the event, will be felt on various aspects of human and social development, for some time to come. The affected population (see Figure 2) may be divided into three categories, as illustrated in figure 3, the primary included those that have lost their lives (60) and those that were injured (672). The secondary includes those who were made homeless because of the event (99,728). The tertiary population group is defined as that group that have lost income because of the event. In the case of Malawi farmers and small micro entrepreneurs amounting to just under 500,000 would have fallen into this category.

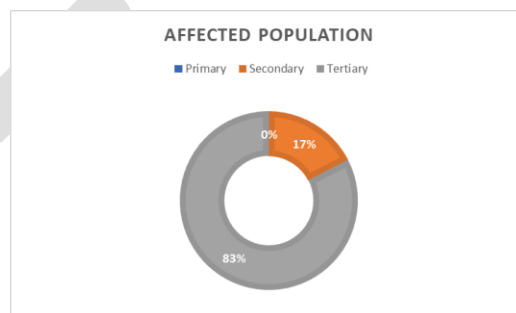


Figure 2: The affected Population

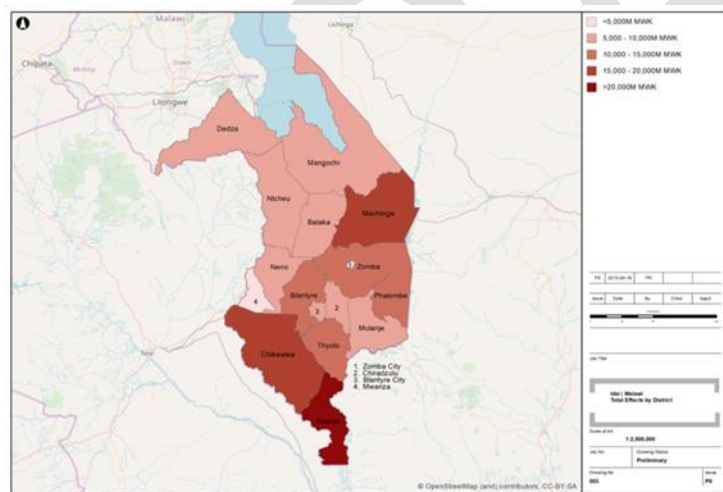


Figure 3: Per capita distribution of Total Effects (Million MWK)

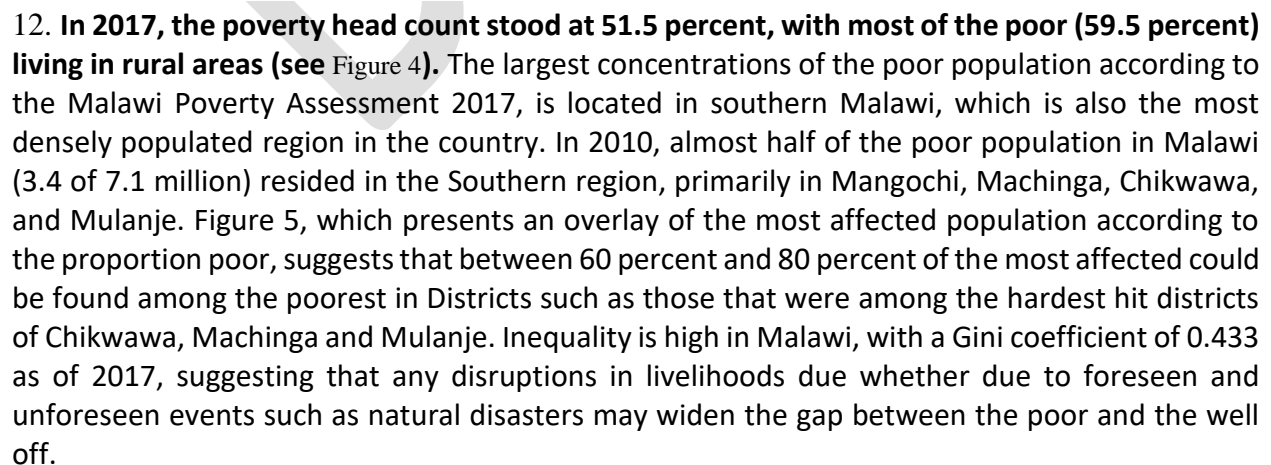
and Machinga.

10. Direct effects on the infrastructure and productive sectors are further compounded by impacts on socio-economic conditions such as increased poverty level, declines in health status, poor environmental conditions and a decline in quality education of affected populations, which are key to their productive lives.

Figure 3 shows the per capita distribution of the population affected according to the extent of damage and loss in Malawi Kwacha, suggesting that the most affected populations will be found in Nsanje, followed by Chikwawa

11. The agriculture sector is dominated by women (90%), largely subsistence farmers (produce 80% of household food), who also account for a higher proportion of the population in the informal sector of the economy. Therefore, the effects on Crops such as maize, pulses, sorghum and rice, key to household food and income sources were seriously affected, indicating outright

Figure 4: Poor distributed by hardest hit districts in 2019 Floods



1.5 Needs for recovery and reconstruction

13. Recovery needs include the costs of prioritized interventions identified through a recovery strategy on the basis of short, medium and long term. The 2019 Post-disaster needs are valued at US\$ 370.0 million (See Table 3). Recovery needs refer to financing required to assist affected people to recover the pre-disaster level of household income, to restore the supply and access to basic services of health, education, water and sanitation, etc.; and to ensure recovery of production in sectors of agriculture, industry, commerce, etc. Reconstruction requirements are the financial resources needed to repair and rebuild destroyed or damaged assets and infrastructure under disaster-resilient standards and conditions. The share of estimated recovery needs among the main sectors of the economy and cross cutting issues reveals that the Social Sector is expected to absorb the largest share of the cost of recovery (54 percent of the total recovery needs), followed by the Infrastructure sector (20 percent), cross-cutting issues (14 percent), and the productive sector (12 percent), illustrated by Figure 6. Learning from past disaster events and the current event, Malawi requires strengthening its disaster risk management strategy that promote resilience to disasters and build back better while fostering an inclusive sustainable economic growth and development. Acceptable structural standards on construction, with appropriate hazard-resistant features and physical planning to avoid locating homes or public infrastructures in flood-prone areas, improved strengthening and expansion of flood control systems, flood-forecasting and prevention activities and restoration of fragile ecosystems are some of the perquisite for resilience and building back better and smarter.

Table 3: Share of Disaster Recovery by Sectors and Cross Cutting Issues in USD Millions

		Sector needs	Crosscutting	Total Needs
Social	Housing	105.64	0.30	105.94
	Health	26.30	4.33	30.64
	Education	59.59	3.00	62.59
Productive	Agriculture	-	0.33	0.33
	Crops	19.07	-	19.07
	Livestock	2.35	-	2.35
	Irrigation	17.91	-	17.91
	Fisheries	1.36	-	1.36
	Trade	3.30	-	3.30
Infrastructure	Transport	-	-	-
	Roads and Bridges	42.64	-	42.64
	Electricity	4.30	-	4.30
	Water and sanitation	11.95	0.37	12.33
	Water Resources	17.00	-	17.00
Crosscutting issues	DRR	-	10.93	10.93
	Environment	-	1.01	1.01
	Governance	-	1.30	1.30
	Persons with Disabilities	-	0.32	0.32
	Social Protection	-	28.92	28.92
	Gender	-	4.00	4.00
	Old Person	-	0.30	0.30
	Child Protection	-	3.40	3.40
Total		311.43	58.53	369.95

14. The planned needs include structural and non-structural measures with the value of non-structural needs being identified as being a little over 25 percent of the value of all needs identified. This augurs well for strategic positioning of needs activities towards resilience building, as the measures identified as non-structural, address issues of capacity building, redeveloping processes, introducing innovations, ultimately doing things differently to achieve greater efficiency and resilience. Furthermore, the Needs are substantially higher than the value of damage and Loss or Total effects (at about 67% increase) due to a number of factors such as (i) Capital stock in the social sector was not high resulting in low economic value of damage; (ii) the value of damage and loss in the productive sector was low as high income earning aspect of the economy such as Tobacco or tea production were not significantly affected and (iii) the economic value of damage to infrastructure although significant was localized. Since the emphasis is on resilience building, then there is some expectation that to achieve such, the investment will need to be well above the value of the damage and loss.

1.6 Way forward

15. Recurrent and severe disasters in Malawi in the past few years call for new thinking and approaches to recovery and resilience. Sector-specific recommendations are anchored on the National Disaster Risk Management Policy (2015), the Malawi Growth Development Strategy III, the draft National Resilience Strategy (2018-2030), the draft NRS Phase I Implementation Plan (2018-2023), and the draft Disaster Risk Management Bill. Therefore, the occurrence of the 2019 disaster should be considered as an opportunity to solve longstanding challenges and hence the recovery and reconstruction program should be viewed as an integral part of socio-economic development plans for Malawi. Given this understanding, investment that aim at enforcing the common framework for disaster risk reduction and building resilience, while fostering inclusive sustainable economic development should be part of the development agenda for Malawi. Mechanisms need to be in place to enforce the existing institutional arrangements for disaster risk management in the country.

16. The recovery and reconstruction should be regarded as part of risk reduction and therefore the infrastructures and productive activities should be less vulnerable. Acceptable structural standards on construction, with appropriate hazard-resistant features and physical planning to avoid locating homes or public infrastructures in flood-prone areas, improved and expanded floods control systems, better flood-forecasting, prevention and early warning activities, and restoration of degraded ecosystems while involving the local communities are some of the prerequisites for resilience and building back better and smarter. The recovery and reconstruction strategy also need to focus on increasing the resilience of poor and ultra-poor households from disasters, facilitate quick recovery and reduce adoption of negative coping mechanisms. Targeting assistance to the most disaster affected people would also help to reduce existing differences in development and reduce the number of marginalized people living under poverty line.

17. Essential to resilience building are the effective tools for building back better including enforcement of compliance to construction specifications; dissemination of safer construction guidelines for schools and housing at grassroot level, comprehensive hazard mapping and zoning,

and effective contact management. In addition, resilience agricultural measures and diversification would be needed to ensure resilient and diversified agricultural production for sustainable income of the poor households who are severely affected by disaster all the time.

2 PART I: DISASTER IMPACT AND EFFECTS

2.1 Disaster Risk Profile of Malawi

18. Malawi is exposed to a number of hydro-meteorological and other hazards, mainly, floods, droughts, hailstorms, strong winds and earthquakes. Malawi's vulnerability is linked to specific geo-climatic factors: (i) the influence of the El Niño and La Niña phenomena on the country's climate; (ii) the three lakes namely Malawi, Chiuta and Chilwa and the broader hydrological network; and (iii) the location of the country along a tectonically active boundary between two major African plates within the great East African Rift System, causing earthquakes and landslides

19. The Intergovernmental Panel for Climate Change (IPCC) fifth Assessment Report (AR5) identifies Malawi as one of the high-risk countries to adverse effects of climate change. Over the past five decades, Malawi has experienced over 19 major incidences of flooding and seven droughts, which heavily impacted the population. Observed mean annual temperature has increased by 0.9°C between 1960 and 2006 (Vincent et al., 2013). Observed average annual rainfall also shows that in 1989, 1997 and 2015 were very wet whilst 1992, 2005, 2008 as well as 2016 were very dry. However, in 2016, Malawi experienced the worst drought in 35 years. Future climatic projections and models point to possibility of frequent and extreme weather events (FCFA brief, 2017). Nevertheless, the complexity in topographic conditions and unavailability of robust historic data for certain parameters challenge the prediction of rainfall patterns and extreme events (Niang et al., 2014).

2.2 Socio-economic Context of Malawi

1. Malawi's economy is largely agrarian, with the sector contributing about 30 percent to Gross Domestic Product (GDP). As a consequence, economic growth in Malawi is premised on favorable weather pattern, as well as the availability of foreign exchange. Approximately 85 percent of households are involved in subsistence and rain-fed agriculture. Women contributes about 70 percent of the workforce in agriculture. The other sectors are wholesale and retail (15.3 %), manufacturing (9.4 %), real estate activities (7.7 %) and financial activities and insurance (5.1 %). Performance in these sectors is linked to agriculture, through agro-processing, distribution of agricultural products, as well as consumer demand.

20. Malawi has a total population of 17.6 million out of which 49 percent are male and 51 percent are female¹. About 44 percent of the population of rural Malawi lives in permanent houses while 36 percent dwells in semi-permanent houses and 20 percent stay in traditional houses. Both semi-permanent and traditional houses are the most vulnerable to disasters and are usually occupied by the poorest and other vulnerable population such as women, widows, people living with disability, orphans and the elderly.

¹ National Statistical Office. 2018. Fourth Integrated Household Survey 2016/2017. Zomba, Malawi

21. Although improvement in school infrastructure has increased enrolment, some school blocks are built using both community and local development funds which do not follow construction standards rendering them susceptible to disasters. There are approximately 5 million learners enrolled in primary schools and 351,648 pupils in secondary schools. About 88 percent of population aged between 6 and 13 years, in southern region, are enrolled in primary schools out of which 91 and 86 percent are girls and boys, respectively. There are 16 percent are male and 15 percent are female enrolled in secondary school. Currently there are 7,318 of Early Child Development (ECD); 6,194 of primary schools; 1,469 of secondary schools.

22. Malawi primary health care system is categorized in three administrative levels, namely, primary, secondary and tertiary. The rural population is mostly serviced through primary health care system which is provided by rural or community health facilities. Most of these community health facilities provide out-patient services and refer in patients to rural or district hospitals which are either secondary or tertiary health facilities. The affected 17 local councils have a total of 445 Primary Health care facilities, 27 secondary health care facilities and 3 tertiary facilities.

23. The Malawi Vulnerable Assessment Committee Report estimated that a majority of the population would be food insecure during the lean period of the 2018/2019 season. Approximately 3,306,405 people², representing 22 percent of the population, were recommended for humanitarian assistance between October 2018 to March 2019 consumption period. According to the Integrated Household Survey (2016/2017), almost 60 percent of the population in Malawi is annually food insecure and weather events exacerbate the situation.

24. Malnutrition is high in the country where stunting remains high at 37 percent while wasting and under-weight are 3.8 and 11.7 percent respectively. Micronutrient deficiencies are common with anaemia affecting 60 percent of the under five children and 30 percent of women. Only 8 percent of children aged 6 to 23 months meet the minimum acceptable diet, which includes minimum dietary diversity and meal frequency. Childhood diseases are very common; the prevalence of diarrhoea and fever are 22 and 29 percent, respectively. Even though the impact of floods on nutrition isn't yet evident as the physiological effects take time to manifest, the already precarious nutrition situation might deteriorate if the immediate food and nutrition related needs are not addressed.

2.3 Overview of the 2018/2019 rainfall season in Malawi

25. During the first week of March 2019, Malawi experienced one of the worst strong winds, heavy rains and floods induced by Tropical Cyclone Idai³ that formed in the Mozambican channel and moved into Malawi during its formative stage. In September 2018, the Department

⁴ IFPRI 2019 Report

² The 2018/2019 Malawi Vulnerability Assessment Committee Report

³ The Cyclone were in its early formative stages which was on the verge of becoming a Tropical Cyclone IDAI formed in Mozambique and moved into Malawi before looping and tracking back into Mozambique Channel in the Indian Ocean where it strengthened and became a fully blown Intense Tropical Cyclone Idai on 11 March with estimated maximum winds of 195km/h (120mph), which made a landfall in Beira, Mozambique on 14 March but eventually moved to Zimbabwe where it weakened and died on 18 March 2019. In the Southern Hemisphere, it currently ranks as the third-deadliest tropical cyclone on record, behind the 1892 Mauritius cyclone and Cyclone Flores in 1973.

of Climate Change and Meteorological Services (DCCMS) released the seasonal forecast which indicated normal to below normal rainfall amounts in the southern region whilst the Central and Northern Regions would receive normal to above normal rainfall. A closer analysis and downscaled seasonal weather forecast indicated above normal rainfall events across the country. Early March 2019, the country received heavy rains⁴ accompanied by strong winds in the Southern Region Districts which resulted into flooding in 15 out of the 28 districts and 2 Cities of the country.

26. Accordingly, the President of the Republic of Malawi, declared a state of disaster in all flood affected geographical areas and appealed for international assistance on the 8th March 2019. Floods affected 15 districts and 2 cities, namely Balaka, Blantyre, Chikwawa, Chiradzulu, Machinga, Mulanje, Mwanza, Neno, Nsanje, Phalombe, Thyolo, Zomba, Zomba City and Blantyre City. in the Southern region and Dedza as well as Ntcheu in the Central region. A total of 868,895 people affected, 86,976 displaced, 60 killed and 672 injured⁵. About 58 percent of people displaced by floods were women.

2.4 The 2019 flood response and coordination

27. The Government of Malawi launched a Flood Response Plan on 28 March 2019 with immediate humanitarian response needs estimated at about US\$45.2 million. The plan had a financial gap of US\$ 15.6 million⁶ for short term response. The plan sought to support response interventions around Food security, Agriculture, Nutrition, Protection, WASH, Education, Health, Shelter and Camp Management, Early Recovery and Coordination clusters. Although government as well as other humanitarian actors continued to support relief activities, it was observed that food and non-food items were still inadequate amongst internally displaced people (IDP). Furthermore, most IDP sites had inadequate water supply, sanitation facilities as well as protection issues which increased gender-based violence particularly for women and girls.

28. Government activated eleven clusters to coordinate disaster assessment and emergency response, at national and district level. A communication technical working group was also set up to coordinate and manage information during both the assessments and response activities. Additionally, a National Emergency Operations Centre (NEOC) was established in the Southern Region and in Lilongwe where cluster leads provided updates. However, it was difficult to track other response activities done by the private groups and individuals.

2.5 Reflections from the 2015 and 2019 Floods

29. In this PDNA, lessons on the recommendations for the implementation of recovery interventions on the 2015 and management of the 2019 floods are discussed and analyzed. This analysis will further guide and enhance the whole DRM cycle as well as build back better and smarter to achieve a resilient nation. The followings are the reflections from the 2019 PDNA:

⁴ Mpemba rainfall station recording the highest one-day rainfall amount of 255.5 mm

⁵ Government led Inter Agency Assessment Report and UN Situation Report of 18-22 March 2019.

⁶ Department of Disaster Management Affairs (DoDMA) & United Nations Office of the Resident Coordinator Malawi: Floods Situation Report No. 3 (as of 7 April 2019).

- **There is limited understanding, identification and quantification of disaster related risks.** Existing risk assessment do not adequately provide information to guide stakeholders in DRM, perhaps, because they are scared, outdated and partial. Some infrastructures were evidently constructed in places which were highly vulnerable to disasters such as boreholes situated along the drainage system. The 2019 PDNA observed that in some instances, lack of understanding the magnitude and manifestation of the floods resulted into under-design of dykes, dams and irrigation canals.
- **Implementations of most DRM related activities happened in silos and were sometimes adhoc.** Between 2015 and 2018, the assessment noted that some stakeholders implemented different DRM activities without creating synergy between each other. For example, DoDMA was unable to get information on activities that are implemented by other MDAs, non governmental organizations as well as other private individuals. Moreover, the NREOC, which is usually functional during disasters, was unable to capture data on vulnerable groups due to lack of multi-stakeholders coordination.
- **Weak connectedness between meteorological and hydrological services in early warning system fails to comprehensively inform decision making in the country.** Currently, the Department of Climate Change and Meteorological Services (DCCMS) provides information about weather patterns including rainfall and temperature. While the Department of Water Resources provide hydrological information such as early warning and likelihood of disasters. The PDNA observed lack of synergy between the two main components of the early warning system which defies forecasting of disasters.
- **Financing instruments for DRM are not clearly defined thereby frustrating preparedness and response to disasters.** Meanwhile, emergency response is financed through unforeseen vote and external assistance. However, the unforeseen vote does not provide resources for disaster risk reduction making the cost of response high and exerting additional fiscal pressure on Government. Further, in most instances, the external assistance is unpredictable and sometimes delays. The assessment has also found that over the years, local institutions have been unable to mobilise adequate resources for relief to vulnerable communities during disaster time. Furthermore, penetration of insurance services in DRM remain limited.
- **Limited capacity is observed across the whole cycle of DRM that is risk identification and reduction, preparedness, response as well as recovery.** Over the past years, the country has not been able to assess and identify human, social, economic and fiscal risks prior to disasters because of technical gaps in risk modelling. For example, after the release of seasonal forecast, there are no mechanisms to conduct a situational analysis that would identify potential risks for proper scenario planning, risk reduction and preparedness. Data for vulnerable groups such women, girls, people with disability and the elderly, is unavailable and often scanty making it difficult for inclusive recovery.
- **There is a poor programming for recovery and reconstruction for resilience and building back better and smarter.** The assessment observed the following: (i) sequencing of

recovery interventions does not follow underlining principles; (ii) most activities are not prioritized resulting into larger number of interventions in a single phase; (iii) lack of prioritizing investments across sectors; (iv) interventions having inadequate financing; and (v) limited process monitoring of recovery and reconstruction activities. Over the years, it is noted that there is a shift towards non-structural recovery actions.

- **Disaster risk management in Malawi has a number of related policies, strategies and guidelines that lacks proper implementation.** For example, the PDNA noted the availability of safer construction guidelines for social sectors but have not been disseminated and lacks enforcement. The DRM policy has been in place since 2015, but, its operationalization is limited.
- **Contingency planning does not have provision in the national budget as it is developed after Government has already done budget appropriation.** On one hand, the process for developing the contingency planning takes longer and depends on actual weather forecasts. On the other hand, contingency planning is not based on historical data, risk prediction and scenario analysis to adequately reflect the nature of the hazards, vulnerabilities and capacities.
- **Although the DRM policy has established structures at both national and local levels, there few DRM personnel staffed at local authority to coordinate DRM issues.** Moreover, 24 councils use desk officers who are committed with other responsibilities thereby compromising DRM implementation. In addition, Civil Protection Committees which coordinate DRM activities at local level are only active in few council and are usually supported by NGOs.

2.6 Legal and Institutional Framework

30. Policy frameworks at international level, including the Sendai Framework and the African Strategies for Disaster Risk Reduction, have strongly shaped the disaster risk management policy landscape in Malawi. These frameworks have informed Malawi's overarching development planning document, the Malawi Vision 2020, which is implemented through the Malawi Growth and Development Strategies (MGDS) I (2006-2011); II (2011-2016) and III (2017-2022). Building on lessons learned from the implementation of previous strategies, the new MGSD III focuses on fewer development areas. The Disaster Risk Management (DRM) is one of the development cross-cutting area which aims at reducing vulnerability and enhancing the resilience of the population to disasters and socioeconomics shocks. The National Resilience Strategy (draft) informs implementation of the DRM activities of the MGDS III through breaking the cycle of food insecurity.

31. Additionally, the National DRM Policy (2015) provides strategic guidance for effective mainstreaming, implementation and coordination of DRM programming at all levels of sustainable development policies and planning. It highlights a set of key priority areas and strategies for making Malawi a nation resilient to disasters. It also provides a common direction to all government, non-governmental organizations, private sector organizations, media and development partners at national and local levels on how to effectively implement disaster risk management programs and activities. Furthermore, Malawi has a progressive national gender policy and the legal environment including the Gender Equality Statutes and the National Gender Policy which provides the guidance to integrate gender into all development plans including Disaster Risk Management.

32. The National Resilience Strategy (NRS) provides a paradigm shift whereby it puts more emphasis on resilience building from a multi-sectoral perspective to break the cycle of food insecurity and other humanitarian support following disasters. The NRS is designed on the understanding that building resilience must be done across multiple sectors, at the household level as well as within the systems and structures that govern and impact people's lives and livelihoods. It is centred around four pillars, namely: Resilient Agricultural Growth; Risk reduction, flood control, early warning and response systems; Human Capacity, Livelihoods, and Social protection; and Catchment Protection and management.

33. Although the Government of Malawi is in the process of drafting the new DRM bill, the National Disaster Preparedness and Relief (DPR) Act of 1991 is still the oldest and main legal legislation that establishes the Department of Disasters Affairs Management (see Figure). The DPR Act 1991 provides guidance on coordination and implementation of disaster reduction initiatives in the country. It also establishes the National Disaster Preparedness and Relief Committee, i.e. at both Technical and Steering level, and the National Disaster Preparedness and Relief Fund and the Civil Protection Committee at local level. The Act further mandates the President to declare the State of Disaster which establishes the specific geographic area of affectation within the country and the period of its effectiveness is within three (3) months.

Meanwhile, the draft DRM bill captures issues of DRM, resilience building and sustainable financing (Error! Reference source not found.).

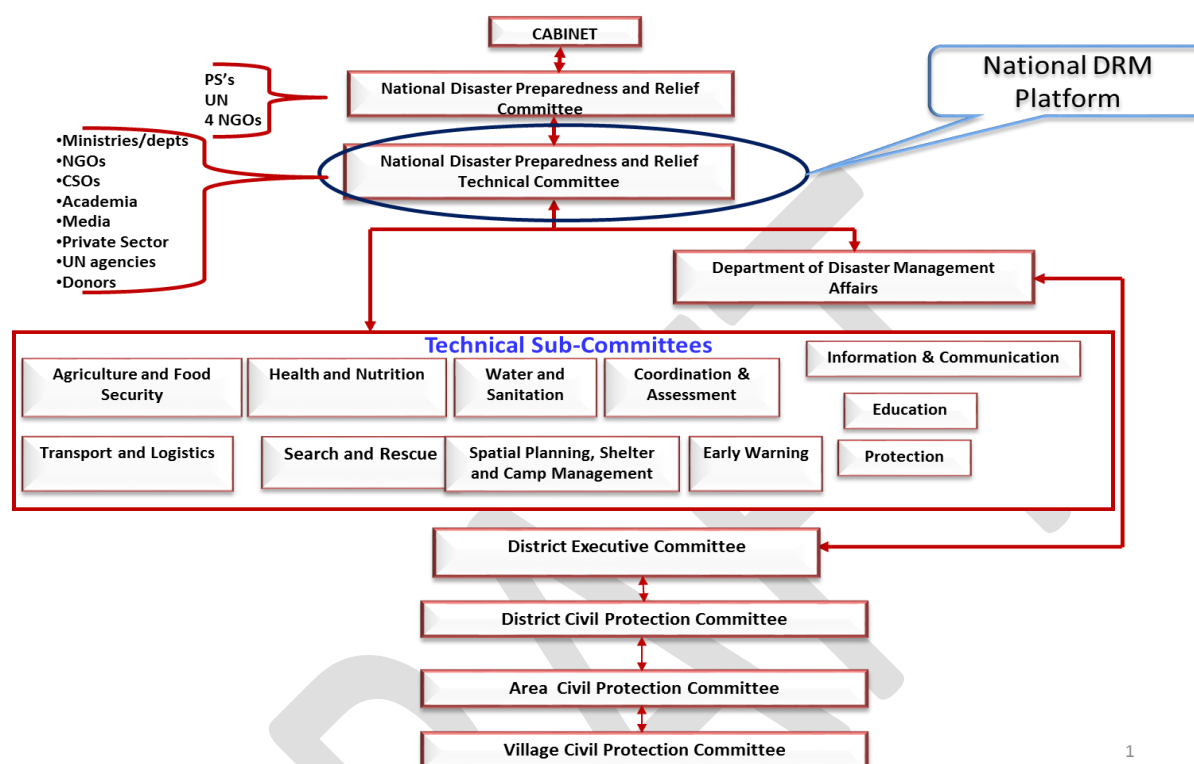


Figure 5: DRM Institutional Framework in Malawi at various levels

2.7 PDNA Approach and Methodology

34. **The PDNA is a people centered methodology for joint assessment and recovery planning that analyzes effects and impacts of disasters for the purpose of identifying and estimating recovery financial needs and defining a recovery strategy.** It evaluates the effects of the disaster while using information on the physical damages and socioeconomic aspects. Further, the PDNA provides an overall impact analysis of disasters on macroeconomic and human development contexts of the country. It presents a comprehensive picture of pre and post-disaster contexts, recovery strategy that determines distinct needs and recovery priorities of different sectors and cross cutting issues that builds back better and smarter.

35. **The PDNA is a government led and owned process that receives technical and financial support from Government, European Union, World Bank and United Nations based on joint declaration of 2008 on post crisis response.** The process involves multi-stakeholder⁷ engagement, and coordination becomes an important element to produce a participatory and comprehensive Post Disaster Needs Assessment product and has four core deliverables:

- A consolidated and comprehensive assessment report;

⁷ Includes affected population, local authority, donor community, NGOs, Civil Society and the Private Sector.

- A Recovery Strategy that defines the vision and sectoral actions;
- A basis for resource mobilization in support of the country's recovery; and
- An outline for implementation mechanisms of recovery strategy

36. The Government initiated the Post Disaster Needs Assessment early April 2019 to conduct a joint assessment of the impacts of heavy rains and floods. Government together with development partners conducted the PDNA in all the 15 districts and 2 cities, namely, Balaka, Blantyre, Chikwawa, Chiradzulu, Dedza, Machinga, Mangochi, Mulanje, Mwanza, Neno, Nsanje, Ntcheu, Phalombe, Thyolo, Zomba and Blantyre City as well as Zomba City. This PDNA covered sectors such as Housing, Health and Nutrition, Education, Agriculture (Crops, Livestock, Irrigation and Fisheries); Commerce and Industry, Transport, Energy, Water Supply and Sanitation and Water Resources, DRR and EWS and Cross Cutting. Further, the PDNA undertook the Macroeconomics as well as Human Development Impact Analysis of heavy rains and floods.

