



Malawi Government

Malawi 2019 Floods Post Disaster Needs Assessment Report





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This work is a product of Malawi Government with Financial and Technical Support from The World Bank, Global Facility for Disaster Reduction and Recovery (GFDRR) and The United Nations.

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Table of Contents

Foreword	viii
Acknowledgements	ix
List of Acronyms	x
Executive Summary	xiii
Disaster Profile	xiii
The Disaster Overview	xiii
The Effects	xiv
The Impact of the Disaster	xvi
Macroeconomic Impact	xvi
Human and social development impact	xvii
Needs for recovery and reconstruction	xviii
Way forward	xix
PART I	
1. Disaster effects and impacts	1
1.1 Disaster Risk Profile	1
1.2 Malawi’s Socio-Economic Context	2
1.3 Overview of the 2018/2019 rainfall season in Malawi	3
1.4 The 2019 flood response and coordination	3
1.5 Lessons Learnt from the 2015 and 2019 Floods	4
1.6 Legal and Institutional Framework	5
1.7 PDNA Approach and Methodology	7
1.8 Economic and Social Impacts	9
1.8.1 Overview	9
1.8.2 Pre-disaster economic context	9
1.8.3 Impacts on Gross Domestic Product (GDP)	11
1.8.4 Impacts on Inflation	12
1.8.5 Impacts on the Fiscal Position	13
1.8.6 Impacts on External Position (Balance of Payments)	13
1.9 Pre-Disaster Human Development Profile	13
1.10 Post-Disaster Impact on Human Development	15
2. Damage and loss	19
2.1 Social Sectors	19
2.1.1 Housing and settlements	20
2.1.2 Health and Nutrition	21
2.1.3 Education	22
2.2 Productive Sector	22
2.2.1 Agriculture (Crops, Irrigation, Fisheries and Livestock)	22

2.2.2	Crop Sub-sector	23
2.2.3	Livestock Subsector.....	24
2.2.4	Irrigation Subsector	25
2.2.5	Fisheries Subsector.....	25
2.2.6	Commerce and Industry.....	26
2.3	Infrastructure Sector	26
2.3.1	Road Transport	26
2.3.2	Energy: Electricity and Forestry	28
2.3.3	Water, Sanitation and Hygiene.....	28
2.3.4	Water Resource (Flood Protection)	30
2.4	Disaster Risk Reduction and Early Warning Systems.....	30
2.5	Cross-cutting Issues	31

PART II

3.	Recovery Strategy	33
3.1	Introduction	33
3.2	The Recovery Strategy: Vision, Guiding Principles and Element	33
3.2.1	Vision	33
3.2.2	Guiding Principles	33
3.2.3	Recovery and Reconstruction Needs.....	34
3.3	Social Sectors	35
3.3.1	Housing subsector.....	35
3.3.2	Health and Nutrition	35
3.3.3	Education	36
3.4	Productive Sectors.....	36
3.4.1	Agriculture (Crops, Irrigation, Fisheries and Livestock).....	36
3.4.2	Commerce and Industry.....	37
3.5	Infrastructure Sectors	37
3.5.1	Road Transport	37
3.5.2	Energy - Electricity	38
3.5.3	Water, Sanitation and Hygiene (WASH)	38
3.5.4	Water Resources (Flood Protection).....	38
3.6	Disaster Risk Reduction (DRR) and Early Warning Systems (EWS).....	38
3.7	Cross-Cutting Issues.....	39

4. Key Recommendation for Resilience Building.....

References	41
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Annexes

Annex I: Detailed Sector Reports	43
Housing Subsector.....	43
Health and Nutrition Subsector	45
Education Subsector	48

Agriculture-Crops Subsector	51
Agriculture: Livestock Subsector.....	53
Agriculture: Irrigation Subsector	54
Agriculture: Fisheries Subsector.....	56
Commerce and Industry subsector	57
Transport Subsector	60
Energy/Forestry Subsector.....	61
WASH Subsector	63
Water Resources Subsector	66
Social Protection Subsector	72
Cross cutting issues.....	77
Annex 2: Distribution of Damage and Loss across districts	79

List of Boxes

Box 1: The Impact of Tropical Cyclone Idai on Welfare	16
Box 2: Housing Sector Impacts and Learning for Recovery.....	20
Box 3: Transport Sector Impacts and Learning for Recovery	27
Box 4: Handpumps used by communities	29
Box 5: Manifestation of Gender issues in other sectors.....	32

List of Box Figures

Box Figure 1: Maize harvest lost due to Cyclone Idai	16
Box Figure 2: Baseline Poverty (2016/17).....	16
Box Figure 3: Decline in consumption per capita after Cyclone Idai	16
Box Figure 4: Changes in Moderate Poverty.....	17
Box Figure 5: Changes in Ultra Poverty	17
Box Figure 6: Houses affected by 2019 floods	20
Box Figure 7: Bridges affected by floods.....	27
Box Figure 8: Hand pumps located along the drainage.....	29

List of Figures

Figure 1: Share of total effects of floods by subsectors.....	xiii
Figure 2: Per capita distribution of Total Effects (Million MWK).....	xvii
Figure 3: The Poor distributed by hardest hit districts in 2019 Floods	xvii
Figure 4: DRM Institutional Framework in Malawi at various levels.....	6
Figure 5: Projected nominal GDP (Malawi Kwacha millions) and real GDP growth (percent) in 2019 Percent	9
Figure 6: Impact of the Floods on Sectoral Growth (Pre and Post-Floods)	12
Figure 7: Poverty incidences between 2004/2005 and 2016/2017	14
Figure 8: Percentage distribution of various sectors towards employment.....	14
Figure 9: Share of effects of floods across social subsectors.....	19
Figure 10: Total effects of floods on housing subsector across districts in million US\$	20
Figure 11: Total effects of floods on the Health and Nutrition Subsector in million US \$.....	21
Figure 12: Value and Details of Damage in Education Subsector in million US \$.....	22

Figure 13: Damage, Loss and total effects of floods by agricultural subsectors in US\$ million.	23
Figure 14: Total effects of floods on agriculture subsector across districts in million US \$	23
Figure 15: Total Effects of floods across districts in million US \$.....	24
Figure 16: Total Effects of Floods on livestock across districts in Million US \$.....	24
Figure 17: Total effects of floods on irrigation subsector across districts in million US \$.....	25
Figure 18: Total effects of floods on transport subsector across districts in million US \$	27
Figure 19: Damaged facilities in water, sanitation and hygiene subsector	29
Figure 20: Damage of floods on the water resource subsector by affected districts in million US\$	30
Figure 21: Total recovery needs by subsectors in million US \$.....	35

List of Annex Figures

Annex Figure 1: Health facilities by facility type and management	46
Annex Figure 2: Number of ECD classrooms, teachers houses and toilets destroyed by floods	48
Annex Figure 3: Number of education facilities partially or totally destroyed by floods	49
Annex Figure 4: Damage to ECD shelters and facilities in US\$.....	49
Annex Figure 5: Education loss due to temporary creation of IDPs in schools	50
Annex Figure 6: Pearl millet germinated after submerged in Zunde EPA in Nsanje	52
Annex Figure 7: Total Effects in Fisheries Sector in million US \$	56
Annex Figure 8: Damage and Loss across commerce subsector in US\$.....	59
Annex Figure 9: Affected Social Protection Beneficiaries by Program.....	72
Annex Figure 10: Affected Social Protection Beneficiaries by Gender	73
Annex Figure 11: Number of vulnerable groups affected by floods	76

List of Tables

Table 1: Damage, Loss and Needs for Recovery by Sector and Cross Cutting Issues (in million US\$) ...	xv
Table 2: Summary of Key Physical Assets Partially and totally destroyed by the 2019 Floods in Malawi	xvi
Table 3: Share of Disaster Recovery by Sectors and Cross Cutting Issues in USD Millions	xviii
Table 4: Key macroeconomic indicators, 2014-2019.....	10
Table 5: Nominal GDP by affected sectors Pre and Post Floods in million Malawi Kwacha	11
Table 6: Damage and Loss of 2019 floods across sectors and subsectors.....	19
Table 7: Damage and loss of floods on WASH sub-sector by affected districts and cities in million US\$	26
Table 8: Damage and loss of floods by affected Districts and Cities in million US \$	28

List of Annex Tables

Annex Table 1: Number of vulnerable groups affected by selected characteristics.....	44
Annex Table 2: Summary of key findings and recommendations of Housing reconstruction and recovery	44
Annex Table 3: Recovery Needs across short, medium and long term	48
Annex Table 4: Recovery Needs and Strategy for the Education Cluster.....	51
Annex Table 5: Reconstruction needs in livestock sub sector	54
Annex Table 6: Summary of flood effects on several irrigation infrastructure.	54
Annex Table 7: Strategies for recovery and reconstruction in Irrigation.....	55
Annex Table 8: Short, Medium- and Long-Term Recovery Needs for fisheries sector	57
Annex Table 9: Recovery Strategies and needs for the commerce and industry sector	58

Annex Table 10: Energy Recovery Strategies.....	62
Annex Table 11: Recovery needs for WASH.....	65
Annex Table 12: Recovery and reconstruction needs for water resources.....	67
Annex Table 13: Recovery and reconstruction needs in the DRR and EWS	71
Annex Table 14: Social Protection Recovery Strategies.....	73
Annex Table 15: Table of affected people with disabilities by districts.....	75
Annex Table 16: Key Cross Cutting Sectors Recovery Needs Summary.....	76
Annex Table 17: Distribution of Social Sector Damage and Loss in Million US\$ across districts	79
Annex Table 18: Distribution of Productive Sector Damage and Loss in Million US\$ across districts.....	80
Annex Table 19: Distribution of Infrastructure Sector Damage and Loss in Million US\$ across districts	81
Annex Table 20: Distribution of Total Effects of Floods in Million US\$ across districts.....	82

Foreword

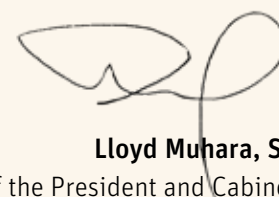
In early March 2019, Malawi experienced one of the worst tropical cyclone that formed in the Mozambican channel, bringing heavy rains and strong winds. Severe flooding negatively affected people's lives, livelihoods and socio-economic infrastructure, pushing more people into poverty. In total, an estimated 975,000 people were affected, with 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, with the social sector experiencing most of these effects. In the social sector, the housing subsector experienced the greatest damage, with 288,371 houses being partially or completely destroyed. Most affected people were accommodated in temporary internally displaced people (IDP) camps, mostly located in classrooms and school facilities, with limited access to safe water and sanitation facilities. This resulted in significant disruptions to learning and teaching activities at the school. In addition, the 2019 floods affected roads, bridges, power supply lines, irrigation infrastructure and mature crops. Power supplies were interrupted for more than two days across the country.

The Government and development partners responded swiftly to the disaster, immediately implementing rescue and relief operations that saved many lives and rapidly mobilizing resources to provide food and non-food items to people in the affected areas. However, most of the affected areas remained without shelter, requiring large numbers of IDP to be temporarily located in makeshift facilities and school classrooms, often with limited access to safe water and sanitation facilities. This use of school buildings disrupted schoolchildren's learning activities.

On March 19, 2019, the Government of Malawi, through the Ministry of Finance, Economic Planning and Development, submitted a formal request to the World Bank for assistance to conduct a Post Disaster Needs Assessment (PDNA) of the floods. The objective of the PDNA was to quantify the damage and loss resulting from the effects of those disaster and to estimate the recovery and reconstruction needs. The PDNA 2019 drew lessons from the 2015 flood response to determine and quantify multi-sectoral needs and to build consensus to implement a systematic recovery and resilience building initiative. The assessment estimates that the total value of the effects of the disaster stands at US\$ 220.2 million, while the total needs for recovery and reconstruction stands at US\$ 370.5 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 early recovery approaches that focus on minimizing the negative impacts of recurrent disasters on peoples' lives very early in the humanitarian response and all the way until the path to sustainable development is re-established in those affected communities. The World Bank has already committed US\$120 million to support recovery and reconstruction including early recovery assistance to the most vulnerable with commitments from the UN and other development agencies for additional contributions.



Lloyd Muhara, SC
Chief Secretary to the Government, Office of the President and Cabinet

Acknowledgements

The Malawi Post Disaster Needs Assessment for the 2019 Floods was commissioned by the Government of Malawi, with financial and technical support from the World Bank, the Global Facility for Disaster Reduction and Recovery (GFDRR), United Nations Development Programme (UNDP), the European Union (EU) and the African Development Bank (AfDB). The PDNA assessed the impact and needs of the tropical cyclone and associated rains and flooding that adversely affected 15 districts and two cities in Malawi from 6 March 2019.


On 19 March 2019, the Government, through the Ministry of Finance, Economic Planning and Development, submitted a formal request to the World Bank for assistance to conduct a Post Disaster Needs Assessment (PDNA) of the floods. The objective of the PDNA was to quantify the damage and loss resulting from the effects of those disaster and to estimate the recovery and reconstruction needs. The PDNA 2019 drew lessons from the 2015 flood response to determine and quantify multi-sectoral needs and to build consensus to implement a systematic recovery and resilience building initiative.

The Government would like to thank the development partners and organizations that participated in the PDNA. The assessment team consisted of around 70 officers from government ministries, departments and agencies, including the Ministry of Agriculture, Irrigation and Water Development (Departments of Crops, Irrigation, Livestock, Fisheries, Water Resources and Water Supply and Sanitation); the Ministry of Finance, Economic Planning and Development; the Ministry of Education Science and Technology; Ministry Land, Housing and Urban Development; Ministry of Health and Population; Ministry of Transport and Public Work, Ministry of Natural Resources, Energy and Mining; Department of Disaster Management Affairs; Ministry of Gender, Children, Disabilities and Social Welfare; and from United Nations Agencies and multilateral agencies, including the AfDB, FAO, UNDP, UNFPA, UNICEF, UN Women, WFP, WHO, World Bank; and from INGOs, including Action Aid, Care International, FEDOMA, MANEPO, Save the Children, YONECO; and from the Malawi Red Cross Society. The Government recognizes the dedication and hard work of these individuals to producing credible results within a short period of time.

The PDNA involved a rapid assessment of the impact of the recent floods, utilizing existing data from similar or related ongoing assessments and from the various local authorities. As such, the assessment team would like to express its appreciation for the support provided by district and city councils and the Office of the District Commissioners and Chief Executive Officers, either rendered directly or through various sectors and departments. The Government expresses its appreciation for the valuable information these entities provided, together with their other support to the teams that visited the districts to collect data and conduct verifications.

The PDNA team would also like to express its gratitude to the Directors of Planning and Development and the Assistant District Disaster Risk Management Officers / Desk Officers at all of the 17 Councils, who participated in validating the results of the assessment. The reflections and contributions of these individuals played a valuable role in ensuring the quality, timeliness and credibility of this report.

Our gratitude also goes out to all the individuals who gave their time and energy to contribute to defining a strategy for recovery; to determining the financial implications; and to making practical recommendations to improve Malawi's level of resilience to face future weather shocks and other natural disasters.



Wilson Moleni

Secretary and Commissioner of Disaster Management Affairs

List of acronyms

AFDB	African Development Bank	EAD	Environmental Affairs Department
APES	Agriculture Production Estimates Survey	ECD	Early Child Development
BBB	Building Back Better	ECLAC	Economic Commission for Latin America and the Caribbean
BDA	Building Damage Assessment	EFSA	Emergency Food Security Assessment
BOP	Balance of Payments	ENN	Emergency Nutrition Network
CAADP	Comprehensive African Agricultural Development Programme	EOC	Emergency Operations Centre
CBCCC	Community Based Child Care Centre	EPA	Extension Planning Area
CBO	Community Based Organization	ESCOM	Electricity Supply Commission of Malawi
CFSVA	Comprehensive Food Security and Vulnerability Assessment	EU	European Union
CHAM	Christian Health Association of Malawi	EWS	Early Warning System
CMAM	Community Management of Acute Malnutrition	FAO	Food and Agricultural Organization
COMESA	Common Market for Eastern and Southern Africa	FBO	Faith Based Organisation
CPC	Civil Protection Committee	FEWS	Flood Early Warning System
CRED	Centre for Research on Epidemiology of Disasters	FEWSNET	Famine Early Warning System Network
CSO	Civil Society Organization	FISP	Farm Input Subsidy Programme
DAHLD	Department of Animal Health and Livestock Development	GAM	Global Acute Malnutrition
DALA	Damage and Loss Assessment	GBV	Gender Based Violence
DCCMS	Department of Climate Change and Meteorological Services	GDP	Gross Domestic Product
DCPC	District Civil Protection Committee	GFDRR	Global Facility for Disaster Reduction and Recovery
DDPS	District Development Plans	GHI	Global Hunger Index
DEM	District Education Manager	GIS	Geographical Information System
DFID	Department for International Development	GOM	Government of Malawi
DHMT	District Health Management Team	GSD	Geological Survey Department
DHS	Demographic and Health Survey	GVH	Group Village Headmen
DIS	District Information Systems	HCT	Humanitarian Country Team
DNA	Damage and Needs Assessment	IDP	Internally Displaced Persons
DNCC	District Nutrition Coordination Committee	NRS	National Resilience Strategy
DODMA	Department of Disaster Management Affairs	IDSR	International Strategy for Disaster Reduction
DRM	Disaster Risk Management	IEC	Information Education and Communication
DRR	Disaster Risk Reduction	IFAD	International Fund for Agriculture
DSWO	District Social Welfare Office	IFPRI	International Food Policy Research Institute
		IHS3	Third Integrated Household Survey
		ILO	International Labour Organization
		IOM	International Organization for Migration

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



Executive Summary

Disaster Profile

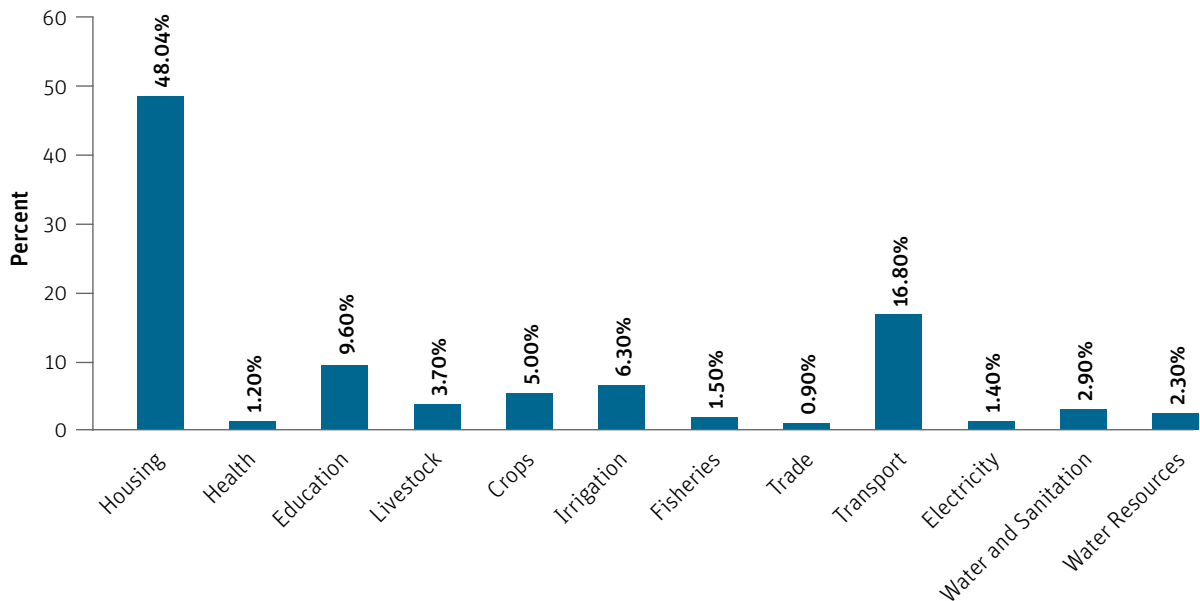
Malawi is highly vulnerable to the impacts of extreme weather events given its location along the great African Rift Valley, rapid population growth, unsustainable urbanization, climate variability and change, and environmental degradation. The most common weather-related shocks affecting Malawi include floods, drought, stormy rains and hailstorms. Over the past five decades, Malawi has experienced more than 19 major floods and seven droughts, with these events increasing in frequency, magnitude and scope over the years. In early March 2019, heavy rains developed from a Tropical Depression 11 that formed offshore central Mozambique. Heavy rains hit Malawi, causing severe flooding in the Southern and, to a lesser extent, Central Region of the country. These disaster events have had a significant impact on people’s lives, livelihoods and socioeconomic infrastructure in the affected areas, pushing a large number of people into poverty and food insecurity.

With these events following the floods in 2015 and the drought in 2016, the impact on the affected population has been cumulative. In the pre-disaster period, about 3.3 million people in the flood affected districts were already categorized as food insecure. In 2016/2017, the national poverty rate stood at 51.5 percent, with most of the poor (59.5 percent) living in rural areas. In Malawi, the level of inequality is high, with the Gini coefficient standing at 0.433 in 2017. Thus, disruptions to livelihoods resulting from natural disasters and other causes are likely to widen the gap between the poor and the well off.