37. The PDNA process comprising over 50 sector experts from the Government, the World Bank, the UN and other development partners and selected civil society organizations run from 1st to 18th April, 2019. The team reviewed and finalized data collection tools, compiled baseline data and structured the PDNA report during orientation. After which the team gathered and analyzed sector specific data on damage, loss, impacts and needs as well as visited selected floods' affected districts to validate the findings. The PDNA process combined both bottom-up and top-down approaches by engaging local and national level administrators, respectively.

38. The PDNA evaluated the effects of floods through assessing (i) damages to infrastructure and physical assets, (ii) disruption of access to goods and services, (iii) governance and decision-making processes as well as (iv) increased risks and vulnerability. The effects of floods determine the recovery needs and strategy of the PDNA. Usually, effects of floods are expressed both in quantitative and qualitative terms and evaluated in terms of damages and losses.

- Damage is defined as total or partial destruction of physical assets existing in the affected area. Damage occurs during and immediately after floods and is measured in physical units. Its monetary value is expressed as the replacement costs according to prices prevailing just before the event.
- Loss is defined as changes in economic flows arising from the damage to infrastructure and assets or disruption in access to goods and services because of a disaster. Loss occurs until full economic recovery and reconstruction is achieved, in some cases lasting for several years.

39. The PDNA team estimated the economic value of the effects based on four key effects, namely, (i) total and partial destruction of infrastructure as well as assets; (ii) changes on production, delivery and access to goods and services; (iii) changes on governance processes; and (iv) risks whereby economic loss related to changes in financial flows.

40. The Recovery Strategy identified and prioritized the recovery and reconstruction needs on the basis of short, medium and long term. The recovery needs are required to rehabilitate basic services and re-activate productive activities. Recovery needs also include capacity building and

operational costs for service delivery and differentials for building-back-better that enhance future disaster resilience. The reconstruction needs are required to finance replacement or repair physical assets that were destroyed by the disaster.

41. **This PDNA used both primary and secondary data and was sourced from the respective Government ministries and departments, to estimate the effects.** Data validation techniques included field visits to affected districts, key informant interviews with relevant stakeholders, as well as desk reviews. Further validation of data was performed using process verification techniques and empirical plausibility checks. Expert review technical field assessment and discussions were held to validate the findings and come up with plausible recommendation moving forward. The assessment used a floods reduction factor to ensure that damage and loss captured by the PDNA, was attributable to the floods and heavy rains.

2.8 Economic and Social Impacts

2.8.1 Overview

42. The floods are estimated to have caused about MWK 7.47 billion (US\$ 9.96 million) of production losses to the economy, equivalent to 0.13 percent of Gross Domestic Production, in 2019. The real Gross Domestic Product is, therefore, estimated to slow down by 0.1 percentage points in 2019 having moved from 5.0 percent before the floods to 4.9 percent after the floods (see Figure 6). This impact is driven by losses in agriculture, construction, electricity, wholesale and retail trade, transport and accommodation and food services sectors. The current account deficit as a percentage of GDP is expected to slightly change as exports and imports respond to the effects of the disaster during the year. Inflow of aid is likely to have a positive effect on the financial account. Expenditures towards relief and post floods recovery will exert extra pressure on the fiscal position.



Figure 6: Projected real GDP growth in 2019 Percent

2.8.2 Pre-disaster economic context

43. Malawi registered a GDP growth rate of 4.0 percent in 2018, 5.2 percent in 2017 and projected 5.0 percent in 2019 (see Table 4). This was on account of a decline in agricultural output following dry spells and fall army worm infestation in 2018. A rebound in agricultural production increased growth in 2017 following two consecutive years of floods and droughts in 2015 and 2016, respectively. Agriculture continues to be the main driver of economic growth contributing approximately 30 percent to GDP over the past decade and 80 percent of foreign exchange with tobacco, sugar, tea, and pulses being the major export products. As an agro-based economy, the country is vulnerable to weather and climate related shocks and good harvest hugely determine the economic growth.

Table 4: Key macroeconomic indicators, 2014-2019

	2014	2015	2016	2017	2018	2019
GDP Growth (%)	6.2	3.3	2.7	5.2	4.0	5.0
Inflation (%) annual average	23.8	21.9	21.7	11.5	9.2	8.0
Exchange rate (average US/MWK)	424.4	499.6	718.0	730.3	732.3	--
Current account balance incl transfers (% of GDP)	(18.7)	(17.0)	(19.1)	(25.1)	(14.7)	(13.7)
Fiscal balance (% of GDP)/1 ⁸	(6.5)	(5.7)	(3.8)	(3.4)	(6.1)	(5.3)

⁸ /1 Reported on a fiscal year basis

Primary balance (% of GDP)/1	(2.1)	(1.7)	(0.1)	1.0	(2.3)	(2.5)
External debt, public sector (% of GDP)	33.5	36.9	33.2	32.5	32.1	34.2
Domestic debt, Central Government (% of GDP)	19.3	19.4	21.2	22.6	22.2	20.3
Gross reserves in months of import cover	3.1	3.4	2.9	3.2	3.3	--
Lending rate	36.8	36.4	30.0	24.8	14.9	--

Source: Ministry of Finance Economic Planning & Development; National Statistical Office; Reserve Bank of Malawi

44. Inflationary pressure has subsided over the past two years receding to single digit levels since end 2017. The national headline year-on-year inflation recorded an annual average rate of 9.2 percent in 2018 compared to 11.5 percent the previous year. The slowdown in inflation was mainly driven by declining food prices and stability of the Malawi Kwacha against currencies of Malawi's major trading partners. Despite upward pressure from rising maize prices during the lean season and increased water and electricity tariffs, the year 2019 was estimated to close with an annual average headline inflation of 8 percent. This reflects the improvements in the macroeconomic fundamentals including inflation over the past three years, albeit pressure from continuous negative impacts of natural disasters.

45. The Malawi Kwacha has remained relatively stable against the US\$ since 2017 trading at a monthly average of MWK 735/US\$. Stronger confidence in the local currency, robust reserves and weak demand for imports has supported stability of the Kwacha. Foreign exchange reserves have stood at or more than 3.0 months of import cover since mid-2017. A continued stability of the Kwacha relative to the US Dollar partly helped contain inflation to single digits as it exerted downward pressure on non-food inflation.

46. Despite a relatively stable macroeconomic environment over the past three years, Malawi's fiscal position remains vulnerable to shocks and poses risk to public debt sustainability. The country's history on fiscal outcomes has been one of significant volatility with expenditure overruns against revenue shortfalls and poor grant disbursements – all affecting the execution of the budget. This leads to persistent fiscal deficit which subsequently results in a growing share of public expenditure going toward servicing of domestic debt. This reduces fiscal space for public service delivery and investment. The recurrence of adverse weather shocks has also compounded the fiscal situation. This is due to declines in agricultural output and an accompanying slowdown in economic growth which in turn leads to a decline in Government revenue. Experience has shown that every natural disaster is accompanied by increased expenditure on relief interventions as the Government assists disaster victims. Before the 2019 flood disaster, the fiscal deficit was projected to narrow from 6.1 percent of GDP in 2017/18 Fiscal Year (FY) to 5.3 percent in 2018/19 FY.

47. On the external front, Malawi has continuously experienced a current account deficit mainly because exports are perpetually less than imports. However, a significant growth in net exports in 2018 saw the current account deficit narrow to 14.7 percent of GDP from 25.1 percent of GDP in 2017. A slowdown in economic activities and depressed disposable incomes following a poor agricultural season in 2018 also saw a decline in imports. Before the floods, current account balance for 2019 was projected to further narrow to a deficit of about 13.7 percent of GDP.

2.8.3 Effects on Gross Domestic Product (GDP)

48. **The impact of the floods on the economy is estimated to slowdown GDP growth from an estimated 5 percent (before the floods) to 4.9 percent growth (after the disaster).** The nominal loss is estimated at 0.13 percent of GDP. These calculations are derived from a production-side national accounts growth model based on the assessment of losses by sector. Table 5 below depicts agriculture, construction and electricity and water supply as the most affected sectors contributing 58.4 percent, 22.6 percent and 12.3 percent to the total loss, respectively. Figure 6.3 shows GDP loss as calculated at national level which might overshadow the loss in GDP by sectors such as agriculture, manufacturing as well as wholesaling and retail trade (see Figure 7).

Table 5: Nominal GDP by Affected Sectors Pre and Post Floods⁹

Sector*	Pre-floods GDP (MK'million)	Post-floods GDP (MK'million)	GDP Loss (MK'million)	Sector Loss (% of Total Loss)
Agriculture, forestry and fishing**	1,614,950.9	1,610,587.8	(4,363.1)	58.4
Crop and animal production	1,119,179.5	1,114,901.6	(4,278.0)	57.3
Fishing and aquaculture	96,794.0	96,708.9	(85.1)	1.1
Manufacturing	540,869.5	540,952.3	82.9	(1.1)
Electricity and water supply	71,516.8	70,600.6	(916.2)	12.3
Construction	168,804.9	167,116.8	(1,688.0)	22.6
Wholesale and retail trade	947,791.4	947,546.9	(244.5)	3.3
Transportation and storage	166,336.5	166,171.3	(165.3)	2.2
Accommodation and food service activities	118,527.7	118,349.9	(177.8)	2.3
Nominal GDP	5,970,090.1	5,962,618.2	(7,471.9)	100.0

49. **In the agriculture sector, the crop and animal production sub-sector was the most affected having registered 57.3 percent of the total losses while fisheries accounted for only 1.1 percent of the total losses.** The most affected crops were rice, pulses and maize accounting for an estimated loss of MK2.0 billion (US\$ 2.7 million), MK 1.1 billion and MK 0.2 billion, respectively. In the livestock sub-sector, the most affected are goats, cattle and chickens reflecting an estimated loss of MK2.9 billion, MK2.6 billion and MK1.7 billion, respectively.

50. **Manufacturing sector saw a net gain of 1.1 percent on account of increased demand for plastic products towards relief efforts for the flood victims.** Notwithstanding this, the dairy sub-sector was negatively affected due to challenges of accessibility to milk-bulking groups by dairy manufactures as the roads became impassable during the disaster period. This was further compounded by the loss in cattle in the affected districts. Loss in livestock also negatively affected meat processing industries.

51. **Electricity and water supply accounted for about 12.3 percent of the total loss.** This was due to the accumulation of debris which affected generation of power and consequently water

⁹ * The table summarizes affected sectors only. Those without any impact have been excluded while ** Excludes forestry

supply. Furthermore, water boards experienced an additional cost of purifying water before it could be distributed to consumers.

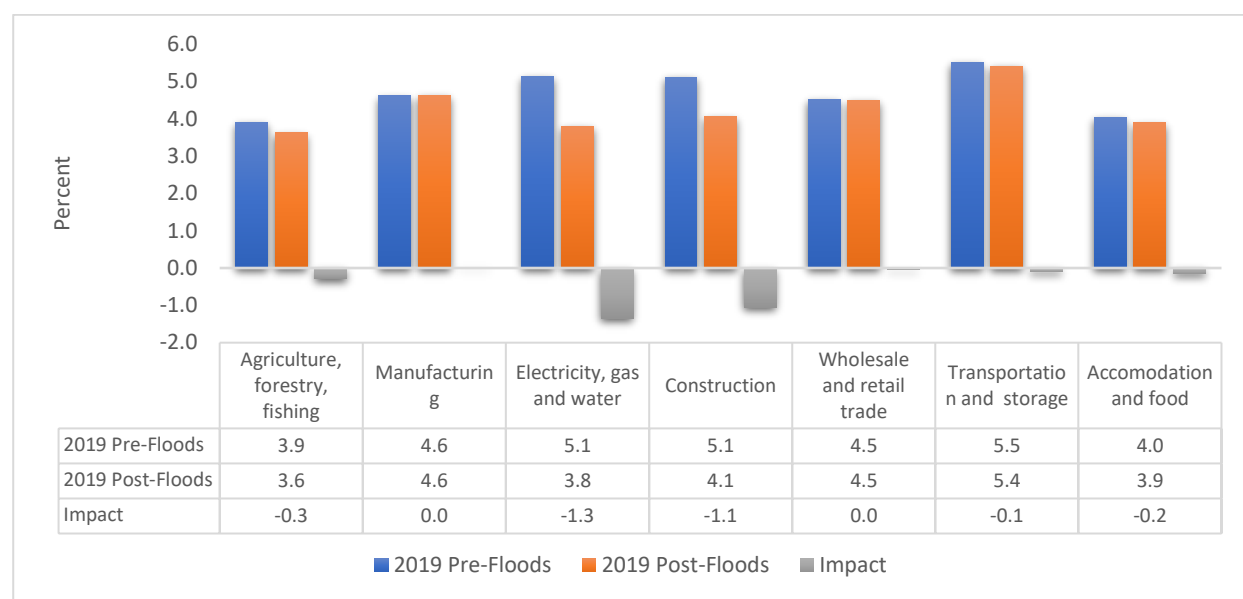


Figure 7: Impact of the Floods on Sectoral Growth (Pre and Post-Floods)

52. The construction sector suffered losses in value added which accounted for about 22.6 percent of total losses. Construction companies incurred additional costs following destruction of construction sites as well as costs to remove debris to resume construction works that were halted during the disaster period. However, commencement of reconstruction and recovery efforts of physical infrastructure is expected in the aftermath of the disaster which should partially offset some of the losses.

53. Wholesale and retail trade; transport and storage; and accommodation and food services accounted for 3.3 percent, 2.2 percent and 2.3 percent, respectively. Though the impact was limited, the slowdown in wholesale and retail trade was largely on account of disrupted trading with the affected areas after the disaster. The major challenge in the transport sector was disruption in business as transporters could not access some affected districts. Tea transporters reported floods forced them to temporary take longer routes through Der Es Salaam and Nacala instead of Beira thereby increasing their costs of doing business. For accommodation and food services, during the period of the disaster there was a net loss. On the one hand, business was affected by cancelled bookings as some places became inaccessible as well as a negative perception of the devastating impact of the cyclone by international media which affected foreign travelers. On the other hand, immediate recovery efforts and assessments saw a surge in the hotel service industry as stakeholders responded to the disaster.

2.8.4 Effects on Inflation

54. Although pressure on inflation is expected, especially in districts where rural areas have been hit hard, the effects of 2019 floods may not translate to high overall inflation. The shock has negatively affected the agriculture sector by washing away crops and livestock thereby

disrupting own food production in the affected districts. As such, the flood may be expected to drive up the staple food prices especially maize in the affected areas. This is, however, likely to be contained by the anticipated bumper harvest from other districts across the country with food being supplied from surplus districts to flood affected districts. In addition, flood affected the areas that are less productive and may, therefore, not significantly affect the overall food inflation. On non-food inflation, the impact is also expected to be minimal as the foreign exchange pressure from demand of importation of recovery and reconstruction materials may be offset by aid inflows which will buffer up reserves assuming international crude oil prices and domestic prices of electricity remain stable. In view of the above, the overall impact of the current disaster on inflation is thus expected to be negligible.

2.8.5 Effects on the Fiscal Position

55. The fiscal position may slightly deteriorate as Government responds to the disaster exerting further pressure on the budget. Projection in 2019 shows that Malawi has total debt of about 54.5 percent of the GDP where 34.2 percent is external debt and 20.3 percent is domestic debt. Financing requirements for the recovery disaster plan through borrowing or budget re-allocation may significantly disrupt the fiscal plan where borrowing may worsen the debt situation. Borrowing for internal procurement of maize for the affected population may not substantially affect the fiscal position due to low prices emanating from bumper yields from other districts. Although it is early to ascertain the fiscal impacts of the floods, some reconstruction needs which may be met through external support will offer relief to fiscal pressure respond to the disaster.

56. Notwithstanding the anticipated expenditure overruns, the floods are expected to have an insignificant negative impact on revenue prospects for 2019. The floods have mainly affected smallholder households and informal businesses which mainly produce for own consumption or are engaged in informal activities. As such, the impact of 2019 floods on the individual and corporate tax revenue is expected to be very small. Large scale enterprises were not significantly affected, though some reported indirect losses through reduced demand for their products due to decreased disposable income as the flood had affected livelihood of communities and may take long to fully recover from the disaster. Furthermore, the donor inflow induced recovery spending may likely boost the effective demand thereby improving tax revenues.

2.8.6 Effects on External Position (Balance of Payments)

57. Malawi's current account is expected to be slightly affected by the current flood disaster. Whilst exports may not necessarily decline, it is, however, anticipated that imports of goods and services for recovery and reconstruction may increase as a result of the current disaster. The assessment has shown that, apart from pulses, most of the major export commodities, namely, tobacco, tea and sugar, have not experienced any major production losses. Tobacco, the largest foreign exchange earner, saw limited impact because it is largely grown outside of the affected districts and it is an upper land crop and impacted areas are mostly lower land. Tea production was not significantly affected by floods. However, floods increased the cost of exporting tea due to use of longer Nacala route instead of the Beira route.

58. **Increased aid inflows are expected with a positive effect on the capital account.** It is anticipated that transfers are likely to increase to finance recovery and reconstruction activities. While the floods may slightly negatively affect the current account balance, the impact on the financial account will likely be positive. In view of the above, the overall impact on the balance of payments would, therefore, depend on the relative magnitudes of the deterioration in the current account and improvement in the financial account.

2.9 Pre-Disaster Human Development Profile

59. **Poverty in Malawi is high, wide and stagnant where poverty incidence slightly deepened from 52.5 percent in 2004/2015 to 51.5 percent in 2016/2017 (see Figure 8).**

Rural areas have the highest poverty head counts of about 59.5 percent in 2016/2017.

Across regions, the southern region has the largest proportion (65.2 percent) of poor people implying that the population may not be resilient to disasters. Southern region districts such as Phalombe, Nsanje and Mangochi have three out of five household poor. Further, inequality is high in Southern Malawi with a Gini coefficient of 0.50 as of 2017 suggesting that any disruptions in livelihoods due to either foreseen or unforeseen events such as disasters widen the gap between the poor and the well off.

60. **The majority of Malawians are food insecure and is higher in rural (66 percent) than in urban (42 percent) areas¹⁰.** Food insecurity is more prevalent in female-headed (69 percent) than male headed (58 percent) households. Additionally, 69 percent of widows are food insecure. Across regions, the Southern region has highest levels (63 percent) of food insecurity where Zomba, Machinga and Nsanje have about 80 percent of households experiencing food insecurity. Sixty nine percent of women and 58 percent of male are food insecure. Occurrence of any disaster would therefore exasperate food insecurity levels among most households.

61. **Malnutrition is alarming in Malawi with 37 percent of children aged between 6 and 59 months stunted.** Almost 37 out of 100 children in southern Malawi are malnutritional where both Mangochi and Neno have the highest levels (45 percent) of child malnutrition. Approximately 49 percent of mothers have body mass index that is less than normal (18.5). While disasters may not

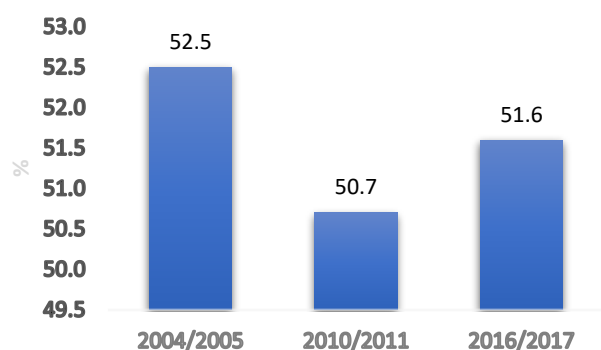


Figure 8: Poverty incidences between 2004/2005 and 2016/2017

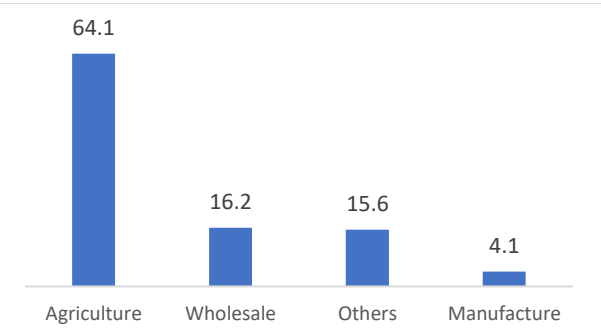


Figure 9: Percentage distribution of various sectors towards employment

¹⁰ NSO. 2017. Fourth Integrated Household Survey 2016/2017. Zomba, Malawi

have an immediate effect on malnutrition, it is likely that the levels of malnutrition worsen in the aftermath of the floods.

62. Malawi ranks about 171 out of 189 countries with a human development index of 0.476 placing it well below the sub-Sahara Africa average of 0.523. The employment rate for Malawi is reported at 79.6 percent where 85.7 percent are male and 74.3 percent are female¹¹. The majority of the population is employed in the agriculture sector (64.1 percent) followed by 16.2 percent in retail and trade (see Figure 9). Almost 70 percent of workforce in agriculture is provided by women who produce 80 percent of household food. Any effects of disasters on agriculture erodes households' livelihoods and most households adopt negative coping strategies such as selling of productive assets and sexual transaction.

63. Malawi has a higher burden of disease influenced by HIV/AIDS, Tuberculosis, diarrhoea diseases, neonatal disorder, malaria and nutritional deficiencies. Women are particularly vulnerable to HIV and AIDs with prevalence rates of women aged between 15-64 to be 12.8%, compared with 8.2% among adult men. Non-communicable and cardiovascular diseases, mental disorders and unintentional injuries have a sizable contribution to the disease burden and mortality. In addition, regular disease outbreak exerts pressure and increases the burden of caregivers particularly women and girls. In terms of water, sanitation and hygiene (WASH), 86 percent of the population in rural areas have access to improved water with approximately 64 percent of the water points fully functioning. Any damage of WASH facilities such as pit latrines results into spillage of human wastes in water bodies which leads into increased water related, borne and carried diseases.

64. Only 14 percent of the population aged 15 years and above have never attended schools because of lack of money for uniforms; parents not allowing children; helping at home and schools being far from home. Across regions, the southern region has the highest number of people aged 15 years and above not attending school. Above half of the population in the school going age in Southern region did not participate in primary school because of lack of money. In terms of gender, 19 percent of the female population aged 15 years and above did not attended school while 9 percent of males never attended school. It is anticipated that disaster may worsen the attendance rate of the school going affected population.

¹¹ National Statistical Office, 2013 Malawi Labor Force Survey.

2.10 Impact of Disaster on Human Development

65. **The March 2019 floods had varying effects on different facets of human development.**

Floods had deepened poverty whereby people were homeless, jobless or without a livelihood, vulnerable to food insecurity and diseases and disrupted the normal education and health service deliveries. All of these added up to immense psychological stress, but also increased the likelihood of the affected districts relapsing into deep poverty.

66. **Households lost wage income because of the destruction in productive assets such as land, SME stocks, livestock, fisheries, machineries and working tools.** In addition, destruction of markets, roads further impede fast recovery of household and community economies. Overall, women may fare worse than men as their participation in the labour force is primarily in informal work and subsistence activities. Their gender roles, compounded by discrimination from accessing and controlling productive assets, also means that they have less mobility to search for casual labour further widening the inequality gap and burdening their ability to recovery quickly as well as building back better. The floods therefore had a significant impact on the livelihoods and social conditions of the affected population thereby increasing income inequality between the poor and the well off.

67. **The 2019 floods have further affected social protection activities which lifts the poorest out of poverty as well as smooth seasonal consumption.** Social protection program supports households with chronically ill heads (51 percent), elderly (48 percent) and people with disabilities (24 percent). These households have lost productive assets acquired through social protection initiatives thereby limiting their resource base to recover from the disasters. The effects of floods have increased vulnerability of more people signaling the need to scale up the social cash transfer programming. Households have also lost passbooks and passbook transfer details which will disrupt overall administration of the social cash transfer activities. Besides, school feeding programs had about 1569 feeding facilities destroyed by floods resulting into non-provision of nutritional porridge to school going children.

68. **Approximately, 2.3 million farming households had their crop farms washed away by intense surface runoff, which will have serious implications on their food security and nutrition.** With the majority of households depending on agriculture as main source of employment and livelihood, households will continue to struggle in meeting their basic needs and engage in negative coping strategies. Not only did the floods affected pregnant and lactating mothers who need high nutritional food diets but will further deepen levels of child malnutrition, especially, in Neno and Mangochi¹² where slightly above 45 percent of children are already stunted. Significant efforts for food security and nutrition redress on the affected households and population is therefore an urgent policy and programmatic imperative. Furthermore, sustained surveillance of nutrition status among children, pregnant women and lactating mothers and response will be extremely essential.

¹² <https://dhsprogram.com/pubs/pdf/FR319/FR319.pdf>

69. A total of 288,000 houses were damaged by floods, leaving about 87,000 people displaced in temporary shelters which likely increased communicable and infectious diseases. Due to lack of shelter, women and girl child experienced heightened risk of sexual and other gender-based violence. Although the housing sector is usually most affected by floods, it's often the most ignored sector during recovery and reconstruction. Consequently, most families rebuild their houses using their own traditionally resourced materials which renders susceptible to future disasters. Usually, floods affect houses which are traditionally constructed and are commonly occupied by single women, the elderly, widows and widowers, and PLWD who are not resilient towards any disasters. It is imperative, therefore, that housing reconstruction programme gives a special attention to these social groups to ensure that they do not become more destitute.

70. Damage in infrastructures, such as school, health and water as well as sanitation related, exacerbated living conditions for most flood affected household members. Extensive damaged to school facilities made most pupils have un-conducive environment for learning resulting into declining attendance and later dropping out of school. Furthermore, non-attendance of girls in schools increases early pregnancies and forced marriages as a coping mechanism during disasters. Besides, floods curtailed access to primary health services leaving the people in affected communities in poor health. In this PDNA, there were some women who gave birth on their way to the hospitals as they could not manage crossing the floods river. Additionally, affected WASH facilities rendered more people vulnerable to vector-borne diseases.

71. Access to various social amenities in the affected districts also suffered disruptions due to the floods. Estimates show that across the country, 129 bridges were destroyed and road network of 1,841km representing 11.9% of the total road network, was destroyed, cutting out populations from reaching various social amenities such as health facilities, market centers, schools and work stations. Limitation of access to various places and centers from which people work, trade and obtain various socioeconomic services entails lowered income, shortage of livelihoods and resources for sustenance, leading to deepening poverty and poor quality of life.

72. Not only did the 2019 floods destroy community properties but also led to 60 people losing their lives and 672 people injured. There were also reported cases of infections such as coughs, malaria, diarrhea, cholera associated with poor living conditions after the floods. These infections negatively affected individual involvement in various livelihood activities further deepening households' poverty, food insecurity and malnutrition. In addition, illness at household level increased their out of pocket expenditure further lowering household total income. Increased health costs at household level directly affected government expenditure on health resulting into budget re-allocation away from productive sectors.

73. Women and girl child were directly affected by the floods as their interface with almost every facet of human development indicator. Women and girls fetch food and water for the households. They look after the family during sickness and above 70 percent of women in Malawi engage in casual labour, especially in agriculture, for the household livelihoods. Floods therefore increased women distance and time to fetch for water, fuelwoods and look after the family due to increased water borne diseases. These factors reduced women's time in income generating

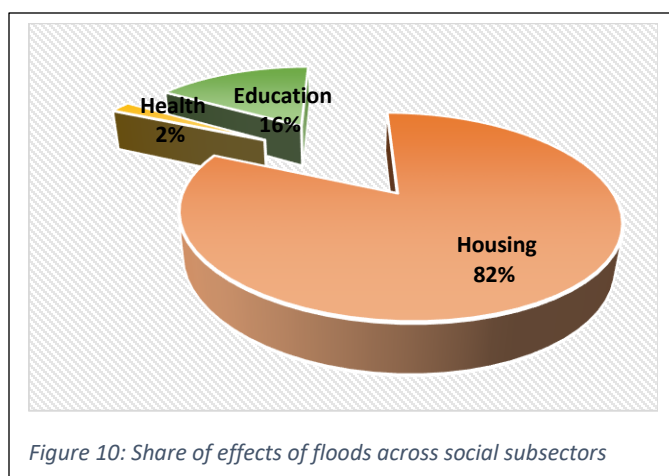


Figure 10: Share of effects of floods across social subsectors

activities and exposed them to sexual and gender-based violence. In addition, people with disability lost their materials such as lotions hence exposing them to more infections.

3 DAMAGE AND LOSS

74. This section discusses overall damages and losses of the 2019 floods across all sectors. Total effects of 2019 floods are estimated at US\$ 220.2 million whereby damage amount to US\$ 157.7

million while losses total to about US\$ 62.5 million. About 60 percent of the total effects are observed in the social sector, followed by the infrastructure sector (23 percent) and the productive sector (17 percent). Table 6 shows damage and loss across sectors and subsectors.

Table 6: Damages and losses of 2019 floods across sectors and subsectors

Sector	Sub-Sector	Damage, million US\$	Loss, million US\$	Total Effects	Sub-sectoral share of effects
Social	Housing	82.71	23.93	106.64	48.4%
	Health	0.19	2.42	2.61	1.2%
	Education	20.29	0.75	21.04	9.6%
Productive	Crops	0	11.11	11.11	5.0%
	Livestock	0.55	7.66	8.21	3.7%
	Irrigation	4.2	9.61	13.81	6.3%
	Fisheries	1.81	1.4	3.21	1.5%
	Trade	0.32	1.75	2.07	0.9%
	Transport	36.1	0.87	36.97	16.8%
Infrastructure	Electricity	2.79	0.31	3.1	1.4%
	Water and sanitation	3.72	2.65	6.37	2.9%
	Water Resources	5.05	0	5.05	2.3%
Total		157.73	62.47	220.2	100.0%

3.1 Social Sectors

This section presents damage and loss in the social sector due to 2019 heavy rains and floods and includes housing, education and health as well as nutritional subsector. About 60 percent of the total effects of the 2019 floods are experienced in the social sector. Within the social sector, housing subsector was the most affected with about 82 percent of the total social sector effects of floods, followed by education and health as well as nutrition came third (see Figure 10).