The Disaster Overview

On 8 March, in consideration of the impact of the heavy rains, floods and strong winds associated with Tropical Cyclone Idai, the Government of Malawi (“the Government”) declared a State of Disaster in the 13 districts and two cities in the Southern Region and two districts in the Central Region. It is estimated that approximately 975,600 people were affected by these floods (see Figure 1), with 60 deaths and 672

Figure 1: Share of total effects of floods by subsectors.



injuries reported. The 15 affected districts are Balaka, Blantyre, Chikwawa, Chiradzulu, Machinga, Mangochi, Mulanje, Mwanza, Neno, Nsanje, Phalombe, Thyolo, Zomba districts in the Southern Region and Dedza and Ntcheu in the Central Region. The two cities were Zomba City and Blantyre City. As a result of the disaster, around 90,000 internally displaced people (IDP) were sheltered in 174 IDP sites. Despite limitations to disaggregated data, an inter-agency assessment finding shows that the IDP included disproportionate number of women, with 63 percent of those in IDP shelters in Machinga, Mangochi, Balaka and Zomba being women, and 37 percent male.

The Government and development partners responded swiftly to the disaster, immediately implementing rescue and relief operations that saved many lives and rapidly mobilizing resources to provide food and non-food items to people in the affected areas. However, most of the affected areas remained without shelter, requiring large numbers of IDP to be temporarily located in makeshift facilities and school classrooms, often with limited access to safe water and sanitation facilities. This use of school buildings disrupted schoolchildren's learning activities to a significant extent.

To enable a full understanding of the effects and impact of the disaster, the Government in line with international best practice, initiated a Post Disaster Needs Assessment (PDNA) to inform recovery and resilience interventions. In collaboration with development partners, the Government conducted the PDNA in all the affected 15 districts and two cities throughout April 2019 to jointly assess the effects and impacts of the heavy rains, strong winds and floods and to identify the needs for recovery. The assessment process began with the involvement of the PDNA Team (consisting of more than 50 government staff, together with representatives of the World Bank, United Nations agencies and other non-state actors) in an orientation to the PDNA process, covering data collection, review, and analysis and report compilation. The assessment was conducted in the period from 4-18 April, drawing on both primary and secondary data. A triangulation process was conducted, involving field visits to a number of affected districts to conduct interviews with key informants and relevant stakeholders, together with desk and expert reviews. The PDNA evaluated the effects of floods in terms of the total or partial destruction of infrastructure and physical assets and changes in economic flows arising from the disaster.

The economic value of effects was calculated on the basis of the cost of replacing or repairing infrastructure and physical assets; forgone income opportunities; higher operating costs; unexpected expenses; additional costs for coordination; provision of temporary facilities and staff; restoration of governance capacity; and expenditure related to the management of increased and/or new risks arising from the disaster.

The PDNA estimated that the total value of the effects of the disaster amounted to US\$ 220.2 million and the Government will require US\$ 370.5 million for resilient recovery and reconstruction needs. (see Table 1). In principle, the estimation of needs is based on estimations of the value of the capital damage; the cost of quality improvements; of technological modernization; of relocation and disaster risk reduction measures; and of livelihood, socio-economic, and environmental recovery activities. This PDNA was organized around a number of sectors and subsectors, as follows: (i) the social sector (housing, health and nutrition, education); (ii) the productive sector (agriculture: crops, livestock, irrigation and fisheries; and commerce and industry); (iii) the infrastructure sector (transport; energy; water supply and sanitation; and water resources); (iv) cross cutting issues (disaster risk reduction, DRR; environmental water systems; EWS, environment; social protection). In addition, the PDNA conducted both a macro-economic impact analysis and a human development impact analysis.

The Effects

The devastating heavy rains and floods associated with the disaster resulted in substantial damage to infrastructure and physical assets and changes in economic production flows resulting in loss in both the public and private domains. The assessment estimates that the total effects of the disaster (in terms of both damage and loss) in the 17 affected areas (15 districts and two cities) amounted to US\$ 220.2 million. Out of this, damage (the value of destroyed physical assets) accounts for US\$ 157.7 million (72 percent of the total effects), while loss accounts for US\$ 62.5 million (28 percent of the total). In terms of a sectoral breakdown, the largest proportion of the effects were on the social sector (US\$130.3 million, 59 percent); followed by infrastructure (US\$51.5 million, 23 percent); and then the productive sector (US\$28.4 million, 17 percent) (see Figure 1).

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

Sector	Sub Sector	Damage	Losses	Effects (US\$ m)	Needs (US\$ m)
Social	Housing	82.7	23.9	106.6	106.1
	Health & Nutrition	0.2	2.4	2.6	30.9
	Education	20.3	0.8	21.0	62.3
Productive	Crops	-	11.1	11.1	19.6
	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
	Commerce and Industry	0.3	1.7	2.1	3.1
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	-	5.1	17.0
Cross Cutting	DRR & EWS				10.9
	Environment				1.0
	Governance				1.3
	Persons with Disabilities				0.3
	Social Protection				29.0
	Gender Equality and Social Inclusion				4.0
	Older Persons				0.3
	Child Protection				3.7
Total		157.7	62.5	220.2	370.5

Source: Estimates based on official government data

¹ Cross cutting issues outlined additional needs and strategies which are aligned to specific sectors so these have been added to the sectoral needs i.e. Health & Nutrition (US\$ 4.6 million), Education (US\$ 2.7 million), WASH (US\$ 0.4 million), Housing (US\$ 0.5 million), and Crop Development (US\$ 0.6 million).

The disaster effect was highest in the Social Sector whereby the Housing Sub-sector proportionately suffered the most damage followed by the Education and Health Sub-sectors. In some areas, a significant proportion of the population could not access social services in the post-disaster period due to extensive damage to roads and drainage structures. The floods washed away extensive sections of infrastructure (roads, bridges, power supply and irrigation and water supply equipment, intake structures, conveyance and distribution systems) in the affected districts and cities making it the second affected sector (see Table 2). In the productive sector, most of the effects were attributed to income loss among: farmers due to crops being submerged and washed away at maturing stage²;

fishermen; and small traders. Furthermore, the damage in one sector had spill-over effects in other sectors. For instance, the shutdown of the power plants³ for more than 48 hours resulted in disruptions to a range of commercial and economic activities. As a result of disruptions to supply, commodity prices increased by around 20 percent in post-disaster period and have remained volatile, increasing the risk of food insecurity for households in the affected areas.

² A total of 109,625 hectares of crops washed away leading to a loss of livelihoods for around 308,702 farm families

³ Flooding debris blocked and dislodged screens used for hydro power supply

Table 2: Summary of key physical assets partially and totally destroyed by the 2019 floods in Malawi.

Sector	Items Description	Quantity
Agriculture	Crop Land Destroyed (Hectares)	91,638
	Livestock (Number (No.))	47,504
	Irrigation Systems Head works (No.)	64
	Irrigation Canals (m)	67,734
	Irrigation Flood Embankment (meters)	19
	Solar Based Schemes (complete Sets) (No)	14
	Irrigation system pumping station (No.)	134
	Irrigation wells (No.)	607
	Irrigation drainage canals (meters)	47
Education	School Blocks (No.)	154
	Teachers Houses (No.)	81
Health	Health Facilities (No.)	25
Housing	Houses (No.)	288,372
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 (meters)	30
	Collapsed Latrines (meters)	258,000
	Healthy facility latrines	140
	Hydrological Stations (No.)	11
	Dykes (No)	10
	Dams (No.)	7
Transport	Roads (kilometers)	1841
	Bridges (No.)	129
	Culverts (No.)	68
	Drifts (No.)	68

The Impact of the Disaster

Macroeconomic Impact

The disaster is estimated to have resulted in production losses to a value of about US\$ 9.96 million to the economy in 2019, equivalent to 0.13 percent of GDP. With the pre-disaster forecast for real GDP in 2019 estimated at 5.0 percent, this has been revised down by 0.1 percentage points to 4.9 percent as a result of the floods. This impact is driven by loss in the agriculture, construction, electricity and water, 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 widen slightly, with exports and imports responding to the effects of the disaster during the year. Similarly, expenditures on the relief and post-floods recovery are likely exert extra pressure on the Government's fiscal position. However, the effects of the floods on the overall economy could be mitigated by the multiplier effects resulting from the recovery efforts through an increase in both public expenditures and private consumption on account of remittances. Typically, the effect of a natural disaster on GDP is a fall in the year of the event and/or the subsequent year, followed by a rebound in successive years as a result of the recovery efforts.

Human and social development impact

The disaster has left deep and wide impacts on various aspects of human and social development at individual, household and community levels. The affected population included those who lost their lives (60); those who were injured (672); and those who were rendered homeless because of the event (99,728). It is estimated that 500,000 farmers and small micro-entrepreneurs at least lost a portion of their income because of the event.

The effects of the disaster on the infrastructure and productive sectors further compounded the impacts on socio-economic conditions, including increased poverty, declines in health status, poor environmental conditions and a decline in the quality of education of affected populations. Figure 2 shows the per capita distribution of the affected population in terms of the extent of damage and loss in Malawi Kwacha. This figure shows that the most significant impact on the population occurred in the district of Nsanje, followed by Chikwawa and Machinga.

Malawi’s agriculture sector is dominated by women, most of whom are engaged in subsistence farming. Women produce 80 percent of household food and are engaged in the informal sector of the economy to a disproportionate extent. The floods had a major impact on crops such as maize, pulses, sorghum and rice, all of which are vital food crops, often produced for own consumption. With the impact on these crops, the immediate food security of some 2.3 million farming households was affected. With the data indicating that women comprise 90 percent of farmers, it is expected that female-headed households will be disproportionately affected, as well as households headed by vulnerable populations such as the young, elderly and disabled and people living with disabilities.

In 2017, the national poverty rate stood at 51.5 percent⁴, with most of the poor (59.5 percent) living in rural areas (see Figure 3). The largest concentration of the poor population is in southern Malawi, which is also the most densely populated region in the country. In 2010, almost half of Malawi’s poor (3.4 of 7.1 million) resided in the Southern Region, primarily in Mangochi, Machinga, Chikwawa, and Mulanje. Figure 4, which presents an overlay of the most affected population according to the proportion

Figure 2: Per capita distribution of total effects (Million MWK).

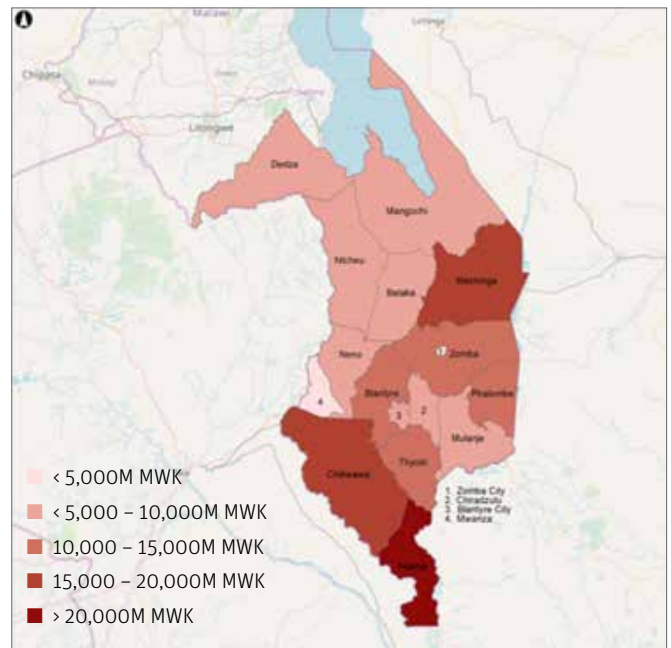
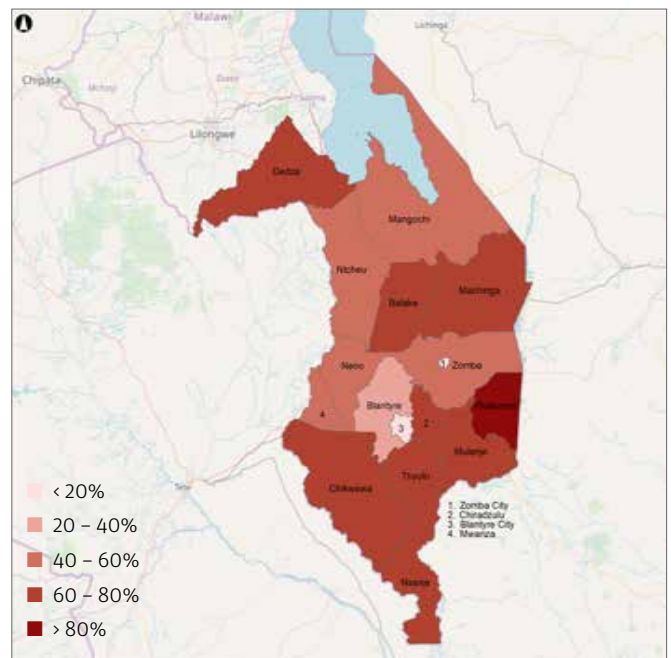


Figure 3: The poor distributed by hardest hit districts in 2019 floods.



of poor people, suggests that between 60 to 80 percent of the most affected population could be found in the districts most affected by the disaster (Chikwawa, Machinga and Mulanje). The level of inequality is high in Malawi, with a Gini coefficient of 0.433 in 2017. This suggests that any disruptions to livelihoods resulting from events such as

⁴ NSO. 2018. The Fourth Malawi Integrated Household Survey 2016/2017. Zomba, Malawi.

natural disasters may widen the gap between the poor and the well off.

Needs for recovery and reconstruction

The recovery and reconstruction needs, valued at US\$ 370.5 million, include the costs of prioritized interventions and spread across short (44.4 percent), medium (13.6 percent) and long (42.0 percent)-term (see Table 3). Recovery needs refer to financing required: (i) to assist affected people to recover their pre-disaster level of household income; (ii) to restore the supply of and access to basic health, education, and water and sanitation services; and (iii) to facilitate the recovery of production in the agriculture, industry, commerce, and other sectors. Reconstruction requirements refer to the financial resources required to repair and rebuild destroyed physical

assets and infrastructure according to disaster-resilient standards. The social sector absorbs the largest share of the cost of recovery (53.8 percent of the total recovery needs), followed by the infrastructure sector (20.6 percent); cross-cutting issues (13.6 percent), and the productive sector (12.0 percent).

To ensure resilient recovery and reconstruction implementation, Malawi needs to strengthen its disaster risk management (DRM) strategy by “building back better” and by fostering inclusive sustainable economic growth and development. Some of the measures needed to achieve increased resilience to future disasters include: (i) the formulation and, more importantly, actual implementation of acceptable structural construction standards that incorporate appropriate hazard-resistant

Table 3: Share of disaster recovery by sectors and cross cutting issues in US\$ Millions.

Sector	Sub Sector	Short term	Medium Term	Long term	Sub Sector Total
Social	Housing	2.5	0.5	103.1	106.1
	Health & Nutrition	26.0	2.1	2.9	30.9
	Education	46.1	9.5	7.0	65.3
Sector Totals		74.2	12.1	113.0	199.3
Productive	Crops	6.4	4.6	8.6	19.6
	Livestock	1.3	0.1	0.9	2.4
	Irrigation	7.9	7.4	2.6	17.9
	Fisheries	0.1	1.2	0.1	1.4
	Commerce and Industry	0.4	0.07	2.7	3.1
Sector Totals		16.2	13.4	14.8	44.4
Infrastructure	Transport	42.6	-	-	42.6
	Energy-Electricity	1.1	2.2	1.0	4.3
	Water and Sanitation	2.9	2.5	7.0	12.3
	Water Resources	5.8	10.0	1.2	17.0
Sector Totals		52.4	14.7	9.2	76.3
Cross Cutting	DRR & EWS	3.9	4.3	2.8	10.9
	Environment	0.5	0.4	0.1	1.0
	Governance	0.3	0.4	0.6	1.3
	Persons with Disabilities	0.2	0.09	0.08	0.3
	Social Protection	15.4	0.09	13.6	29.0
	Gender Equality and Social Inclusion	1.0	1.5	1.5	4.0
	Older Persons	0.1	0.1	0.02	0.3
	Child Protection	0.3	3.4	-	3.7
Sector Totals		21.6	10.3	18.7	50.5
Grant Totals		164.5	50.4	155.6	370.5

features; (ii) the implementation of a physical planning system to avoid locating homes or public infrastructure in flood-prone and other areas susceptible to disasters; (iii) measures to strengthen and expand flood control systems, flood-forecasting and prevention activities; and (iv) measures to restore fragile ecosystems.

The identified needs include structural and non-structural measures, with the value of non-structural needs standing at slightly more than 25 percent of the value of all identified needs. Malawi has a significant opportunity to strategically direct the recovery and reconstruction activities to ensure higher levels of resilience. The non-structural measures address issues related to capacity building, redeveloping processes, introducing innovations, and ultimately, doing things differently to achieve greater efficiency and higher levels of resilience. Thus, the value of needs is substantially higher than the value of damage and loss or total effects (at about 67 percent increase) due to a number of factors: (i) in the pre-disaster period, the capital stock in the social sector was not high, resulting in damage of a low economic value; (ii) the value of damage and loss in the productive sector was low, as commercial, high-income generating activities, such as tobacco or tea production, were not significantly affected; and (iii) while the economic value of damage to infrastructure was significant, it was also localized. Since the emphasis of the recovery and reconstruction efforts is on building resilience to levels higher than in the pre-disaster period, it can be expected that to achieve this goal, the cost of the investment will be significantly greater than the value of the damage and loss.

Way forward

With the increasing frequency and severity of natural disasters in Malawi, it is clear that new approaches and new ways of doing things are required to facilitate recovery and the resilience building. Sector-specific recommendations are anchored on the National Disaster Risk Management Policy (2015); the Malawi Growth Development Strategy III (2017-2022); the draft National Resilience Strategy (2018-2030); the draft NRS Phase I Implementation Plan (2018-2023); and the 2019 Disaster Risk Management Bill. The 2019 flood disaster should be seen as an opportunity to address longstanding challenges, with the recovery and reconstruction program viewed as an integral part of Malawi's socio-economic development plans. On the basis of this understanding, investments

to enforce a common framework for effective disaster risk reduction and building resilience and for fostering inclusive sustainable economic development should be an integral part of Malawi's development agenda, as reflected in the draft National Resilience Strategy. Mechanisms need to be established to enforce the existing institutional arrangements for disaster risk management.

The recovery and reconstruction efforts should be implemented in order to achieve the goal of improving resilience (“building back better”), with priority given to physical planning to reduce risks, and ensure that the infrastructures that support productive activities are less vulnerable to shocks. The recovery and reconstruction strategy also focus on building resilience for the poor and ultra-poor households to disasters; to facilitate quick recovery; and to reduce the use of negative coping mechanisms. Targeting assistance to the most disaster affected households would also help to reduce people living below the poverty line.

New ways of working are needed to better integrate humanitarian and development action. Within the framework of the New Ways of Working agreed at the 2016 World Humanitarian Summit in Istanbul, it was determined that continuous improvement is needed in the areas of: (i) information management systems for disaster response, early recovery, and recovery; (ii) partnership coordination; (iii) coordination of disaster response and recovery interventions; and (iv) mutual accountability for collective outcomes.

It is therefore essential to develop effective tools to build back better. These tools include systems and measures to enforce compliance with construction standards; to disseminate safer guidelines for the construction of schools and housing at the grassroot level; to implement a comprehensive, nationally-owned hazard mapping and zoning system; and to implement effective contact management. In addition, it is necessary to build resilience and to foster diversification in the agriculture sector to ensure resilient and diversified climate-smart agriculture to generate higher levels of sustainable income for the poor households that are most severely affected by the increasingly frequent natural and other shocks affecting Malawi.



PART I

1. Disaster Effects and Impacts

1.1 Disaster Risk Profile

1. **Malawi is vulnerable to a number of hydro-meteorological and other hazards, including floods, droughts, hailstorms, strong winds and earthquakes.** Malawi's high level of vulnerability is linked to a number of specific geo-climatic factors, including the following: (i) the influence of the El Niño and La Niña phenomena on climate variability; (ii) the variability in the water levels of the country's three major lakes (Malawi, Chiuta and Chilwa) and the broader hydrological network, due to variations in rainfall and other factors; and (iii) the location of Malawi along a tectonically active boundary between two major African plates within the great East African Rift System, which creates vulnerability to earthquakes and landslides
2. **The Intergovernmental Panel for Climate Change's (IPCC) Fifth Assessment Report (AR5) has identified Malawi as a country at high risk to the adverse effects of climate change.** Over the past five decades, Malawi has experienced more than 19 major flooding incidents and seven droughts. Mean annual temperatures have been consistently increasing, going up by an average of 0.9°C over the period from 1960 to 2006 (Vincent et al., 2013). There is a high level of variation between average annual rainfalls. While there were very high levels of rainfall in 1989, 1997 and 2015, by contrast, 1992, 2005, 2008 and 2016 were very dry. Of all the weather-related shocks to which Malawi is susceptible, droughts and floods have had the most significant impact on the country's economy, the lives and livelihoods of its people, and its infrastructure.
3. **Over the past five years, Malawi has been affected by a series of successive climatic shocks that have had a compounding impact.** In 2015, Malawi was affected by the worst floods it has experienced in 50 years. The whole economy suffered loss valued at US\$ 35 million. In 2016, Malawi was significantly affected by an El Niño event, which resulted in the worst drought in 35 years. This led to a loss of US\$ 500 million⁵ to the economy overall.
4. **Climatic projections and models suggest that the severity and frequency of climatic shocks will continue to increase** (Future Climate for Africa brief, 2017). While the complexity of topographical conditions and the unavailability of robust historic data for certain parameters make the accurate forecasting of rainfall patterns and extreme events challenging, there is evidence to suggest that the intensity and number of weather-related incidents will continue to increase into the future⁶.

⁵ World Bank. 2016. *Malawi Drought 2015-2016: Post-Disaster Needs Assessment (PDNA)*. Washington, D.C.: World Bank Group, p. 17 and Executive Summary.

⁶ Niang, I., O.C. Ruppel, M.A. Abdrabo, A. Essel, C. Lennard, J. Padgham, and P. Urquhart, (2014). Africa. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, UK and NY, USA, pp. 1199-1265.