3.1.1 Housing and settlements

75. The 2019 floods have damaged about 288,000 houses across the affected districts of which 48 and 52 percent of houses belong to male and female household heads, respectively.

Approximately, 44 percent of houses in Malawi are permanent while 36 and 20 percent are semi-permanent and traditional houses. The PDNA noted that 89 percent of affected houses are constructed of traditional materials, followed by the semi-permanent (12 percent) and permanent (4 percent) materials. Box 1 illustrates houses damaged by floods. The total effects of floods on housing subsector was estimated at MWK 80 billion (US\$ 106.6 million) where damage was valued at US\$ 82.7 million while losses amounted to US\$ 23.9 million. Figure 11 shows total effects of floods on housing subsector cross districts. Total cost for damaged kitchens and toilets was estimated at US\$ 6.9 million while damaged household items were valued at US\$ 10.8 million.

Box 1: Housing Sector Impacts and Learning for Recovery

The PDNA has shown that most houses affected are private owned which do not follow acceptable construction standards. Although Malawi has recently approved the Safer Housing Construction Guidelines (SHCGs), the guidelines have not disseminated to communities and local artisans. To facilitate adherence to SHCGs, affected houses owned by women, elderly, people with disability and others need to be identified and assisted accordingly. The PDNA suggests that low-cost safeguards, good site selection; good drainage systems, very resilient traditional designs have to be considered to quickly achieve the objectives of the SHCGs.

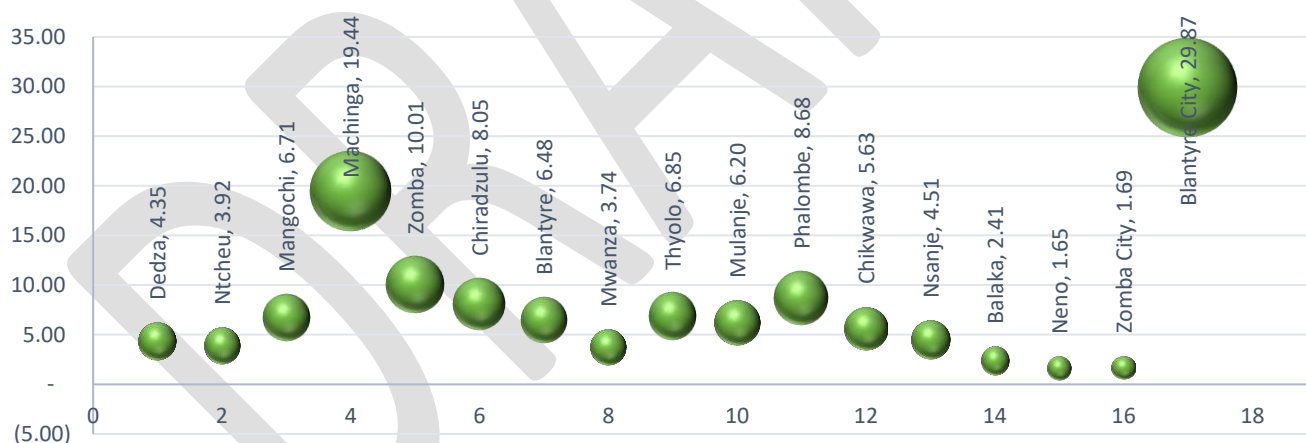


Figure 11: Total effects of floods on housing sub-sector across districts in million US \$

76. A majority of houses affected by floods were private houses which do not adhere to acceptable structural standards. Apart from, floods destroyed private houses leading to loss in rental income. Furthermore, for some houses, they also exerted additional costs on households of removing debris. Box XX provides a short description of the floods and how the safer housing construction guidelines would benefit resilience and building back better.

3.1.2 Health and Nutrition

77. **Total effects of 2019 floods on health and nutrition sub-sector was estimated at about US\$ 2.6 million where damage was valued at US\$ 0.19 million and loss totaled US\$ 2.4 million.** Figure 12 shows damage and loss across districts affected by floods. Although the health and nutrition sub-sector was not heavily affected by the floods, there are some districts which had healthy facilities partially damaged. For instance, Blantyre and Chikwawa had seven and six healthy facilities affected by floods, respectively, which had their refrigerators washed away, medicine soaked in water, blown off of roofs, water tower as well as toilets. Districts along the borderline of Malawi and Mozambique reported fear of cases of cholera due to disruption of water, sanitation and hygiene services. No health worker was reported injured as well as no vehicle is reported to have been damaged. Referral mechanisms were also disrupted as some health facilities for almost two weeks. Sadly, in Nsanje, a woman gave birth to twins along the way as they could not cross to the other side of the road. Furthermore, women reported to have lost their family planning records which resulted into unwanted pregnancies in some flood affected communities. Healthy facilities also reported damage to nutritional related equipment, namely, salter scales and height boards.

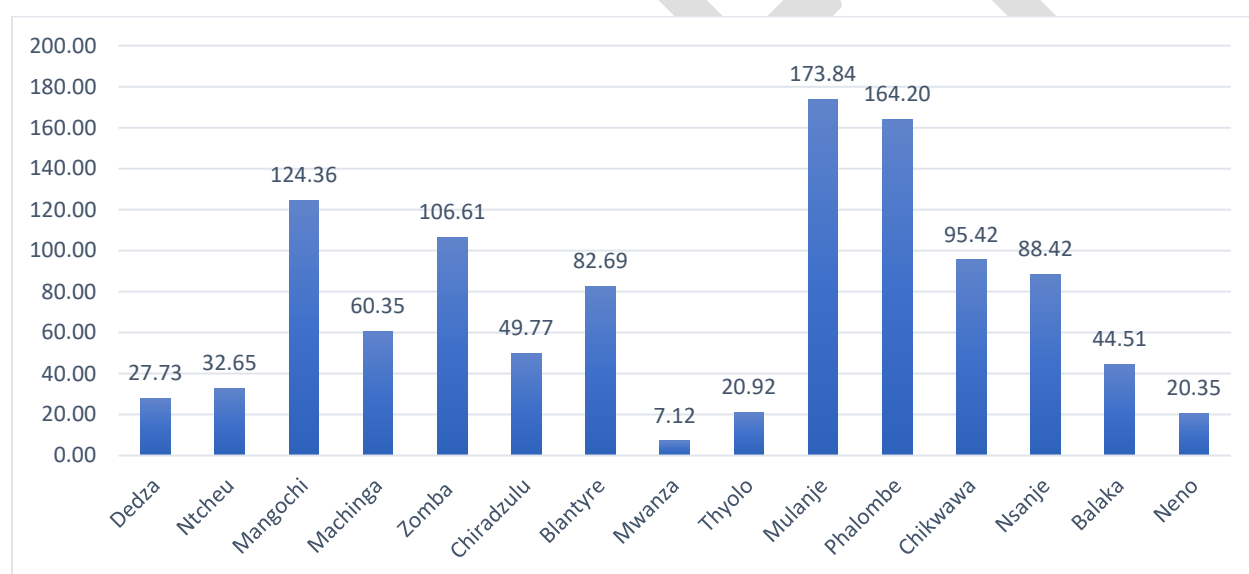


Figure 12: Total effects of floods on the health and nutrition sector across affected districts in million US \$.

78. **Though the floods disrupted provision of primary health services in some affected communities, temporary clinics and mobile clinic teams were instituted to reach out to affected areas.** In addition, health services were temporarily increased through mobilization of additional personnel, health promotions, vector control, disease surveillance, coordination and provision of SRH services for women and health. However, access to health facilities in most of the affected districts has remained normal and there has not been a major increase in outpatient attendance since the displaced population has remained in their catchment areas. In the Lower Shire, people were relocated to camps far from affected locations. Although no disease has been reported, it is anticipated that households may have experienced increased risks to diseases. For example, women, men and some youths in the IDP camps risk contracting STI as they may not have access

to enough condoms. Among women and girls in IDP camps, they may have higher exposure to unplanned and early pregnancies, respectively as sexual transactions become one of the coping strategies.

79. Although the 2019 floods did not have immediate effects on nutrition status of household members, it is expected that the floods will have medium to long term effects on malnutritional levels of the under five children and lactating mothers. District affected by the 2019 floods have the highest child malnutrition rate of 37 percent with Neno and Mangochi registering 45 percent stunted children. Coupled with high poverty levels, the 2019 floods will worsen the malnutrition status of children unless nutritional programmes are put in place to reverse the situation.

3.1.3 Education

80. The 2019 floods caused damage to 154 out of 2460 public primary schools and 455 out of 7318 Early Child Development Centers. Most schools affected were predominantly rural and constructed by communities except few urban schools in Blantyre and Zomba cities. District education offices reported toilets, teachers' houses and classrooms as some of the school infrastructure destroyed by floods. Over 5500 desks were destroyed by the 2019 floods while 967 learners' toilets collapsed because of heavy rains and flooding. Almost 67347 (equivalent to US\$ 12.4 million) learners' text books were damaged by floods (see **Error! Reference source not found.**).

81. The total effects of floods on education sector was estimated at US\$ 21 million where damages are US\$ 20.3 million, and losses make up US\$ 0.75 million. Much of the damage came from teaching and learning materials, followed by teachers' houses and toilets (see Figure 13). Loss in education sector were attributed to costs of removing debris, cleaning classrooms which acted as IDPs, buying tents for children whose schools were affected and paying volunteer teachers during the time of floods. Furthermore, floods disrupted teaching and learning services for almost 14 days due to collapse of classrooms. Equally, schools which accommodated internally displaced people were temporarily not available for learning compromising sanitation, hygiene and safety needs for both girls and boys.

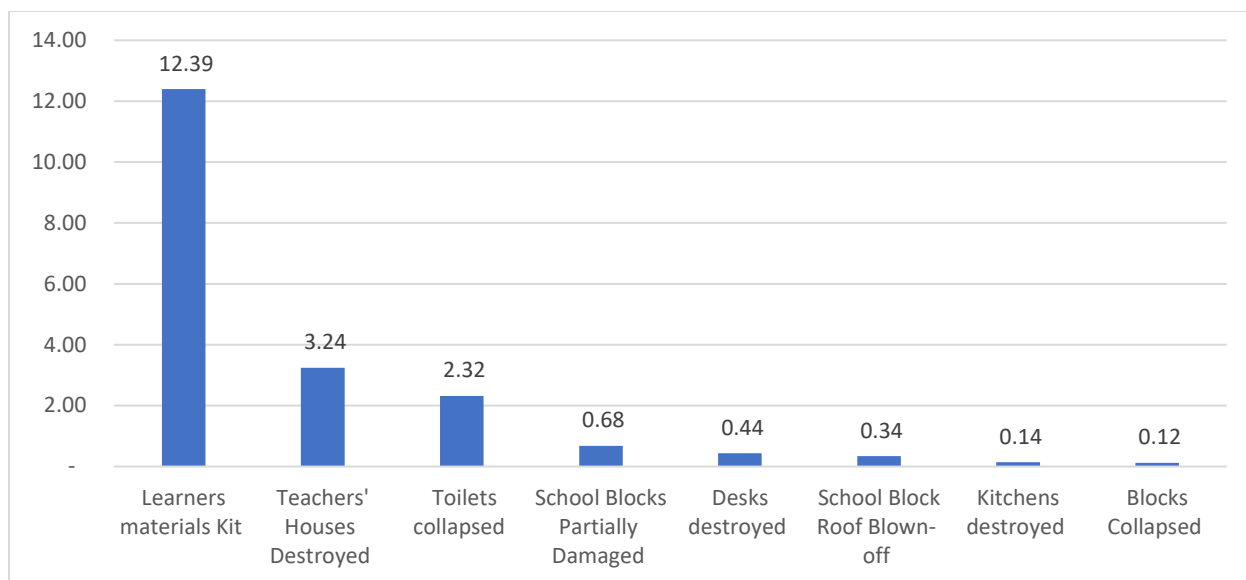


Figure 13: Value of some of the selected education infrastructures and materials damaged by 2019 floods in million US \$

3.2 Productive Sector

3.2.1 Agriculture- (Crops, Irrigation, Fisheries and Livestock)

82. Total effects of floods in agriculture were estimated at US\$ 36.3 million where damage amounted to US\$ 6.5 million while loss was estimated at about US\$ 29.8 million. The damage to the agriculture sector includes losses in production to crops planted; partially or fully

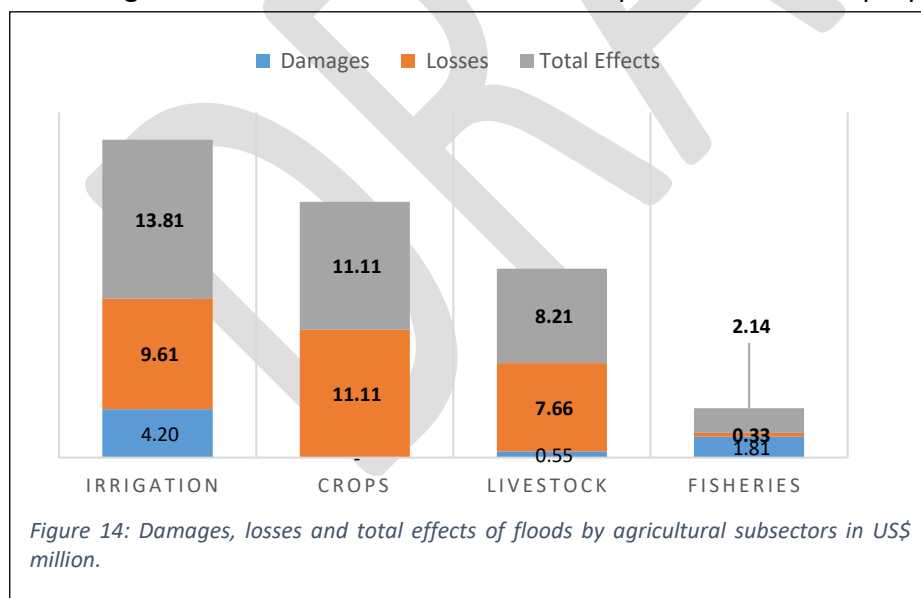


Figure 14: Damages, losses and total effects of floods by agricultural subsectors in US\$ million.

destroyed irrigation infrastructure, livestock and fisheries infrastructure, washed away livestock, fisheries and other assets.

83. The effects of the disaster on irrigation infrastructure alone counts for US\$ 13.8 million; production to crops counts for US\$11.1 million,

livestock counts for US\$8.2million; and fisheries counts for US\$3.2 million (see Figure 15). A larger total effects were encountered in areas where there were irrigation infrastructure such as in Nsanje, Chikwawa, Phalombe, Zomba and Machinga (see Figure 15).

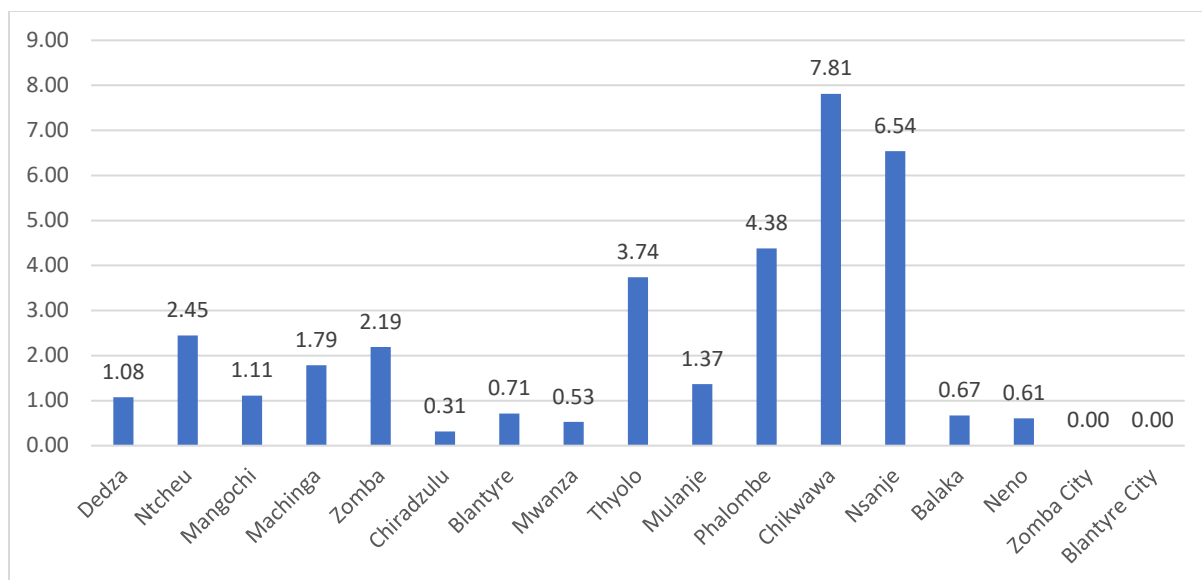


Figure 15: Total effects of floods on agriculture sub-sector across districts in million US \$

3.2.2 Crops Subsector

84. **Most farming households in Malawi are subsistent and depend on rainfed agriculture for their livelihoods where a total of 1.7 million ha is under cultivation.** The floods have caused total effects of US\$11.1 million in the crops sub-sector. Farmland has been affected in all the 15 affected districts. The worst affected districts are Phalombe, with 31.5 percent of the effects, followed by Chikwawa (10.8 percent), Ntcheu (9.9 percent) and Mulanje (9 percent) (see Figure 16). The floods have affected a total of 91,638 ha of productive land belonging to 308,702 farm families of which 56 percent of the land was under maize production. The effects in crops subsector has been calculated mainly from production losses due crops being submerged, prolonged water logging condition, mature cobs and ears germinating and plants wilting beyond regeneration.

85. **The floods affected crops that were mostly cultivated in lowland area such as maize, rice, sorghum, millet, groundnuts, cotton, pulses, sesame, cassava, sweet potato and potato.** Floods resulted into submerging and washing away of already matured crops which reduced returns from crop production. In addition, floods affected supply casual labour to crop production. In Malawi, agriculture employs over 80 percent of the rural population, majority of whom are women and the floods reduced the opportunity to generate more income for their livelihoods.

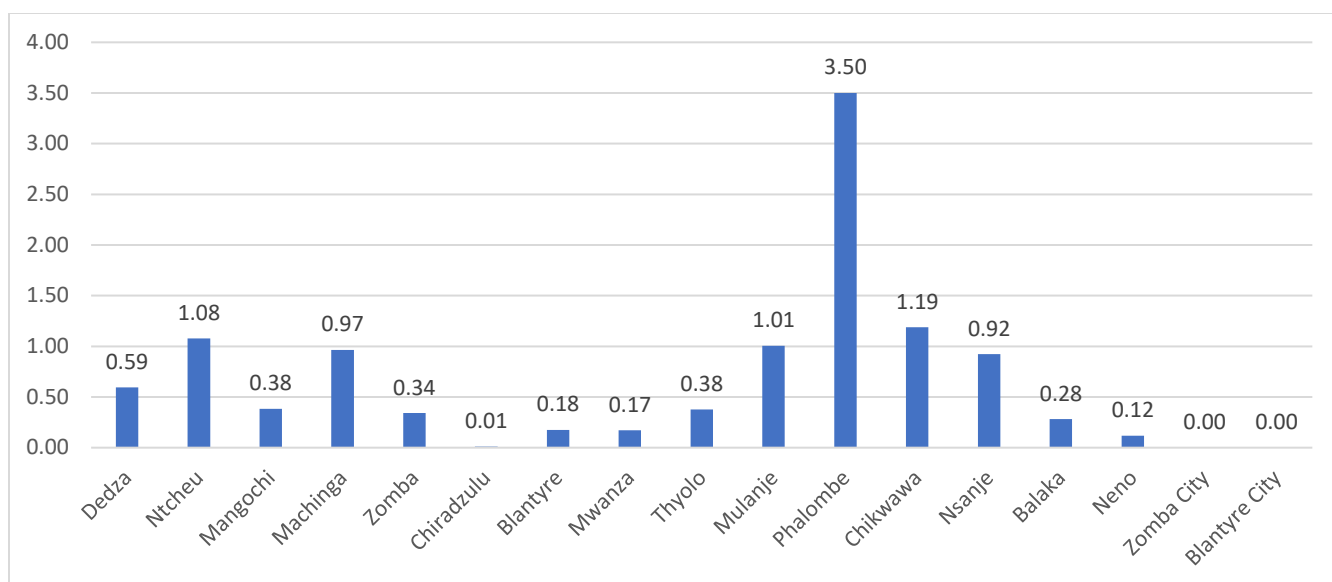


Figure 16: Total Effects of floods across districts in million US \$

3.2.3 Livestock Subsector

86. Damage to the livestock subsector were minimal where they amounted to US\$ 0.55 million as compared to loss which were estimated at US\$ 7.6 million (see Figure for total effects across districts). Across districts, Chikwawa (34.1%) was the most affected, followed by Nsanje (20.7%), Phalombe (8.5%) and Zomba (6.1%) districts (see Figure 17). A total of 11,194 households were affected out of which 5,871 are male headed and 5,323 are female headed. The livestock affected include, goats, sheep, cattle, pigs, chickens, guinea fowls, ducks, doves, rabbits and turkey. The damage registered were due to partially or completely destroyed livestock housing, dip tanks, markets, kraals, abattoirs and other equipment. Loss in livestock subsector included reduction in meat, hides, skins, eggs and milk production. A total of 2.5 million livestock were at risk in the 15 districts and two cities. About 47,899 livestock were washed away and died of which most of them small ruminants and owned by women.

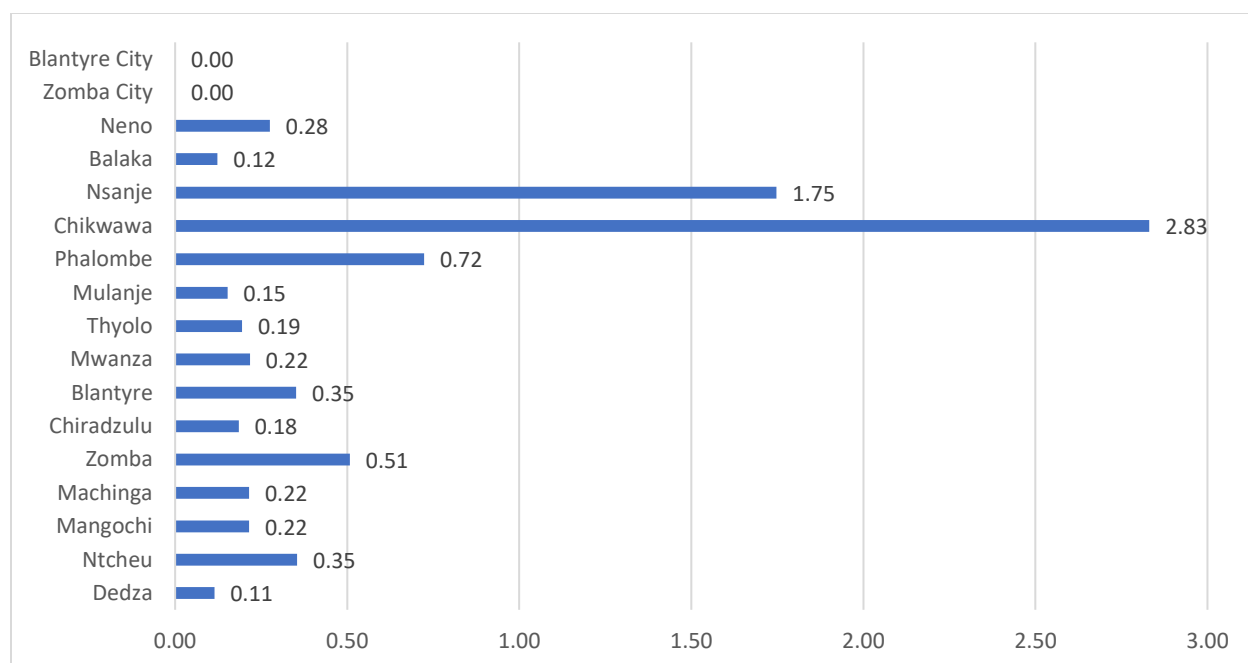


Figure 17: Total Effects of Floods on livestock across districts in Million US \$

87. **Livestock continue to be at risk because the waterlogging conditions** which have created environmental conditions suitable for proliferation of mosquitoes, predisposing livestock to diseases, such as, Rift Valley Fever, Dengue, as well as the exposure of Anthrax spores. In addition, birds would migrated from drier areas to wetter parts of Malawi and Mozambique in search of food and water, leading to higher congregation of multiple wild bird species, and potential outbreaks of highly pathogenic avian influenza. Furthermore, a dog population built up around Internally Displaced People sites and increased the incidence of rabies, placing additional pressure on scarce human anti-rabies stocks available at regional referral hospital.

3.2.4 Irrigation Subsector

88. **The floods damaged irrigation infrastructures estimated at US\$ 4.2 million resulted into US\$ 9.6 million losses rendering 3,328.75 hectares of irrigated land unutilized for crop production.** Figure 18 shows a total effect of floods on the irrigation subsector across all the affected districts. Households lost irrigated land due to sand deposits, erosion of arable soils suitable for crop production and disrupted irrigation season as a result of flood damages of the irrigation infrastructure. The damaged irrigation infrastructure included dykes, head-works, pump stations, canals, pipelines, turnouts, Dams / night storage reservoirs, wells, drainage systems and scheme roads and bridges. The solar pump-based irrigation schemes had their pumps and associated electrical connections of solar generator submerged and washing away of solar panels and structural holders.

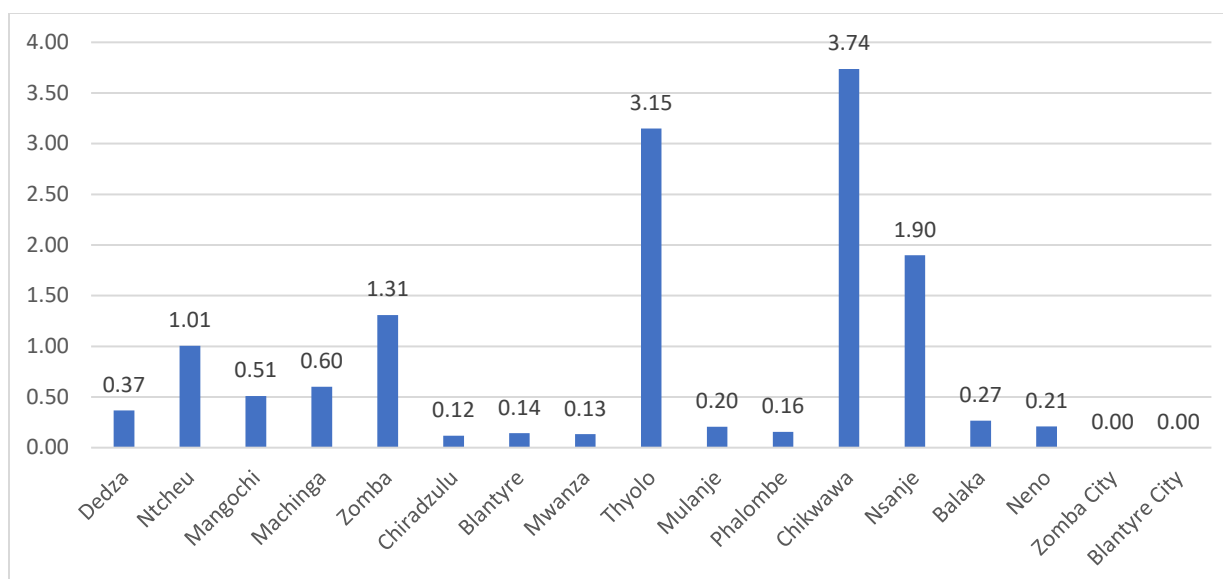


Figure 18: Total effects of floods on irrigation sub-sector across districts in million US \$

3.2.5 Fisheries Subsector

89. Overall, damage and loss due to floods in the fisheries sector are estimated at US\$ 1.8 million and US\$ 1.4 million, respectively, representing total effects of US\$ 3.2 million. Floods damaged 287 fishing boats, 6,589 fishing gears, 189 fish ponds and washed away fish in some ponds. In addition, fish processing equipment, viz., smoking kilns got destroyed by floods. Floods also negatively affected income¹³ from fishing sales as harvest were reduced. The fisheries and aquaculture accounts for about 4 percent of national GDP. It contributes over 70 percent of dietary animal protein intake of Malawians and 40 percent of the total protein supply. The sector directly employs over 60,000 fishers and 15,465 fish farmers where 38.5% are women suggesting that the effects of disaster in fisheries will not only affect animal protein uptake but also affect household livelihoods.

3.2.6 Commerce and Industry

90. The commerce and industry sector suffered from the 2019 flooding and the heavy rains, and was felt significantly by both the small and the medium and large-scale enterprises. The total cost of the disaster on commerce and industry sector as a whole is estimated at about US\$ 2.1 million. The cost of total losses amounted to \$1.7 million and the cost of total damages amounted to US\$ 0.3 million (see Table 7).

¹³ lost income is estimated by considering tonnage of fish expected from the fishponds and the farm gate prices

Table 7: Total effects of floods on commerce and industry sector across districts in million US \$

Districts	Damage	Loss	Total effects
Dedza	0.00	0.00	0.00
Ntcheu	0.00	0.00	0.00
Mangochi	0.04	0.01	0.05
Machinga	0.07	0.01	0.09
Zomba	0.02	0.03	0.05
Chiradzulu	0.00	0.09	0.09
Blantyre	0.00	0.01	0.01
Mwanza	0.01	0.03	0.04
Thyolo	0.01	0.04	0.06
Mulanje	0.02	0.04	0.06
Phalombe	0.05	0.09	0.14
Chikwawa	0.07	0.00	0.07
Nsanje	0.07	0.00	0.07
Balaka	0.02	0.37	0.38
Neno	0.02	0.00	0.02
Zomba City	0.00	0.98	0.98
Blantyre City	0.03	0.00	0.03
TOTAL	0.42	1.71	2.13

91. **The large-scale sub-sector recorded the highest cost of damage, contributing 72 per cent or about US\$ 0.8 million to the total damage estimate.** Major damage in the large-scale sub-sector were on physical assets such as plant and machinery owned by the private sector which were either washed away or submerged in water. For instance, tractors at one of the large construction companies in Blantyre were damaged. For the SMEs sub-sector, the damage occurred in nearly fifty trading centers i.e. eight in Chikwawa, four in Phalombe, five in Nsanje, ten in Zomba and the rest in the remaining districts. The damage was largely on commercial properties and other types of infrastructure majority of which were owned by the private traders (about 94 percent).

Damage was also recorded for markets around the trading centers, most of which were makeshift.

92. Loss caused by the heavy rains and the floods were largely felt more by enterprises in the SMEs sub-sector (US\$ 0.93 million), which is dominated by women, compared to the large-scale sub-sector (US\$ 0.89 million). The loss in the SMEs sub-sector varied across districts with some districts being heavily affected, for instance, Nsanje and Chikwawa that recorded 15 percent and 13 percent of total loss, respectively. Others were affected less e.g. in Blantyre and Thyolo that recorded a 1 percent and 2 percent of total losses respectively (**Error! Reference source not found.**). The loss mainly included: stocks in terms of fish, vegetables and grocery goods which were washed away and soaked in water; food and cash crops; temporary market shifts; livestock; government revenue due to market inactivity; and proceeds from sales etc. For larger scale enterprises, loss was largely on repairing costs of damaged plant and machinery; potential proceeds from sales and loss of raw materials especially in farms or plantations such as Nchalo Sugar Plantation.

3.3 Infrastructure Sector

3.3.1 Road Transport

93. The total damage and loss for road transport sector was estimated at US\$ 36.1 million. The floods damaged approximately a total of 1,841km¹⁴ of road network that primary (33km); secondary (274 km), tertiary (398km) and district (1136 km) roads (Box 2). The disaster destroyed 129 bridges which were constructed using out-dated public works manual and washed away 68 culverts and drifts resulting into diversions. The most affected districts were Nsanje (US\$ 10.1 million), Chikwawa (US\$4.6 million), Mangochi (US\$ 2.8 million), Phalombe (US\$ 2.44 million) and Thyolo (US\$ 2.43 million) (see Figure 19).

94. These total effects of floods on the road networks resulted into increased transportation and operation costs as well as inaccessibility to social services and amenities. Furthermore, damage to road networks compromised operationalization of relief and recovery

Box 2: Transport Sector Impacts and Learning for Recovery

The road network was damaged mainly due to strong run-off water which was aggravated because of lack of vegetative cover and steep gradients (see **Mafisi Bridge in Thyolo in the picture below**). Further, lack of monitoring and adherence to construction standards in the road transport sector was also one of the attributed factors. Strong winds also uprooted trees and hauling of large boulders which blocked some drainage structures resulting into washing away of some roads.

It is recommended that Government should revise roads' design standards and parameters as well as maintain road infrastructure. There is also a need of enforcing integrated catchment management practices and developing a road network integrated management information system.



¹⁴ 1841 km represents about 10 percent of the road network in the country

activities in which some roads became impassable. Consequently, Government intervened through expensive mode of transportation and re-allocated resources to temporarily restore the road connectivity which exerted additional fiscal pressure. However, floods did not have significant effects on companies which had long term contract agreements with transporters.

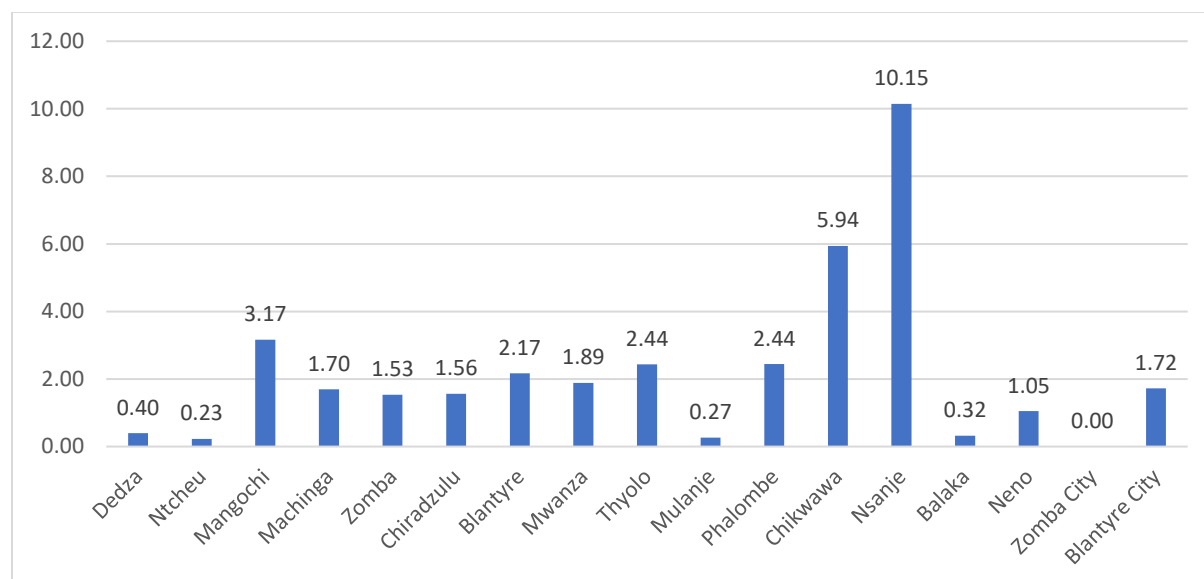


Figure 19: Total effects of floods on transport sub-sector across districts in million US \$

3.3.2 Energy – Electricity and Forestry

95. **Estimated damage in Energy sub-sector was valued at US\$ 2.8 million while loss was estimated at US\$ 0.3 million with Chikwawa being heavily affected with about US\$ 2.69 million of damages, followed by Blantyre (US\$ 0.38 million).** Debris from floods dislodged power plant screens from their original position resulting into differential pressures that led to shutdown of the power plants. The disaster also heavily affected the electricity distribution line in Chikwawa, Nsanje, Zomba Mulanje and Phalombe. Even though power generation was restored, floods caused loss of power supply for almost 50 hrs. The affected infrastructure and physical assets included the power generation plants and distribution network. In terms of loss, the floods reduced the amount of revenues from sales and non-production of electricity. Moreover, both households and firms lost income due to non-operations of equipment which run on electricity.

96. **Although floods had insignificant effect on the forestry subsector, about 40 percent of trees planted along river-banks were washed away in some affected districts.** Due to increased needs for fuelwood and poles for temporary shelter for displaced communities, trees from some communal forests were cut down. In terms of loss, the floods resulted into reduction of sales from fuelwoods for households that sell charcoal and other non-timber products for livelihoods. In addition, households purchased poles for temporary construction or maintenance of their partially damaged houses which reduced their disposable income.

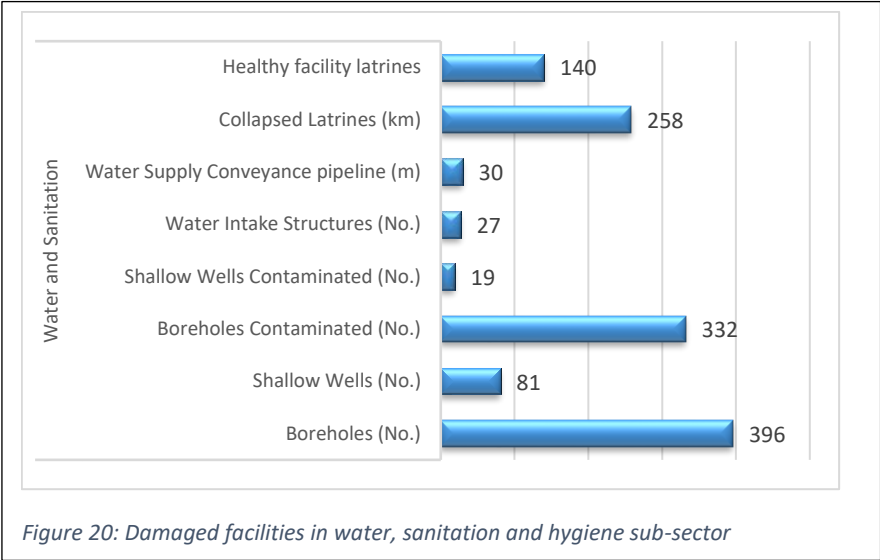
3.3.3 Water, Sanitation and Hygiene

97. The floods' damage on water, sanitation and hygiene (WASH) sub-sector was estimated at about US\$ 3.7 million and Loss was valued at US\$ 2.7 million. Total effects were high in Chikwawa, Phalombe, Mulanje, Nsanje and Thyolo. Table 8 shows damages and losses of 2019 floods on the water, sanitation and hygiene sector across affected districts.

Table 8: Damages and losses of floods across affected geographical areas in million US \$

	Damage	Loss	Total Effects
Dedza	0.11	0.00	0.12
Ntcheu	0.17	0.01	0.18
Mangochi	0.15	0.00	0.15
Machinga	0.14	0.01	0.16
Zomba	0.23	0.01	0.23
Chiradzulu	0.23	0.00	0.24
Blantyre	0.19	0.00	0.19
Mwanza	0.47	0.00	0.47
Thyolo	0.21	0.47	0.68
Mulanje	0.31	0.48	0.78
Phalombe	0.32	0.46	0.79
Chikwawa	0.57	0.48	1.05
Nsanje	0.27	0.47	0.74
Balaka	0.15	0.00	0.15
Neno	0.16	0.00	0.17
Zomba City	-	0.01	0.01
Blantyre City	0.02	0.23	0.25
Total	3.72	2.65	6.36

98. Damage in water supply and hygiene subsectors included replacement of destroyed infrastructure such as boreholes and piped water supply systems that were washed away. Most of the sanitation facilities such as pit latrines were damaged and curved in resulting into spillage of human waste into water related, borne and carried diseases (see Figure 20). While loss comprised of increased operational costs in supply of portable water and temporary provision of water to the heavily affected areas. In addition, Government incurred costs in providing water and sanitation services to IDP including latrine services. Loss in the subsector was also incurred through removal of silt at the water reservoirs or intake points, reduced revenue of the water supply and construction of temporary sanitation facilities. Prolonged unavailability of water led to more women and girls spending more time fetching water and thereby reducing time for other economic and livelihood opportunities. Box 3 shows one of the handpump located very close to the road network drainage system.



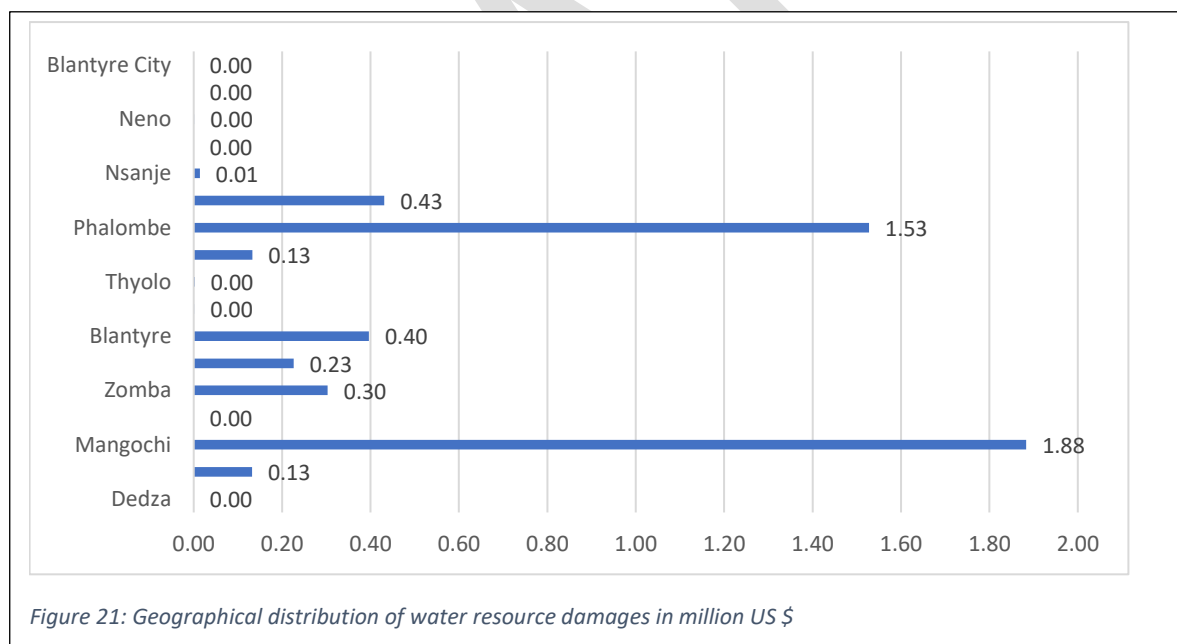
Box 3: Handpumps used by communities

Communities still use partially functional handpumps which were built using low quality construction standards and materials, poor siting as well as lack of maintenance making them susceptible to any disaster. For example, poor construction cases are evident where one visisted area had a broken and washed away concrete apron.

3.3.4 Water Resource (Flood Protection)

99. **The floods destroyed various water resource infrastructure which included seven (7) multipurpose dams, two (2) excavated storage tanks, 10 dykes and 11 hydrological monitoring stations.** Total effects of floods on water resource subsector were estimated at about US\$ 5.1 million. Dams (US\$ 2.9 million) had the highest damage, followed by dykes (US\$ 2.1 million) and hydrological meteorological stations (US\$ 0.024 million). Figure 21 shows total effects across the affected districts. Damage were due to overtopping, scouring of embankments and spillways as well as lack of spillways in some dams and dykes.

100. **Water resource infrastructure provides several benefits to the surrounding communities.** For example, dams provide water for irrigation, domestic use as well as livestock plus act as flood control measure. While dykes act as flood controls and the hydrological monitoring stations are used for data collection, flood forecasting and early warning system. Damage to water resource infrastructure therefore put the surrounding communities at risk of flooding, lack of water for irrigation, domestic use and livestock as well as compromised future hydrological monitoring.



3.4 Disaster Risk Reduction and Early Warning Systems

101. **Malawi is highly exposed to climate related shocks, mainly, floods, droughts, hailstorms, strong winds and earthquakes** which are linked to factors such as (i) the influence of the El Niño and La Niña phenomena, (ii) hydrological network and (iii) location along the great African rift valley. Furthermore, country's vulnerability is exacerbated by (i) over reliance on rainfed agriculture, (ii) cultivation of less resilient crop varieties, (iii) cultivation and settlement in marginal lands; and (iv) environmental degradation due to rapid population growth. The effect of the floods on infrastructures such as roads, schools and health facilities suggest that investments in these sub-sectors are not risk informed. The effects of the 2019 floods in the DRM and EWS sector have been analyzed based on the risk factors (i.e. structural, institutional and operational systems) of each sector and recommendations for building back better and safer.

102. **The built and infrastructural environment are heavily affected by the floods and strong-winds due to high exposure and lack of adherence to resilient construction standards.** Previous discourse shows that the social and infrastructural sectors are highly vulnerable to floods because of the following risk factors: (i) lack of adaptive planning and designing, (ii) poor siting, (iii) lack of hazard mapping; (iii) out dated land-use plans; (iv) poor materials; and (v) limited technical skills and capacity. For instance, it is observed in Education infrastructure that the affected blocks frequently show little or no consideration of flood and wind risks exceeding normal thresholds. Moreover, in some cases correctly conceived designs were poorly executed, ignoring specifications and details, leading to the failure of infrastructure. This is compounded by lack of maintenance guidelines. Therefore, resilience building will require integrating DRR through the following activities; (i) disseminate and enforce construction guidelines and building codes that incorporates emerging issues; (ii) build capacity at all levels; (iii) enhance use of comprehensive hazard and risk assessment, (iv) develop resilient land use plans for all planning areas, (v) improve contract management and periodic maintenance.

103. **Floods and heavy winds adversely affect the productive sector that increases the vulnerability and exposure to food insecurity and lack of income.** The contributing factors include: environmental degradation, lack of resilient agricultural measures and diversification, lack of early warning system, and poor practices. Therefore, a number of measures need to be integrated to ensure resilient and risk sensitive for sustainable development and these include: (i) strengthen early warning system throughout the supply chain; (ii) enhance resilient agricultural measures; (iii) improve marketing systems; (iv) diversify livelihood strategies; and (v) strengthen integrated catchment management.

104. **Environmental degradation contributes to the decline of the socio-economic conditions in Malawi exacerbating the effects and impact of floods.** Several factors contribute to environmental degradation including cultivation in marginal lands, clearance of agriculture land and over reliance of fuelwood for energy. As such there is extensive soil erosion leading to siltation of rivers, rising river bed, thereby increasing the exposure and vulnerability of to future climatic hazards. The environmental effects cut across several sectors and need a holistic approach and strict adherence to environmental management and standards.

3.5 Cross-cutting Issues

105. **Gender:** The 2019 disasters affected women, older people, and people with disabilities, children and other vulnerable groups more disproportionately than other segments of the population. Moreover, a majority of the households that were affected by floods in 2015 had not yet fully recovered and enhance resilience¹⁵, before the 2019 disrupted the country social and economic sphere again. The inter-agency assessment baseline findings showed that 63% female and 37% male affected by the disaster in the districts Machinga, Mangochi, Balaka and Zomba with the high number of vulnerabilities including people with disability. The assessment also showed that 77% of the households under Social Cash Transfer Programme (SCTP) and 1.2% children of School Meal Program (SMP) were also affected by the 2019 floods. Despite the inadequate disaggregated data, some rapid gender and vulnerability analysis showed that women were not able to engage in income generating activities due to lack of opportunities and loss of livelihoods assets due to the floods. For example, women were no longer conducting small businesses and participated in the Village Savings and Loans Associations (VSLAs) groups that would enable them to earn extra income to support their families.

Box 4: Manifestation of Gender issues in other sectors

Health: Most of maternity homes requiring an immediate restoration of Sexual and Reproductive Health Rights (SRHR). The assessment from 4 affected districts and 64 camps showed that a total 13,438 persons extremely vulnerable including pregnant and breastfeeding women (5,143 women), person with chronic disease/serious medical condition (667) and person with mental and physical disabilities (1,642 persons) individual will require special medical attention during the recovery phases. Analysis showed that high case of women infected with STDs were reported during post-disaster in Blantyre, Machinga and Nsanje districts as compared to pre-disaster. Furthermore, negative coping mechanism for girls and women have been observed such as exchanging sex for relief items or engaging in prostitution to get money for survival as a result of flood.

Housing: Based on shelter damages- gender and vulnerability, 57% percent of houses owned by poor male headed household families were fully and partially destroyed, followed by female headed at 34 %. The disables persons had a 7% of their houses damaged, with the least being the child headed at 2%. The reasons for damaged houses could be a result of the use of substandard materials for construction and poor techniques that rendered houses more vulnerable to natural disasters.

106. There were also threats of increasing cases of SGBV because of the poor conditions in the camps (i.e. lack of adequate lighting and shortage of basic needs). These increased the risk of security and violence for young girls and women. For instance, there were high case of women infected with STDs reported during post-disaster in Blantyre, Machinga and Nsanje districts as compared to pre-disaster. Furthermore, negative coping mechanism for girls and women such as exchanging sex for relief items or engaging in prostitution to get money for survival as a result of flood were observed. Furthermore, Box 4 shows how floods disproportionately affected women, girls and other gender groups in health as well as education.

¹⁵ World Bank 29/11/2016; Burunga 11/3/2019; GFDRR 2015.

107. **Disability and the Elderly:** In the event of disaster, some groups need special attention, due to extreme vulnerable situation. During the recent flood in 15 districts a total 4,737 (Male 2056 (43%) and Female 2,621 (57%)) were reported as people with disabilities. These disabilities include Albinism, physical, visual impairment, hearing impairment etc. Distinct older persons were also identified as the most vulnerable social groups that struggles most in coping with the disaster. In the aftermath of a disaster, older persons face additional challenges in accessing livelihood opportunities because of age discrimination or unrecognition and underutilization of their skills (Barbelet V, 2018)¹⁶. They also have restricted mobility in accessing post disaster recovery activities. In Malawi there are 891 805 (386 034 (43%) male and 505 771 female (57%)) older persons, 60 years and above.

¹⁶ Veronique Barbelet; Older People in Displacement, July 2018.

4 PART II: RECOVERY STRATEGY

4.1 Introduction

109. **After a disaster strikes, it is necessary to address the needs of the affected population and interventions are designed to address short, medium and long-term needs.** In this assessment, a comprehensive sector-by-sector report of the damage, loss and needs is summarized into a Recovery Strategy. The Recovery Strategy identifies priorities, a cost structure, stakeholders, and suggests a time- frame while linking them to the overall objective of the strategy.

110. **The primary objective of recovery is to enable affected population to improve their overall well-being by restoring their physical assets, livelihoods, socio-cultural and economic status.** The Recovery Strategy defines the vision for recovery, identifies priority interventions as well as results and costs for recovery within a given time frame. It provides the critical link between assessment results and a comprehensive Recovery Framework.

4.2 Recovery Vision, Guiding Principles and Element

4.2.1 Vision

111. A nation that is resilient to disasters and builds back better while fostering an inclusive sustainable development.

4.2.2 Guiding Principles

112. **Policy alignment and enforcement:** This Recovery Strategy is aligned with existing international frameworks, namely, the Sendai Framework, the African Strategies for Disaster Risk Reduction and the Post Disaster Needs Assessment Guidelines. At national level, the strategy is informed by the Malawi Growth and Development Strategy III (2017-2022), the draft DRM bill (2019), the Malawi DRM Policy (2015), the National Resilience Strategy (2018-2030), the Decentralisation Policy (1998) and other sectoral policies on gender, environment and climate change. Additionally, this strategy ensures that stakeholders enforce policy and adhere to stipulated operational guidelines, whilst considering the multi-sectoral approaches that can reduce ripple effects that disasters have on each sector.

113. **Disaster resilience and building back better:** It is observed that most places affected by 2019 floods are the same areas affected by 2015 floods. This implied that resilience and building back better as well as smarter were not holistically mainstreamed during DRM related policies and guidelines' implementation. Climate models project increasing frequency and intensity of disaster mainly because of climate and other exogenous factors. Therefore, guidelines, namely, safer schools and housing constructions, should be adhered to in order to create resilient communities to disasters. Building back better and smarter measures should be mainstreamed in all stages of the recovery process and needs, viz., reconstruction of physical assets, restoration of services and access to goods and services, restoration of governance and decision-making process and reducing risks and vulnerability.

114. **Multi Stakeholder engagement and coordination:** Disasters cut across sectors, hence, lack of proper multi-sectoral engagement and coordination would create silos in delivering services in disaster risk management. In this recovery, the DoDMA should continue to engage and coordinate various stakeholders through existing DRM structures at national and sub-national level to avoid creating silos within the recovery process. However, the DoDMA will have to be resourced into order to engage and coordinate a wide range of stakeholders, including CSO working on women rights and issues, around DRM in Malawi.

115. **Decentralized approach and community participation:** The Recovery Strategy will promote people-centered interventions which aim at community participation, decision-making, ownership and capacity building to ensure that solutions are locally appropriate in all aspects of the recovery process. Further, there is a need for pro-active efforts to ensure an inclusive approach that enables women and girls, the elderly, PWD, and other vulnerable and often overlooked segments of the population to be active participants in Recovery process. The Recovery Strategy will primarily be implemented by affected local authorities, with active involvement of communities and other stakeholders. DoDMA will ensure that decisions made at local levels align with international and national best practices thereby building resilience and building back better and smarter.

116. **Integrate gender and other cross cutting issues:** It is essential that all programs are sensitive and respond to the needs of women and girls and all genders as well as other vulnerable groups, such as, the elderly and people with disabilities for recovery interventions to be successful and effectively contribute to resilience building. Equally important, recovery interventions should not increase risks for these groups but rather enhance all genders' self-reliance and resilient to disasters. Special effort must also be made to promote all gender and vulnerable groups' participation in planning regarding DRR measures. This strategy will further promote equality and empowerment of women and other gender groups.

4.3 Recovery Needs

Total recovery needs for the damage and loss due to the 2019 floods was estimated at MWK 276.2 billion (US\$ 368.3 million) and will be implemented over a period of one to five years. Specifically, the social sector required about MWK 149.4 billion (US\$ 199.2 million) while MWK 56.1 billion (US\$ 74.8 million) was required by the infrastructure sector and productive and cross cutting sectors needs amounted to about US\$ 43.9 million and US\$ 50.5 million, respectively (see Figure 22).

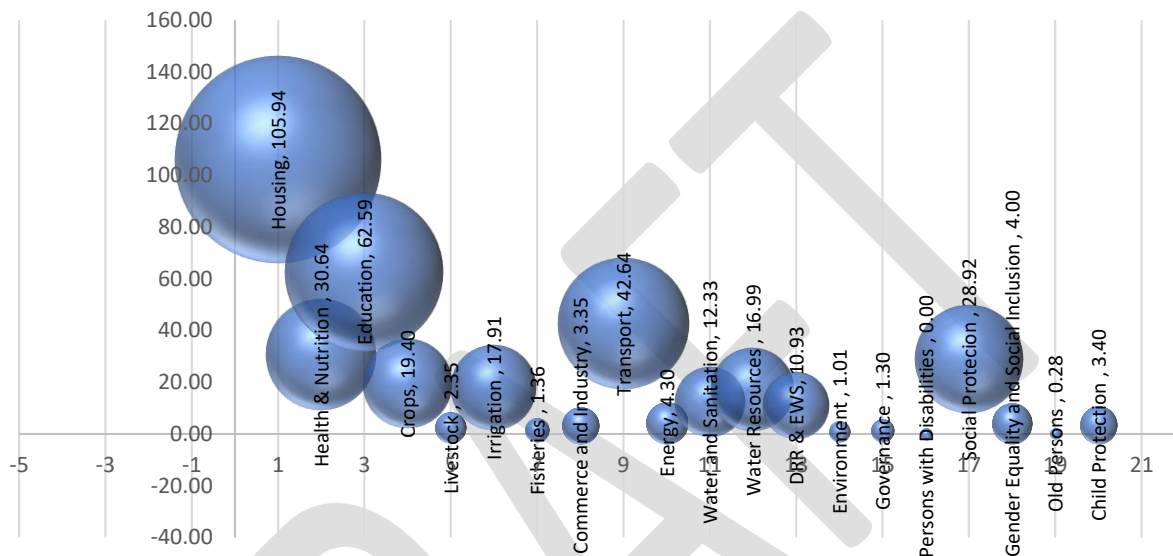


Figure 22: Total recovery needs by subsectors in million US \$

4.4 Social Sectors

4.4.1 Housing subsector

117. **The total costs for recovery and reconstruction was valued at about US\$ 105.9 million in the housing subsector of which 95 percent were structural and long-term needs.** Previous discussion suggested that resilience building should mainstream and adhere to acceptable structural standards and proper site selection. The sub-sector therefore proposed the following recovery actions: (i) translation and dissemination of Safer Construction Guidelines; (ii) training of artisans; (iii) mobilization of financial resources for procuring quality building materials and constructing houses for the less privileged population such as women, elderly, people with disability and others; and (iv) construction of demonstration houses for artisans. Furthermore, the subsector will also remove debris to allow temporary reconstruction of damaged homes.

4.4.2 Health and Nutrition

118. **Recovery needs in health and nutrition sector amounts to US\$ 30.6 million and aims at restoring the primary health delivery system that integrates resilience building towards disasters.** The short and medium term strategies will include: (i) provision of temporary health facilities to the affected population, (ii) cost of temporarily increased health provision including

medicine, RH kits and support for referrals for pregnant women and those needing admissions, (iii) cost of coordination of disasters, supervision and early warning systems as well as health information systems, (iv) cost of interventions above normal to mitigate related risks, which includes costs for immunization and provision of SRHR services to women and girls as well as psychosocial care of affected population and (v) integrated disease surveillance and response.

119. **This Recovery Strategy advocates for provision of minimum standards for health care based on principles of equity, access to essential health care, timeliness, results based and accountability.** In the short to medium term, vulnerable groups such as women, mothers and children should be targeted. During reconstruction, implementation should ensure that partially damaged health facilities including health workers houses should mainstream resilience and building back better and smarter principle. In the long terms, health stakeholders should consider strengthening and continuation of epidemiological surveillance and emergency preparedness through improving financing, accessibility and adherence to health standards.