1.2 Malawi's Socio-Economic Context

5. **Malawi's economy is largely agrarian, with the agriculture sector contributing to approximately 30 percent of the total Gross Domestic Product (GDP).** However, the agricultural sector also has a major impact on the performance of other sectors, with a significant proportion of manufacturing activities involving agro-processing and therefore dependent on agricultural inputs, and with the performance of the services sector driven by consumer demand, which is heavily dependent on agricultural incomes. In terms of their contribution to GDP, wholesale and retail contributes 15.3 percent; followed by manufacturing (9.4 percent); real estate (7.7 percent); and financial and insurance (5.1 percent). Given the significance of agriculture both in terms of its direct contribution to GDP and to its impact on other sectors, with approximately 85 percent of households involved in subsistence, rain-fed agriculture, Malawi's economic growth is heavily dependent on favorable weather patterns.
6. **Malawi has a total population of 17.6 million, of which 49 percent are male and 51 percent are female while 84.5 percent of the population resides in rural area.⁷** About 44 percent of the rural population lives in permanent houses; 36 percent lives in semi-permanent houses; and 20 percent live in traditional houses. Semi-permanent and traditional houses are particularly vulnerable to natural disasters. Those dwelling in these structures are typically the poorest and most vulnerable segments of the population, including women, widows, people with disabilities, orphans and the elderly.
7. **While educational infrastructure has expanded significantly over recent years, with an associated increase in enrolment, a significant proportion of school buildings has been constructed using both community and local development funds, without following established construction standards, rendering them particularly susceptible to disasters.** Recent statistics show that there are approximately 5 million students enrolled at primary schools and 351,648 at secondary schools. In the Southern Region,

about 88 percent of the population aged between 6 and 13 years is enrolled in primary schools, with the rate standing at 91 percent for girls and 86 percent for boys. Of those enrolled in secondary schools, 16 percent are male, and 15 percent are female. Currently, there are 7,318 children enrolled in Early Child Development (ECD), of whom 6,194 attend primary schools and 1,469 attend secondary schools.

8. **The vast majority of the rural population receives healthcare services provided by rural or community health facilities through the primary health care system.⁸** Most of these community health facilities provide out-patient services and refer individuals in need of in-patient services to rural or district hospitals (secondary or tertiary health facilities). The 17 councils affected by the cyclone, have a total of 445 primary health care facilities; 27 secondary health care facilities; and three tertiary health care facilities.
9. **Prior to the floods, the Malawi Vulnerable Assessment Committee Report estimated that a majority of Malawi's population would be food insecure during the lean period in the 2018/2019 season.** Approximately 3,306,405 people,⁹ or about 22 percent of the population, were recommended as being eligible humanitarian assistance for the October 2018 to March 2019 consumption period. According to the 2016/2017 Integrated Household Survey, almost 60 percent of the population in Malawi is chronically food insecure, with weather events exacerbating this situation.
10. **Malawi's rate of incidence of malnutrition is high, with the stunting rate standing at 37 percent; the under-weight rate at 11.7 percent; and the wasting rate at 3.8 percent.** Micronutrient deficiencies are common, with anemia affecting 60 percent of children under the age of five and 30 percent of all women. Only 8 percent of children aged six to 23 months meet the minimum acceptable diet standards, which includes minimum levels for dietary diversity and meal frequency. Childhood diseases are very common, with the rate of prevalence for diarrhea standing at 22 percent and for fever at 29 percent. In terms of these indicators, the impact of the floods

⁷ National Statistical Office. 2018. Fourth Integrated Household Survey 2016/2017. Zomba, Malawi

⁸ Malawi primary health care system is categorized in three administrative levels, namely, primary, secondary and tertiary.

⁹ The 2018/2019 Malawi Vulnerability Assessment Committee Report.

may not yet be apparent, as the physiological effects of malnutrition take time to manifest. However, it is reasonable to assume that with a large portion of the population already in a precarious nutritional state, performance in terms of these indicators could deteriorate if the immediate food and nutrition related needs of the affected population are not addressed.

1.3 Overview of the 2018/2019 rainfall season in Malawi

11. **During the first week of March 2019, a number of districts in Malawi were affected by experienced one of the worst strong winds, heavy rains and floods induced by Tropical Cyclone Idai10 (one of the worst storms in its history) that formed in the Mozambican channel and moved into Malawi during its formative stage.** In September 2018, the Department of Climate Change and Meteorological Services (DCCMS) issued a 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. However, in early March 2019, as a result of the cyclone, Malawi experienced heavy rain falls across the country,¹¹ with strong winds in the Southern Region Districts. These weather patterns resulted in flooding in 15 out of Malawi's 28 districts and in two cities. These heavy rains involved precipitation of more than 255 mm over a 24-hour period, which was the result of a severe weather system (Tropical Depression 11 or TD 11) that formed in the region offshore central Mozambique. This event hit Malawi before looping and tracking back and converting into Cyclone Idai.

¹⁰ 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.

¹¹ Mpemba rainfall station recording the highest one-day rainfall amount of 255.5 mm.

12. **In response to the flooding, on 8 March 2019, the President of the Republic of Malawi declared a State of Disaster in all geographical areas directly affected and issued an appeal for international assistance.** The 15 flood-affected districts included Balaka, Blantyre, Chikwawa, Chiradzulu, Machinga, Mulanje, Mwanza, Neno, Nsanje, Phalombe, Thyolo, and Zomba in the Southern Region and Dedza and Ntcheu in the Central Region. In addition, two of Malawi's four major cities were also affected, these being Zomba City and Blantyre City in the Southern Region. A total of 975,000 people were affected, of whom 86,976 were displaced, 60 killed and 672 injured.¹² About 58 percent of those displaced by floods were women.

1.4 The 2019 flood response and coordination

13. **On 28 March 2019, the Government issued a Flood Response Plan, with this plan estimating the cost of the immediate humanitarian response needs amounted to US\$ 45.2 million.** The plan recognized that the Government faced a financial gap of US\$ 15.6 million¹³ for its short-term response. The plan recognized a number of categories of response interventions, with these categories including food security; agriculture; nutrition; protection; WASH; education; health; shelter and camp management; early recovery and coordination clusters. Despite the interventions conducted by the Government and humanitarian relief agencies, it was observed that there was an inadequate supply of food and non-food items to meet the needs of the internally displaced people (IDP). Furthermore, most IDP sites had inadequate water supply and sanitation facilities. They were also affected by protection and security issues, with a recorded increase in the incidence of gender-based violence.
14. **To coordinate the disaster assessment and emergency response at the national and district levels, the Government activated the eleven clusters.** A technical working group for communications was also established to coordinate and manage information

¹² Government led Inter Agency Assessment Report and UN Situation Report of 18-22 March 2019.

¹³ Department of Disaster Management Affairs (DoDMA) & United Nations Office of the Resident Coordinator Malawi: Floods Situation Report No. 3 (as of 7 April 2019).

during both the assessments and the implementation of the response activities. Additionally, a National Emergency Operations Centre (NEOC) was established in the Southern Region and in Lilongwe, with cluster leaders reporting to these centers to provide updates. However, it was often not possible to utilize this system to track the response activities implemented by private groups, individuals, and organizations operating outside the auspices of the Government program.

1.5 Lessons Learnt from the 2015 and 2019 Floods

15. **This PDNA discusses and analyses the implementation of the recovery and reconstruction interventions of the 2015 floods as well as the management of 2019 floods to generate a series of recommendations and lessons learnt for resilience building.** This analysis will provide inputs to further guide and enhance the entire DRM cycle to contribute to resilient and sustainable recovery. On this basis, the following observations can be made:
 - **There is limited understanding, identification and quantification of disaster-related risks and integration into national, sectoral and local level strategies, policies, and plans.** Existing district development and sector at all of these levels, development plans do not sufficiently integrate measures to mitigate multiple risks. Therefore, these plans do not provide adequate guidelines for stakeholders to effectively implement disaster risk reduction measures. For example, some infrastructure were constructed in locations highly exposed to risk, such as boreholes situated along the drainage system or houses in floodplains. In other instances, land use plans are not in use resulted in increased exposure to flood risk. The 2019 PDNA team observed that in some instances, the lack of understanding related to vulnerability to floods and associated risks as well as other hazards resulted in the poor design of dykes, dams and irrigation canals. These findings indicate that there is a strong need to reassess the formulation and application of standards to guide the scaled-up development of shock-resistant infrastructure, according to the principle of “building back better and smarter.”
 - **The implementation of most DRM-related activities is constrained by poor planning and a lack of effective budgeting systems to develop district-driven contingency plans.** The assessment notes that in the period from 2015 to 2018, there was a lack of funds at the district level to adequately coordinate and monitor the development and implementation of contingency plans. This gap resulted in a lack of information available to DoDMA regarding the activities of other MDAs, non-governmental organizations and other private individuals. This contributed to suboptimal planning and resource allocation.
 - **The limited integration between meteorological and hydrological services as well as other institutions continues to compromise the delivery of timely and reliable early warning advisories to vulnerable populations.** Currently, the Department of Climate Change and Meteorological Services (DCCMS) provides information and forecasts related to weather patterns, including rainfall and temperature. The Department of Water Resources is responsible for collecting information related to hydrological issues, such as water levels and the likelihood of flooding. The assessment noted the need for improved institutional coordination between these departments and DoDMA. To achieve this improved integration, standard operational procedures should be developed, including to outline the roles and responsibilities of MDAs.
 - **At present, financing instruments for DRM are suboptimal, which constrains timely actions to prepare and respond to disasters.** At present, emergency response is financed through the Unforeseen Vote and External Assistance. However, the Unforeseen Vote does not clearly provide a budgetary allocation for disaster risk reduction, which undermines measures to build resilience and to implement coordinated preparedness and prevention activities. In addition, in most cases, the level of external assistance remains unpredictable and projectized, which often constrains coordination. The uptake and coverage of pooled risk instruments, weather-index insurance, and other risking assessment models remains low, despite their potential to contribute to mitigating disaster risks.
 - **Limited capacity in MDAs is observed across the whole cycle of DRM, especially at district level.** Activities relating to risk identification and reduction, preparedness, prevention, response, early recovery and long-term recovery continue to be constrained by the limited availability of trained and empowered personnel across districts. This shortcoming affects the ability of districts to scale-up resilience-building initiatives and to implement disaster

risk reduction activities, including risk modelling, seasonal forecasts, and the collection of data related to vulnerable groups such as women, girls, people with disabilities and the elderly.

- **There is a poor integration of early to long-term recovery and reconstruction for resilience and building “back better.”** The assessment observed the following: (i) after the delivery of the immediate-to-short-term response, recovery interventions remain under-resourced, which undermines resilience building; (ii) in many instances, response and recovery activities are not sequenced appropriately, resulting in district capacities to coordinate being overwhelmed; (iii) there is a failure to prioritize investments across sectors appropriately, particularly in the context of finance gaps; and (iv) there is limited monitoring and evaluation of recovery and reconstruction activities.
- **Disaster risk management is conducted on the basis of a range of policies, strategies and guidelines that are implemented inconsistently.** For example, while the PDNA noted that safer construction guidelines have been formulated for the social sectors, there is a lack of incentives to ensure that these guidelines are disseminated and applied. The promotion of safer construction guidelines could be a cost-effective means to optimize risk reduction, while also facilitating the achievement of other objectives, such as increased accessibility and usability for people with disabilities; climate change mitigation (through the construction of energy-efficient buildings); and climate change adaptation (through promoting buildings resilient to hydro-meteorological hazards). Equally important, the PDNA noted that the DRM Act (2019) strongly strengthens the role of DoDMA and clearly defines the roles and responsibilities of other MDAs. However, success of this Act is dependent on the effective implementation of the operational guidelines. The PDNA noted that so far, the operationalization of the approved DRM Policy (2015) still remains limited. In addition, the National Resilience Strategy (2018-2030) also remains in the drafting stages and has yet to be officially released.
- **While Malawi has established structures for DRM at both the national and local levels, there is still only a very limited number of personnel with specific capacities in areas related to DRM and with the ability coordinate associated issues.** In the case of 24 councils, the responsibility for DRM is assigned to desk officers

who also have a number of other responsibilities and mandates, which undermines their ability to implement DRM. In addition, only a small number of councils have established Civil Protection Committees to coordinate DRM activities at the local level, with the few initiatives that exist generally being supported by NGOs.

1.6 Legal and Institutional Framework

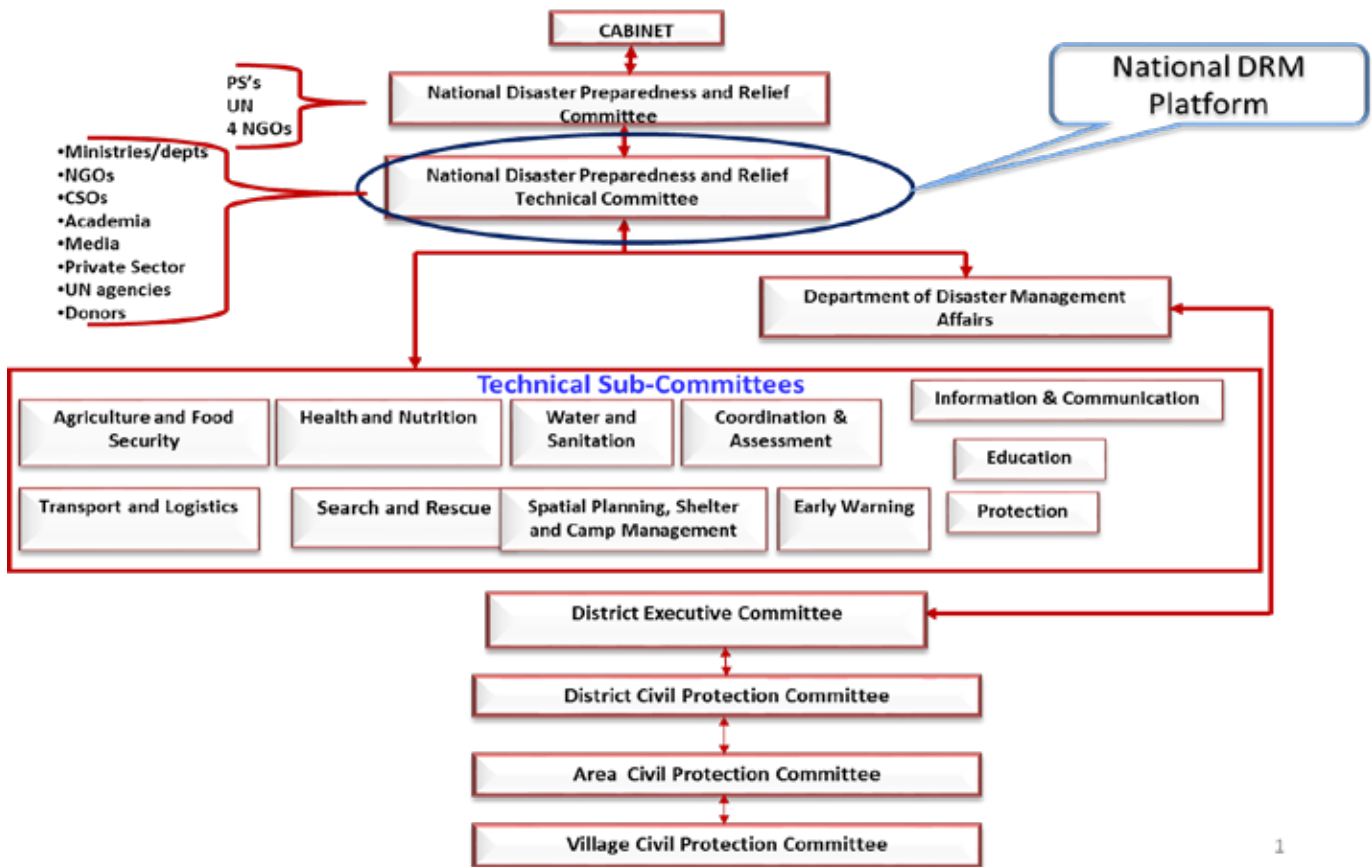
16. **Malawi’s Disaster Risk Management (DRM) policy landscape has been shaped by international frameworks, including the Sendai Framework and the African Strategies for Disaster Risk Reduction.** These frameworks have informed the formulation of Malawi’s overarching development planning document, the Malawi Vision 2020, which has been and continues to be 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. DRM is defined as a cross-cutting theme which aims to reduce vulnerability and to enhance the resilience of Malawi’s population to disasters and socioeconomic shocks. The National Resilience Strategy (draft) is intended to inform the implementation of the DRM activities under MGDS III, with a particular focus on breaking the cycle of food insecurity.
17. **Additionally, the National DRM Policy (2015) provides strategic guidance for the effective mainstreaming, implementation and coordination of DRM programming at all levels of sustainable development policy and planning.** This policy highlights a set of key priority areas and strategies to increase Malawi’s resilience to disasters. It also provides guidelines to all government, non-governmental organizations, private sector organizations, media and development partners at the national and local levels for the effective implementation of DRM programs and activities. In addition, Malawi has formulated a progressive national gender policy and legal framework, including the Gender Equality Statutes and the National Gender Policy, which provides guidance to integrate and mainstream gender issues into all development plans, including DRM.
18. **The National Resilience Strategy (NRS) facilitates**

a paradigm shift, with greater emphasis on a multisectoral perspective to build resilience to break the cycle of food insecurity and to facilitate the provision of other humanitarian support in the event of disasters. The NRS was formulated on the basis of an understanding that building resilience requires the comprehensive involvement of multiple sectors. It was also formulated on an understanding that resilience must be increased at the household level as well as through the systems and structures that govern and impact people’s lives and livelihoods. The NRS is centered around four pillars, including: (i) resilient agricultural growth; (ii) risk reduction, flood control, early warning and response systems; (iii) human capacity, livelihoods, and social protection; and (iv) catchment protection and management.

and Relief (DPR) Act of 1991 still provide the main legal framework for DRM and established the Department of Disasters Affairs Management until the new DRM act (2019) is operationalized (see Figure 4). The DPR Act 1991 was promulgated to guide the coordination and implementation of disaster reduction initiatives in Malawi. It also establishes the National Disaster Preparedness and Relief Committee (at both the technical and steering levels) and the National Disaster Preparedness and Relief Fund and the Civil Protection Committees (at the local levels). The Act also provides a legal basis for the President to declare a State of Disaster, which defines the extent of the geographic area affected by the disaster, with the period of effectiveness being within three months. The new DRM Act (2019) strongly provide improved guidelines for DRM, with greater emphasis on resilience building and sustainable financing.

19. While the Government has recently approved the new DRM bill, the National Disaster Preparedness

Figure 4: DRM Institutional Framework in Malawi at various levels



1.7 PDNA Approach and Methodology

20. **The PDNA utilizes a people-centered methodology to conduct a joint assessment and to facilitate recovery planning on the basis of an analysis of the effects and impacts of disasters to identify and estimate recovery financial needs and to define a recovery strategy.** It evaluates the effects of the disaster by using information related to the damage to infrastructure and physical assets and the resulting production loss. In addition, the PDNA provides an overall impact analysis of disasters in terms of their impact on macroeconomic and human development indicators. It presents a comprehensive picture of pre- and post-disaster contexts to identify a recovery strategy that determines the distinct needs and recovery priorities of different sectors and cross cutting issues to build back better and smarter.
21. **The PDNA was implemented under the leadership of the Government of Malawi, with technical and financial support provided by the World Bank and United Nations on the basis of a joint declaration in 2008 on post-crisis response.** The process involves multi-stakeholder¹⁴ engagement, with a high level of coordination to produce a participatory and comprehensive PDNA product, with four core deliverables:
- A consolidated and comprehensive Assessment Report;
 - A Recovery Strategy to define a vision for DRM and associated sectoral actions;
 - A basis for resource mobilization in support of the country's recovery; and
 - An outline for implementation mechanisms of recovery strategy
22. **The Government initiated the PDNA in early April 2019 to facilitate a joint assessment of the impacts of heavy rains and floods.** The PDNA was conducted in all the affected 15 districts (Balaka, Blantyre, Chikwawa, Chiradzulu, Dedza, Machinga, Mangochi, Mulanje, Mwanza, Neno, Nsanje, Ntcheu, Phalombe, Thyolo, and Zomba) and two cities (Blantyre City and Zomba City). This PDNA covered a number of sectors, including housing; health and nutrition; education; agriculture (crops, livestock, irrigation and fisheries); commerce and industry; transport; energy; water supply and sanitation and water resources; cross cutting issues including DRR and EWS; environment; social protection; and governance. In addition, the PDNA utilized both a Macro Economic Analysis and a Human Development Impact Analysis.
23. **The PDNA process involved the participation of more than 70 sector experts from the Government, the World Bank, the United Nations and other development agencies and from selected civil society organizations in the period from 1-18 April 2019.** The team reviewed and finalized data collection tools, compiled baseline data and structured the PDNA report during the orientation stage. After this, the team gathered and analyzed sector-specific data related to damage, loss, impacts and needs. Representatives of the team then visited the selected floods' affected districts to validate the findings. The PDNA process combined both bottom-up and top-down approaches by involving the participation of both local and national level administrators.
24. **The PDNA evaluated the effects of floods through an assessment of:** (i) damage to infrastructure and physical assets; (ii) disruption of access to goods and services; (iii) governance and decision-making processes; and (iv) increased risks and vulnerability. The effect and impact of the floods determined the recovery needs and strategy of the PDNA. Usually, the effects of floods are expressed both in quantitative and qualitative terms, with evaluations conducted in terms of damage and loss.
- Damage is defined as the total or partial destruction of physical assets in the affected area. Damage occurs during and immediately after floods and is measured in terms of physical units. Its monetary value is expressed as the replacement costs according to prices prevailing just before the event.
 - Loss is defined as changes to economic flows resulting from the damage to infrastructure and assets or disruption to access to goods and services because of a disaster. Loss occurs until full economic recovery and reconstruction is achieved, within this period in some cases lasting for several years.

¹⁴ Includes affected population, local authority, donor community, NGOs, Civil Society and the Private Sector.

25. **The PDNA team estimated the economic value of the effects in terms of four key effects**, these being: (i) total and partial destruction of infrastructure as well as assets; (ii) changes on production, delivery and access to goods and services; (iii) changes to governance processes; and (iv) activities to reduce immediate risk or vulnerability that is usually attributed to economic loss manifested in the changes to financial flows due to the disaster.
26. **The Recovery Action Plan identified and prioritized the short-, medium- as well as long-term recovery and reconstruction needs.** These recovery needs refer to the resources required to rehabilitate basic services and to re-activate productive activities. Recovery needs also include early recovery assistance to help kick-start local economies and to support affected populations to better participate in the long-term recovery process. They also include costs related to capacity building and operational costs for service delivery and differentials

for building-back-better to enhance future disaster resilience. The reconstruction needs refer to the resources required to finance the replacement or repair of physical assets that were destroyed by the disaster.

27. **This PDNA used both primary and secondary data, with this data are 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, and desk reviews. The further validation of data was conducted using process verification techniques and empirical plausibility checks. Expert reviews, technical field assessment and discussions were held to validate the findings and to formulate recommendations for further action. The assessment used a floods-reduction factor to ensure that damage and loss captured by the PDNA was in fact attributable to the floods as well as heavy rains.





1.8 Economic and Social Impact

1.8.1 Overview

28. **The floods are estimated to have resulted in production loss to a value of US\$ 9.96 million to the economy, equivalent to 0.13 percent of Gross Domestic Product (GDP), in 2019.** Real GDP growth is estimated to slow down by 0.1 percentage points in 2019, with projected growth having been reduced from 5.0 percent before the floods to 4.9 percent after the floods (see Figure 5). This impact is driven by loss to the agriculture, construction, electricity and water, wholesale and retail trade, transport and accommodation and food services sectors. As

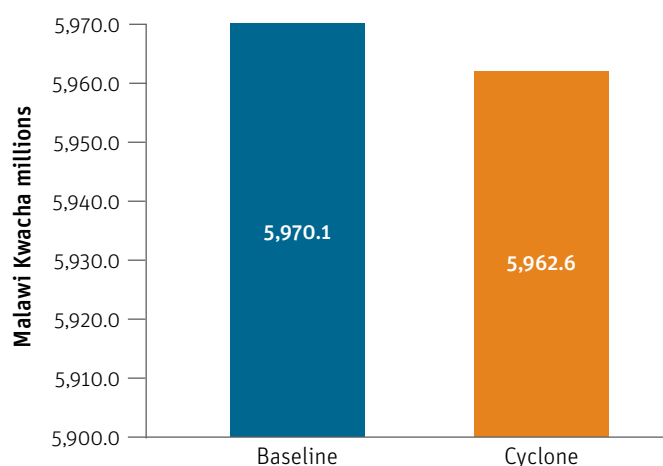
a percentage of GDP, the current account deficit is expected to slightly widen due to the impact of the floods, with exports and imports responding to the effects of the disaster during the year. The inflow of aid is likely to have a positive effect on the financial account. Expenditures on relief and post floods recovery is likely to exert additional pressure on the fiscal position.

1.8.2 Pre-disaster economic context

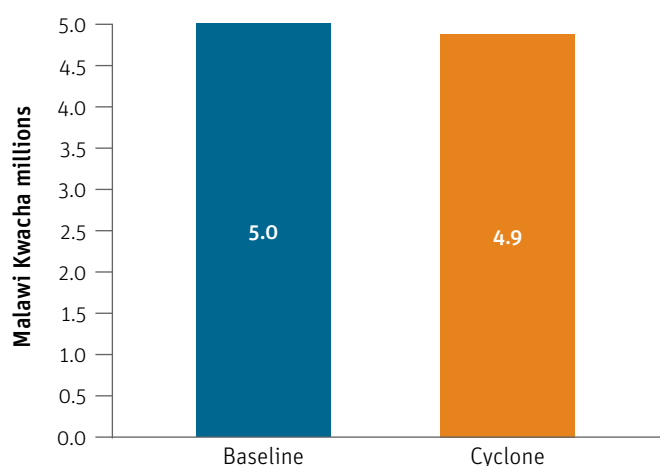
29. **In 2018, Malawi’s GDP growth rate stood at 4.0 percent, a moderation from 5.2 percent recorded in 2017** (see Table 4). The deceleration in 2018 was on account of a decline in agricultural output following unusually long dry spells and Fall of Army Worm infestations. This followed a rebound in agricultural production 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 to approximately 30 percent of GDP over the past decade and to 80 percent of foreign exchange, with tobacco, sugar, tea, and pulses being the major export products. As a predominantly agricultural economy, with a high proportion of rain fed agriculture, Malawi is vulnerable to weather and climate related shocks, with the quality of harvests having a strong determining effect on economic growth.

30. **Inflationary pressure has subsided over the past two years, with the rate receding to single digits since the end of 2017.** In 2018, the average annual national headline year-on-year inflation rate stood at

Figure 5: Projected nominal GDP (Malawi Kwacha millions) and real GDP growth (percent) in 2019 Percent.



Source: PDNA Macro Team Calculations



Source: PDNA Macro Team Calculations

Table 4: Key macroeconomic indicators, 2014-2019¹⁵.

Indicator	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 ¹⁶	(6.5)	(5.7)	(3.8)	(3.4)	(6.1)	(5.3)
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	--

9.2 percent in 2018, compared to 11.5 percent in the previous year. The slow down in inflation rate was mainly driven by declining food prices and the stability of the Malawi Kwacha relative to the currencies of Malawi's major trading partners. Despite upward pressure from rising maize prices during the lean season and increased water and electricity tariffs, it was projected that the average annual headline inflation rate would stand at around 8 percent in 2019. This ongoing decline reflects the improvements in the macroeconomic fundamentals over the past three years, despite the pressure from the cumulative negative impacts of natural disasters.

31. **The Malawi Kwacha has remained stable relative to the US\$ since 2017, trading at a monthly average of MK 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 a minimum of 3.0 months of import cover since mid-2017. The continued stability of the Kwacha relative to the US Dollar partly helped to contain inflation within the single-digit range, exerting downward pressure on non-food inflation.
32. **Despite a relatively stable macroeconomic environment over the past three years, Malawi's fiscal position remains vulnerable to shocks, which poses risks to public debt sustainability.** In terms of its fiscal outcomes, Malawi has a history of significant volatility, with both expenditure overruns and revenue

shortfalls and poor grant disbursements, all of which affect the execution of the budget. This leads to persistent fiscal deficits, which subsequently results in an increasing share of public expenditure being allocated to servicing the costs of domestic debt. This reduces the fiscal space for the delivery of public services and for capital investment. The recurrence of adverse weather shocks has also compounded Malawi's fiscal situation, with these shocks resulting in declines to agricultural output and an accompanying slowdown in economic growth, which in turn leads to a further decline in domestic revenue. Experience has shown that every natural disaster has been accompanied by increased expenditure on relief interventions, with the Government allocating unbudgeted funds to assist disaster victims. Before the 2019 flood disaster, the fiscal deficit was projected to narrow from 6.1 percent of GDP in the FY 2017/18 to 5.3 percent in FY 2018/19.

33. **On the external front, Malawi has experienced a persistent current account deficit, mainly because the value of exports is consistently lower than that of imports.** However, as a result of a significant growth in net exports in 2018, the current account deficit narrowed to 14.7 percent of GDP, down from 25.1 percent in 2017. A slowdown in economic activities and depressed disposable incomes following a poor agricultural season in 2018 also contributed to a decline in imports. Before the floods, the current account deficit in 2019 was projected to continue to narrow to about 13.7 percent of GDP.

¹⁵ Source: Ministry of Finance Economic Planning & Development; National Statistical Office; Reserve Bank of Malawi

¹⁶ /1 Reported on a fiscal year basis

Post Disaster Impact

1.8.3 Impact on Gross Domestic Product (GDP)

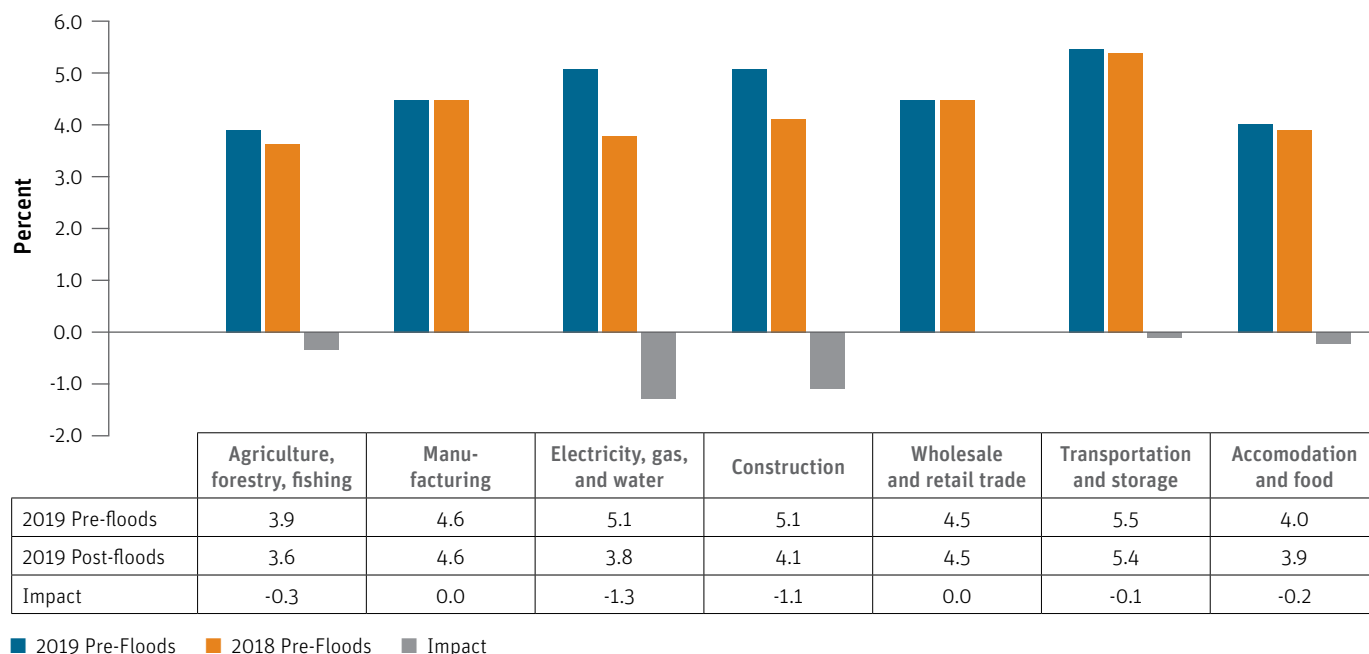
34. **As a result of the impact of the floods, it is projected that Malawi's real GDP growth rate will decelerate from an estimated 5.0 percent (before the floods) to 4.9 percent growth (after the floods).** The nominal loss is estimated at 0.13 percent of GDP. These calculations are derived from a production-side national accounts growth model based on the assessment of loss by sector. As Table 5 below shows, the sectors experiencing the most significant impact are agriculture, which contributes to 58.4 percent of the total loss; construction (22.6 percent); and electricity and water supply (12.3 percent). Floods have led to GDP loss as calculated at the national level, which might overshadow the loss in GDP by sectors such as agriculture, manufacturing and wholesaling and retail trade (see Figure 6).
35. **In the agriculture sector, the crop and animal production subsectors were the most significantly affected, with these sub-sectors contributing to 57.3 percent of the total loss. By contrast, the fishing and aquaculture subsector accounted for only 1.1 percent of the total loss.** The most significantly affected crops were rice, pulses and maize, accounting for an estimated loss of MK 2.0 billion (US\$ 2.7 million), MK 1.1 billion (US\$ 1.5 million) and MK 0.2 billion (US\$ 0.3 million), respectively. In the livestock subsector, the most significantly affected livestock were goats, cattle and chickens, accounting for an estimated loss of MK 2.9 billion, MK 2.6 billion and MK 1.7 billion, respectively.
36. **As a result of the floods, the manufacturing sector experienced a net gain due to the increased demand for plastic products to support relief efforts for the flood victims.** However, the dairy subsector was negatively affected due to challenges related to access to milk-bulking groups by dairy manufactures, with a significant proportion of the road network becoming 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.
37. **Electricity and water supply accounted for about 12.3 percent of the total loss.** This was mainly due to the accumulation of debris, which affected power generation and consequently water supply. Furthermore, water boards experienced increased costs related to the need to purify water before it could be distributed to consumers.
38. **Loss to the construction sector accounted for about 22.6 percent of total loss.** Construction companies incurred increased costs related to the destruction of construction sites and to the necessity to remove debris to resume construction works that were halted during the disaster period. However, it is expected that activities related to the reconstruction and repair of

Table 5: Nominal GDP by affected sectors Pre and Post Floods in million Malawi Kwacha¹⁷.

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

¹⁷ * The table summarizes affected sectors only. Those without any impact have been excluded while ** Excludes forestry

Figure 6: Impact of the Floods on Sectoral Growth (Pre- and Post-Floods).



physical infrastructure and assets in the aftermath of the disaster will partially offset some of the loss.

39. **Loss to the wholesale and retail trade sector contributed to 3.3 percent of total loss; accommodation and food services to 2.3 percent; and transport and storage to 2.2 percent.** The impact on wholesale and retail trade was limited, with most of the loss attributed to disrupted trading in the affected areas after the disaster. The most significant challenge to the transport sector related to the disruption to business, as transportation service providers had limited access to some affected districts. Tea transporters reported that the floods forced them to temporarily take longer routes through Der es Salaam and Nacala, instead of through Beira, thereby increasing their cost of doing business. In the case of accommodation and food services, there was a net loss during the disaster period. On one hand, business was adversely affected by cancelled bookings, with a number of places becoming inaccessible. As a result of coverage by international media, there was also a negative perception of the devastating impact of the cyclone, which affected foreign travelers. On the other hand, there was an increased demand for hotel and food services as a result of the immediate recovery efforts and assessments, with a large number of development workers and other stakeholders travelling to affected areas.

1.8.4 Impact on Inflation

40. **Although it is expected that the floods will exert upward pressure on inflation, especially in districts where rural areas have been hit hard, this may not result in significantly increased inflation rates at the national level.** The shock has negatively affected the agriculture sector by destroying crops and livestock, thereby disrupting own-food production in the affected districts. As a result, the floods may be expected to drive up staple food prices, especially the price of maize, in the affected areas. However, this effect is likely to be contained by the anticipated bumper harvest from other districts across the country, with food being supplied from districts recording a surplus to flood affected districts experiencing a deficit. In addition, the areas most significantly affected by the floods are among the less productive. Therefore, the impact on these areas may not significantly affect the overall food inflation rate. The impact on non-food inflation is also expected to be minimal, as the foreign exchange pressure from increased demand for imports of recovery and reconstruction materials may be offset by aid inflows, which can be expected to buffer up reserves, assuming international crude oil prices and domestic electricity prices remain stable. In view of the above, the overall impact of the current disaster on inflation is thus expected to be negligible.

1.8.5 Impact on the Fiscal Position

41. **As a result of the floods, the fiscal position may deteriorate slightly, with the additional expenditure associated with the Government response to the disaster exerting further pressure on the budget.** Projections for 2019 shows that Malawi's total debt is expected to reach a value of about 54.5 percent of the GDP, with the value of external debt standing at 34.2 percent of GDP and of domestic debt at 20.3 percent. Financing requirements for the recovery disaster plan that involve borrowing or budget re-allocations may significantly disrupt the fiscal plan, with increased borrowing having the potential to exacerbate the debt situation. However, borrowing for the internal procurement of maize to meet the needs of the affected population may not substantially affect the fiscal position, due to the low prices associated with the bumper yields from other districts. Although it is still too early to ascertain the fiscal impacts of the floods, some reconstruction needs may be met through the provision of external support, which will offer relief to the fiscal pressure associated with the response to the disaster.
42. **Notwithstanding the anticipated expenditure overruns, the floods are expected to have an insignificant negative impact on the Government's revenue collection prospects in 2019.** The floods have mainly affected smallholder farming households that produced primarily for their own consumption and informal businesses. As such, the impact of the 2019 floods on individual and corporate tax revenue collections is expected to be small. On the whole, large-scale enterprises were not significantly affected, though some reported indirect loss as a result of reduced demand for their products due to a decline in disposable incomes after the impact of the floods on community livelihoods. Furthermore, the donor inflow-induced recovery spending is likely to boost the effective demand, thereby improving tax revenues.

1.8.6 Impact on External Position (Balance of Payments)

43. **Malawi's current account is expected to be slightly widen after the flood disaster.** While exports may not necessarily decline, it is anticipated that the imports of goods and services for recovery and reconstruction may increase as a result of the current disaster. The assessment has shown that, with the exception of pulses,

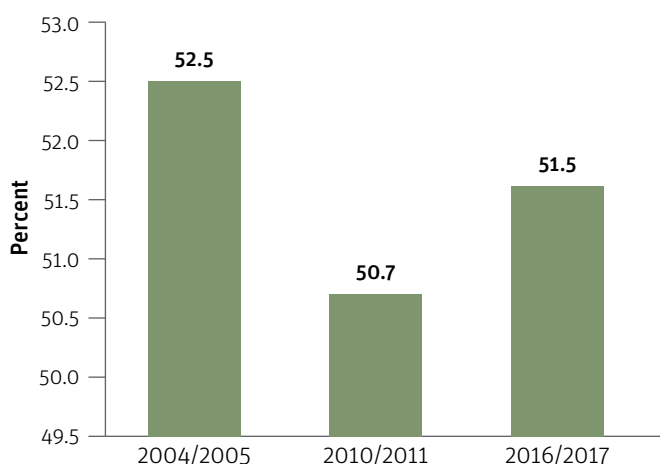
most of the major export commodities (tobacco, tea and sugar) have not experienced any major production loss. Tobacco, the largest foreign exchange earner, was only minimally impacted because it is largely grown outside the affected districts. In addition, tobacco is an upper land crop, and most of the impacted areas were in lower land areas. Tea production was also not significantly affected by floods. However, the floods may have increased the cost of exporting tea due to their impact on transportation networks, with exporters being required to use the longer Nacala route instead of the Beira route, at least temporarily.

44. **Increased aid inflows are expected to exert a positive effect on the capital account.** It is anticipated that transfers will increase to finance recovery and reconstruction activities. While the floods may have a slight negative impact on the current account balance, the impact on the financial account is likely to be positive. In view of the above, the overall impact on the balance of payments will depend on the relative magnitudes of the deterioration to the current account and the improvement to the financial account.

1.9 Pre-Disaster Human Development Profile

45. **Malawi has a high and largely stagnant poverty incidence rate declining only slightly from 52.5 percent in 2004/2015 to 51.5 percent in 2016/2017** (see Figure 7). The rate is drastically higher in rural areas than in urban areas, with the rate in rural areas standing at about 59.5 percent in 2016/2017. Across regions, the southern region records the highest rates in the country (65.2 percent). This implies that the population in this region may be particularly susceptible to the impact of disasters. In addition, the level of inequality is relatively high in the southern region, with a Gini coefficient of 0.50 in 2017. This suggests that any disruptions to livelihoods, including those related to the impact of disasters, may widen the gap between the poor and the well off.
46. **At the national level, the majority of Malawi's population is food insecure, with higher rates in rural areas (66 percent) than in urban areas (42**

Figure 7: Poverty incidences between 2004/2005 and 2016/2017.



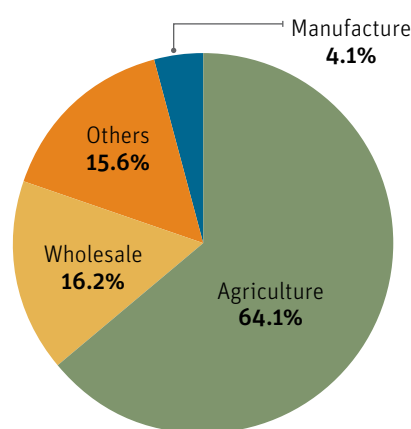
percent).¹⁸ Food insecurity is more prevalent in female-headed households (69 percent) than in male-headed households (58 percent). The Southern region has the highest levels (63 percent) of food insecurity, with these rates being particularly high in Zomba, Machinga and Nsanje, where around 80 percent of household’s experience food insecurity. At the national level, 69 percent of women and 58 percent of men are food insecure. From these figures, it can be seen that disasters can be expected to exacerbate food insecurity levels among most households.

- 47. **Almost 37 out of 100 children in Malawi aged between 6 and 59 months are experiencing stunting.** Southern Malawi has the highest rates of malnutrition with Mangochi and Neno both reaching a rate of 45 percent . At national level approximately 49 percent of mothers have body mass index that is less than normal (18.5). While disasters may not have an immediate effect on malnutrition, it can be expected that levels of malnutrition will increase in the aftermath of the floods.
- 48. **In terms of the human development index, Malawi has a score of 0.476, well below the sub-Saharan African average of 0.523, with the score placing it in 171st rank out of 189 countries.** Malawi’s reported employment rate stands at 79.6 percent, with a figure of 85.7 percent for males and 74.3 percent for females.¹⁹

¹⁸ NSO. 2017. Fourth Integrated Household Survey 2016/2017. Zomba, Malawi
¹⁹ National Statistical Office, 2013 Malawi Labor Force Survey.