4.4.3 Education

120. **Revamping of quality teaching and learning services in the affected schools will require about US\$ 62.6 million.** Furthermore, the costs will have to cater for building back better so that such schools become resilient to disasters. The most urgent requirement for education is the restoration of effective teaching and learning in all schools and those schools being used as temporary shelters for the IDPs. This would encompass the provision of temporary and semi-permanent alternative learning spaces and the repair of partly damaged schools, as well as the repair of education administrative structures. In addition, learning materials, furniture and school-based counseling programs for the traumatized would need to be provided. Teachers will need to be trained in psychosocial counseling for which manuals are on hand following the 2014/2015 disasters. Additionally, school blocks which have been destroyed should be constructed following recently adopted 2019 Safe School Construction Guidelines and that sanitation facilities accounts for the safety needs of both girls and boys. Table XX presents short, medium- and long-term action points to recover from the 2019 floods:

4.5 Productive Sectors

4.5.1 Agriculture (Crops, Irrigation, Fisheries and Livestock)

121. **The recovery needs to restore crop production is estimated at US\$ 19 million and crop production is the main source of livelihood for over 80% of the rural population.** The immediate to short-term recovery interventions in the crop subsector of agriculture includes: (i) support to farmers with inputs for the residual moisture planting and irrigation; (ii) training household in food budgeting and preservation; and (iii) support farmers with drought tolerant and early maturing planting materials such as cassava, orange fleshed sweet potatoes, sorghum and millet. The medium to long-term interventions comprise the following (i) enforce policies which restrict cultivating on marginal lands; (ii) promotion of river bank rehabilitation through planting of fruit trees such as banana plants and pasture along river banks; and (iii) advocate for water harvesting technologies as well as catchment soil and water conservation measures. Although there is a

financial gap of US\$ 17.7 million, Government has already committed US\$ 1.3 million to support replanting early maturing crops, recovering crop loss and minimising food shortage.

122. **In the livestock subsector, recovery interventions will minimise further spread of parasites and vectors which may have an effect on productivity and livelihoods of the affected population. The total cost of recovery is US\$ 2.4 million.** The prioritized short-term needs include, enhancing production through livestock restocking programmes and improved animal housing and equipment, animal health interventions in affected districts and supporting the technical and operational capacity of Department of Animal Health and Livestock Development (DAHLD). To ensure livestock health other interventions include, increasing access to water by rehabilitating water reservoirs/catchment areas and constructing water points and distribution of small-scale equipment (where needed). The medium-term to long-term recovery needs aim to enhance governance systems in the sector through finalization and the implementation of the Livestock Sector Policy and aligning it to the NRS. To strengthen the restocking programmes, active disease surveillance; parasites and vector control (Ticks, tsetse flies, fleas and establishment of water points and fodder banks (one per EPA in SVADD) will be done.

123. **The irrigation subsector is one of the adaptation strategies to the effects of disasters and becomes an immediate recovery to reduced crop production.** The total recovery and reconstruction needs for the irrigation sub-sector were estimated at about US\$ 17.9 million. For recovery, reconstruction and rehabilitation of the partially damaged irrigation infrastructure will be undertaken. Farmers will also be provided with either treadle pumps or motorized pumps as a temporary measure. Reconstruction actions will include conducting surveys, production of designs and construction of schemes and procurement of equipment.

124. **Recovery and reconstruction need for fisheries were valued at US\$1.3 million:** The recovery needs include repairing and reconstructing fishing boats and landing sites, supply of fishing nets and other gears, rehabilitating fish ponds and supply of fingerlings and fish feeds to affected fish farmers. Reconstruction will involve repairing and construction of infrastructure that were fully damaged such fish processing plants, fish ponds etc.

4.5.2 Commerce and Industry

125. **The sector would require an estimated US\$ 3.1 million to implement reconstruction of the damaged infrastructures and recover lost capital assets.** However, multi-stakeholder collaboration is one of the critical factors in the success of planned recovery strategies in the commerce and industry subsector. While efforts should be placed on rebuilding bridges and road network to ease access to affected markets, the following strategies should be implemented: (i) Provision of affordable loans to both women and men having micro-enterprise affected by floods; (ii) Provide relief items to both men, women and other vulnerable groups to ease pressure on their capital and business; (iii) Offer training program to both women and men in business development and management skills as well as financial management; (iv) sensitize community members including women on minimum standards of construction (v) quickly reconstruct damaged community markets for continued livelihood sources; (vi) reconstruct damaged

infrastructures such as road and communication networks to ensure markets connectivity; (vii) mobile existing and potential villagers and women's VSLs into cooperatives.

4.6 Infrastructure Sectors

4.6.1 Road Transport

126. **The road transport sector requires US\$42.6 million for recovery and reconstruction of damaged roads network and associated drainage structures.** The provisions for Building Back Better to Disaster Resilient Standards has guided the estimations for recovery and reconstruction needs for roads and transport sector. Recovery actions include the construction of bridges and drainage structure to open access to inaccessible areas. Under reconstruction earth roads that would link up the rural areas with the main roads such as East Bank Roads, Makhanga and Bangula and bridges will be upgraded and rehabilitated requiring comprehensive designs. Based on the past incidents, there is a need to establish a logistics emergency staging area in Bangula, Nsanje district. The staging would consist of marine capacity and the necessary infrastructure to support air operations to allow a quick disaster response. To compliment preparedness efforts, (i.e. staging area), there will a need to establish a specific preparedness working group which should be trained and fully equipped to response. gaps and needs.

4.6.2 Energy - Electricity

127. **The total recovery needs for Energy subsector amounts to US\$2.8 million. Energy sector will** develop strategies for reducing impacts of the flood to the infrastructure, and immediate needs will be to restore river and stream banks through tree planting and promotion of natural regeneration on the degraded buffer zones of the Shire and its tributaries and development of guidelines for construction of disaster/climate resilient power lines and sensitization of communities on the use of alternative sources of energy. The reconstruction needs for energy will be the installation of trash booms at hydropower ponds of Nkula, Tedzani and Kapichira, landscape restoration along the Shire River banks and its tributaries down stream of Kamuzu Barrage, promotion of good natural resource conservation farming practices, promotion of community forestry for firewood and use of energy saving cook stove and diversification of power generation sources.

4.6.3 Water, Sanitation and Hygiene

128. **The urgency of restoring access to safe and portable water cannot be overemphasised.** The cost of recovery and reconstruction for water, sanitation and hygiene is US\$ 12.3 million. The immediate to short-term recovery needs that includes rehabilitation and disinfection of damaged boreholes and protected shallow wells, temporary repairs on the damaged gravity fed systems and provision of safe water in the camps of the displaced communities to ensure access to portable water. Additionally, efforts for targeted provision of sanitation facilities especially to vulnerable groups in camps will be made. To build back better the rehabilitation phase and new construction works should ensure that construction standards are adhered to. The medium to long-term needs include risk assessment of environmental hazards to evaluate site location of the damaged structures, redesign the damaged structures based on the findings of the risk

assessment and training of local contractors on building standards of sanitation and water supply structures. The public should be aware of the importance of following resilient construction standards in constructing latrines. Behaviour change messages on proper use of sanitation and hygiene facilities, promotion of open defecation free (ODF) and capacity building on the operation and maintenance of water supply structures will be conducted in affected c to restore the hygiene status communities who were previously declared ODF.

4.6.4 Water Resource (Flood Protection)

129. **Water Resources Recovery and reconstruction Needs are valued at US\$16.99 million:** The immediate needs for water resources includes River bank stabilization, rehabilitation of Dykes and all flood protection structures considering that these might cause further damage to existing infrastructure as well as unprotected communities and farmland during the next rainy season. The recovery works will be performed in consideration of principles of Building Back Better and Smarter. For dykes, this includes raising of heights (designing for higher return period), installation of grouted-rock protection and aprons along critical sections of dykes and spillways to allow for controlled overtopping. Dams are to have upgraded spillways and outfalls (including downstream channels) with grouted-rock protection. For hydrological monitoring stations, weirs are proposed to be installed as they are more robust. The design standards for flood protection structures and dams would be updated to ensure resilience against natural disasters.

4.7 Disaster Risk Reduction and Early Warning Systems

130. The total recovery and reconstruction needs for the DRM and EWS is US\$ 10.9 Million. The sector will prioritize activities such as: conducting gender-responsive disaster risk assessment (including capacity building of stakeholders) and zoning 15 district and 2 city councils; reviewing the implementation of the NDRF and align it the recovery framework of 2019 PDNA; monitoring the implementation of the National Disaster Recovery Framework which has incorporated 2019 PDNA recommendations; supporting development of evacuation plans in disaster prone areas; and reviewing the disaster impact and needs assessment and reporting to include recovery needs (including building capacity of stakeholders at national and local level; and from short to medium to long term) as short-term recovery strategies which are costed at US\$ 2.6 Million.

131. The medium-term recovery needs include strategies such as rehabilitation, establishment and strengthening of community-based flood early warning system with particular consideration for the needs of women, children, the elderly and PWD; establishing, revamp and train CPCs in DRM; training and strengthening local search and rescue teams and provide necessary equipment for males and females; training contractors in resilience building and BBB and Smarter; conduct Comprehensive Building Damage Assessment (BDA) to inform construction/rehabilitation of damaged infrastructure; and support development of DRM plans. The long-term recovery needs include the construction of 4 evacuation centers one in each Phalombe, Nsanje, Chikwawa and Zomba districts; and Promote ecosystem and cross-boundary disaster risk reduction (catchment management and capacity building of communities in catchment and riverbank management) with consideration for the needs of women, men, children, PWD.

4.8 Cross-Cutting Sectors

132. The needs in cross cutting sub sector were costed within the sector in which they are addressed with exception of crop production, fisheries, livestock, irrigation, water resources, transport and energy. The crosscutting sectors will need a total of US\$38.7million for recovery from the disaster effects by the various sub-sectors. The cross-cutting sector strategy will be to ensure that national plans, policies, institutions and budgets reflect how governments translate commitments to gender equality into results for women and vulnerable groups. The post-disaster recovery presents an opportunity to start redressing inequalities and at the very least not perpetuate unequal access to power and resources through the allocation of recovery financial and human resources. The specific recovery needs under this sector includes: Cross Cutting targeted actions in Agriculture (US\$0.6 million), Cross Cutting targeted actions in Housing and Infrastructure sector (US\$0.5), Support Education and Child Protection (US\$6.4 million), Cross Cutting targeted actions in Nutrition sector (US\$2.6 million), Cross Cutting targeted actions in Health sector (US\$2.0 million), Cross Cutting targeted actions in WASH sector (US\$0.4 million), Integrated Social Protection (US\$28.9 million), Gender Equality Social Inclusion (GESI) (US\$4.0 million), Governance (US\$1.3 million), Support People with Disabilities (US\$ 0.3 million), environment (US\$1.3 million) and Cross Cutting targeted actions for Older Persons (US\$0.3 million).

5 Key Recommendation for Resilience Building

133. The below are some key recommendations, and need to be incorporated and mainstreamed across sector planning and programming of disaster risk management:

- **Strengthen the organizational, technical, structural and financing arrangement for Disaster Risk Management in the country:** There is a need for Government to operationalise implementation of existing institutional and financial arrangements and further clarification of roles and responsibility for various MDAs involved in DRM at all levels.
- **Develop disaster management information system that collects and provides sex and age disaggregated data for risk identification and reduction, preparedness, response and recovery.** In particular, there is a need to ensure that the National Emergency Operational Centre is functional through-out the year other being active during disasters to capture pre- and post-disaster disaggregated data.
- **Implement the Malawi National Social Support Programme II to allow scalability of shock sensitive interventions where it can be expanded to vulnerable communities during disasters either vertically or horizontally.** Government should also identify beneficiaries through Universal Beneficiary Register (UBR) data framework.
- **Strengthen coordination among stakeholders in early warning system to inform effective decision making and early actions.** Government and other stakeholders should develop a smooth information flow that will enhance the national capacity to manage and monitor floods control systems as well as forecast and communicate extreme weather events.
- **Review, adopt and implement infrastructural design standards, processes and parameters for roads, bridges, irrigation, water control systems and others to ensure climate resilient building.** There is a need to disseminate and enforce the safer construction guidelines for housing and schools at all levels while paying attention to the most vulnerable groups.
- **Develop comprehensive hazard mapping and zoning as well as community mapping that inform climate resilient land use plans.** There is a need to develop zones for different threshold of disasters to facilitate resettlement planning and incentives for relocation outside flood hazard zones.
- **Strengthen contract management and quality assurance frameworks:** Address the existing gaps at national and local levels in contract management of infrastructure projects to ensure efficient design, implementation, monitoring and construction of resilient structures following the set standards and guidelines. Further, there is a need to enforce performance management and monitoring tools for contractors and consultants which should form part of evaluation during tendering.

- **Enhance measures to ensure resilient and diversified agricultural production for sustainable income of the vulnerable households affected by disaster all the time.** The planned measures should be gender inclusive by ensuring equal consideration and access by men and women.

DRAFT

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Annexes

Annex I: Detailed Sector Reports

Housing-Sub-Sector

1. The 2016-17 NSO survey revealed that 44 % of the population of rural Malawian are living in Permanent houses while as 36% dwells in semi-permanent houses leaving a total of 20% being the traditional/temporary habitants¹⁷ (). The construction of houses in both rural and urban areas is regulated by the Ministry of Lands, Housing and Urban Development, specifically the Department of Housing in collaboration with other Government Departments including DODMA and Buildings. However, due to lack of resources, it has proved difficult for the Department of Housing to implement its mandate including regulations and civic education. It is due to this reason that people mainly in the rural areas lack the required information or skills on how to construct houses in line with government standards of construction. Most of the houses constructed in the rural areas are either made of sun cured clay blocks/ bricks, (adobe) or fire cured clay blocks/bricks and are substandard. Furthermore, in the rural areas, people resort to using unskilled artisans who offer cheap labour but poor workmanship to construct houses. It is against this background that when storms occur, most of the houses affected are those constructed without proper guidance, with low quality building materials and poor workmanship (See Figure 1).

2. Housing is one of the heavily affected sector in the 2019, with Machinga, Phalombe, Chiradzulu and Neno being the worst affected. The needs for reconstructing the damaged houses has taken into consideration 10% of the target population as women and other vulnerable such as the elderly, chronically ill, people living with disability and child headed households.

Effects in the Housing Subsector

3. Houses have been damaged in all the 2019 flood affected districts and the total effects are US\$ 106.9 million. The the most damaged houses are the traditional houses (88.97 percent) followed by the semi-permanent houses (11.9 percent) and then permanent houses (4.13 percent). A total of 288,371 houses have been damaged in the 17 councils representing 13. 4% of the total number of houses in the affected councils. The floods have fully damaged 87,950 houses whilst 219,415 houses have been partially damaged. The total cost of the damage for houses, toilets, kitchens and household assets is US\$ 82.7 million(Figure 2).

According to the finding in the PDNA calculations, the total cost for the losses amount to 1% of the damage. The losses include rent, removal of debris and piece work for repairs. The sum of all total losses calculated in the summary table 1 below is US\$23.9 million.

Social impact of damage and loss of housing

¹⁷ IHS-NSO 2016-17 Page103

4. In shelter and housing, 57% percent of houses owned by poor male headed household families were either fully or partially destroyed, followed by female headed at 34%. People living with disabilities had 7% of their houses damaged, with the least being the child headed at 2% (Annex Table 1). Female headed, diasability and child headed households, often form the poorest social group, and often have poorly constrcuted homes. In addition, due to higher poverty levels and labour constraints, households with vulnerable groups are less likey to reconstruct new homes in comparison with the male headed households. This means that 43% of the affected households are at a disadvanted position in terms of ability to recovery quickly and build back better.

5. The majority of damage in houses could have been prevented if safer housing and building guidelines were followed. Through the use of raised foundations, damp-proof courses to the base of walls, waterproof and sacrificial coatings to walls and also by incorporating large roof overhangs or verandahs to keep the rain off walls and effective local drainage networks, damage to houses would have been minimised.

Annex Table 1: Number of vulnerable groups affected

Groups women & vulnerable Households	No
Child Headed Household	18,884
Disability Headed Household	4,572
Male Headed Household	14,1979
Female Headed Household	83,861
Total	249,296

Recovery Strategy & Needs

6. Effective responses need to consider not only early recovery but also reducing the effects of future disasters by among others, resilient building (see Annex Table 2). Some of the key considerations for building will be promotion of positive pull factors that include avenues to address Housing , Land and Property rights based on cultural practices and/or government regulations. Site planning to allow for different shelter typologies should adopted depending on the soil, drainage and locally available materials. However,it has been noted that many houses were damaged due to lack of skilled workmanship and use of substandard construction materials. In order to address this challenge, government has developed Safer Housing Construction Guidelines that will be used to guide the construction industry in order to build back better and safer. The total recovery needs are are estimated at **US\$105.9million**. A long-term component has been included in the recovery process that will require building of houses for the less privileged/ vulnerable groups of people.

Strategies and Recommendations

Annex Table 2: Summary of key findings and recommendations for strategic reconstruction and recovery

Phase	Key findings	Implications for the sector	Recommendations for resilient reconstruction & recovery
Governance and coordination	<p>The MoL, H and UD Department of Housing has developed Safer House Construction Guidelines which are yet to be disseminated to districts for implementation.</p> <p>The Building Code for Malawi is under development.</p> <p>The cost of implementing the minimum Safer House Construction guidelines is likely to be unattainable for many households.</p>	<p>Quality of house construction is varied and often low quality.</p> <p>Structures at each level of affordability retain vulnerability to hazards.</p>	<p>Dissemination of the Safer House Construction Guidelines is a high priority.</p> <p>Develop 'better practice' guidelines for lowest income households who will continue to use local, traditional construction materials and techniques.</p> <p>Communicate appropriate best practice for each level of affordability.</p> <p>Implement Safe House Construction programmes for most vulnerable identified members of communities.</p>
Site planning and management	<p>Land use planning for housing is not mapped against known hazards.</p> <p>Many houses are located in areas prone to risk with no viable alternative.</p> <p>The need for adaptation and / or mitigation is poorly understood.</p>	<p>A significant number of houses are and will remain vulnerable to risk.</p> <p>Lack of awareness of hazards / lack of access to data on hazards prevents reduction of vulnerability even in areas where risk reduction is possible.</p>	<p>Mapping of hazards at district level to allow for preparedness.</p> <p>Make information on hazards available and accessible to local communities. Additional support can be provided to target villages with a view to enlighten them on land use. Key will be inclusions of various spaces allowing for adequate spaces for community, children, family spaces, hygiene and sanitation as well as for livelihoods. Adaptation and preparedness to reduce impact in the face of hazards must be planned at district and traditional authority level.</p>
Design	<p>Designs are un-engineered.</p> <p>Design follow local norms / typical practice eg for layout of buildings, details used during construction.</p>	<p>Designs may be inherently vulnerable due to lack of technical knowledge.</p> <p>Details which may increase vulnerability are repeated across many structures.</p> <p>Houses are typically built without incorporating risk reducing strategies.</p>	<p>Risk-reducing designs details can be developed and communicated including building layout. Designs can be adapted to suit locally available materials and soil types to reduce vulnerability.</p> <p>During design formulation affected community's can be asked to participate, key will be local artisans and technicians who normally do the constructions. Formulated designs can be engineered to meet local</p>

			regulations as well as government regulations – Ministry of lands and housing. Designs should allow for expansions whenever individual families have resources
Procurement & construction	Domestic housing is delivered through self-build or by local artisans. Materials are sourced locally and cheaply with income levels necessitating the use of low quality materials.	Quality of construction is dependent on knowledge and skill of untrained actors. Structures are made vulnerable through use of poor quality materials and construction standards.	Locally appropriate 'better practice' construction standards should be communicated and demonstrated. Promote / subsidise production of affordable construction products using locally sourced (affordable and appropriate) materials and techniques. Continuous market assessment and evaluations should inform the supply chain demands.
O&M	Routine or seasonal maintenance rarely takes place.	Degradation of structures through weathering is not remedied, leaving structures with higher vulnerability in the face of extreme events.	Simple maintenance strategies and benefits need to be communicated. Local artisans can be trained on maintenance as well as construction techniques.

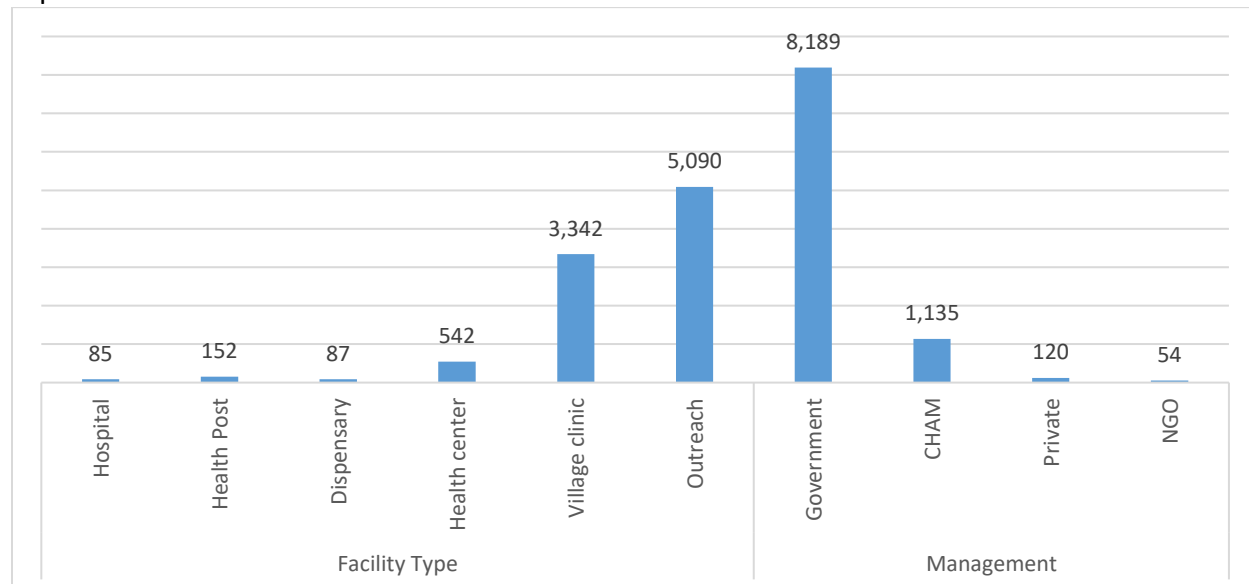
Recommendations

7. The recommendation includes creating enabling environment where processes, policies, guidelines and legislations are part of structured software mechanisms employed in building back better. Of importance will be to acknowledge the rural dynamics where communities' have been adversely affected and how Housing, Land and Property rights can enhance a steadfast recovery bearing in mind the main stakeholders are the community's affected. An example from a shelter perspective will be; provision of a safe, secure, habitable shelter with stable land tenure provides both physical and psychological sense of security. This goes along way in enhancing active participation in livelihoods activities and leads to increased enrollment for school going children. Legal assistance can be afforded to affected community with a view to strengthening existing; cultural, community and government policies on the same. When properly done the community is able to socially and economically build back better.

Health and Nutrition Sub-Sector

1. Public health care services comprise the services provided by all health facilities in Malawi under the Ministry of Health and Population (MoH&P), district councils, Department of Forestry, the Police, the Prisons and the Army. The health facilities under the Christian Health Association of Malawi (CHAM) are the main private but non-profit providers of health services. The District Councils are responsible for the delivery of health services by secondary and primary health facilities. The Central Hospitals (tertiary level facilities) report directly to the MoH&P at central level. The Government of Malawi controls about 69 percent of health facilities, followed by CHAM (29 percent), the Private sector (4 percent) and NGOs (1 percent) (see Annex Figure 1). Table 1 shows the hospital distribution by facility type and ownership. Diseases such as malaria,

sexually transmitted infections, skin, acute watery diarrheal and malnutrition are commonly reported infections in the 15 flood affected districts.



Annex Figure 1: Health facilities by facility type and management

Floods Damage and loss for Health Sector

2. Total effects of the 2019 floods on the health and nutrition sector amounted to US\$ 2.6 million where damages were estimated at about US\$ 0.2 million and losses at US\$ 2.4 million.

About 4 out of 15 affected districts, namely, Nsanje (3), Chikwawa (6), Phalombe (6) and Blantyre (7) had more facilities partially damaged by floods disrupting health service delivery. There were 60 deaths reported as of 11th March 2019, as well as 672 injuries 3 missing. As of March 9, the MoH reported 4 suspected cases of cholera, 2 were confirmed with no death. Almost all of the cholera patients live along the border between Malawi and Mozambique bordering the following districts: Nsanje, Chikwawa, Mwanza and Dedza.

3. Floods predominately affected Public Health facilities where twenty-three (23) were primary and one was a secondary health facility. No health officer was directly injured during disaster and no vehicle is reported to have been damaged due to the devastation. The types of damage ranged from facilities being flooded, in Makhanga for instance, a refrigerator with vaccines was destroyed, roofs being blown off, water tank tower damage, staff and patients toilets damaged in some cases perimeter fences partially damaged and cracks.

4. Loss in the health and nutrition sector originates from increased cost as well as immediately resumption of health services. In Mangochi, Blantyre, Balaka, Zomba, Nsanje, Mulanje, Phalombe, Chikwawa and Machinga, development partners reached out to the affected with comprehensive services including treatment of common ailments, disease surveillance, vaccinations, laboratory diagnostics, nutrition mass screening, antenatal and postnatal care, referrals for delivery to nearby MoH&P static facilities and establishment of mobile clinics. In addition, health services were temporarily increased through mobilization of

additional personnel, health promotions, vector control, disease surveillance, coordination and provision of SRH services for adolescents, women and the general population.

5. Although the health and nutrition sector was not heavily affected by the 2019 floods, some districts recorded an increase in the number of deliveries for March. For instance, in Balaka, 436 deliveries occurred in January, about 433 in February and 501 in March alone with 2 maternal deaths and 91 deliveries of mothers aged between 14 and 18 years. Some women reported losing their family planning records in the floods increasing the likelihood of unplanned pregnancies. Due to poor sanitation, waterborne diseases such as Cholera was reported in Nsanje and Chikwawa within a month after the floods. Affected communities in IDP camps are at high risk of malaria and other waterborne diseases because they lost their mosquito nets and poor hygiene and inadequate sanitation facilities.

6. To ascertain the losses in nutrition, data of admissions into the Community Management of Acute Malnutrition programme was used. The CMAM program is a nationwide system that collects routine data on admission, which can be used as an early warning indicator of deteriorating nutrition status. CMAM collects comprehensive information on Out-patient Therapeutic Programme (OTP), Supplementary Feeding Program (SFP) and information from Nutrition Rehabilitation Unit (NRU). Admissions have decreased across all three programs for both severe (<-3 standard deviations) and moderate malnutrition (<-2 standard deviations) except for the children under 5 years due to disruption of health service delivery system and limited community mobilization. On the other hand, OTP, in Blantyre, Dedza, Mangochi and Nsanje, experienced increased number of admissions during the time of floods. Similarly, SFP experienced a 5 percent increase in admission. CHAM hospitals incurred an economic loss of about US\$ 0.98 million to treat admissions that have been attributed to the heavy rains and floods in the 15 affected districts.

Social impact of floods in health and nutrition sector

7. About 217,224 out of 868,895 flood affected people, were estimated to be women and girls of reproductive age and 57,942 were pregnant mothers. Referral mechanisms were affected when some areas became cut off from the mainland and were only accessed by boats, predisposing pregnant women to unsafe home deliveries, resulting in preventable maternal and neonatal deaths. Moreover, patients had to bear the cost of transportation by boats. In Ndamera (Nsanje), due to a road being cut off, one maternal death was reported as women could not be referred to the main health facility. In Makhanga, a woman with twin pregnancy delivered on the way home after failing to reach the facility, and one of the twins died within 24 hours. In general, about 8,691 pregnant women required access to emergency obstetric care services and sexually active men are at increased risk of HIV and STIs.

Recovery Strategy & Needs

8. The recovery needs for the health and nutrition sector was estimated at about US\$ 30.6 million. The short-term recovery needs include provision of integrated mobile services through mobile clinics to affected populations to cover service disruption (US\$ 212,000); provision of medicines, RH kits and other supplies (US\$ 2,300,000); Integrated Disease surveillance and response (US\$ 450,000) ;and CMAM (US\$ 21,500,000) (see Annex Table 3).