The majority of the population is employed in the agriculture sector (64.1 percent) followed by retail and trade (16.2 percent) (see Figure 8). Almost 70 percent of the agricultural workforce consists of women, who produce 80 percent of household food. Any effects of disasters on agriculture erodes households’ livelihoods, with most households adopting negative coping strategies such as selling off productive assets or engaging in sexual transactions.

Figure 8: Percentage distribution of various sectors towards employment.



- 49. **Malawi has a relatively high burden of disease due to the impact of HIV/AIDS, tuberculosis, diarrhea, neonatal disorders, malaria and nutritional deficiencies.** Women are particularly vulnerable to HIV and AIDS, with prevalence rates for women aged between 15-64 estimated to stand at around 12.8 percent, compared to 8.2 percent for adult men. Non-communicable and cardiovascular diseases, mental disorders and unintentional injuries also make a sizable contribution to the burden of disease and mortality. In addition, regular outbreaks of infectious disease exert pressure and increase the burden of caregivers, particularly women and girls. In terms of water, sanitation and hygiene (WASH) facilities, 86 percent of the population in rural areas have access to improved water, with approximately 64 percent of water points fully functional. Any damage to WASH facilities, such as pit latrines, has the potential to result in the spillage of human wastes into water bodies, which in turn results in increased rates of infection to waterborne and other diseases.

50. **Approximately 14 percent of the population aged 15 years and above never attended school. The most commonly reported reasons for this failure including a lack of money for uniforms; parents refusing permission to their children to attend; children being required to help at home, and the excessive distance of schools from home.** Across regions, the southern region has the highest proportion of people aged 15 years and above who have never attended school. Above half of the student aged population in the Southern region do not participate in primary school because of lack of money. Broken down by gender, 19 percent of the female population aged 15 years and above have never attended school, with the figure for the male population standing at 9 percent. It is anticipated that the impact of the disaster may result in a deterioration in the school attendance rate.

1.10 Post-Disaster Impact on Human Development

51. **The March 2019 floods have had varying effects on different facets of human development.** Floods had deepened poverty, rendering a large number of people homeless, jobless or without a livelihood, vulnerable to food insecurity and diseases and experiencing disruptions to normal education and health service deliveries. All of these have created immense psychological stress and increased the likelihood of the affected districts relapsing into deep poverty. Box 1 illustrates impacts of Tropical Cyclone Idai on welfare at national and district levels.

52. **Households' lost wage income due to the destruction of productive assets such as land, Small and Medium Enterprise (SME) stocks, livestock, fisheries, machineries and working tools.** In addition, the destruction of markets, roads and other facilities have placed further constraints on speedy economic recovery at the household and community levels. Overall, women may have fared worse than men, with a disproportionately large number of women engaged primarily in informal work and subsistence activities. Their gender roles, compounded by discrimination and the associated lack of access to and control over productive assets, also means that they have less mobility to search for casual labor, which further

exacerbates the inequality gap and constrains women's ability to recover quickly and to build back better. Thus, the floods have not only had a significant overall impact on the livelihoods and social conditions of populations in affected districts, they have also exacerbated income inequality between the poor and the well off and between the genders.

53. **In addition, the 2019 floods have affected social protection activities that may enable members of the poorest households to rise out of poverty and to smooth seasonal consumption patterns.** Malawi's social protection program supports households with chronically ill heads (51 percent); the elderly (48 percent); and people with disabilities (24 percent). These are particularly vulnerable households have lost the productive assets that they have acquired through social protection initiatives, thereby limiting their resource base and constraining their ability to recover from the disasters. The effects of the floods have increased the proportion of highly vulnerable people, suggesting that there is a need to scale up the social cash transfer program and other social support initiatives. Moreover, households have lost passbooks and passbook transfer details as a result of the floods, which will disrupt the overall administration of the social cash transfer program. In addition, about 1569 feeding facilities used to support school feeding programs were destroyed by floods, disrupting the provision of nutritional porridge to school going children.

54. **Approximately 0.3 million farming households were affected by their crops being washed away by intense surface runoff, which will have serious implications for their food security and nutritional status.** With the majority of households depending on agriculture as their main source of employment and livelihood, households will continue to struggle to meet their basic needs, often engaging in negative coping strategies. The floods affected pregnant and lactating mothers who need high nutritional food diets and other ways deepened levels of child malnutrition, especially in Neno and Mangochi,²⁰ where slightly more than 45 percent of children are already stunted. Significant efforts are urgently required to address

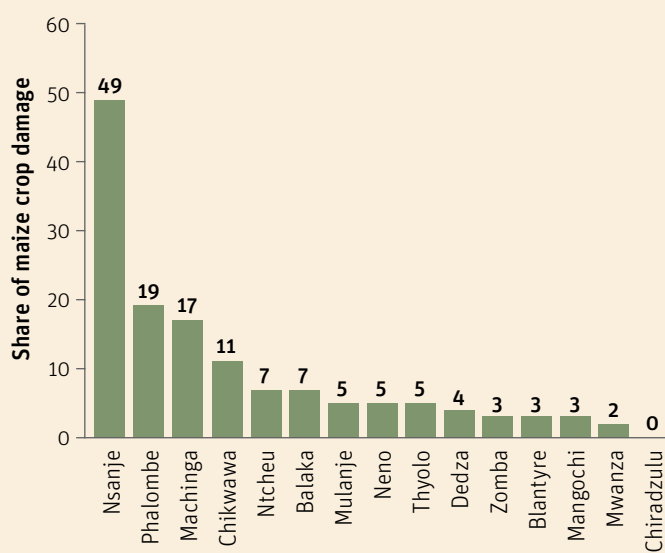
²⁰ <https://dhsprogram.com/pubs/pdf/FR319/FR319.pdf>

Box 1: The Impact of Tropical Cyclone Idai on Welfare.

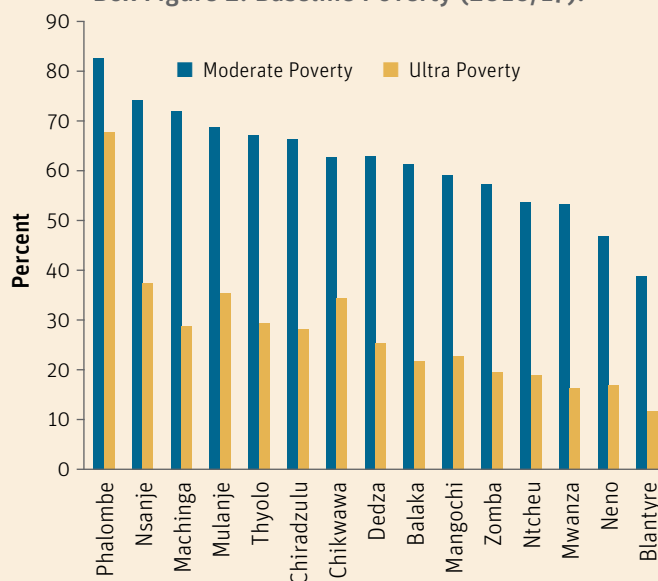
In terms of crop losses, the districts most significantly impacted by Cyclone Idai were Nsanje, Phalombe and Machinga (see Box Figure 1) Cyclone Idai hit Malawi at a time when crops in the affected area were reaching the point of maturity and farmers were ready for harvest. It is estimated that crop losses were highest in Nsanje district, where about half of the land area used for the cultivation of maize was severely affected. Farmers in Phalombe and Machinga district also lost a significant proportion of their maize.

In all these affected districts, the baseline moderate and ultra-poverty rates were relatively high compared to the national average high. For example, the ultra-poverty rate in Phalombe district stood just over 50 percent, while in Nsanje district it stood at 37 percent. If the proportion of the population experiencing moderate poverty is included, the rate increases to 83 percent in Phalombe and 74 percent in Nsanje (see Box Figure 2). By contrast, the national ultra-poverty rate stands at 20 percent.

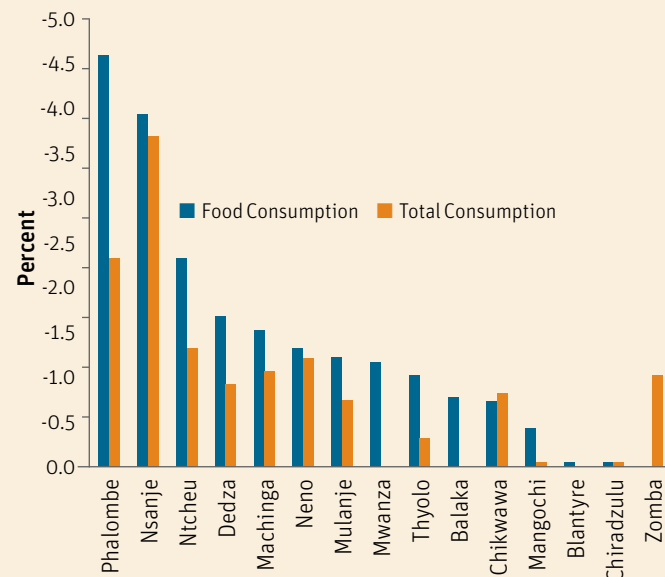
Box Figure 1: Maize harvest lost due to Cyclone Idai.



Box Figure 2: Baseline Poverty (2016/17).



Box Figure 3: Decline in consumption per capita after Cyclone Idai.



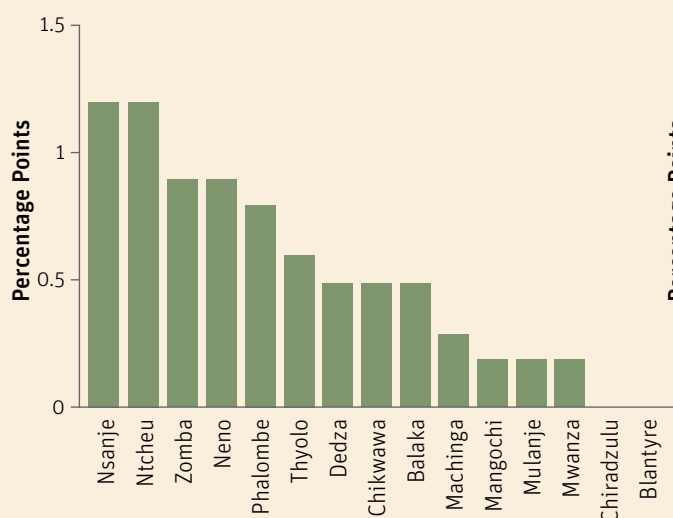
These crop losses have significant implications for both food security and welfare in the affected districts. In the two most severely affected districts (Nsanje and Phalombe), food consumption is expected to decline by more than 4 percent. Similarly, total household expenditure is expected to decline by 2-3 percent (see Box Figure 3). Given the high baseline poverty rates, the decrease in consumption could exacerbate already dire welfare conditions in these districts.

Source: World Bank staff calculations based on data from the Fourth Integrated Household Survey (IHS4), estimated crop losses, and average land covered with maize in each district over the past five years.

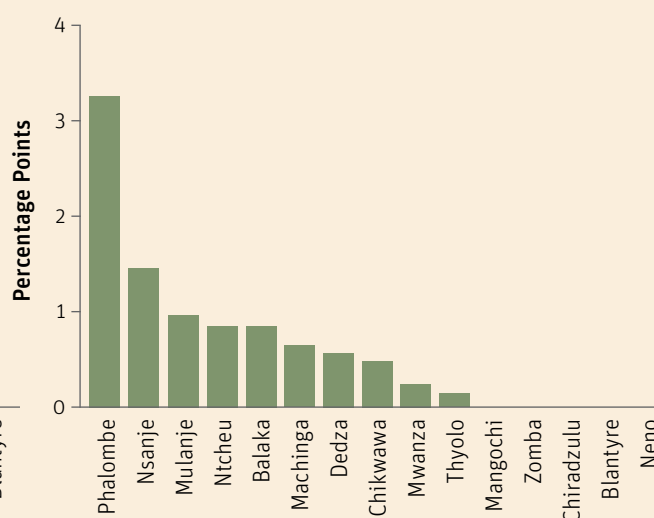
Box 1: The Impact of Tropical Cyclone Idai on Welfare (cont.).

Without concerted effort towards humanitarian assistance, the crop losses are likely to translate into higher moderate and ultra-poverty rates (see Box Figure 4 and Box Figure 5). The floods and associated damages to crops and other assets are likely to have exacerbated both monetary and non-monetary poverty. Various aspects of human development have also been affected, including through the impact on assets such as houses, buildings, livestock, crops, bicycles and farming equipment; on health and education services; and environmental conditions. In terms of monetary poverty, simulation results show that as a result of the crops lost due to Cyclone Idai, the moderate poverty rate is expected to increase by as much as 1.2 percentage points in Nsanje district. In five of the affected districts, increases of at least 0.5 percentage points are also expected. Ultra-poverty rates are also expected to increase, with the increase for Phalombe estimated to stand at 3.3 percentage points and for Nsanje at 1.5 percentage points.

Box Figure 4: Changes in Moderate Poverty.



Box Figure 5: Changes in Ultra Poverty



Source: World Bank staff calculations based on data from IHS4 and estimated crop losses.

Note: These estimates are based on a simulation exercise, and not on official poverty statistics. The simulation is based on the areas of crop land damaged for 7 major staple crops, the typical total area of land covered by these crops in each district, and the share own production in total household consumption in the affected districts.

these food security and nutrition issues. In addition, it will be necessary to maintain surveillance of the nutritional status of children, pregnant women and lactating mothers into the future.

- 55. **A total of 288,371 houses were damaged by floods, leaving about 87,000 people displaced and forced to seek refuge in temporary shelters, which increased the risk of contagion with communicable and infectious diseases.** Due to the lack of shelter, women and girl children have experienced increased risk of sexual and other gender-based violence. Although the housing sector is usually the sector that is most significantly affected by floods, it often receives a relatively low priority ranking during recovery and reconstruction. As a result, most

families rebuild their houses using their own traditionally-sourced materials, resulting in the production of sub-standard housing that is highly susceptible to the impact of future disasters. Usually, floods have a disproportionately significant impact on traditional houses, with a disproportionate number of those dwelling in these houses being single women, the elderly, widows and widowers, and people with disabilities (PWD), who are already and otherwise particularly vulnerable to the impact of disasters. Thus, it is imperative that housing reconstruction programs place a particular emphasis on meeting the needs of these social groups to ensure that they do not remain entrenched in a vicious cycle of poverty and vulnerability.

56. Damage to infrastructure such as schools, health and WASH facilities has exacerbated the poor living conditions of most flood-affected households.

Extensive damage to school facilities have created an un-conducive environment for learning, resulting in declining attendance, which might be expected to result in increased dropout rates. Furthermore, the non-attendance of girls at school results in an increased proportion of girls experiencing early pregnancies and forced marriages, which may form a coping mechanism during disasters. In addition, the floods have constrained access to primary health services, leaving many people in affected communities in poor health. This PDNA noted that there were reported cases of women giving birth after having tried unsuccessfully to go to hospitals, as they were unable to cross flooded rivers. Additionally, the damage to WASH facilities has resulted in increased vulnerability to vector-borne diseases.

57. Access to a range of other social facilities has also been disrupted in the affected districts. Estimates show that across the country, 129 bridges were destroyed. In addition, 1,841 km of road network, or around 11.9 percent of the total, was destroyed. This has constrained access to social amenities such as health facilities, market centers, schools and work stations. The limited access to commercial centers and other places where people work, trade and obtain various socioeconomic services results in reduced

income, a decline in livelihoods and a lack of resources for sustenance, leading to deepening poverty and reduced quality of life.

58. In addition to the extensive destruction to property, the floods also directly resulted in the death of 60 individuals and in injuries to an additional 672.

There has also been an increase in the reported number of cases of infectious conditions such as coughs, malaria, diarrhea, and cholera, with these increases associated with the poor living conditions after the floods. These infections have negatively affected individual involvement in various livelihood activities, further exacerbating poverty, food security and malnutrition at the household level. In addition, treating these illnesses has involved out-of-pocket expenses at the household level, placing further pressure on available incomes.

59. Women and girl children have been directly affected by the floods in terms of almost all human development indicators. Women and girls are often required to fetch food and water for their households. They are required to act as caregivers when members of the family fall sick. More than 70 percent of women engage in casual labour, especially in agriculture, to support their household livelihoods. As a result of the floods, all of these burdens have increased. At the same time, they are experiencing increased risks in a number of other areas, including increased vulnerability to sexual and gender-based violence.

2. Damage and Loss

60. **This section presents an analysis of the effects (damage and loss) of the 2019 floods.** The total value of the damage and loss resulting from the 2019 floods is estimated to reach US\$ 220.2 million. Of this total, the total value of damage is valued at US\$ 157.7 million, with the total value of loss standing at about US\$ 62.5 million. The most significantly affected sector was

the social sector (about 60 percent of the total effects), followed by the infrastructure sector (23 percent) and the productive sector (17 percent). Table 6 presents a breakdown of the damage and loss across sectors and subsectors. Annex Table 17 to 20 show distribution of damage and loss across districts and two cities in million US\$.

Table 6: Damage and Loss of 2019 floods across sectors and subsectors.

Sector	Subsector	Damage, million US\$	Loss, million US\$	Total Effects	Sub-sectoral share of effects
Social	Housing	82.71	23.93	106.64	48.4%
	Health and Nutrition	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%
Infrastructure	Transport	36.1	0.87	36.97	16.8%
	Energy-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%

2.1 Social Sectors

This section presents a description and analysis of the damage and loss to the social sector due to the 2019 floods. This sector includes a number of subsectors, including housing, education, health and nutrition. As stated above, the social sector contributed to about 60 percent of the total effects of the 2019 floods. Within the social sector, the housing subsector was most significantly affected, contributing to about 82 percent of effects experienced by the social sector. The second most significant contributor to the facts was the educational subsector, followed by health and nutrition (see Figure 9).

Figure 9: Share of effects of floods across social subsectors

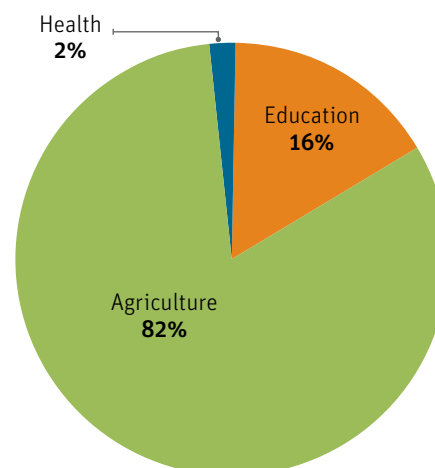
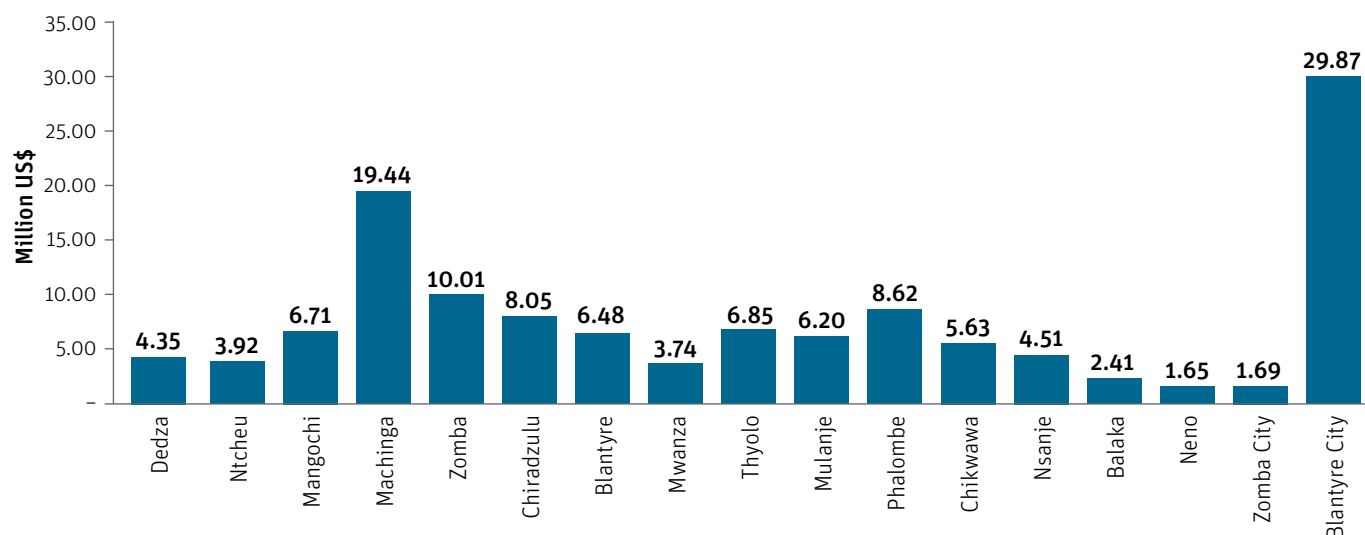


Figure 10: Total effects of floods on housing subsector across districts in million US\$



2.1.1 Housing and settlements

61. **As stated previously, the 2019 floods resulted in damage to about 288,371 houses across the affected districts.** Of these houses, approximately 48 percent belong to male-headed households, while 52 percent belong to female-headed households. Approximately, 44 percent of houses in Malawi are permanent structures; 36 percent are semi-permanent structures; and 20 percent are traditional houses. The PDNA found that 89 percent of affected houses are constructed of traditional materials; 12 percent of semi-permanent materials; and four percent of permanent materials. Figure 10 provides a further description of the impact of the floods on the housing sector, with lessons learnt as inputs for recovery. The total value of the effects of the floods on the housing subsector is estimated at US\$ 106.6 million, of which damage constituted US\$ 82.7 million of the total and loss constituted US\$ 23.9 million. Figure 10 provides a breakdown of the total effects on the housing subsector across the affected districts. The total cost of the damage to kitchens and toilets is valued at US\$ 6.9 million, while the cost of damage to household items is estimated at US\$ 10.8 million.

62. **The majority of houses affected by floods were privately-owned houses that did not comply with building standards.** Apart from the impact of loss of dwellings, the destruction to private houses also lead to a loss of rental income. Furthermore, in some

Box 2: 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 (see Box Figure 6). 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.

Box Figure 6: Houses affected by 2019 floods.



cases, households faced additional costs related to removing debris. Box 2 provides a short description of the impact of the floods on housing, with a discussion of how adherence to the Safer Housing Construction Guidelines would result in improved resilience and building back better.

2.1.2 Health and Nutrition

63. **The total value of the effects of the floods on the health and nutrition sub-sector is estimated at about US\$ 2.6 million, of which damage constitutes US\$ 0.19 million of the total and loss US\$ 2.4 million.**

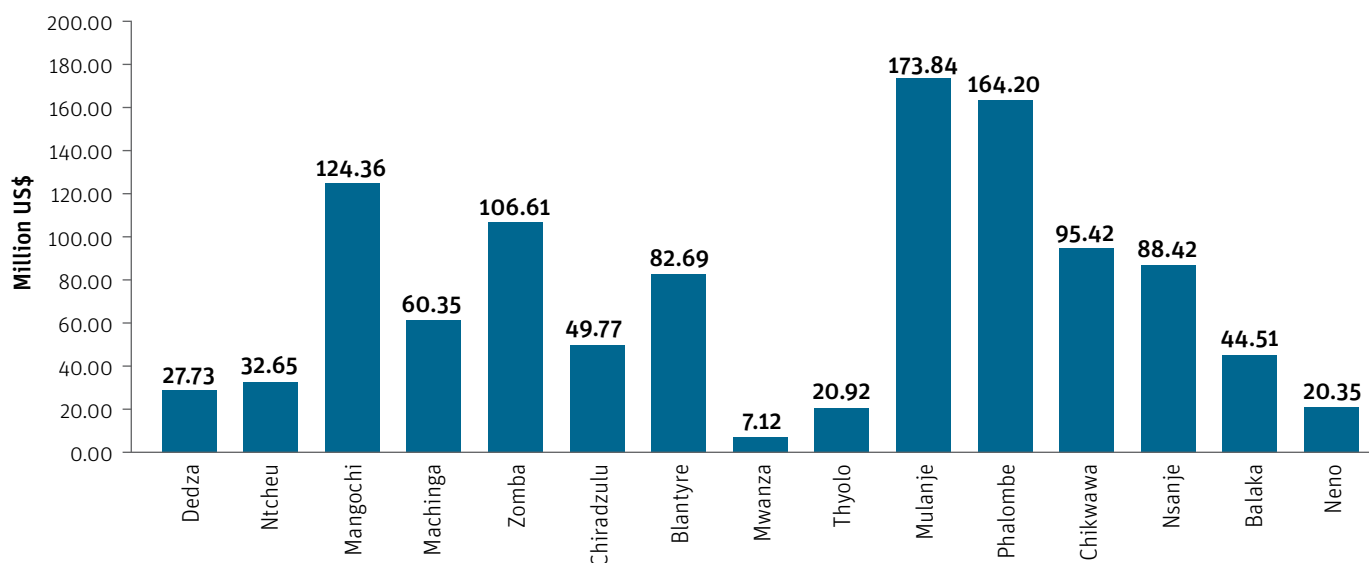
Figure 11 presents a breakdown by district of the effects of the floods on this subsector. Although the health and nutrition subsector was relatively lightly affected by the floods, health facilities were at least partially destroyed in some of the affected districts. For instance, seven health facilities were affected in Blantyre and six in Chikwawa, with cases of refrigerators being washed away, medicine supplies lost, roofs blown off, and water towers and toilets collapsing. Districts located along Malawi's border with Mozambique reported suspected or potential cases of cholera due to disruptions to water, sanitation and hygiene services. There were no reports of health workers being injured as a direct result of the floods, nor of damage to vehicles. There were reported cases of referral mechanisms being disrupted, with some primary health facilities remaining cut off from secondary and tertiary facilities for almost two weeks. Finally, there were reported cases of damage to equipment used to facilitate nutritional programs, including salter scales and height boards.

64. **Though the floods resulted in disruptions to the provision of primary health services in some affected communities, temporary clinics and mobile clinic teams were established to provide services in the affected**

areas. In addition, there was a temporary increase in the provision of health services through the mobilization of additional personnel, health promotions, vector control, disease surveillance, coordination and provision of SRH services for women and health. It should be noted that despite some exceptions, access to health facilities in most of the affected districts remained normal. There have been no major increases in outpatient attendance, since the displaced population has remained in their catchment areas. In the Lower Shire, people were relocated to camps far from the affected locations. Although no outbreaks of disease have been reported, it may be assumed that households may have experienced increased risks to such outbreaks. For example, women, men and some youths in the IDP camps risk contracting sexually transmitted infections (STI), due to decreased access to condoms. Women and girls in IDP camps may be at increased risk of unplanned and early pregnancies, with reports of sexual transactions being used as a coping strategy.

65. **Although the 2019 floods have not had immediately measurable effects on the nutritional status of the affected population, it is expected that the floods will have medium to long term impact on the status of children under five and lactating mothers.** Even prior to the floods, the districts affected by the 2019 floods record relatively high rates of stunting (average of 37 percent, with the rates in Neno and Mangochi reaching to 45 percent. Combined with high poverty

Figure 11: Total effects of floods on the health and nutrition subsector in million US\$.



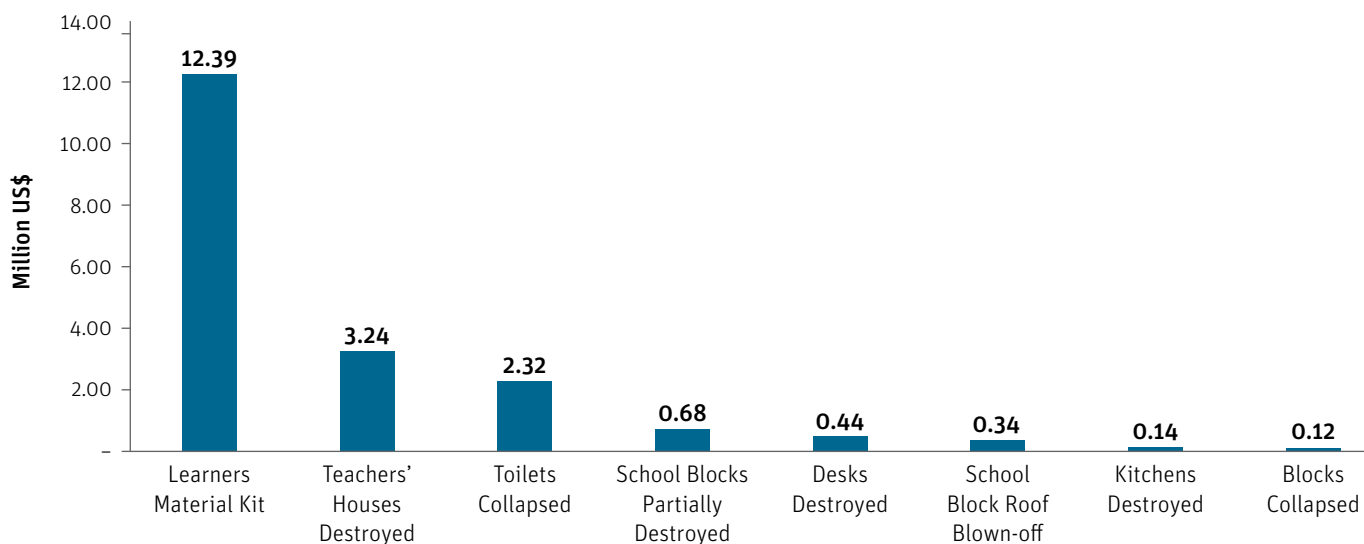
levels, the 2019 floods will doubtless exacerbate the nutritional status of children unless specific programs are implemented to address the situation.

2.1.3 Education

66. **The 2019 floods resulted in the partial or total destruction of 154 out of 2,460 public primary schools and of 455 out of 7,318 Early Child Development Centers.** With the exception of a few urban schools in Blantyre and Zomba cities, most of the affected schools were located in rural areas and constructed by communities. District education offices have reported cases of school infrastructure including toilets, teachers’ houses and classrooms being destroyed by floods. More than 5500 desks and 967 learners’ toilets were reported to be destroyed. Almost 67,347 school textbooks were reported to be damaged, to a value of approximately US\$ 12.4 million.

67. **The total value of the effects of the floods on the education sector is estimated at US\$ 21 million, of which damage constitutes US\$ 20.3 million and loss constitutes US\$ 0.75 million.** The destruction of learning materials contributed to the vast majority of the effects, followed by the impact on teachers’ houses and toilets (see Figure 12). Loss was attributable to costs associated with removing debris, cleaning classrooms (many of which served as refuges for IDPs), purchasing tents to provide temporary facilities for children whose schools were affected, and paying volunteer teachers. Furthermore, floods disrupted teaching and learning services for almost 14 days, due to the collapse of classrooms. Similarly, schools used to provide shelter for IDPs were temporarily unavailable for their intended purpose.

Figure 12: Value and details of damage in education subsector in million US\$.



2.2 Productive Sector

2.2.1 Agriculture (Crops, Irrigation, Fisheries and Livestock)

68. **The total value of the effects of the floods on the agriculture sector are estimated to stand at US\$ 36.3 million, of which damage constitutes US\$ 6.5 million and loss constitutes US\$ 29.8 million.** The effect on the agriculture sector results from production loss to crops planted; partially or completely destroyed irrigation infrastructure; partially or completely

destroyed livestock and fisheries infrastructure; and the loss of livestock, fisheries and other assets.

69. **The value of the effects of the floods on irrigation infrastructure alone is valued at US\$ 13.8 million; on crop production at US\$11.1 million; livestock losses at US\$8.2million; and fisheries losses at US\$3.2 million** (see Figure 13). The effects were relatively more significant in affected areas with more developed irrigation infrastructure, particularly Nsanje, Chikwawa, Phalombe, Zomba and Machinga (see Figure 14).

Figure 13: Damage, loss and total effects of floods by agricultural subsectors in US\$ million.

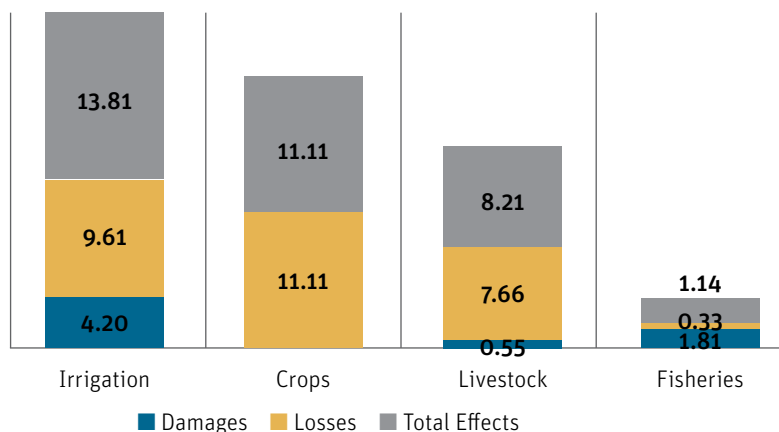
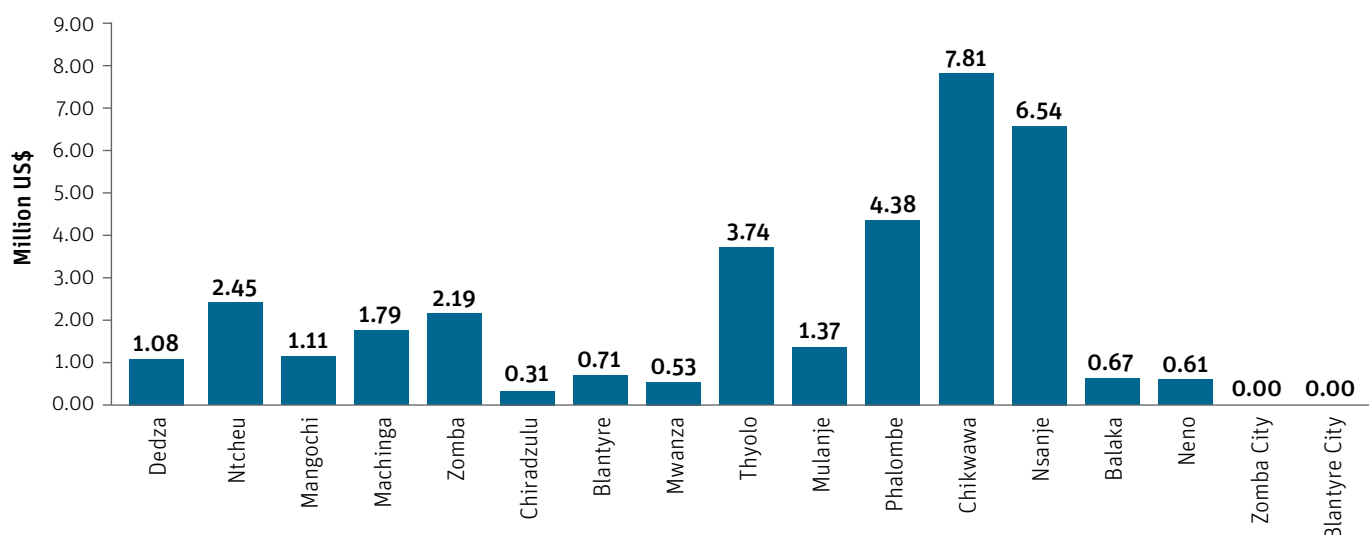


Figure 14: Total effects of floods on agriculture subsector across districts in million US\$.



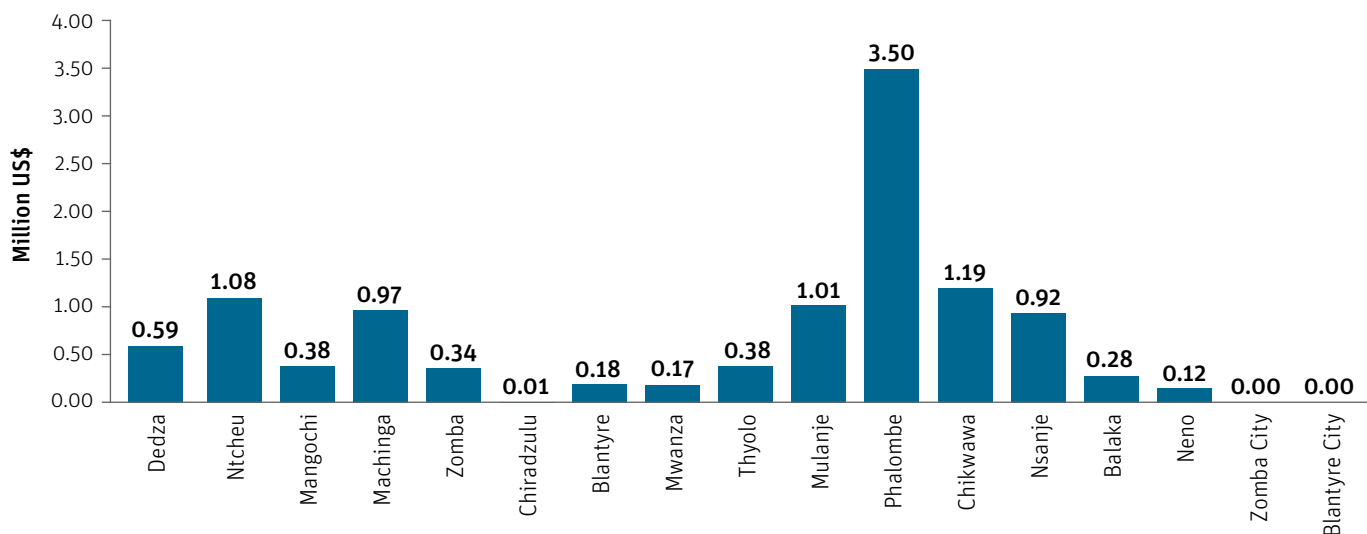
2.2.2 Crop Sub-sector

70. **In Malawi, most farming households are engaged in subsistence, rain-fed agriculture, with this form of agriculture accounting for a total of 1.7 million ha of cultivated land.** The total value of the effects of the floods on the crop subsector is estimated at US\$ 11.1 million. Farmland was affected to some degree in all of the 15 affected districts. The most significantly affected districts with Phalombe, which experienced 31.5 percent of the effects, followed by Chikwawa (10.8 percent); Ntcheu (9.9 percent); and Mulanje (9 percent) (see Figure 15). The floods are estimated to have affected a total of 91,638 ha of productive land belonging to 308,702 farm families, with 56 percent of the land utilized for maize production. The effects on the crop subsector has been calculated primarily on the

basis of loss due to crops being submerged; prolonged water logging; mature cobs and ears germinating; and plants wilting beyond regeneration.

71. **The floods affected crops that are mostly cultivated in lowland area, particularly maize, rice, sorghum, millet, groundnuts, cotton, pulses, sesame, cassava, sweet potato and potato.** Floods resulted in mature crops being submerged and/or washed away, which reduced returns from crop production. In addition, floods affected the supply of casual labor for crop production. In Malawi, agriculture provides employment to more than 80 percent of the rural population, the majority of whom are women. The floods reduced opportunities to generate income from this source of employment.

Figure 15: Total effects of floods in crop subsector across district in million US\$.



2.2.3 Livestock Subsector

72. Of the effects of the floods on the livestock subsector, damage constituted a relatively small proportion, at US\$ 0.55 million, while loss amounted to US\$ 7.6 million (see Figure 16). Across districts, Chikwawa

was most significantly affected, contributing to 34.1 percent of the total value of the effects to the subsector. This was followed by Nsanje (20.7 percent); Phalombe (8.5 percent); and Zomba (6.1 percent) (see Figure 16). A total of 11,194 households were affected, of which 5,871 were male-headed households and 5,323 were

Figure 16: Total effects of floods on livestock across districts in million US\$.

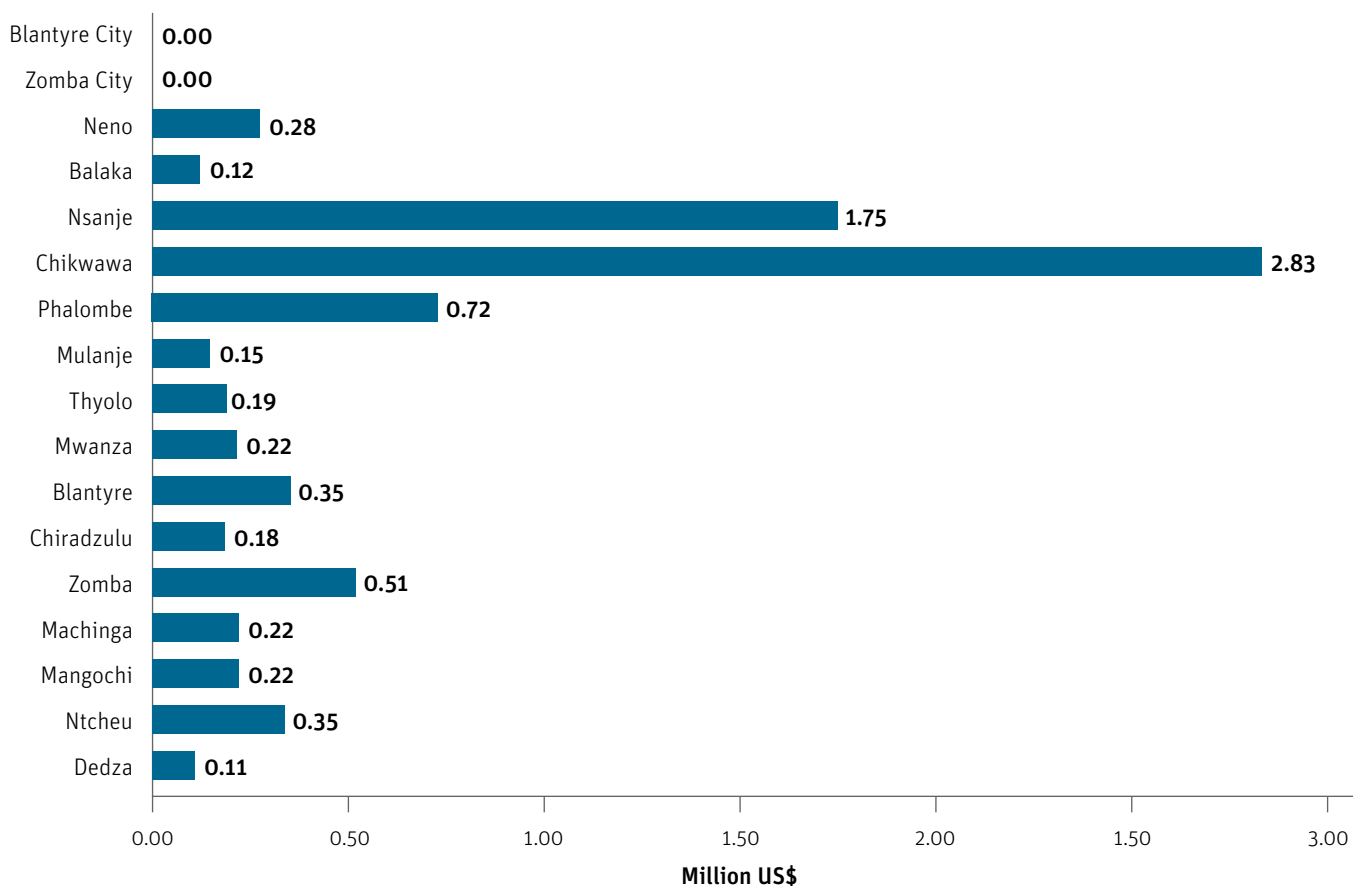
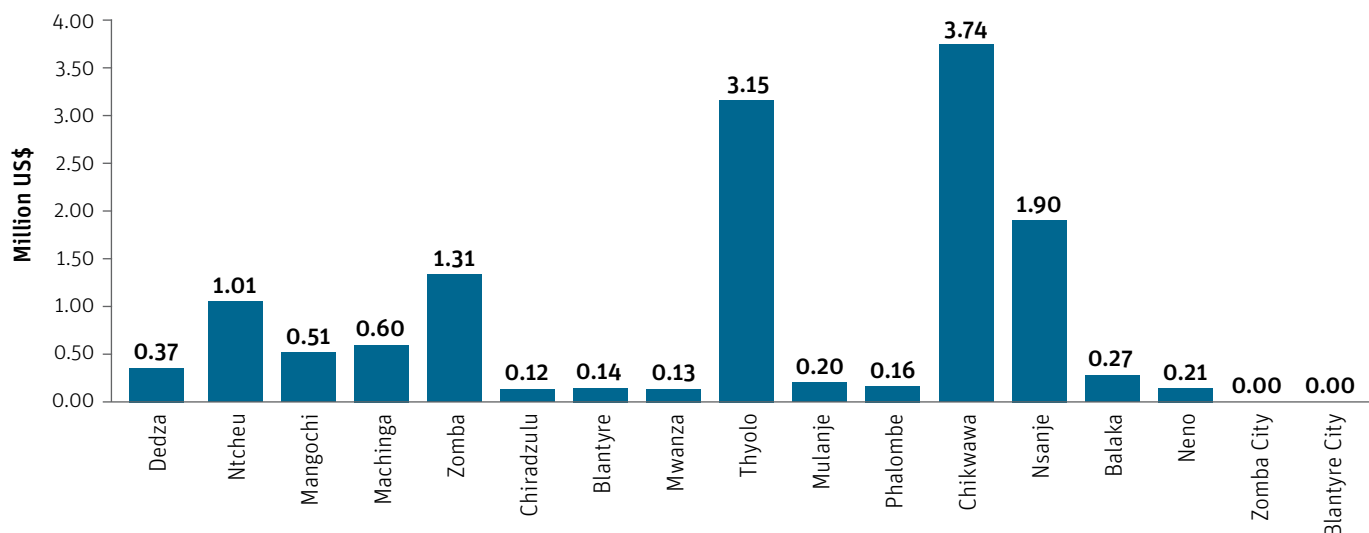