Annex Table 3: Recovery Needs across short, medium and long term

Program of Activity	Value (in US\$)	Responsible Agency
Short Term Recovery Needs (1 year)		
Provide integrated mobile services through mobile clinics to affected populations to cover service disruption	212,000.00	MOH, UNFPA, UNICEF, WHO
Provide CMAM supplies for 3 months	21,500,000.00	MOH, UNICEF, WFP
Provision of medicines, RH kits and other supplies	2,300,000.00	MOH, UNICEF, WHO, UNFPA
Integrated Disease surveillance and response	450,000.00	MOH, WHO
Replenish MoH drugs used in emergency	320,000.00	MoH&P with Health sector partners
Medium to Long Term Recovery Needs (2-5year)		
Repair of Health Facilities including protection from flash floods	200,000.00	MoH & P
Improve financing for the ministry of health. Health to be represented in special allocation for health in DRR	100,000.00	GOM
Improve access to healthcare especially for remote areas.	1,000,000.00	MoH&P
Adherence to health sector building maintenance	100,000.00	MoH&P
Mainstream resilience in health policies and strategic plans	120,000.00	MoH&P

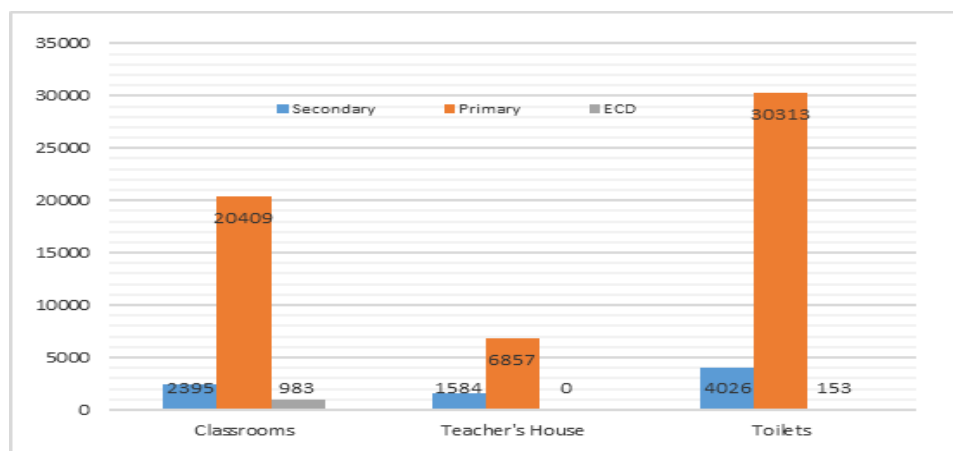
Recommendations

- Partners should support comprehensive health sector activities to ensure effective and efficient delivery of health services.
- The strategies should cater for the provision of minimum standards for health care based on the key principles of equity, access to essential health care, timeliness, results and accountability.
- The medium to long term plan should draw attention to chronic issues related to the health service delivery as well as strengthening and continuation of an epidemiological surveillance and emergency preparedness.
- During re-construction, adherence to safe construction guidelines and building back better should strictly be observed to achieve disaster resilience.

Education Sub-Sector

9. Nationally, over 5 million children are enrolled in primary education and about 0.35 million in secondary education. About 0.012 million children are in Early Child Development Centres. There are 6194 primary schools of which one eight have permanent structures and 1469 secondary schools in the country. The 15 districts and 2 Cities affected by the 2019 floods account

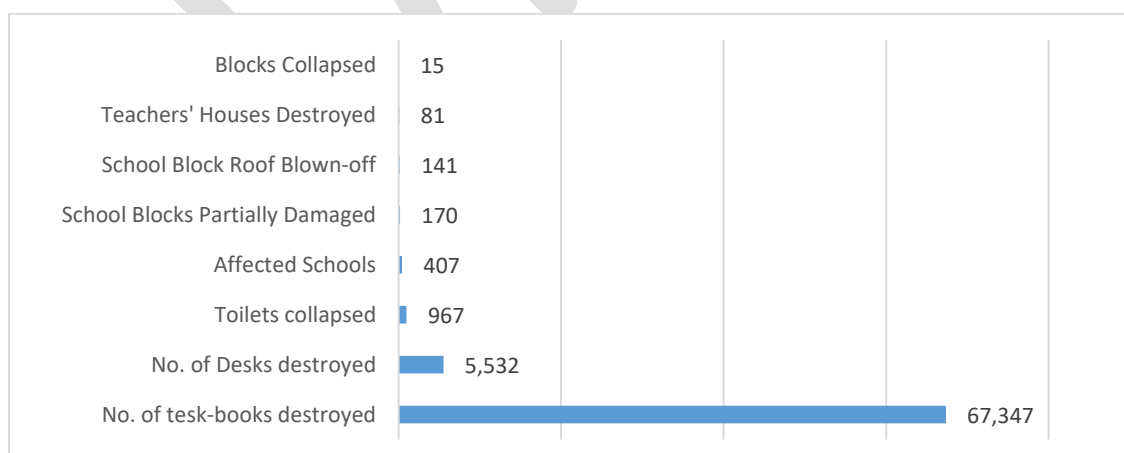
for 53.31 percent of the enrolment in



Annex Figure 2: Number of teachers houses and toilets destroyed by floods

primary education, 48.7 percent of secondary schools and 25.7 percent in Early Children Development Centres. About 983 ECD shelters have permanent structures (see Annex Figure 2). Approximately 37218 teachers provide primary education in the floods affected area of which 40 percent are female. The affected districts have over 8.9 million assorted school teaching and learning materials.

9. Location of education facilities in these affected areas is prone to natural hazards, namely, floods, cyclone winds, landslide, land settlements as well as earthquakes. The natural hazards have negative consequences on children safety as well as teachers' wellbeing as school blocks were damaged (see Annex Figure 3). Furthermore, community non-engineered school construction designs make these educational infrastructures vulnerable to minor as well as major disasters. However, in January 2019, Government of Malawi, through the Ministry of Education, Science and Technology has adopted the Malawi Safer Schools Construction Guidelines which will guide choice of construction sites, materials and designs for schools are both primary and secondary level.

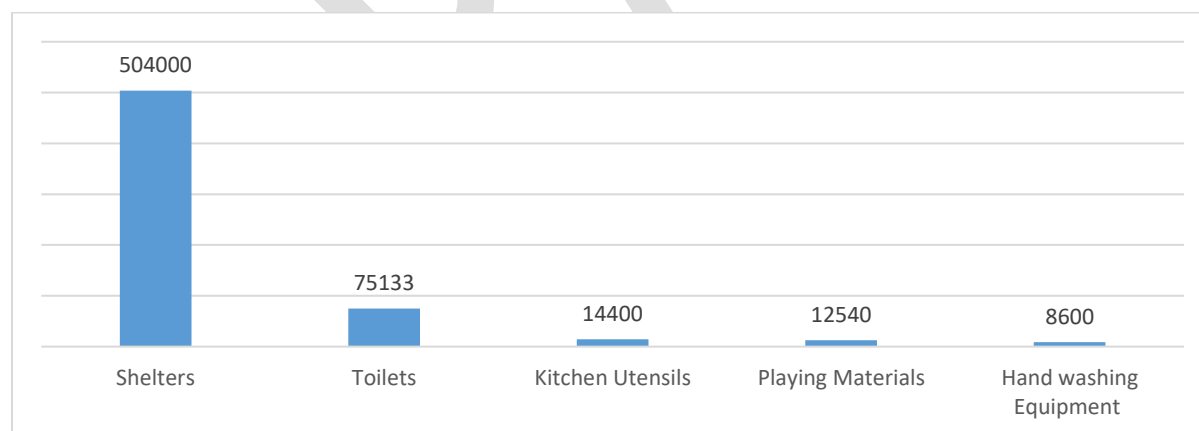


Annex Figure 3: Number of education facilities damaged by floods

Damage and loss in the Education Cluster

10. Early March 2019, floods heavily affected provision of teaching and learning services in the 15 districts and 2 cities leading to failure to conduct school assessment. The total damage to the sector is US\$ 20.3 and loss is US\$ 0.8. Shelters for ECD services suffered much of the damages, that is, about 82 percent of the total damage (US\$ 0.6 million) (**Error! Reference source not found.**). In other areas, schools were temporarily used as camps for internally displaced people. In short, half of the primary schools in the country were affected by these floods which are commonly associated with Cyclone IDAI. About 424 out of 7318 ECD centers were affected, representing 5.8 percent. Most of the affected ECDS were predominately public which in general did not account for disaster resilient and hazard mapping during planning and construction stages.

11. The disaster affected education delivery in three ways: disruption of access to ECDs and teaching and learning deliveries; disturbance of playing and learning services among students especially in schools which accommodated IDPs and infrastructure damages by heavy rains either partially or totally. Although the damages are highly attributed to poor designs that lack disaster resilience, correctly conceived designs proved ineffective when executed by contractors who do not follow safer school's construction guidelines and lack of maintenance of education facilities. Furthermore, seven percent of primary schools in the affected geographical areas were also disrupted. For example, about 15 blocks collapsed completely, 150 blocks were partially damaged and 150 classrooms had their roof blown off (see Annex Figure 4). Almost 81 teachers' houses were damaged including household items. Total damages of floods at primary school was estimated at US\$ 19.7 million with 62 percent of the damages associated with teaching and learning materials.



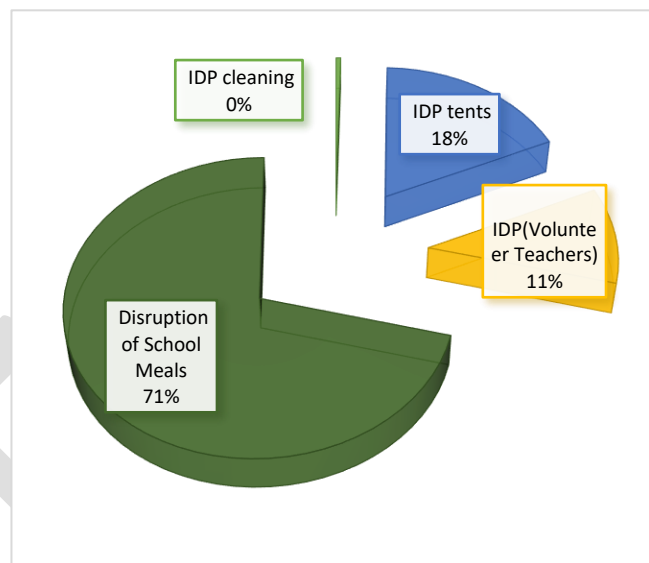
Annex Figure 4: Damages in the ECD shelters and facilities in US\$

12. Loss in education sector came from bring back teaching and learning services and clean facility conducive for learning. Accordingly, in this PDNA, loss in education cluster comprised of cleaning schools' blocks that were used as shelter for displaced people in the respective districts, tents for temporary classrooms as well as volunteer teacher. Of the US\$0.75 million losses, about 71 percent came from disruption of school meals, 18 percent from IDP tents and 11 percent as addition payments for hiring volunteering teachers (Annex Figure 5).

Social Impacts of floods in the Education Cluster

13. Floods had negatively impacted on the psychosocial and health well-being of girls, boys, PWD and other learners through disruption of teaching and learning sessions, playing and leaning grounds, viewing of people encamped in the IDP camps and others.

Damage of textbooks created a niche for low quality delivery of education as teachers taught without reference materials as well as scheme. Furthermore, girls and boys including other vulnerable children living in camps had difficulties in studying and doing their homework without proper lighting and reading facilities. Since displaced families had lost property including food, some school children could not attend classes as they went out to perform piece work in order to supplement food provided by relief agencies. Girls were visibly seen looking for water and firewood thus limiting their opportunities to attend classes, exposing them for sexual abuse, early marriages as well as increasing school drop outs.



Annex Figure 5: Education losses due to temporary creation of IDPs in schools

Recovery Strategy & Needs

14. Creating a conducive environment for teaching and learning will be critical during the recovery period and require a number of prioritized interventions, categorised into short, medium and long-term options (see Annex Table 4). Total needs for recovery process is estimated at about US\$ 62.6 million spread across short, medium and long-term needs. In this section, strategies as well as interventions that need to be implemented to achieve a desirable teaching and learning environment are presented where improvements are accounted to ensure that education infrastructures are resilient to disasters as well as built back better and smarter following the Malawi Safer Schools' Construction Guidelines.

Annex Table 4: Recovery Needs and Strategy for the Education Cluster

Program of Activity	Value (in US\$)	Responsible Agency
Short term strategies (1 Year)		
Rehabilitate damaged schools, ECD centers and other facilities in the affected districts	26,586,369.52	MOEST, MoGCSW
Provide teaching and learning materials and temporary spaces to affected schools including psychosocial support	15,211,167.47	MOEST

Disseminate and enforce adherence to Safer Schools Construction Guidelines in ECD centres, Primary and Secondary Schools	1,500,000.00	MOEST, DoDMA, Councils, NCIC
Medium term strategies (2 Years)		
Conduct Quality Assurance Capacity Building and Vulnerability Assessment in line with SSCGs	979,500.00	MOEST, DODMA, NCIC
Reconstruct and repair teacher's houses and totally damaged school blocks using SSCGs	7,379,937.00	MOEST
Long term strategies (3-5 Years)		
Reconstruct and repair teacher's houses and new school blocks	3,915,000.00	MOEST
Train EIMU and other Public Works in tailor made to Safer Schools Construction Guidelines	3,066,250.00	MOEST, DoDMA, Councils, NCIC
Grand total in US\$	58,638,223.99	

Recommendations

- Enhance decentralized capacity to deliver on devolved responsibilities by reinforcing local authorities in rural areas to supervise and manage school construction.
- Adopt Safer Schools Construction Guidelines (SSCG) as a pragmatic first step, incorporating updates previously recommended. SSCG Standard design to be regionalised as part of future revisions of the SSCG. This is to ensure that the relevant regional hazards and local materials are fully considered in designs for that region.
- Consolidate and disseminate hazard data which can be used to inform good planning. In addition, ensure systematic use of hazard information for physical planning of school infrastructure to ensure that risks are mitigated from the outset.
- Enhance capacity for physical planning at local government level to effectively address hazards and mitigate risks. Further, support appropriate hazard- and site-specific design which can be built by the available construction resources.

Agriculture-Crops Sub-Sector

15. **Agriculture is the main livelihood for the majority of rural people who account for more than 84 percent of the country's population (Annual Economic Report, 2018).** Crop Production contributes between 28-30 percent of the agriculture GDP, employs about 87 percent of total Malawi's work force, and contributes 90 percent of the foreign exchange earnings. The total land area under cultivation in Malawi is about 2.5 million hectares¹⁸. Smallholder farmers cultivate small and fragmented land holdings of less than one hectare (on average 0.61 ha) under customary land tenure arrangements and produce lower crop yields than those produced in the estate subsector. Among

¹⁸ NSO

smallholder farmers, female-headed households cultivate relatively smaller land holdings than their male-headed counterparts (0.53 ha compared to 0.75 ha)¹⁹.

16. The sub sector experienced the floods at the time when most of the crops in the Southern Region were at maturity stage, as a result some of the crops were submerged and washed away. The floods affected 91,637.53ha of the crop area with Phalombe (17,774.4 ha), Nsanje (12,572.3 ha), Machinga (10,624 ha) and Ntcheu (10,394 ha) as the most affected districts (refer annex 1). The most crops affected were maize (51,327.55 ha), pulses (15,524.8 ha), rice (8,052.76 ha) and sorghum (5,918.31 ha). The floods resulted into low yields due to germination of matured grain and rotting in some of the crops like maize, millet and sorghum hence a reduction in production (refer to figure 1 and 2). The crops sub-sector did not experience any damage towards plantation or orchards but losses through reduction in yield, opportunity cost of not irrigating the total area under schemes, and total crop production loss in cases of washaways.

17. The 2019 floods has led to severe damages and losses in the crop production subsector and the total effects of the floods are estimated at US\$ 11.1 million (approximately MK 8.33 billion) from all the fifteen districts. The distribution of effects were as follows: Phalombe (US\$ 3.5 million), Chikwawa (US\$ 1.2 million), Ntcheu (US\$ 1.1 million), and Mulanje (US\$ 1.0 million) just to mention a few.. To calculate the effects, Agricultural Production Estimates Survey (APES), produced annually by the Ministry of Agriculture was used as the major source of production data. A five-year average of the APES figures was analysed to create a baseline which was used as a basis for the estimation of losses. The MoAIWD minimum prices and the prevailing market prices from Agriculture Marketing Information System (AMIS), WFP's mobile vulnerability and analysis and mapping (mVAM) were also used to estimate economic crop losses.

Economic and Social Impacts

18. The effects of the 2019 floods have brought a reduction in crop yield due to excess water that caused rotting and losses through wash aways (see Annex Figure 6). The low crop production will affect food availability and income which may put the affected households at higher risk of malnutrition especially in under five children and pregnant women. The affected households livelihood sources were disrupted which may lead to increased vulnerability and resort to negative coping strategies and female headed households being affected more.

19. Maize prices as the main staple crop in Malawi increased by 12 percent just after the floods due to physical access challenges



Annex Figure 6: Pearl millet germinated after submerged in Zunde EPA in Nsanje

¹⁹ (National Agriculture Policy 2016)

as a result of heavy flooding that rendered key supply routes impassable. The increased price for the staple has an impact on food access especially for the affected households. Further impact of the floods is on the quality of produce such as cotton since the lint was dented. and farmers may fetch low prices.

20. The floods have affected 308,702 farm households of which 47.9% are male headed households and 52.1% are female headed household representing 13 percent of the total farming households of 2,300,363, Mostly Female Headed Households (FHH) were affected, this entails that they require more support than the male headed households in the affected district

Recovery Needs

21. The sub sector 's recovery needs amount to a total cost of US\$19.4 which US\$1.3million is available from the Government through the Ministry of Agriculture and Water Development with a gap of US\$17.7 million. The recovery needs are subdivided into short-term (up to one year), medium term (2 years) and long term (3-5 years)..

22. A number of key factors were attributed to the Loss and Damage from the floods and the following recommendations have been made:

- Population pressure has led to river bank and river bed cultivation and settlement rendering most of the areas susceptible to floods. There is a need to therefore harmonise and enforce riverbank guidelines.
- Low adoption of soil and water conservation techniques that improves drainage of excess water. There is a need to sensitize communities on adoption of soil and water conservation practices
- Increased deforestation and cultivation in the marginal areas increases run off. There is a need to promote re-afforestation and natural regeneration in marginal lands.

Agriculture-Livestock Sub-Sector

23. The livestock subsector contributes an estimated 11 per cent to the agricultural gross domestic product (GDP) and plays a vital role in food and nutrition security especially for the poorer households. In times of crises, livestock are sold to raise cash for food and other immediate household needs. According to the Ministry of Agriculture, Irrigation and Water Development (2019), the main livestock species raised in Malawi are cattle (1 730 605), goats (8 950 992), sheep (323 473), pigs (7 328 668) and chickens (137 001 243) and almost 45 per cent of the cattle are found in the districts of Chikwawa, Nsanje, Mzimba and Karonga, while goats and sheep are more abundant in the central and southern regions of the country.

Damage and Loss

24. Damage to the livestock subsector were minimal where they amounted to US\$ 0.5 million as compared to loss which were estimated at US\$ 7.7 million. The damage and loss were attributed to deaths and wash away of livestock, failure to access livestock products (meat, milk, hides, skins and eggs) and partial or full destruction of livestock infrastructure such as slaughter houses, dip tanks, kraals and livestock markets.

25. Impact AnalysisThe disaster has already negatively impacted on the production capacity of the affected households and have reported the following challenges:

- **Reduced/or no livestock production** - overall production of livestock products has been negatively affected. After the disaster, 47,899 various classes of livestock died, infrastructure washed away and 2,802,723 animals are predisposed to increased disease risk. This has resulted in transient food shortages, disrupted incomes for HH dependent on livestock.
- **Reduced employment opportunities** – reduced household incomes for casual laborers who normally depend on livestock owners.
- **Deterioration of food security (potential increase in malnutrition rates)** - resulting from loss of food stocks (immediate term) and loss of future production (medium term). The assessment anticipates that this situation will be significantly higher in the Lower Shire areas.
- **Disruptions to service delivery.** The damages to infrastructure especially livestock slaughter houses and dip tanks in affected districts has disrupted service delivery.

26. In addition, the extreme wet weather and flooding has created environmental conditions suitable for proliferation of mosquitoes, predisposing to zoonotic vector-borne diseases such as, Rift Valley Fever, emerging infectious diseases such as Dengue, as well as the exposure of Anthrax spores in the soil. Given the unfavourable weather conditions that have characterized Southern Africa during the past three months, migratory wild birds will move from drier areas in the region to wetter parts of Malawi, Mozambique, Tanzania and Zambia in search of food and water, leading to higher congregation of multiple wild bird species, and potential outbreaks of highly pathogenic avian influenza. A dog population build up at Internally Displaced

People (IDP) camps will also increase the incidence of rabies, placing additional pressure on scarce human anti-rabies stocks available at regional referral hospital.

Recovery and Reconstruction

27. The total recovery requirements in this subsector for the 15 affected districts has been estimated at about US\$2.4 million (see Annex Table 5). The overall recovery and reconstruction requirements identified through this PDNA in order to get the affected households back to the pre-disaster production levels are: protection of remaining livestock through vaccination and provision of veterinary care to sick animals; vector control and distribution of small stock livestock (goats, rabbits, guinea pigs and poultry) is essential. Livestock vaccinations against Foot and Mouth disease (FMD), Lumpy Skin Disease (LSD) and Newcastle (NCD) should be prioritized. All cattle, goats and sheep should be de-wormed as the worm burden is likely to increase with flood waters receding and animals grazing on previously flooded areas. If this is left unattended then production is likely to be directly affected. Distribution of livestock especially with rapidly multiplying species such as rabbits, guinea fowl, chicken and to a small extent goats and sheep should be supported at the recovery stage to boost livestock production losses at household level.

Annex Table 5: Reconstruction needs in livestock sub sector

Sub-sector	Intervention	Value (in US\$)	Responsible Agency
Short terms needs			
Livestock	Livestock vaccination and veterinary care for sick animals	574,143	DAHLD
	Provision of livestock (Rabbits, Guinea Fowls & chicken, ducks)	754,280	DAHLD
	Conduct Parasites and vector control (Ticks, tsetse flies, fleas)	10,038	DAHLD
Medium terms			
	Resilience strategic plan development	60,000	DAHLD
	Community participatory disease surveillance	25000	DAHLD
	Conduct Parasites and vector control (Ticks, tsetse flies, fleas)	10,038	DAHLD
Long terms			
	Conduct active disease surveillance	754,280	DAHLD
	Repair and reconstruction of livestock infrastructures and equipment	44,848	DAHLD
	Establish water points and fodder banks one per EPA in SVADD)	120,000	DAHLD

Agriculture-Irrigation Sub-Sector

27. The technologies being promoted under smallholder irrigation development include gravity fed irrigation, motorized pumps, treadle pumps and watering cans. According to the Department of Irrigation (DOI, 2017), the total area irrigated for smallholder farmers is 56,868ha and there are 39,238 farmers out of which 179,322 are males and 156,199 are female.

Effects of Disaster

28. The damage and losses in irrigation has been estimated at US\$13.8 million. The recent unprecedented floods have caused tremendous damage to irrigation infrastructures depriving 35,180 irrigation farmers (17,255 males, 17,925 females) from accessing irrigation services. About 4,901ha of land has been lost due to sand deposits, erosion of soils suitable for crop production and disrupted irrigation season as a result of flood damages.

29. This inundated floods washed pipelines and the canals. A number of solar based pumped irrigation schemes suffered a great damage with pumps and all accessories (electrical connections of solar generator submerged, solar panels and their structural holders) were completely washed away (see Annex Table 6). The surge of overland also damaged infield irrigation structures, scheme roads & related structures, flood protection bunds and water storage reservoirs (Figure 2). The floods damaged irrigation infrastructures worthy US\$ 4.2 million and have resulted into US\$ 9.6 million loss since about 3,328.75ha will not be utilized for irrigation. The impact of the disaster will result into loss of employment and income for the affected communities.

Annex Table 6: Summary of flood damages on several irrigation infrastructure.

Lost Infrastructure	Unit	Quantity
Headworks	No	64
Flood Protection Embankments/Bunds	No	19
Solar Based Schemes (Complete Sets)	No	14
Irrigation Canals	m	67,734
Dams/NSR	No	51
Pipes	No	18,111
Pumping Stations	No	134
Infield Structures	No	763
Wells	No	607
Scheme roads	km	1,197
Scheme roads infrastructures	No	57
Drainage canals	m	47
Drainage structures	No	42

30. Social Impact of Damage and Loss: According to the DOI, close to 7,230.5 ha will not be utilized for irrigation because of the damage cause by the disaster. This will result into losses which are estimated at US\$ 8,090,160.71.

Recovery Needs for Irrigation subsector

31. The damaged irrigation infrastructure need to be recovered within the shortest period possible to reduce the losses. Recovery and reconstruction actions include the provision of motorized and treadle pumps to affected farmers as a temporary measure while awaiting reconstruction of the damaged schemes, reconstruction and rehabilitation of the partially damaged irrigation infrastructure will be undertaken. Reconstruction actions will include conducting surveys, production of designs and construction of schemes and procurement of equipment. The estimated total recovery and reconstruction needs for irrigation sector are valued at US\$ 17.9 million (Annex Table 7).

Annex Table 7: Strategies for recovery and reconstruction in Irrigation

Sub Sector	Outcome	Output	Intervention	Value (in US\$)	Available Resources	Gaps
Short term						
Dept. of Irrigation	Climate resilient irrigation infrastructure developed	Feasibility studies conducted and designs for irrigation schemes prepared	Conduct feasibility studies and prepare designs for disaster affected irrigation schemes	390,924.63	-	390,924.63
		Adherence to irrigation standards, code of practice and irrigation development guidelines improved	Encourage stakeholder adherence to irrigation standards, code of practice and irrigation development guidelines	887,669.62		887,669.62
		Capacity for irrigated agriculture enhanced	Training of irrigation professionals and other stakeholders	2,589,125.89		2,589,125.89
	Promotion of Catchment Management Practices	Catchment Management for irrigation schemes	Farmer training and motivation	4,068,623.25		4,068,623.25
Short term Total				7,936,343.39	-	7,936,343.39
Medium term						
Department of Irrigation	Rehabilitate disaster damaged infrastructure for irrigation	disaster damaged infrastructure for irrigation rehabilitated	Optimize investment in irrigation development	6,014,225.06		6,014,225.06
Department of Irrigation	Develop water harvesting infrastructure	No of water harvesting infrastructure developed	Develop and empower farmer organizations for effective participation in irrigation management	1,383,271.76		1,383,271.76
Medium Term Total				7,397,496.82	-	7,397,496.82
Long term						

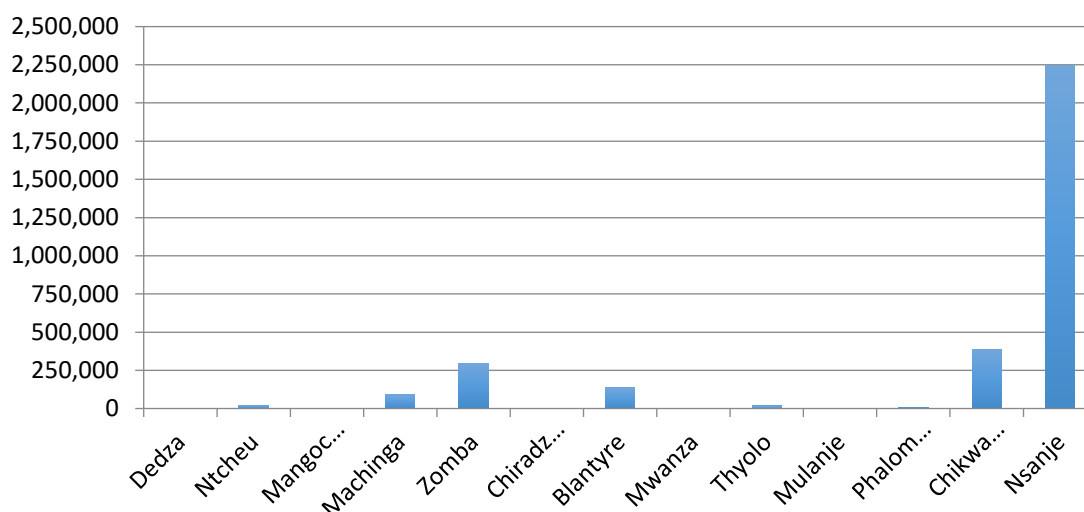
Department of Irrigation	Promote community catchment conservation for the rivers that are frequently flooding these areas	Construct rain water harvesting structures	Promote water harvesting structures and soil and water measures	1,342,645.67		1,342,645.67
Department of Irrigation	Farmer organizations developed and empowered	Develop and empower farmer organizations	Encouraged stakeholder participation in irrigation management	1,235,234.02		1,235,234.02
Long Term Total				2,577,879.69	-	2,577,879.69
Grand Total of Recovery Need				17,911,719.90	-	17,911,719.90

Agriculture-Fisheries Sub-Sector

32. The Fisheries sub sector constitutes capture fisheries, aquaculture and aquarium or ornamental fish trade. The sub sector accounts for about 4 percent of national GDP. It contributes over 70 percent of dietary animal protein intake of Malawians and 40 percent of the total protein supply. The sector directly employs over 60,000 fishers and 15,465 fish farmers where 38.5 percent are women. The sector is supported by ancillary activities which include fish processing, fish marketing, boat building and engine repair, among others. The current fish production from capture fisheries and aquaculture are estimated at 199,454 metric tons (all water bodies) worth US\$235.7 million to the fishers and 12,217 tons per annum (from both ponds and cages) worth US\$ 33.1 million to the fish farmers, respectively.

Assessment of Disaster Effects (Damage and Loss):

33. A total of 574 fishers were affected by the floods and these were all males whereas 104 fish farmers were affected with 49 females and 55 males. Overall, the floods damaged 287 fishing boats and 6,589 fishing gears, 189 fish ponds, 1 smoking kiln and over 50 drying racks that are used for fish processing. The losses estimated for the fisheries sector are mainly to do with opportunity cost to fishing and fish farming as a result of the impact of the floods. The assessment considered total number of direct beneficiaries from fishing (fishers) and fish farming (farmers). The damages and losses due to floods in the fisheries sector are estimated at US\$ 1.8 million and US\$ 1.4 million, respectively, representing US\$3, 209,671 as total (see Annex Figure 7). The collected information on post disaster was validated through triangulation and comparison with well established means of data collection notably fishery surveys, aquaculture inventory surveys and data from National Statistical Office, among others. All the affected properties were privately owned by fishers and fish farmers.



Annex Figure 7: Total Effects in Fisheries Sector in million (US\$)

Social impact of Damage and Loss :

34. Due to damage of fishing boats and gears, reductions are expected in the catch from capture fisheries and fish harvests from aquaculture. Reduced fish production will lead to an increase fish prices which has implications on access to fish protein at household level and hence the serious concerns on food and nutrition security. After the disaster, most areas were not able to resume fishing and this will lead to transient food fish shortages and disrupted household incomes for the majority of the households that depend on fish production. The affected households still require rehabilitation of fish ponds prior to restocking. There is potential increase in malnutrition rates resulting from loss of fish protein source in the immediate term.

Recovery Strategy & Needs for Fisheries Sector

35. The total recovery needs in fishiries are valued at US\$1.4 million (see Annex Table 8). The needs of the fisheries sector given the impact of the floods are: repair and reconstruction of fishing boats and landing sites; supply of fishing nets and other gears; rehabilitation of fish ponds; repair and construction of infrastructure for fish processing; supply of fingerlings; and fish feeds to affected fish farmers. Most of the damages in fishiries sector are on private property.

Annex Table 8: Short , Medium and Long Term Recovery Needs for fisheries sector

Sub-sector	Program of Activity	Value (in US\$)	Responsible Agency
Fisheries	Rehabilitation of fish ponds	45,600	Dept. of Fisheries
Fisheries	Supply of fingerlings from National Aquaculture Centre government hatchery	72,300	Dept. of Fisheries
Fisheries	Supply of fish feeds National Aquaculture Centre	3,483	Dept. of Fisheries
Fisheries	Repair and reconstruction of fishing boats	133,547	Dept. of Fisheries
Fisheries	Supply of fishing nets and other fishing gears	1,052,333	Dept. of Fisheries
Fisheries	Repair and reconstruction of infrastructure for fish processing	3,500	Dept. of Fisheries

Fisheries	Training and capacity building of fishers and fish farmers on climate smart fishing and aquaculture technologies	45,600	Dept. of Fisheries
Fisheries	Improve early warning system against disasters to secure movable assets	50,100	Dept. of Fisheries
Fisheries	Supply of inputs for fishing and fish farming	2,850	Dept. of Fisheries
Total		1,313,713.00	

Recommendations

- Fish farmers require to be supported with proper and recommended fishing boats and gear configurations as recommended by experts from Mpwapwe Boat Yard in Mangochi prior to accessing or assembling the boats/gears for fishing operations. This will enable the boats to be both seaworthy and strong enough to withstand strong impacts due to floods.
- The fish farmers need to be capacitated with large deep pond technology through expert consultation with National Aquaculture Centre to enable the ponds withstand disaster effects. In addition, the fish farmers require access to good quality fingerlings and fish feeds for pond restocking program after the disaster.
- There is also need for prompt dissemination of key messages as early warning system for fishers, fish farmers and the general public against extreme weather events mainly through internet, messages through mobile phones (sms alerts) and whatsapp platforms, among other channels.

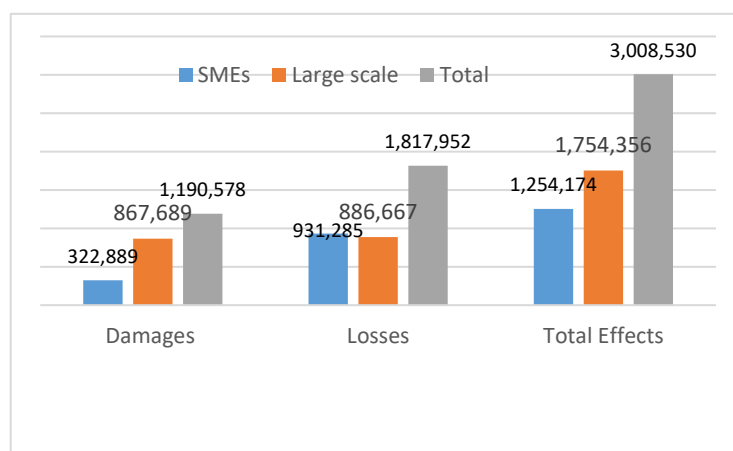
Commerce and Industry

36. Prior to occurrence of the disasters, most of the businesses were operating effectively and efficiently and most of the sectors were showing the potential for growth in 2019. In Malawi, commerce and industry sector incorporate over 11 sectors which are operated on either large, medium or small scale and were on the right growth protectory (**Error! Reference source not found.**). Among several sectors, agriculture remains the key sector that is driving the economy – contributing around 30 percent of the total GDP. In the 15 districts that were affected by floods, the most common business activities included sugar and tea plantations in Chikwawa, Thyolo, and Mulanje; fish farming in Zomba, Mangochi and Machinga; fruit and vegetables mostly in Mwanza and Neno (tangerines), Dedza (tomatoes and vegetables), Ntcheu (beans, vegetables and tomatoes); rice production in some parts of Phalombe; wholesale and retail trade and manufactured products in all districts.

Damages and Losses in the Commerce and Industry Cluster

37. The Cyclone IDAI and flooding in early March, 2019 affected commerce and industry sector in Malawi. About 120,000 business enterprises were directly affected. A number of largescale and smallscale enterprises incurred damage and consequent losses, estimated at US\$2.1 million where large-scale comprised 58 percent percent of the total effects (**Error! Reference source not found.**). The large scale sub-sector incurrd damage cost of up to US\$ 0.88 million, or 72 per cent of the total estimated damage. The heavy rains and the floods caused damages to plants and machinery owned by some of the firms especially in Blantyre. Some of these were washed away and some were submerged in water during the flooding. For the SMEs sub-sector, the damages occurred in nearly fifty trading centres i.e. more severely in Chikwawa (8 trading centres), Phalombe (4), Nsanje (5), Zomba (10) districts and the rest in Dedza, Ntheu, Mangochi, Machinga, Zomba, Chiradzulu, Blantyre, Mwanza, Thyolo, Mulanje, Phalombe, Chikwawa, Nsanje, Balaka, and Neno. In these places, commercial properties and other infrastructures owned by private traders were destroyed or damaged. Markets around the trading centres were also partially or sometimes fully destroyed.

37. The SMEs incurred significant losses in business as a result of the floods. The heavy rains and the resulting flooding resulted in losses estimated at US\$0.93 million or 51 percent of total value of losses due to the heavy rains and flooding(see Annex Figure 8). The losses in the SMEs sub-sector varied across districts, in which case some districts were heavily affected e.g. Nsanje and Chikwawa that recorded 15 percent and 13 perecnt of total losses respectively. Market stocks (fish, vegetables and other market goods and groceries in shops) were washed away and stored food were destroyed by the floods. Consequently, Government



Annex Figure 8: Damages and losses across commerce subsector in US\$

revenue was lost due to market inactivity, low sales. The largescale sub-sector incurred losses equivalent of US\$ 0.89 million or 49 percent. Large scales enterprises incurred some losses, as they had to repair damaged plant and machinery. Production of goods was disrupted during the disasters and the firms experienced low supply f raw materials, such as at Nchalo Sugar Plantation.

38. It is estimated that the sector needs US\$3.3 million to recover ad reconstruct the damaged infrastructures and lost capital assets. The majority of this (83 percent) would support reconstruction of damaged market facilities and construction of entirely new markets (possibly 2 i.e. 1 in Chikwawa and 1 in Nsanje). Other necessities include to provide relief items to ease pressure on business, provision of cheap loans (preferably at 20 percent interest rate or less *per annum* as opposed to 30 percent to 40 percent interest rate or higher *per month* charged by village bank groups and up over 100 per cent *per annum* for some of the microfinance institutions operating in the areas), provision of training on business start-up and management to enhance the capacity of the affected traders and mobilizing traders or affected communities in corporatives in which they have comparative advantage. The Government, the private sector players and the donor community could collaborate and ensure the affected are supported within the shortest period possible. Efforts should be placed to rebuild bridges and roads as soon as possible and open the affected places to markets outside.

Social impact of damages and losses of the floods as it affected commerce and trade:

39. The effects of floods on businesses were equally distributed amongst ordinary women and men. This however is likely affecting more women as most of their livelihoods depended on proceeds from the kind of businesses.. However, nothing much on effects of the damages and losses on businesses operated by youths and other vulnerable groups such as the disabled and people living with HIV/AIDS was reported in the visited districts. All this led to deterioration of livelihoods and poverty. Some of the key social impact of the disaster effects included: (i) disruption of infrastructure that support businesses in the affected areas such as cutting of electricity a period; . (ii) damage of markets and shops and consequent disruption of businesses led to loss of livelihoods and reduction in purchasing power, leaving communities economically vulnerable; (iii) displacement of people around some of the trading centres from their homes and (iv) loss of livelihoods, reduction in purchasing power by the people affected by the floods and the loss of land value in the floodplains may leave communities economically vulnerable for some time. These effects have rendered most people more vulnerable and hopeless.

Recovery Strategy and Needs for Commerce and industry sub-sector

40. Recovery needs for the commerce and industry sector is estimated at MK 2.4 billion (**Error! Reference source not found.**), spread over short, medium to long term space. Annex Table 9 shows the recoevry needs for the sector.

Annex Table 9: Recovery Strategies and needs for the commerce and industry sector

	Value (in million US\$)	Responsible Agency

Short Term Recovery Needs (1 year)		
Small and cheap loans for SMEs	0.27	Commercial Banks; Ministry of Industry, Trade and Tourism; Ministry of Finance;
Trainings on business start-up and management	0.05	TEVETA; Ministry of Industry, Trade and Tourism; SMEDI
Provision of relief items	0.07	DoDMA
Mobilizing communities in cooperatives	0.01	Ministry of Industry, Trade and Tourism;
Medium Term Recovery Needs (2 year)		
Reconstruction of market structures	0.07	Ministry of Local Government and Rural Development; Ministry of Finance
Long Term Recovery Needs (3-5 years)		
Construction of proper/formal markets	2.7	Ministry of Finance and Ministry of Local Government and Rural Development

Recommendation

- There is need of collaborative effort both from private and public sector in order to speed up the processes and avoid continued loss of revenue for economic agents and also failure to access goods and services by end users.

Transport Sub-Sector

41. Transport sector in Malawi facilitates trade, exports and imports and provides for internal freight and passenger movements. It also provides access to social-economic activities (health facilities and schools) at both international and local level. As a landlocked country, Malawi relies on overland transportation and thus road and rail to gain access to Sea ports for the movement of its imports and exports. Road transport is the major mode of transport in Malawi handling more than 70% of the internal freight traffic and 99% of passenger traffic. The country's classified road network comprises 15,451 km of which about 28% is paved with the rest being unpaved and mostly earth standard. The road network is divided into 5 categories: main (3,357km), secondary (3,125km), tertiary (4,121km), district (3,500km) and urban (1,348km) roads respectively. The main, secondary, and tertiary roads effectively make up the country's primary road network, with district and other undesignated roads acting as a feeder system to the primary network. Main focus of this report is on the road transport network of the 15 districts and 2 cities that have been affected with the 2019 floods. No damages have been reported under rail network.

Damage/loss on Roads

42. Approximately 1,841 km or 11.9% of the total road network was damaged due to the force of run-off water occasioned by heavy precipitation and aggravated by lack of vegetative cover, steep gradients, bad condition and ageing road infrastructure. The floods damaged a total of 33km of primary roads, 274 km of secondary roads, 398 km of tertiary roads, and 1,136 km of district roads.

43. For bridges, the floods damaged a total of 129 bridges were affected out of which 122 were totally destroyed while only 7 partially damaged. However, the partially damaged bridges needs to fully to carter for changing catchment characteristics and traffic safety considerations.

Bailey Bridges were urgently required on some roads, which had been rendered impassable resulting in isolation of some communities. Consideration should also be given to deepen river channels by dredging to avoid future infrastructure loss. For culverts, a total of 68 culverts and drifts were completely washed away by the floods. With regard to losses, transport sector suffered losses in repairing damaged sections of the roads, culverts, drifts and bridges to provide temporary access to various road users. The total damage was valued at US\$33.1 million while loss was estimated at US\$ 0.9 million. The losses are based on the actual costs that were incurred in implementing the emergency works. The roads were severely damaged in Nsanje, Chikwawa, Mangochi, Phalombe and Thyolo districts.

44. The roads sector suffered damages amounting to US\$36 million dollars in all the 15 affected districts including Blantyre city. Chikwawa, Mangochi and Nsanje were the most affected districts in terms of damage to road infrastructure. At the time of compiling this report, data for Zomba City was not available. Additional damages may be reported once the data for Zomba City is made available. For the roads sub sector, all the affected areas are public roads and therefore no private roads were considered

Social-economic Impact of Infrastructure Damage

45. The damage on the transport infrastructure had more impact on the accessibility of most of the social-economic amenities, which include schools, health facilities, trading centres and other social services. Most school going children and teachers were not able to cross rivers due to the damaged bridges, culverts and drifts which then would likely have an impact on the quality of education for the pupils. Additionally, the business sector was equally adversely affected as the vehicles, both cargo and passengers were not able to operate normally.

46. In some cases, vehicles had to use longer routes to divert from damages structures and sections. Women and children were most affected and experienced a lot of challenges in using the available road infrastructure like crossing the damaged bridges and the rivers. In other areas, people were forced to pay for the use of locally erected temporary crossings thereby reducing household income levels. The actual social losses and impacts arising from road infrastructure damages are captured in the relevant sector reports such as health, education and commerce.

Recovery Needs and Strategy

47. The short term strategies include Construction of Diversions, Launching of Bailey Bridges, grading and Reshaping of damaged road network and backfilling of scoured approaches. The long term strategies have made provisions for Building Back Better to Disaster Resilient Standards. The road transport sector requires about US\$ 42.6 million for recovery and reconstruction of damaged roads. Most of the costs are for Chikwawa, Nsanje and Mangochi Districts which were most affected by the flooding.

Recommendations

- There is need to revise design standards, regular inspection, maintenance and replacement and enforcement of environmental and catchment management practices and development of data base for all road infrastructures.

- There is need to prioritize on the bridges and drainage structure to open up access to inaccessible and hard to reach areas.
- There is need to develop a robust programme aimed at upgrading and rehabilitating the earth roads that would link up the rural areas with the main roads.
- The East Bank Road and the bridges require additional resources to fully upgrade the road to bitumen standard and make it more resilient to flooding.
- Makhanga and Bangula would require a well comprehensive design so that the structures that would be developed should be resilient to any future disasters.
- Construction regulators require to develop a tool for monitoring the performance of contractors and consultants to enforce responsibility and ensure quality of completed works.

Energy/Forestry Sub-Sector

48. Electricity and biomass energy (firewood, charcoal and agricultural residues) are the main sources for energy for cooking, heating and lighting in Malawi. The total installed capacity for electricity generation is 490.35MW from hydro (362.65MW) covering 98% of the base load and thermal using diesel generators (127.7MW) and used for peaking load. In the period before the disaster, the average power generation was 202MW due to limited flows in the Shire River. Electricity is used for power in industries and domestically for cooking, heating/cooling and lighting. The electricity access rate in Malawi is low at 11% of the total population but growing at an increasing rate (IHS, 2017).

49. On the other hand, biomass energy is predominantly used for cooking and heating in urban as well as in rural areas. It is supplied from both, natural and planted forest. The total forest cover in Malawi is 28 per cent (GoM, 2016). However, the use of biomass as energy source, exceeds the regeneration rate of these forests. This is evident from the deteriorating forest resources in the country. The total consumption for biomass energy is estimated at 8.9 million metric tonnes in wood equivalent which accounts for 88.5 per cent of gross annual energy demand in Malawi (BEST, 2009). Almost all households in Malawi (98 per cent) use solid fuel for cooking (Figure 1). The most common source of cooking fuel in the country is firewood (81%), followed by charcoal (16%), electricity (2%) and crop residue (1%). It is estimated that on average 81.7% of the affected households use firewood for cooking and electricity use is very small except in Zomba and Blantyre Cities where 13.7% and 15.5% of households use electricity for cooking respectively.

Assessment of Disaster Effects

50. The 2019 disaster flooded the Shire River thereby affecting the hydropower plants on the river. The flooding also destroyed electricity distribution facilities and natural resources such as trees. The main cause of the damage was the trash carried along with the increased rainfall runoff water due to change in landscape use. The trash blocked the screens at the power generating plants causing them to dislodge from original position. The trash also caused differential pressures, which necessitated shutdown of the power plants. Total shutdown time due to differential pressure was 46.65 hours at Nkula A, 3.52 hours at Nkula B and 20.63 hours

at Kapichira power plants which are all situated in the affected district, For Nkula shutdown time for repairs was 17.5 hours. The electricity generation facilities were completely shut down three times for a total of 109 minutes between 7th and 9th March 2019. Restoration of electricity supply took between 7 to 14 days. There was partial destruction of the intake screens, tailrace embankment and river training dyke. In other affected areas over 405 poles of the distribution network and about 35% of the newly planted trees were damaged. For forestry, 7,400,000 tree seedlings planted during the 2018/19 National Forestry Season were damaged, representing a 35% loss. There are reports cutting down of trees for construction of temporary shelters by some displaced people hence degradation of forests. The total damage and losses are estimated at US\$2.8 million and US\$ 0.3million respectively (Table 1). **Loss:** The disaster caused great losses to the power generation and distribution companies in terms of loss in revenue due to non-production and no sales of electricity. Commercial/enterprise users of electricity also suffered losses in revenue due non-availability of electricity.

Social impact of damage and loss

51. The social impact of the damage and loss in the energy sector include: Loss of entertainment in areas using electricity; Impact on health service delivery for hospitals using electricity to store some drugs and other items; Loss of perishable food stuff in households using electricity; Loss of livelihoods for different groups like those operating barber shops and salons; Impact on education as study period for students was reduced; Disruption of water supply due to loss of electricity (for electricity driven water pumps); Increased risks and vulnerabilities resulting from disaster such as disease outbreaks and loss of revenue leading to poverty.

Recovery Strategy & Needs and Strategies

52. The damaged facilities have already been repaired or replaced using the resources from the utility companies and hence minimal requirements for recovery. Therefore, the recovery needs and strategies will focus on addressing the causes of the damage to the power generation facilities and building on disaster resilient structures. The recovery needs and strategies will be to regain and maintain the natural regeneration of the landscape, promotion of good natural resource conservation farming practices, promotion of community forestry for firewood and use of energy saving cook stove and diversification of power generation. The total Needs are estimated at US\$ 4.3 million (see Annex Table 10). These proposed interventions will be implemented through other sectors such as Agriculture.

Recommendations

- There is need to restore degraded forests and deforested areas including stabilization of the river/stream banks through tree planting and management and promotion of natural regeneration
- Agricultural production technologies and practices in the Shire River catchments should be reviewed in order to promote best practices that can reduce soil erosion and water runoff and increase productivity on available land

- Community forests or woodlots should be promoted through introduction of incentives for area conserved.

Annex Table 10: Energy Recovery Strategies

Sub-sector	Program of Activity	Value (in US\$)	Responsible Agency
Energy	River and stream bank restoration through tree planting and promotion of natural regeneration on the degraded buffer zones of the Shire and its tributaries.	300,000.00	Department of Forestry and EGENCO Ltd
	Develop guidelines for construction of disaster/climate resilient power lines to be used for lines in disaster prone areas	200,000.00	DODMA, NCIC and ESCOM Lt
Energy	Sensitization of communities on the use of alternative sources of energy and efficient energy technologies	250,000.00	MONREM
Energy	Installation of trash booms before the hydropower ponds of Nkula, Tedzani and Kapichira Power Stations	1,200,000.00	DODMA, Dept of Water Resources and EGENCO
Energy	Promote agricultural technologies and practices that will increase resilience to drought and other climatic shocks	400,000.00	MNREM and MOAIWD
Energy	Promote forest management in forest reserves and plantations to decrease sedimentation in catchment of hydropower infrastructure and protect water sources.	500,000.00	DoDMA, MNREM

WASH Sub-Sector

53. The Ministry of Agriculture, Irrigation and Water Development (MoAIWD) has been mandated with the responsibility of ensuring a sustainable and equitable provision of water supply and sanitation services for the people of Malawi. Under this Ministry, the Department of Water Supply and Sanitation (DWSS) is responsible for overseeing the implementation and management of water supply schemes through Water Users' Associations (WUA) in rural communities, and by Water Boards in urban centres.

54. Water Supply: Malawi has been blessed with an abundance of water resources, including lakes, rivers, and groundwater. In rural communities, most of the population receives their water from boreholes and gravity-flow water supply schemes. Before the March 2019 floods, the proportion of the population with access to improved water sources was estimated at 86% in rural areas and 93% in urban areas²⁰; however, only approximately 56% of these water points were fully functioning and 21% partially functioning, but in need of repair²¹. Using the mWater Portal database, the functionality of all the water points in the 15 affected districts were assessed. Based on the proportion of population with access to an improved water source combined with the functionality status of the water points per district, a pre-disaster baseline was derived (see Table 1 below).

²⁰ ATKINS and Wellfield, *Water Resource Investment Strategy*, 2011

²¹ mWater, *Malawi Water Point Functionality*, 2019

55. Sanitation: The Department of Water Supply and Sanitation provides oversight of sanitation and hygiene activities to ensure the quality of interventions and conformance with the country's legislation. The main purpose of hygiene and sanitation promotion is to prevent the transmission of diarrhoeal and other water-related diseases, by educating communities on the safe disposal of excreta and promoting hygienic behaviours. As of the end of 2018, the proportion of population with access to improved sanitation was estimated at 68% in rural areas and 81% in urban areas, with 37% of households using hand washing facilities. In addition, 111 out of 268 Traditional Authorities were declared ODF. The collapse of latrines, especially during disaster prone seasons (rainy season), is one of the main challenges needing to be addressed²².

Assessment of Disaster effects

56. The total damage was estimated at US\$3.7 million, calculated based on replacement value, and the total losses were estimated at US\$ 2.7 million due to service disruption and increased operations in the supply of potable water. Therefore, the total cost of the effects is US\$ 6. 4.

57. The 2019 Floods disrupted the supply of safe water in all the affected districts²³. A total of 396 boreholes and 81 protected shallow wells were reported as damaged to varying extents. In addition, by using GIS data of the flood extents overlaid by the location of water points from mWater Portal, it was determined that 332 boreholes and 19 protected shallow wells were likely contaminated and require disinfection, as confirmed by several water quality tests, and that many handpumps have been inundated with silt and clay. A number of piped water supply schemes also experienced significant damage, including 27 intake structures and over 30km of pipeline, especially at river crossings where underbed and overhead pipe crossings were washed away. The rains and flooding contributed to the reported collapse of over 258,000 household latrines and over 140 health facility latrines, resulting in many people temporarily resorting to the practice of open defecation, due to a lack of alternatives. Much of the losses to the water supply sector include loss of revenue to the Water Users' Associations and Water Point Committees due to service disruption, impacts to public health as a result of using contaminated water sources and practicing open defecation, and the costs associated with temporary provisions of water and sanitation supplies to displaced populations.

Social impact of damage and loss

58. With a substantial number of water facilities damaged or submerged in flood waters, in addition to the flooding of latrines and waste disposal sites, there is a high risk of water supplies being contaminated. For instance, a water quality testing exercise undertaken in Nsanje district following the floods showed that 81% of 44 tested boreholes were contaminated. In addition, the collapse of thousands of latrines is resulting in affected populations resorting to open defecation. These combined factors have significantly increased the risk of water-borne diseases among the affected population. Further to this, most of the sites where the displaced populations have been relocated to have limited access to safe water supply and sanitation facilities.

60. Factors contributing to impact and losses in sector include the following:

²² Ministry of Health and Population, 2018

²³for the purposes of costing damage and losses, only the cost of health facility latrines has been included in the WASH Sector; household latrines are accounted for in the Housing Sector and school latrines are accounted for in the Education Sector.

- a. Lack of site planning:
 - a. In many cases, construction and reconstruction programmes proceed without fully accounting for environmental hazards and risks associated with climate change thus recreating the same conditions of vulnerability and resulting in re-occurring damages after flood events.
- b. Poor quality construction:
 - a. Poor quality construction materials and workmanship have been observed to result in excessive damages to water and sanitation infrastructure. For example, it was noted that most household latrines were constructed on shallow brick foundations and used mud-based grout.

Recovery needs for the water, sanitation and hygiene sub-sector

61. Total recovery needs for WASH totalled US\$ 11.95 million. Strategic interventions have been recommended below in terms of Short-Term Recovery Needs (STRN), Medium-Term Recovery Needs (MTRN) and Long-Term Recovery Needs (LTRN) addressing the immediate needs as well as integrating long-term resilience strategies to improve planning and implementation processes for the reconstruction efforts and future water and sanitation developments (see Annex Table 11).

Annex Table 11: Recovery needs for WASH

Sub-sector	Intervention	Value (US\$)	Responsible Agency
STRN			
Water	Rehabilitation and disinfection of partially damaged boreholes.	1,960,000.00	DWSS
Water	Rehabilitation and disinfection of partially damaged protected shallow wells.	46,667.00	DWSS
Water	Temporary repairs on the damaged gravity fed water systems.	320,000.00	DWSS
Water	Provision of safe water in IDP camps.	340,000.00	DWSS WASH Cluster
Sanitation	Targeted provision of sanitation facilities in IDP camps.	13,334.00	DWSS MoH
Water and Sanitation	Development of improved quality control mechanisms to ensure adherence to construction standards.	66,667.00	DWSS MoAIWD
	Sub-Total:	2,746,668.00	
MTRN			
	Intervention	Value (US\$)	Responsible Agency
Water	Assessment of the environmental hazards and climate risks to inform the appropriate site selection of reconstructed infrastructure.	300,000.00	DWSS
Water	Redesign of the damaged water supply infrastructure based on the findings of the risk assessment.	400,000.00	DWSS
Water and Sanitation	Training to local artisans on building standards of resilient water and sanitation infrastructure.	100,000.00	DWSS MoH
Water and Sanitation	Public awareness campaign on the importance of following resilient building construction standards.	84,000.00	DWSS MoH

Water	Conduct and implement a Water Network Resilience Analysis for each district to identify how to improve overall resilience of water sector.	1,500,000.00	MoAIWD DWSS
	Sub-Total:	2,384,000.00	
LTRN	Intervention	Value (US\$)	Responsible Agency
Water	Reconstruction of the damaged Gravity fed water supply systems.	1,740,399.00	DWSS
Water	Risk-informed relocation and installation of new boreholes in the affected areas.	286,667.00	DWSS
Water	Retrofit of selected and spatially distributed boreholes in flood-risk areas to be flood-resilient.	850,000.00	DWSS
Sanitation	Reconstruction of sanitation and hygiene facilities in health centres.	1,392,000.00	DWSS MoH
Sanitation	Reinstating of Open Defecation Free and hygiene status of communities, schools and health facilities.	1,066,667.00	DWSS
Water	Capacity building to communities on the operation and maintenance of reconstructed water supply infrastructure.	1,221,334.00	DWSS
Water and Sanitation	Development and implementation of a sector-wide Knowledge Management and Data Analysis Strategy to ensure knowledge is shared and data is available and usable.	266,667.00	MoAIWD
	Sub-Total:	6,823,734.00	

Water Resources Sub-Sector

62. The growing threat posed by water-related disasters (primarily floods) calls for the need for better and smarter management of water resources. The need for flood control structures has become increasingly evident over the years, as a result of increased frequency and severity of floods including major flood events experienced in Malawi in 2015, 2016 and 2019. To fulfil this obligation, the department focuses on construction of flood protection structures (including dykes and dams), surface water storage facilities (excavated storage tanks) and Hydrological Monitoring Stations for flood forecasting and early warning. Flood protection has been implemented primarily through the construction of dykes. These have been constructed by either the Government of Malawi (GoM) or Non-Government Organisations (NGOs) or local communities. The dykes constructed to date are typically earthen material and the works have typically been completed by conventional methods or by hand (Figure 0-29).

63. For major rehabilitation works the communities are advised to seek assistance from the GoM, as well as well NGOs and other development partners. To date the Department of Water Resources (DWR) have installed 45 automated gauging stations and 101 manual gauging stations across the country. There are also additional gauging stations constructed by NGOs that they use for flood forecasting and early warning, however the DWR does not have access to this data or information. The DWR stations are managed by the DWR in conjunction with the Village Civil Protection Committees (VCPCs) and gauge-readers, who are responsible for looking after the

stations, collecting data, and disseminating early flood warnings to the downstream communities. DWR through a Operation Decision Support System (ODSS) also provides early warning messages to various stakeholders, agencies as well as the local communities.

Assessment of Disaster effects

64. The total estimated damage cost of water resources infrastructures is approximately US\$5.1 million. The effects of the damage under water resources were largely due to failure of the dykes and dams, primarily from severe erosion and that lead to breaches or complete wash-out of extensive lengths of assets. Reports indicate that 10 dykes, 7 dams, 2 excavated storage tanks and 11 Hydrological Meteorological Stations (HMS) were either partially or completely destroyed. It is estimated that a total damaged length of all dykes is about 14.8 km. The failure of the dyke and dam structures appears to be primarily due a loss of structural integrity following overtopping of the structures along extensive lengths of the asset. Losses incurred due to damaged of water resource infrastructure is captured within other sector reporting.

Social impact of damage and loss

65. The damage to flood early warning systems and flood protection infrastructure is a huge cause of panic amongst the local communities as they will be exposed to any future storm events. The extensive damage caused by the recent floods now leaves the communities in an even more vulnerable to future events. Impacts to the damaged dams have also resulted in a loss to water supply for domestic use, irrigation and livestock watering.