Figure 17: Total effects of floods on irrigation subsector across districts in million US\$.



female-headed households. The livestock affected included goats, sheep, cattle, pigs, chickens, guinea fowls, ducks, doves, rabbits and turkey. The recorded damage was due to the partial or complete destruction of livestock housing, dip tanks, markets, kraals, abattoirs and other equipment. Loss in the livestock subsector was due to a reduction in the availability of 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 lost, with most of this livestock being small ruminants owned by women.

73. **Livestock continues to be at risk because of water-logged conditions**, which create an environment that facilitates the proliferation of mosquitoes and predisposes livestock to diseases, including rift valley fever, dengue, and exposure to anthrax spores. In addition, birds tended to migrate from drier areas to wetter areas of Malawi and Mozambique in search of food and water, leading to the increased congregation of multiple wild bird species, increasing the potential for outbreaks of highly pathogenic avian influenza. Similarly, the dog population has increased in areas surrounding IDP sites, increasing the risk of rabies and placing additional pressure on the scarce human anti-rabies stocks available from regional referral hospitals.

2.2.4 Irrigation Subsector

74. **The value of damage resulting from the floods to irrigation infrastructure is estimated at US\$ 4.2**

million, with the value of loss at US\$ 9.6 million resulting from 3,328.75 hectares of irrigated land not being utilized for crop production. Figure 17 shows the total effect of the floods on the irrigation subsector across all the affected districts. At the household level, irrigated land was lost due to sand deposits, the erosion of arable soils suitable for crop production and disruptions to the irrigation season as a result of flood damage to the irrigation infrastructure. The damaged irrigation infrastructure included dykes, head-works, pump stations, canals, pipelines, turn-outs, dams, wells, drainage systems and scheme roads and bridges. In many cases, the pumps and associated electrical connections used for solar pump-based irrigation schemes were submerged and/or washed away.

2.2.5 Fisheries Subsector

75. **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 sets of fishing gears; and 189 fish ponds, with fish in some ponds being washed away. In addition, some fish processing equipment, particularly smoking kilns, was destroyed. Floods also negatively affected income²¹ due to lower fishing sales resulting from reduced harvests. The fisheries and aquaculture accounts for about 4 percent of national GDP. It

²¹ Lost income is estimated by considering tonnage of fish expected from the fishponds and the farm gate prices.

contributes to more than 70 percent of Malawi's dietary animal protein intake and 40 percent of the total protein supply. The sector directly employs more than 60,000 fishers and 15,465 fish farmers, of whom 38.5 percent are women. This suggests that in addition to the effects of floods on animal protein uptake, household livelihoods will also be affected.

2.2.6 Commerce and Industry

76. **The 2019 flooding and heavy rains and significant effects on the commerce and industry sector, impacting small-, medium- and large-scale enterprises.** The total value of the effects on the commerce and industry sector as a whole is estimated at about US\$ 2.1 million. Out of this, US\$ 1.7 million is attributable to loss and US\$ 0.3 million to damage (see Table 7).

Table 7: Damage and loss of floods on WASH sub-sector by affected districts and cities 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

77. **The cost of damage to the large-scale subsector contributed to the greatest share of the damage, at about US\$ 0.8 million, or 72 per cent of the total.** Damage in the large-scale subsector took the form of damage to physical assets, such as plants and

machinery owned by the private sector, due to these assets being either washed away or submerged in water. For example, tractors at one large construction company in Blantyre were significantly damaged. In the case of the SMEs subsector, damage occurred in nearly fifty trading centers (eight in Chikwawa, four in Phalombe, five in Nsanje, ten in Zomba and the rest in the remaining districts). Most of this took the form of damage to commercial properties and other types of infrastructure, with most of these assets being owned by private traders (about 94 percent). There was also damage to mostly makeshift markets around the trading centers.

78. **The SME subsector, which is dominated by women, contributed to a larger proportion (US\$ 0.93 million) of the cost of loss than did the large-scale subsector (US\$ 0.89 million).** The extent of the loss in the SMEs subsector varied across districts, with some districts being disproportionately affected. For example, 15 percent of the total loss to the subsector occurred in Nsanje and 13 percent in Chikwawa. In other districts the extent of the loss was significantly lower standing out one percent in Blantyre and two percent in Thyolo. Across the districts, the loss consisted primarily of loss in terms of stocks 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. In the case of larger scale enterprises, loss was mostly associated with the cost of repairing damaged plant and machinery; potential proceeds from sales; and loss of raw materials, especially on farms or plantations, including Nchalo Sugar Plantation.

2.3 Infrastructure Sector

2.3.1 Road Transport

79. **The total value of the effect on the road transport sector is estimated at US\$ 36.1 million.** As a result of floods, a total of approximately 1,841km²² of road network was either partially or totally destroyed. Of this, 33km consisted of primary roads; 274 km of secondary roads; 398km of tertiary roads; and 1136 km of district roads (see Box 3). The disaster destroyed

²² 1841 km represents about 10 percent of the road network in the country

Box 3: 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 Box Figure 3 picture, Mafisi Bridge in Thyolo). 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 paramaters as well as maintain road infrastructure. It is also recommended to the conduct a Building Damage Assessment (BDA) to assess underlying structural causes of damage to infrastructure with corresponding actions for longer-term resilience. There is also a need to incentivize and enforce integrated catchment management practices and developing a road network integrated management information system.

Box Figure 7: Bridges affected by floods



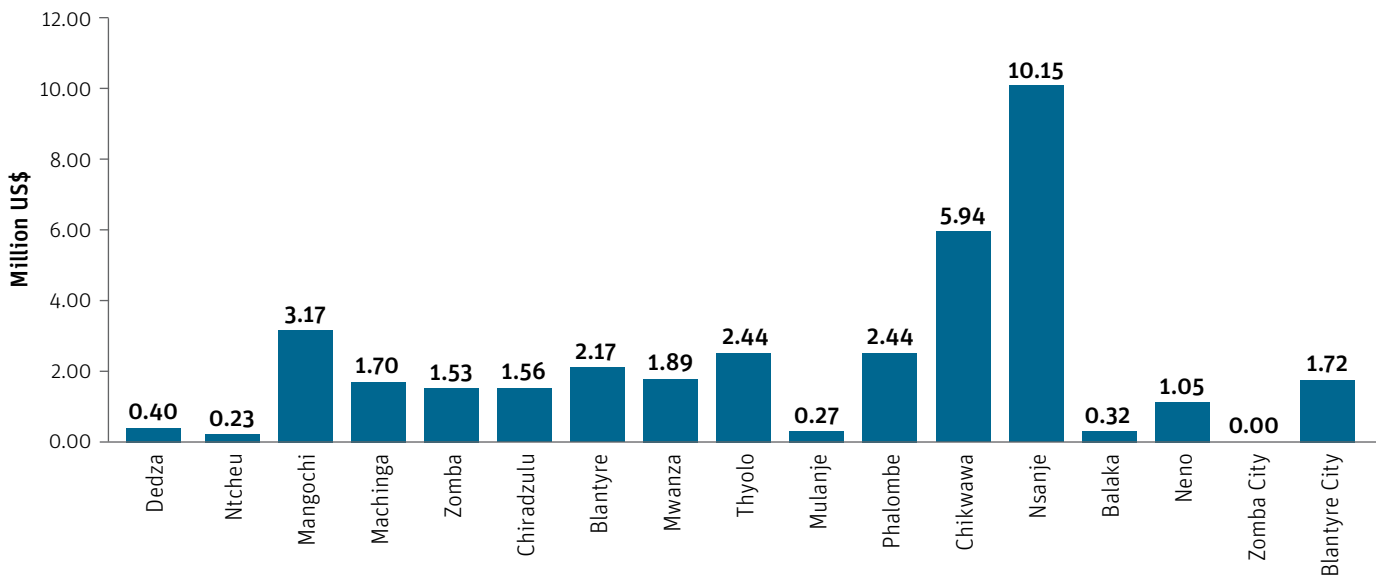
129 bridges, many of which were constructed using an outdated public works manual and washed away 68 culverts and drifts. This resulted in a number of diversions. The most significantly affected districts were Nsanje (US\$ 10.1 million); Chikwawa (US\$ 4.6 million); Mangochi (US\$ 2.8 million); Phalombe (US\$ 2.44 million) and Thyolo (US\$ 2.43 million) (see Figure 18).

in increased transportation and operational costs and compromised access to social services and amenities.

Furthermore, damage to road networks constrained the operationalization of relief and recovery activities, due to some roads becoming impassable. Consequently, the Government was required to use more expensive modes of transportation and to reallocate resources to temporarily restore the road connectivity. This exerted additional fiscal pressure. However, the floods did not

80. The effect of the floods on the road networks resulted

Figure 18: Total effects of floods on transport subsector across districts in million US\$.



have significant effects on companies that had long-term contract agreements with transporters.

2.3.2 Energy: Electricity and Forestry

81. **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 damage, followed by Blantyre (US\$ 0.38 million).** Debris from floods dislodged power plant screens from their original positions, resulting in differential pressures that led to the shutdown of power plants. The disaster also had a major impact on electricity distribution lines in Chikwawa, Nsanje, Zomba Mulanje and Phalombe. Even though power generation facilities were swiftly restored, the floods resulted in interruptions to power supply for almost 50 hours. Infrastructure and physical assets affected by the floods included the power generation plants and distribution network. In terms of loss, the floods reduced the amount of revenues from sales and from the non-production of electricity. Moreover, both household enterprises and firms lost income due to their inability to operate electrical equipment.

82. **Although the floods had a relatively insignificant effect on the forestry subsector, about 40 percent of trees planted along river-banks were washed away in some affected districts.** Due to the increased needs for fuelwood and for poles to facilitate the construction of temporary shelters for IDP, trees in a number of communal forests were felled. In terms of loss, the floods resulted in reduced sales of fuelwoods by households engaged in the trade of charcoal and other non-timber products for their livelihoods. In addition, a number of households were required to purchase poles to build temporary constructions or to maintain their partially damaged houses, with this expenditure reducing their disposable income.

2.3.3 Water, Sanitation and Hygiene

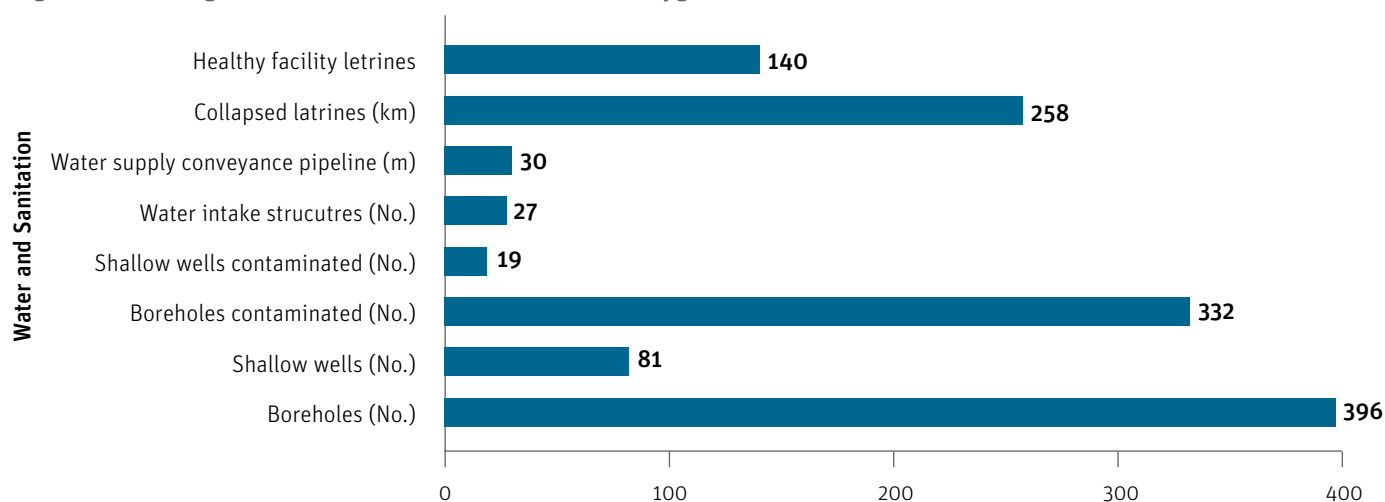
83. **The floods' damage on water, sanitation and hygiene (WASH) sub-sector was estimated at about US\$ 3.7 million and loss was valued at US\$ 2.7 million.** The districts of Chikwawa, Phalombe, Mulanje, Nsanje and Thyolo were disproportionately seriously impacted. Table 8 provides a breakdown by district of the damage and loss resulting from the flood to the subsector.

Table 8: Damage and loss of floods by affected Districts and Cities 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

84. **Damage to the WASH subsector included the destruction of infrastructure such as boreholes and piped water supply systems, a number of which were washed away.** A number of sanitation facilities, including pit latrines, were damaged, resulting in the spillage of human waste into water, resulting in increased risk of borne and carried diseases (see Figure 19). Loss to the subsector derived from increased operational costs associated with supplying potable and other water in the heavily affected areas. In addition, the Government incurred costs related to providing water and sanitation services, including latrines, to IDP. Loss in the subsector was also incurred due to costs associated with the removal of silt from water reservoirs or intake points; from reduced revenue from water supply; and from the cost of constructing temporary sanitation facilities. The prolonged unavailability of water resulted in many people, mainly women and girls, being required to spend greater time fetching water, thereby reducing the time available for other economic activities. Box 4 shows fully constructed handpump located very close to the road network drainage system.

Figure 19: Damaged facilities in water, sanitation and hygiene subsector.



Box 4: Handpumps used by communities

Communities still use partially functional handpumps that have been built according to low quality construction standards and with poor quality materials. These facilities are often poorly sited and maintained, making them susceptible to any disaster. Many examples of poorly constructed facilities were found, including the one depicted below, which had a broken and washed away concrete apron.

Box Figure 8: Hand pumps located along the drainage.



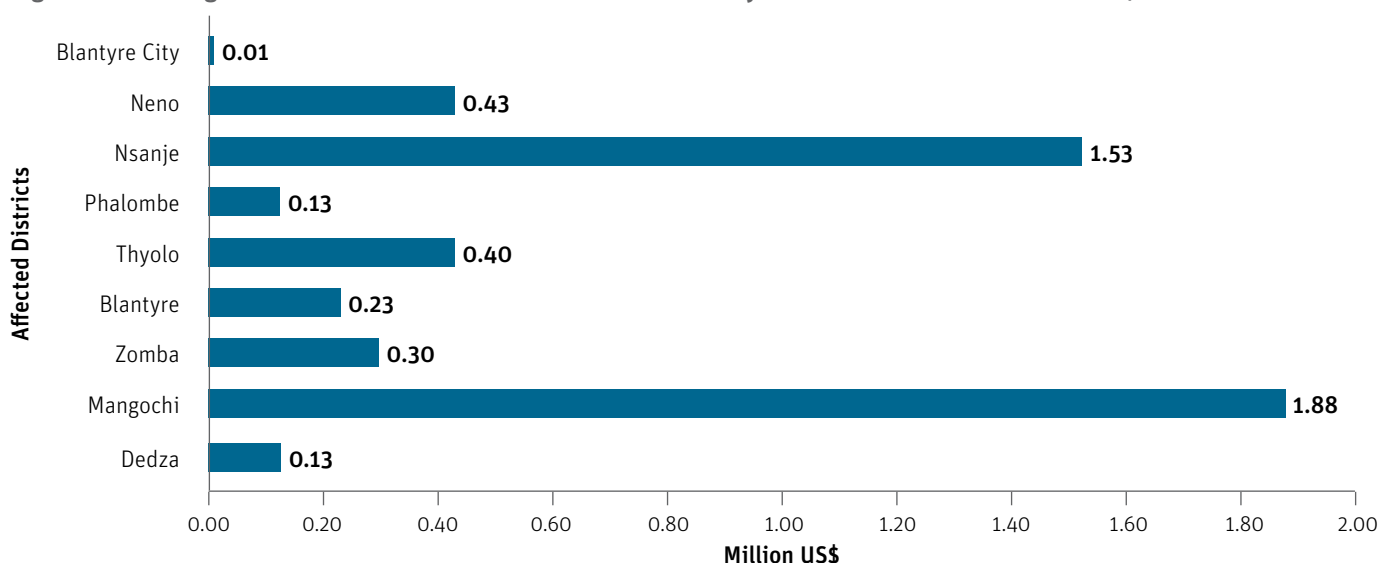
2.3.4 Water Resource (Flood Protection)

- 85. **The floods destroyed a range of water resource infrastructure, including seven multipurpose dams, two excavated storage tanks, ten dykes and eleven hydrological monitoring stations.** The total value of the effects of the floods on the water resource subsector is estimated at about US\$ 5.1 million. Dams contributed to the largest proportion of the damage (US\$ 2.9 million), followed by dykes (US\$ 2.1 million) and hydrological meteorological stations (US\$ 0.024 million). Figure 20 shows the total effects across the affected districts. Damage was due to a number of causes, including overtopping, scouring of embankments and spillways and the lack of spillways in some dams and dykes.
- 86. **Water resource infrastructure provides a number of benefits to members of surrounding communities.** For example, in addition to providing water for irrigation, domestic use, and livestock, dams also act as a flood control measure. Similarly, dykes also act as flood control measures, while the hydrological monitoring stations are used for data collection to support flood forecasting and early warning systems. Thus, damage to the water resource infrastructure created a number of risks for members of surrounding communities, including the increased risk of flooding; loss of livelihood; lack of water for irrigation, domestic use and livestock; and compromised hydrological monitoring.

2.4 Disaster Risk Reduction and Early Warning Systems

- 87. **As this report has made clear, Malawi is highly susceptible to climate-related shocks, including floods, droughts, hailstorms, strong winds and earthquakes.** These shocks are linked to a number of factors, including: (i) the influence of the El Niño and La Niña phenomena; (ii) the hydrological network, with its dependence on rainfall and its susceptibility to damage; and (iii) Malawi’s location along the great African rift valley. Malawi’s vulnerability is exacerbated by: (i) a high level of dependence on rainfed agriculture; (ii) the cultivation of less resilient crop varieties; (iii) the excessive cultivation of and settlement in marginal lands; and (iv) environmental degradation due to rapid population growth. The significant effect of the floods on infrastructure such as roads, schools and health facilities suggest that investments in these subsectors have not been risk informed. The effects of the floods in the DRM and EWS sector have been analyzed on the basis of a number of risk factors (i.e. structural, institutional and operational systems) for each sector, with recommendations to facilitate building back better and safer.
- 88. **The built environment and physical infrastructure are highly susceptible to the impact of floods and strong-winds due to high exposure and lack of adherence to resilient construction standards.** As previously discussed in this report, the social and infrastructure

Figure 20: Damage of floods on the water resource subsector by affected districts in million US\$.