Recovery Strategy & Needs for water resources sub-sector

66. The water resources infrastructure needs includes rehabilitation and reconstruction of dams, dykes, riverbank (at Mwanza river) and HMS and for BBB&S strategies to be implemented. For dykes, this includes raising of heights (designing for higher return period), installation of grouted-rock protection and aprons ng along critical sections the front of dykes embankments and at the toe and spillwayand spillways to allow for controlled overtopping installation. Dams are to have upgraded spillways and outfalls (including downstream channels) with grouted-rock protection. For HMS, weirs are to be installed to control flows during storm events which allows for more accurate data collection and robust assessment through retention of a consistent channel profile (rating curve). Catchment rehabilitation of upstream catchments is also being proposed. The total needs for recovery are estimated at US\$17 million (see Annex Table 12).

Key Recommendations

- Developed framework for coordination between Department of Water Resources and relevant stakeholders;
- Modelling tools (1d or 2d modelling) to be purchased and training implemented for staff of Department of Water Resources;
- Engage independent experts to review and manage design, to ensure appropriate standards for design and construction are being implemented

- Prepare a simple suite of standard designs and requirements adapted to desired service continuity in specific environment for drainage and introduce requirements for certification of materials / testing
- Ensure appropriately trained representatives are on-site for supervision during works.
- Implement a consistent inspection regime - to be recorded and recommendations provided for maintenance with timeframes and ownership responsibilities identified to ensure are actioned

Annex Table 12: Recovery and reconstruction needs for water resources

Water Resources Sector	<u>Program of Activity</u>	<u>Value (in US\$)</u>	<u>Responsible Agency</u>
Short term recovery needs (0 – 1 year)			
Dykes	Rehabilitation of 2 dykes and reinstatement of Mwanza River	3,193,530	MoAIWD – DWR
Hydrological monitoring stations	Reconstruction of hydrological monitoring stations	2,168,874	MoAIWD – DWR
Dam	Rehabilitation of Chagwa Dam	308,582	MoAIWD – DWR
Governance and decision-making processes	Create centralized database for storage of project information for project lifecycle	150,000	MoAIWD – DWR
Sub Total		5,820,986	
Medium – term recovery needs (2 years)			
Dykes	Rehabilitation of 8 Dykes	5,795,854	MoAIWD – DWR
Dams	Rehabilitation of 4 Dams and 2 excavated storage tanks	2,631,617	MoAIWD – DWR
Catchment management	Catchment rehabilitation works (vegetation, check dam installation and awareness promotion)	600,000	MoAIWD – DWR
Governance and decision-making processes	Enforcement of dam design guidelines and public awareness	120,000	MoAIWD – DWR
	Development of Dyke design and construction guidelines	250,000	MoAIWD – DWR
	Review of flood risk management guidelines that were developed under SRBMP 1	170,000	MoAIWD – DWR
	Capacity building in 1D and 2D hydrological modelling	100,000	MoAIWD – DWR
	Produce standardised operation and maintenance regime and undertake training of community	300,000	MoAIWD – DWR
Sub Total		9,967,470	

Long - term recovery needs (3 – 5 years)			
Dam	Rehabilitation of 2 Dams	798,085	MoAIWD – DWR
Governance	Creation of a centralised flood model	400,000	MoAIWD – DWR
Sub Total		1,198,085	
Grand Total Recovery Needs		16,989,542	

DRAFT

Disaster Risk Reduction and Early Warning Systems Service Delivery Sector

67. The Shire River Basin Operational Decision Support System (ODSS) is an integrated real-time multifunctional forecasting and early warning system that supports the DCCMS and the Department of Water Resources in (a) flow and flood forecasting and early warning, (b) seasonal forecasts for agriculture, (c) forecasts for water infrastructure operations, and (d) drought monitoring. The ODSS provides short-term rainfall forecasts generated by DCCMS, long-term ensembles of rainfall predictions, short-term flood and flow forecasts and seasonal flow forecasts. The institutional responsibilities involved in operating the ODSS are the Department of Water Resources (DWR), Department of Climate Change and Meteorological Services (DCCMS) and Department of Disaster Management Affairs.

Effects and Impacts

68. The effects of the 2019 floods overly as a result of the following factors;

1. Inadequate resources to support operations of the national and district technical staff to ensure service providers comply to construction guidelines and standards; and disaster resilience structures.
2. Ineffective or fragmented institutional coordination within and across sectors exacerbates the impacts of disasters. Non-coherence of policies across sectors has led to poor coordination in the mainstreaming of disaster risk deduction and resilience. For instance, the Land Resources and Irrigation policies are not harmonized in the protection of the river buffer.
3. Lack of disaster risk assessments in the affected sectors results into high prevalence of poor or no hazard-informed site selection and physical planning of the school sites, leaving buildings exposed to adverse environmental prevalent conditions and extremes, with little or no site mitigation measures to address residual risks, for instance, drainage plans.
4. Design flaws compounded by lack of adherence to existing construction standards and guidelines are a catalyst for the increased impact. Many of the dykes that were completely destroyed were constructed using non-mechanical means, resulting in a dyke of reduced structural strength that is more susceptible to failure during a flood event. Some dykes had a lower return period which was challenged by the amount of rains and river flows that occurred prior to the flooding period. Lack of adherence to safer house construction guidelines compounded by use of poor materials implies a very high vulnerability to both high velocity runoff water and inundations. Most of the houses that were affected did not follow the construction guidelines. Designs, guidelines and standards for district (secondary) roads are old and do not integrate disaster resilience aspects. There is need to review them to integrate emerging issues including environmental degradation and siltation of rivers.
5. Most of the contractors hired to construct infrastructure across sectors insufficient capacity to properly execute the designs correctly by ignoring specifications and details, leading to the failure of the larger structure, or constructed with inadequate workmanship resulting in the higher vulnerability of the buildings.

6. Damage to some of the infrastructures could be attributed to lack of maintenance that progressively diminishes the capacity of buildings, bridges/culverts, roads as well as dykes to withstand heavy rains, flood and strong wind leading to shorter longevity and increased accumulated risks. Improved reconstruction and resilient construction in the future requires a holistic approach addressing not only the design and weaknesses in the construction and operation system.

DRR and EWS Service delivery

69. There are many stakeholders in the country that offer DRR and EWS services. These stakeholders are both Ministries, Departments and Agencies (MDAs) and NGOs e.g. Department of Climate Change and Meteorological Services (DCCMS), Department of Water Resources (DWR), Department of Disaster Management Affairs (DoDMA) and Civil Protection Committees (CPCs); and Emmanuel International, Goal Malawi, Islamic Relief, World Vision, Care Malawi, Action Aid, CADECOM, Malawi Redcross Society, Catholic Relief Services, Christian Aid, Self Help Africa and CARD respectively. These stakeholders are offering DRR and EWS services such as capacity building of CPCs, DRM planning (undertaking PVCA and formulation of DRMPs), disaster response - impact assessment, relief mobilization and coordination, Catchment Management – afforestation, DRR awareness and education, weather forecasting , waste management and clearing of blocked water ways to minimize flooding e.g. (clearing of clogged culverts), installation of riverine gauges and community awareness campaigns on the seasonal forecast, hazards, vulnerabilities and disaster risks, development and dissemination of early warning messages, installation of river line gauges to monitor the rising levels of water, distribution of phones for easy communication on early warning messages and distribution of drums and whistles in communities and villages to alert people in case a disaster strikes. However, it should also be noted that this diversity also implies some fragmentation in the approaches and, importantly, a sub-optimal use of the outcome and outputs of the projects.

70. According to the EWS baseline survey (2016) 42.74% have access to improved climate information of which 83.37% get the information on time. However, about 89.95% use the information to prepare plans including contingency plans for weather related natural Hazards. Prior to 2019 floods, access to information was enhanced through national and community radio stations, mobile phone messages, and district and community meetings, and bulletins. These media of communications widened the coverage. Utilization of EWS services was low as witnessed by lack of contingency plans and evacuation plans in some communities hence huge impacts of the flood. The delivery of the DRR and EWS services during the rainy season was done effectively in the targeted areas as evidenced by preposition of relief items, and contingency plans. The main challenges however, were lack of coordination; and inadequate financial resources and difficulties in mobility. However, response including search and rescue were done timely in collaboration with different stakeholders including MDF. It should also be noted that the floods have had an impact on the DRR and EWS service delivery resulting in disruption of service delivery and damage to some equipment installed.

71. Communities where DRR projects exist when the floods struck were more involved in the dissemination and delivery of DRR and EWS services. The same was the case with evacuation plans, they are available only in project focus areas. All the districts indicated that they have contingency plans. It is also interesting to note positive experiences from utilities and community water management. For instance, decentralised local water supply schemes acted independently to manage their own water service provision. The Zomba East Rural Water Supply Scheme had used reserved tariffs to stock up on spare parts and materials plans helped in casepreposition of an emergency. Therefore, after five of the pipe river crossings were damaged in the flooding, they were able to immediately mobilise temporary repairs to reinstate water supply services within 20 days, serving over 120,000 beneficiariesrelief items.

New and emerging risks

72. It is important to understand additional risks that may threaten the recovery process. Considering the climatic outlook, DCCMS has indicated that there is a high likelihood of persistence of el nino this coming season, most likely floods in some areas and dry spells in others because the country has experienced a weak el nino this season. It is also important to note that projected hazards value-changes will compound the incremental risks accumulated by infrastructure that has been affected by this event even when it has not collapsed. For instance bridges that have accumulated large sedimentation, or absorbed shocks, will be less likely to withstand future shocks. The same applies for building infrastructure, such as Schools. This will be further worsened if remediation and improved retrofitting and reconstruction is not taken urgently.

73. There are also several environmental risks emanating from the disaster such as loss of trees along river banks, especially trees that were planted in the 2018/19 season. For instance, Chikwawa has lost 30% and Nsanje 50% of river-line tree cover. There is an increase in demand and consumption of trees for construction of temporary shelter, firewood and charcoal. Disruption of livelihoods has resulted into higher production of charcoal and firewood.

74. In addition to the environmental risks there are also sector specific risks that may pose a threat to the recovery process. In the transport sector mobility challenges for both traffic and humans may result in increased occurrence of accidents especially roads and bridges which are not maintained. In the health sector congestion in camps has increased the risk of epidemics and malnutrition cases due to poor hygiene and sanitation facilities. In the agriculture sector, the districts that have been affected were those that were being supported under the lean season support from the MVAC. The communities in these areas were already at risk and the disasters have created conditions that have created new threats or conditions of vulnerability. In the health and WASH sector disease incidents are likely to increase as a result of seepage of latrines causing water pollution and affecting water bodies as a result of poor solid and liquid waste management.

The performance of the DRR and EWS system

75. According to the DCCMS, most rainfall stations in the Southern Region recorded heavy rainfall (with 239mm recorded at Limbuli station on 5th March, 2019, Mpemba recording

255.5mm on 6th and Tsangano recording 220.8mm on 7 th March. These rainfall events generated enormous runoff in the Shire River Catchment, which led to riverine flooding mainly along Shire, Mwanza, Livirivi, Lilangwe, WankuluMadzi, Thuchira, Lichenya and Phalombe Rivers. The above events were ably forecasted by the ODSS which is an integrated real-time multifunctional forecasting (data obtained from real time hydrological stations) and early warning system that supports government personnel and stakeholders in undertaking the following: a) Flow and flood forecasting and early warning; b) Seasonal forecasts for agriculture; c) Water infrastructure operations; and d) Drought monitoring

76. It is important to note that hazard data and modelling exists that can significantly improve the knowledge of risks and vulnerability. However, it is of evidence that often data is ‘projectized’ and not available, poorly available or of difficult access. It is also a fact that the fragmentation of data use and the applications per sectors diminishes its effectiveness.

Recovery Strategy

77. This section highlights the following recovery strategies (see Annex Table 13):

- Improved *governance* of sectoral bodies operating in this region, repeatedly affected by disasters of increasing intensity and frequency, in order to cut across administrative boundaries and institutional mandates, and force technical cooperation at spatial level;
- Enhanced *governance* of the risk through an integrated data management linked to land-use planning and sectoral investments (in particular in infrastructure).;
- The *resilient integrated management of services and infrastructure* for the region homogeneously defined around the watershed through a process of resilient spatial planning at the sufficient scale and across all sectors.
- All phases of typical *service and infrastructure delivery* in the region and particularly: Physical planning and site management, which is essential to prevent and mitigate risk across the Shire River Watershed and the broader river system in southern Malawi; Technical design adapted to the environment in this region and integrating considerations of the current and future hazard profile induced by climate change and Construction processes (procurement, quality-assurance, workmanship) that can ensure infrastructures are delivered to the necessary standards dictated by the project design
- Operation and maintenance, to ensure that all infrastructures are able to withstand and absorb effectively the expected future shocks and continue to perform effectively for the longest possible duration they are conceived for, and not deteriorate precociously.
- The hydrological and meteorological early warning systems in the country provided timely, consistent and accurate severe weather warning information related to IDAI tropical cyclone but failed to timely provide information regarding flooding in the 17 councils. This could have been due to limited advanced and adequate equipment particularly in dissemination. River gauge readers are on voluntary basis and their capacities are questionable in most districts. In addition, capacity of personnel at local level to issue out early warning messages was challenged. Lack of coordination between upland and lower stream communities led to huge impacts of flooding in communities.

Annex Table 13: Recovery and reconstruction needs in the disaster risk reduction and early warning system

SECTOR	PROGRAM OF ACTIVITY VALUE	US DOLLARS	RESPONSIBLE AGENCIES
SHORT-TERM RECOVERY NEEDS (ONE YEAR)			
DRM and Infrastructure	Develop a suite of standards for improved retrofitting and reconstruction of infrastructures for all sectors (Housing, Schools, Health posts, Bridges, Dykes, Drainage, Water points and infrastructure, sanitation) to be used for immediate recovery	200,000	DoDMA and all sectoral agencies
DRM high-risk sectors	Conduct hazard, vulnerability and risk assessments (including capacity building of stakeholders) and zoning of 15 district and 2 city councils	1,500,000.00	DoDMA, DWR, and DCCMS
DRR/M	Document existing good resilient practices across the sectors, map data produced by projects, and ensure integration into sectoral planning and operations	80,000	DoDMA and all sectors
DRR &EWS	Review the National Disaster Recovery Framework (NDRF) to incorporate 2019 PDNA issues	350,000.00	DoDMA
DRR	Monitor the implementation of the revised NDRF	150,000.00	DoDMA and Sectors
DRR	Support development of evacuation plans	350,000.00	DoDMA
DRR	Review the disaster impact and needs assessment and reporting to include recovery needs (including building capacity of stakeholders at national and local level; and from short to medium to long term.	250,000.00	DoDMA
DRR	Provide a return package to households in displacement sites	500,000.00	DoDMA
DRR	Implement a national recovery and resilience public awareness programme	500,000.00	DoDMA
MEDIUM-TERM RECOVERY NEEDS (TWO YEARS)			
DRR	Rehabilitate, establish and strengthen automated community-based flood early warning systems with particular consideration for the needs of women, children, the elderly and PWD	500,000.00	DoDMA, DWR, DCCMS
DRR	Establish, revamp and train CPCs in DRM	350,000.00	DoDMA
DRR	Train and strengthen local search and rescue teams for males and females and provide necessary equipment	1,000,000.00	DoDMA, MDF, and MPS
DRM and infrastructure	On the-job training of contractors in resilient reconstruction (BBB) and improved construction when reconstruction schools; houses; health-posts or other infrastructure	2,000,000	DoDMA, NCIC, Engineers; Sectors

SECTOR	PROGRAM OF ACTIVITY VALUE	US DOLLARS	RESPONSIBLE AGENCIES
DRR	Conduct Comprehensive Building Damage Assessment (BDA) to inform construction/rehabilitation of damaged infrastructure	100,000.00	DoDMA and Housing
DRR	Support development of DRM plans	300,000.00	DoDMA
LONG-TERM RECOVERY NEEDS (THREE TO FIVE YEARS)			
DRR	Construct 4 evacuation centres one in each Phalombe, Nsanje, Chikwawa and Zomba districts	1,300,000.00	DoDMA
DRR	Promote ecosystem and cross-boundary disaster risk reduction (catchment management and capacity building of communities in catchment and riverbank management) with particular consideration for the needs of women, men, children, PWD	1,500,000.00	DoDMA
TOTAL		10,930,000.00	

Cross cutting issues

78. The majority of the households that were affected by floods in 2015 had not yet fully recovered and enhance resilience²⁴, before the 2019 disrupted the country social and economic sphere again. Malawi's total population of 17.5 million with population demographics being male 49.0%, female 51.0%, children below 18 years 51%²⁵ and people with disability 7.4 %²⁶. Average household size is 4.4 persons²⁷, with 31% being female headed households²⁸, Literacy rates for 15-24 years for males being 69% and females 58%²⁹, Infant Mortality rate is 42 per 1000 live births³⁰ and Maternal Mortality rate is 439 per 100,000 live births³¹. Overall, 22% are female farmer headed households³². In general, female farmers are less productive by 28% on average compared to their male counterparts, due to lack of access to land, labour, knowledge, fertiliser, improved seeds and mechanisation. An average length of a woman's day is between 16 to 17 hours, and they spend 10 times as much time as men on housework³³. 69% of women reported that before the disaster, their husbands alone made the decisions related to major household purchases³⁴.

²⁴ World Bank 29/11/2016; Burunga 11/3/2019; GFDRR 2015.

²⁵ Malawi in Figures. 2015. Government of Malawi.

http://www.nsomalawi.mw/images/stories/data_on_line/general/malawi_in_figures/Malawi%20in%20Figures%202015.pdf.

²⁶ World Bank Report - 2010

²⁷ Integrated Household Survey. 2010-2011. Republic of Malawi. http://siteresources.worldbank.org/INTLSMS/Resources/3358986-1233781970982/5800988-1271185595871/IHS3_Report.pdf. 8

²⁸ DHS 2015.16

²⁹ Ibid. 5

³⁰ Malawi Demographic and Health Survey: Key Indicators. 2015-16. <https://dhsprogram.com/pubs/pdf/PR73/PR73.pdf>. 20.

³¹ Malawi in Figures. 2015. Government of Malawi.

http://www.nsomalawi.mw/images/stories/data_on_line/general/malawi_in_figures/Malawi%20in%20Figures%202015.pdf.

³² CARE Gender in Brief

³³ Closing the Gender Gap in Agriculture, UNW and PEI

³⁴ CARE International

79. According to the Malawi Demographic Health Survey, 28.2% women aged 15-49 experience physical violence and 25.3% women aged 15-49 experience sexual violence in their lifetime. Furthermore, one in five women experience sexual violence. According to the Violence against Children Study, 42.4% girls and 64.5% boys experience physical violence and 21.8% girls and 14.8% boys experience sexual violence or abuse. It costs the country at least MK 877 million (US\$2, 698, 462,) per year to manage SGBV cases.

Effects of the Disaster

80. Disasters tend to affect women, older people, and people with disabilities, children and other vulnerable groups more disproportionately than other segments of the population. The inter-agency assessment baseline findings shows that 63% female and 37% male affected by the disaster in the districts Machinga, Mangochi, Balaka and Zomba with the high number of vulnerabilities including people with disability. The assessment also shows that 77% of the households under Social Cash Transfer Programme (SCTP) and 1.2% children of School Meal Program (SMP) have been also affected. Despite inadequate disaggregated data of those affected some rapid analysis shows that women are not able to engage in income generating activities due to lack of opportunities and loss of livelihoods assets.

81. There are threats of increasing cases of SGBV because of the poor conditions in the camps (many people living in camps, lack of adequate lighting and shortage of basic needs which increases the risk of violence and posed a threat to women, children, the elderly and PWD's security including risk of abuse. Annex Table 14 shows the number of people with disability

Annex Table 14: Table of Affected People with disabilities across districts			
Region and District	Male	Female	Total
Central Region			
Dedza	38	25	63
Ntcheu	0	0	0
Southern Region			
Blantyre	150	160	310
Balaka	94	107	201
Chikwawa	215	340	555
Chilazulo	86	166	252
Machinga	205	276	481
Mangochi	90	109	199
Mulanje	86	134	220
Mwanza	80	78	158
Neno	102	107	209
Nsanje	496	659	1155
Phalombe	110	153	263
Thyolo	147	186	333
Zomba	157	181	338
Total	2056	2681	4737

affected by floods across districts. Women, PWD and the elderly are particularly vulnerable to the financial effects of the floods as many of the houses also serve as shops for income generating activities and this may trap them into the poverty cycle. With lack of housing insurance schemes for the general population, particularly rural women and vulnerable groups have no social or institutional safety nets.

82. Despite their vulnerabilities and disproportionate risk exposure, the aftermath of the emergency and the early recovery phase present new opportunities for more progressive gender roles and relationships by ensuring gender responsive disaster management and preparedness, equitable access to decision making, livelihoods and service delivery.

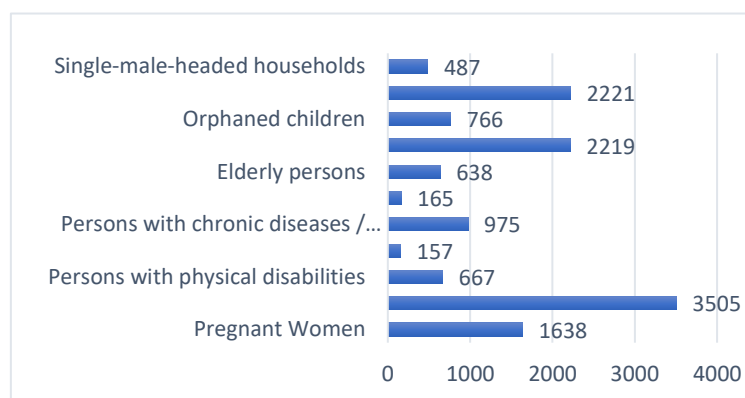
83. During the recent flood in 14 districts there are a total 4,737 (Male 2056 (43%) and Female 2,621 (57%))³⁵ as persons with disabilities. These disabilities include Albinism, physical, visual impairment, hearing impairment, epilepsy, mental health and intellectual disability. Therefore distinct attention will be needed, while designing the recovery programme with affirmative approach with targeted actions. *(See the table on gender and districts disaggregated no of people with disabilities).*

84. In addition, older persons also face additional challenges in accessing livelihood opportunities because of age discrimination or

unrecognition and underutilization of their skills. Therefore, there is emerging need to be considered as a special group during the recovery programming.

85. The Health sector also remains highly affected including maternity homes and under five shelters. The data analysis from 4 districts and 64 camps provided details, that a total 13, 438 extremely vulnerable individuals who will require special medical attention during the recovery phases. (See Annex Figure 9)

86. Furthermore, case of STIs have increased in March, 2019 (12, 368), as compared to March, 2018 (11,665). In 2019, the percentage is higher among Females 41% and Male 15%, this can be attributed partially, to the negative coping mechanism for girls and women and increased vulnerabilities due to poverty, and limited decision-making powers, particularly for adolescent girls as a result of the disaster.



Annex Figure 9: Number of vulnerable groups affected by floods

87. The floods have heavily affected the housing sector, as indicated in figure below, and will required immediate actions during the recovery programming with affirmative actions to the vulnerable group's e.g: Single female headed households, Widows, Child headed household and Disable headed household and household with person with disabilities. Annex Table 15 shows key cross cutting sectoral recovery needs.

Annex Table 15: Key Cross Cutting Sectors Recovery Needs Summary

Mains Cross Cutting Thematic Areas	Budget Requirement (US\$)
Cross Cutting targeted actions in Agriculture	550,000
Cross Cutting targeted actions in Housing and Infrastructure sector	485,000
Support Education and Child Protection	6,399,513
Cross Cutting targeted actions in Nutrition sector	2,569,953
Cross Cutting targeted actions in Health sector	2,007,867
Cross Cutting targeted actions in WASH sector	391,398
Integrated Social Protection	28,924,467
Gender Equality Social Inclusion (GESI)	4,000,000
Governance	1,302,446
Support People with Disabilities	322,000
Environment	1,351,715
Cross Cutting targeted actions for Older Persons	276,303
Total	48,580,662

Cross Cutting Sector Recovery Strategy:

88. The Ministry of Gender, Children, Disability and Social Welfare (MoGCDSW), will take lead on the cross-cutting sector coordination, planning, programming, implementation, monitoring and

accountability with the involvement of relevant stakeholders including government ministries, donors and partners.

89. The cross-cutting sector strategy will ensure the National plans, policies, institutions and budgets reflect how governments translate commitments of gender equality into results for women and vulnerable groups. The post-disaster recovery presents an opportunity to start redressing inequalities and at the very least not perpetuate unequal access to power and resources through the allocation of recovery financial and human resources. It is recommended, therefore, that budget allocation under the government's institutionalized gender responsive budgeting framework should be increased in addition to the specific recovery needs identified in this sector.

90. The cross cutting sector suggests the following recommendation

- **Availability of Sex, Age and Vulnerability Disaggregated Data:** The need for adequate mechanisms to ensure the collection and use of sex, age and vulnerability disaggregated data and gender analysis for effective recovery planning and programming. Need to design and conduct gender specific rapid assessment to provide updated baseline and recommendations for gender specific needs of affected population to promote social protection and sustainable livelihoods in key productive sectors.
 - **Ensuring effective social protection and SGBV Responses:** The recovery efforts needs to strengthen the capacity of community policing structure with provision of alternative livelihoods to ensure and sustain monitoring and support of protection and SGBV issues. The need for institutional representation of vulnerable social groups in all recovery programme to ensure they benefit equally from the recovery intervention.
 - **Economic empowerment:** - Un-conditional cash transfer support program for most vulnerable households to reduce the pressure of adopting to negative coping mechanisms and institutionalize the gender responsive budgeting mechanism. Revitalize small scale income generating activities thorough VSLs and other structures, engage MFIs and commercial banks in creating specific products for women to access finance. Develop measures to support women and vulnerable groups, to promote access to and control over land, attainment of ownership and tenure rights. Support rehabilitation centres for PWD in provision of accessory devices, skill development and livelihood enhancement support and the provision of PWD identity documents. Support and provided financial assistance to establish older persons associations at the affected districts. Institutional representation of vulnerable social groups in all recovery programme to ensure they benefit equally from the recovery intervention.
 - **Governance:** Establish a well-resourced and clearly articulated roles and responsibilities Gender Equality and Social Inclusion (GESI) Unit at the Department of Disaster Affairs Management (DoDMA) and aligned with Ministry of Gender, Children, Disability and Social Welfare (MoGCDSW) to support a sound coordinated gender responsive planning, Implementation, monitoring and evaluation process and integrate GESI measures for all recovery and reconstruction.
- Ensuring effective social protection and SGBV Responses:** The recovery efforts needs to ensure and sustain monitoring and support of protection and SGBV issues by strengthening

the capacity of community policing structure with provision of alternative livelihoods disadvantages groups. Revamp integrated community-based feedback mechanisms and community-based protection structures for affected people especially the vulnerable groups' e.g: single female headed household, children, PWD, people living with HIV, senior citizens, and sexual and gender-based violence survivors by providing psychosocial care and support, capacity building and awareness rising programmes on SGBV and SRH etc. Conduct women safety audits in the affected districts to highlight women and girl's protection and SGBV issues and draft recommendations and plan of actions for implementation. Establish grievance redress mechanism structures to support legal actions for all survivors of abuse, exploitation, deprivation or denial of services. Develop community outreach messaging/communication strategy to ensure that women, PWD's and vulnerable communities are aware of available services, their rights and how they can contribute to the recovery process. There is need to scale up the Social Cash Transfer Programme both vertically and horizontally in the affected areas. This will help ultra-poor households to ably recover from the damages and losses encountered from the flood and reduce adoption of negative coping mechanisms

- **People with Disability (PWD)& Senior citizen/older person:** Support rehabilitation centres for PWD in provision of accessory devices, skill development and livelihood enhancement support and the provision of PWD identity documents. Advocate with Ministry of education on disability friendly school construction to develop guidelines. Support and provided financial assistance to establish older persons associations at the affected districts. Support to implement social cash transfer grants to extremely vulnerable older persons with no sustainable income and include older persons in all interventions of various sectors e.g; livelihood, shelter, health and nutrition.
- **Shelter:** Direct construction of individual house, particularly for affected female headed household, child headed household, Elderly headed household, Headed household with disability, chronically ill and other vulnerable groups. Sensitization on Safer house construction guideline, gender responsive DRR for affected community in all local languages. Develop IEC material, pictorial messages and charts for affected women and vulnerable group's on safer construction and dissemination at affected districts. Develop affirmative action mechanism for people with multiple vulnerabilities with additional cash grants for construction to be used for skill and unskilled labour.
- **Health:** Deployment of mobile health unit to targeted locations for pregnant women safe delivery. Special nutrition support for pregnant and lactating women and children. Provision of dignity kits to adolescent girls and women.
- **Environment:** Build capacity of communities in soil and water conservation technologies. Conduct Environment Screening, development of ESMPs and monitoring of ESMPs on all rehabilitation works. Build capacities of communities in high energy saving technologies. Establish a Community Resilience Adaptation Fund.
- **Education: Provide second chance education activities for women and elder people - adult literacy program.** Gender Disaggregated WASH facilities in schools and EDCs centers. Education continuation scholarships for vulnerable children. All schools designed need to be prepared and approved by certified engineer by considering strong component of DRR to protect children from additional harm and ensuring sustainability.