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) use of out dated land-use plans; (iv) use of poor materials; and (v) limited technical skills and capacity. For instance, in the case of education infrastructure, it was observed that affected blocks had been constructed with little or no consideration to flood and wind risks and were highly susceptible when these exceeded normal thresholds. Moreover, in some cases, there were cases of well-conceived designs that had been poorly executed, with specifications ignored, leading to the failure of infrastructure. This is compounded by a lack of maintenance guidelines. Therefore, resilience building will require the integration of DRR through the following activities: (i) the dissemination and enforcement of construction guidelines and building codes that incorporates emerging issues; (ii) capacity building at all levels; (iii) the enhanced use of comprehensive hazard and risk assessment; (iv) the development of resilient land use plans for all planning areas; (v) improved contract management and periodic maintenance.

89. **Following a shock, resilience-building begins with early recovery interventions which are designed to enhance the local ownership of emergency humanitarian support.** Early recovery assistance includes the emergency employment of members of affected communities through their direct involvement in the restoration of community infrastructure and in other durable solutions to ensure that the negative impacts of the disaster are minimized.
90. **Floods and heavy winds may have an adverse effect on the productive sector, which increases the level of vulnerability to food insecurity and reduced income.** The contributing factors include: (i) environmental degradation; (ii) lack of resilient agricultural measures and diversification; (iii) lack of early warning system; and (iv) poor practices. To address these factors, a number of measures need to be integrated to ensure resilient, risk-sensitive sustainable development. These measures include: (i) strengthened early warning system throughout the supply chain; (ii) measures to enhance the resilience of agriculture; (iii) improved marketing systems; (iv) diversified livelihood strategies; and (v) improved integrated catchment management.

91. **Environmental degradation makes a significant contribution to a decline in socio-economic conditions, exacerbating the effects and impact of floods.** A number of factors may contribute to environmental degradation, including the cultivation of marginal lands, the clearance of agricultural land, and over-reliance on fuelwood for energy. As a result of these factors, extensive soil erosion occurs, leading to the siltation of rivers and rising river bed, which may increase exposure and vulnerability to climatic shocks and other hazards. Given that environmental effects cut across several sectors, a wholistic, multisectoral approach is required to address these challenges, with systems to enforce strict adherence to environmental management and standards.

2.5 Cross-cutting Issues

92. **Gender and human rights:** The 2019 disasters had a disproportionate negative impact on women, elderly people, and people with disabilities (including people with albinism), children, persons living with HIV/AIDS and other vulnerable groups. Moreover, a majority of the households that were affected by flooding in 2015 had not fully recovered and had not been able to enhance their levels of resilience²³ prior to the impact of the 2019 disasters. The inter-agency assessment baseline findings showed that of the total number of people affected in the districts Machinga, Mangochi, Balaka and Zomba, 63 percent were female and 37 percent male. In addition, people with disability and other vulnerabilities were also disproportionately affected. The assessment also showed that 77 percent of households benefiting from the Social Cash Transfer Programme (SCTP) and 1.2 percent of children benefiting from the School Meal Program (SMP) were also affected by the 2019 floods. Despite weaknesses to the disaggregated data, a rapid gender and vulnerability analysis showed that a significant proportion of women were not able to engage in income-generating activities due to the lack of opportunities and loss of livelihood assets in the post-flood period. For example, a large number of women were no longer actively maintaining small businesses or participating in the Village Savings and Loans Associations (VSLAs) groups that would enable them to earn additional income to support their families.

²³ World Bank 29/11/2016; Burunga 11/3/2019; GFDRR 2015.

93. The disaster also resulted in an increased risk of sexual and gender-based violence (SGBV) due to poor conditions in the camps (including lack of adequate lighting and shortage of basic supplies). In particular, these conditions resulted in increased risk of violence for young girls and women. For example, there was a significantly higher number of reports of women being infected with STDs in the post-disaster period in Blantyre, Machinga and Nsanje districts compared to the period prior to the disaster. In addition, there were reports that some girls and women engaged in negative coping mechanisms, such as exchanging sex for relief items or engaging in prostitution to obtain money for survival. Box 5 shows how the floods disproportionately affected women, girls and other gender groups in the areas of both health and education.

Box 5: 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 damage - 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.

94. **Disability, chronic illnesses and the elderly:** It is clear that in the event of disaster, members of vulnerable groups require specific attention to meet their particular needs. In the 15 flood affected districts, there was a total recorded number of 4,737 people with disabilities, of whom 43 percent (2,056) were male and 57 percent (2,621) were female. These disabilities include albinism, physical disability, visual impairment, hearing impairment and a number of others. People with chronic illnesses, including HIV/AIDS, also require targeted attention, including sustained access to antiretroviral therapy for those in need. Due to specific cultural factors, people with albinism are particularly vulnerable to physical attacks, abductions and killings. While no specific assessment has been undertaken on the impact of the floods on people with albinism, there are significantly increased protection concerns for persons with albinism, with a significantly increased risk of attacks and human trafficking. This is particularly the case for children with albinism who are orphaned or separated from their families. Providing access to people with albinism to shelters and water and sanitation facilities involves specific security risks and barriers. Losses of protective sunscreen and specialized glasses may expose these people to burns and damage to vision, creating additional constraints on their accessing shelter and humanitarian aid. The elderly people were also identified as a specific vulnerable group that may face particular challenges in coping with a disaster. In the aftermath of a disaster, the elderly face additional challenges in their struggle to access livelihood opportunities because of age discrimination or lack of recognition and underutilization of their skills (Barbelet V, 2018).²⁴ They may also have restricted mobility, which may constrain their access to post-disaster recovery activities. In Malawi, there are 891,805 men over the age of 60 and 505,771 women.

²⁴ Veronique Barbelet; Older People in Displacement, July 2018.

PART II

3. Recovery Strategy

3.1 Introduction

95. **After a disaster strikes, it is necessary to implement a range of interventions to address the short-, medium- and long-term needs of the affected population.** In this assessment, a comprehensive sector-by-sector report of the damage, loss and needs is summarized to form a Recovery Strategy. The Recovery Strategy identifies priorities, a cost structure, and stakeholders, and then proposes a timeframe to link these elements to the strategy's overall objective.
96. **The primary objective of recovery is to facilitate improvement to the overall well-being of the affected population by restoring their physical assets, livelihoods, socio-cultural and economic status at least to the levels prior to the disaster.** The Recovery Strategy defines a vision for recovery, identifying priority interventions and results and estimating the costs for recovery within a given time frame. The Recovery Strategy provides a critical link between assessment results and a comprehensive Recovery Framework.

3.2 The Recovery Strategy: Vision, Guiding Principles and Element

3.2.1 Vision

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

3.2.2 Guiding Principles

98. **Policy alignment and enforcement:** The Recovery Strategy is aligned with existing international frameworks, particularly the Sendai Framework; the African Strategies for Disaster Risk Reduction; the Post Disaster Needs Assessment Guidelines; the IASC Operational Guidelines on Protection of Persons in Situations of Natural Disasters; and the IASC Accountability Framework on Gender Equality and the Empowerment of Women and Girls in Humanitarian Action. At the national level, the Recovery Strategy is informed by the Malawi Growth and Development Strategy III (2017-2022); the newly approved DRM Act (2019); the Malawi DRM Policy (2015); the National Resilience Strategy (2018-2030); the Decentralization Policy (1998); and other sectoral policies related to gender, environment and climate change. Additionally, this strategy is intended to ensure that stakeholders enforce policy and adhere to stipulated operational guidelines, with consideration to multi-sectoral approaches that have the potential to reduce ripple effects that disasters have on each sector.
99. **Disaster resilience and Building Back Better:** It can be seen that there is a strong correlation between the geographical areas affected by the 2019 floods and those affected by the 2015 floods. This implies that measures to improve resilience and to build back better and smarter were not holistically mainstreamed through DRM-related policies and guidelines following the previous disaster. According to climate model projections, disasters will afflict Malawi with increasing frequency and intensity, mainly

due to climate change and other exogenous factors. Therefore, guidelines related to the construction of safer schools and housing should be adhered to in order to improve the level of community resilience to disasters. Measures to build back better and smarter should be mainstreamed throughout all stages of the recovery process and needs, including the reconstruction of physical assets; the restoration of services and access to goods and services; and the restoration of governance and decision-making processes related to reducing risks and vulnerability.

100. **Multi-Stakeholder engagement and coordination:**

Disasters have a multisectoral impact. Hence, when formulating a DRM system, it is necessary to ensure appropriate multi-sectoral engagement and coordination to prevent the emergence of silos for delivering services. In the current recovery initiative, the DoDMA should continue to engage with a range of stakeholders and to coordinate between them through existing DRM structures at the national and sub-national levels to avoid the creation of silos within the recovery process. However, the DoDMA will have to be appropriately resourced in order to be able to engage and coordinate a wide range of stakeholders, including civil society actors working to protect the rights of women and other vulnerable groups.

101. **Decentralized approach and community participation:**

The Recovery Strategy will promote inclusive, people-centered interventions that are intended to facilitate meaningful community participation, decision-making, ownership and capacity building. This is intended to ensure that solutions are appropriate for local levels throughout all aspects of the recovery process. Further, it is essential to conduct pro-active efforts to develop an inclusive approach that empowers women and girls, the elderly, PWD (including people with albinism), and members of other vulnerable groups to actively participate in the recovery process. Local authorities will play a primary role in implementing the Recovery Strategy, with the active involvement of members of affected communities and other stakeholders. DoDMA will strive to ensure that decisions made at the local levels are in alignment with international and national best practices, to ensure their effectiveness

in developing resilience and building back better and smarter.

102. **Integrate gender and other cross cutting issues:**

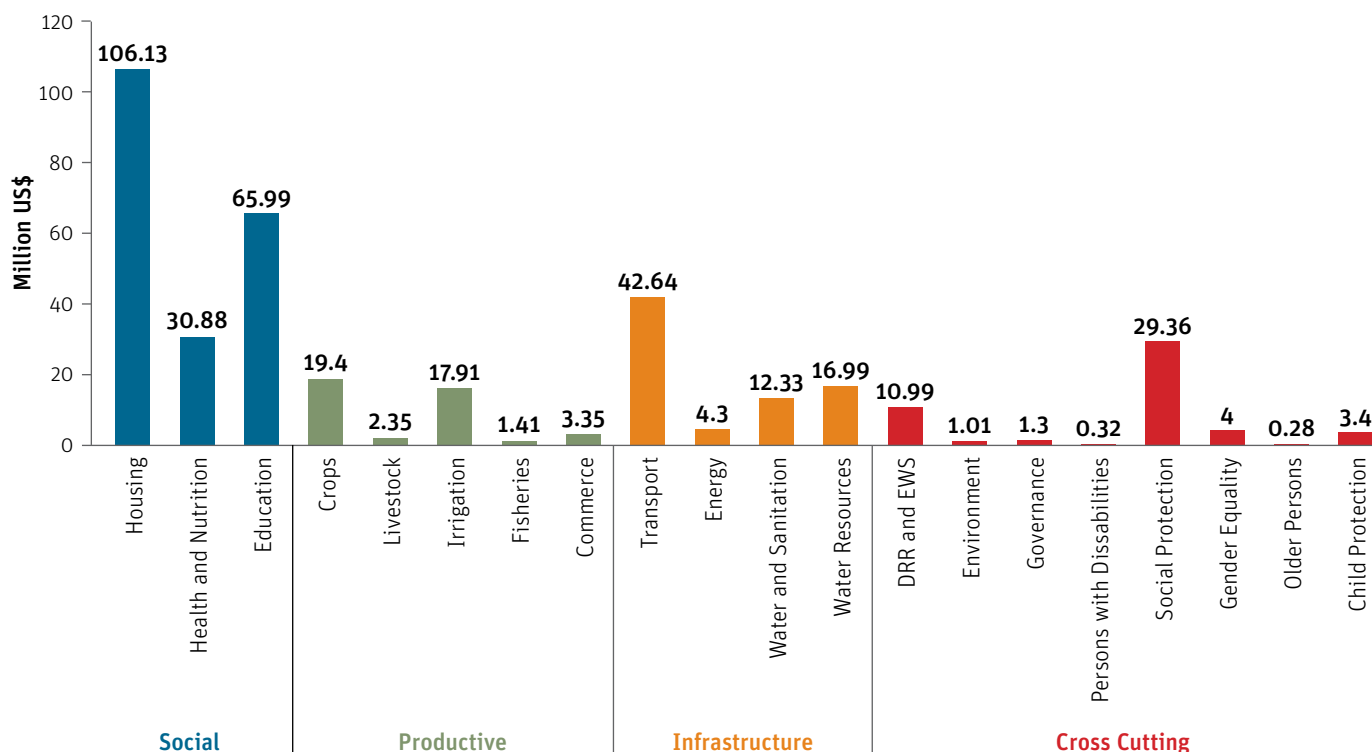
It is essential that all programs are gender sensitive; that they respond to the needs and facilitate the full participation of women and girls and all genders; that they respond to the needs and facilitate the full participation of members of other vulnerable groups, including the elderly, people living with HIV/AIDS, and people with disabilities (including people with albinism). This inclusive approach is essential for recovery interventions to be successful and to effectively contribute to building resilience. The programs must be able to target and prioritize the most vulnerable members of society and to meet their specific needs. Members of vulnerable groups are at high risk of exclusion. This could exacerbate their already precarious situation in the pre-disaster period, unless specific, well-designed measures are implemented to ensure their inclusion and to meet their needs throughout the recovery and reconstruction initiative. Equally important, the recovery process should be designed to improve the autonomy of members of vulnerable groups and to build the resilience to disasters. Special efforts must also be made to promote all gender and vulnerable groups' participation in planning processes related to DRR measures. This strategy will further promote equality and facilitate the empowerment of women and other gender groups. All programs must include mechanisms for assessing the financial requirements to address the needs and facilitate the inclusion of members of the most vulnerable groups through meaningful partnerships with the relevant community and civil society organizations.

3.2.3 Recovery and Reconstruction Needs

103. **The total value of the recovery and reconstruction needs is estimated at US\$ 370.5 million.**

The recovery process will be implemented over a period of one to five years. In terms of the needs of specific sectors, the needs of the social sector are estimated at US\$ 199.3 million; of the infrastructure sector at US\$ 76.3 million; and of the productive sector at US\$ 44.4. The sum required to address cross cutting issues is estimated at US\$ 50.5 million (see Figure 21).

Figure 21: Total recovery needs by subsectors in million US\$.



3.3 Social Sectors

3.3.1 Housing subsector

104. For the housing subsector, the total costs for recovery and reconstruction are valued at about US\$ 106.1 million, of which around 95 percent is to meet structural and long-term needs. Previous discussion suggested that measures to build resilience should be mainstreamed to ensure adherence to acceptable structural standards and proper site selection. For this subsector, the following recovery actions are proposed: (i) the translation and dissemination of safer construction guidelines; (ii) the training of artisans; (iii) the mobilization of financial resources for the procurement of quality building materials and for the construction of safe houses for vulnerable members of society, including women, the elderly, people with disability and others; and (iv) the construction of demonstration houses for artisans. Furthermore, the subsector will also require resources to facilitate the removal of debris to allow the temporary reconstruction of damaged homes.

3.3.2 Health and Nutrition

105. For the health and nutrition sector, the total cost for recovery and reconstruction is estimated at about US\$ 30.9 million, with the principal aim being to restore the primary health delivery system in a manner that integrates measures to build resilience to future disasters. The short- and medium-term strategies to achieve these goals will include the provision of resources to meet the costs of: (i) the provision of temporary health facilities to the affected population; (ii) the temporarily increased provision of health services, including medicine, RH kits and support for referrals for pregnant women and those requiring admission to higher-level facilities; (iii) coordinating disasters, supervision and early warning systems and health information systems; (iv) interventions above the normal level to mitigate related risks, including the costs for immunization and provision of SRHR services to women and girls and of psychosocial care to the affected population; and (v) integrated disease surveillance and response.

106. **This Recovery Strategy advocates for minimum standards for the provision of health care, with the standards based on the principles of equity, access to essential health care, timeliness, results-based performance and accountability.** In the short to medium term, vulnerable groups such as women, mothers and children should be specifically targeted. During reconstruction, the strategy should ensure the mainstreaming of measures to develop resilience and to build back better in efforts to reconstruct partially damaged health facilities. In the long term, health sector stakeholders should consider developing strategies to strengthen and sustain epidemiological surveillance and emergency preparedness through measures to improve financing, accessibility and adherence to health standards.

3.3.3 Education

107. **For the education sector, the total cost for efforts to restore quality teaching and learning services in the affected schools is estimated at about US\$ 62.3 million.** These efforts should facilitate building back better so that the restored schools are more resilient to future disasters. In this sector, the most urgent requirement is for measures to restore effective teaching and learning in all schools, particularly schools that are being used as temporary shelters for the IDP. This would encompass the provision of temporary and semi-permanent alternative learning spaces and the repair of partly-damaged schools and of education administrative structures. In addition, learning materials, furniture and school-based counseling programs for the traumatized need to be provided. Teachers will need to be trained in psychosocial counseling, with manuals for this process available following the 2014/2015 disasters. Additionally, partially or totally destroyed school blocks should be reconstructed in compliance with the recently adopted 2019 Safe School Construction Guidelines. In addition, sanitation facilities should be constructed or restored with reference to the safety needs of both girls and boys. Annex Table 4 presents a list of short, medium- and long-term action points for this sector.

3.4 Productive Sectors

3.4.1 Agriculture (Crops, Irrigation, Fisheries and Livestock)

108. **To restore crop production, the total cost of recovery needs is estimated at US\$ 19.6 million.** Given that crop production is the main source of livelihood for more than 80 percent of the rural population, immediate to short-term recovery interventions should include the following: (i) the provision of support to farmers with inputs for the residual moisture planting and irrigation; (ii) the provision of training for households related to food budgeting and preservation; and (iii) the provision to farmers of drought tolerant and early maturing planting materials such as cassava, orange fresh sweet potatoes, sorghum and millet. Medium to long-term interventions should include the following: (i) the enforcement of policies that restrict cultivation on marginal lands; (ii) the promotion of river bank rehabilitation through the planting of fruit trees (such as banana plants) and pasture along river banks; and (iii) advocacy for the development of water harvesting technologies and the implementation of catchment soil and water conservation measures. While the Government faces a financial gap of US\$ 17.7 million, it has already committed US\$ 1.3 million to support the replanting of affected areas with early maturing crops facilitate the recovery of crop loss and the minimization of food shortages.
109. **To facilitate the recovery of the livestock subsector, interventions should be implemented to minimize the further spread of parasites and vectors that may have an effect on productivity and on the livelihoods of the affected population. The total cost of recovery is estimated at US\$ 2.4 million.** The prioritized short-term needs include: (i) measures to enhance production through livestock restocking programs; (ii) programs to facilitate the construction of improved animal housing and equipment; (iii) interventions to restore animal health in affected districts; and (iv) the provision of support to build the technical and operational capacity of Department of Animal Health and Livestock Development (DAHLD). To ensure livestock health, other interventions should include: (i)

increasing access to water by rehabilitating water reservoirs/catchment areas; (ii) constructing water points; and (iii) distributing small-scale equipment (where needed). The medium-term to long-term recovery needs relate to enhancing governance systems in the sector through the finalization and implementation of the livestock sector policy and the alignment of this policy with the NRS. To strengthen the restocking programs, active disease surveillance to control parasites and vectors should be conducted and water points and fodder banks (one per EPA in SVADD) should be established.

110. **The effective recovery of the irrigation subsector is a vital component of adaptation strategies to build resilience to the effects of disasters. In addition, immediate recovery measures are vital to address reduced crop production.** For the irrigation subsector, the total recovery and reconstruction needs are estimated at about US\$ 17.9 million. To facilitate the recovery, measures will be conducted to facilitate the reconstruction and rehabilitation of the partially-damaged irrigation infrastructure. Farmers will also be provided with either treadle pumps or motorized pumps as a temporary measure. Reconstruction actions will include conducting surveys, producing designs, constructing schemes, and procuring equipment.
111. **For the fisheries sector, the total cost of recovery is estimated at US\$ 1.4 million.** For this sector, recovery needs include measures to facilitate the repair and reconstruction of fishing boats and landing sites; the supply of fishing nets and other gear; the rehabilitation of fish ponds; and the supply of fingerlings and fish feed to affected fish farmers. Reconstruction efforts will involve repairs to and the reconstruction of damaged infrastructure, including fish processing plants, fish ponds, etc.

3.4.2 Commerce and Industry

112. **For the recovery of the commerce and industry sector, an estimated US\$ 3.1 million is required to facilitate the reconstruction of the damaged infrastructures and the restoration of lost capital assets.** It should be noted that multi-stakeholder collaboration is critically important for the success of the planned recovery strategies for the commerce and

industry subsector. While efforts should be made to rebuild bridges and the road network to ease access to affected markets, the following strategies should also be prioritized: (i) the provision of affordable loans to both male and female micro-entrepreneurs affected by floods; (ii) the provision of relief items to both men, women and members of other vulnerable groups to ease pressure on their capital and business; (iii) the provision of training programs to both women and men related to business development, management skills, and financial management; (iv) measures to disseminate and create awareness amongst community members, including women, regarding minimum standards of construction; (v) the speedy reconstruction of damaged community markets to ensure the continued availability of livelihood sources; (vi) the reconstruction of damaged infrastructure, including road and communication networks, to ensure connectivity and access to markets; (vii) the mobilization and transformation of existing and potential villagers' and women's VSLs into cooperatives.

3.5 Infrastructure Sectors

3.5.1 Road Transport

113. **To facilitate the recovery and reconstruction of the road transport sector, it is estimated that US\$ 42.6 million is required, with the main priorities being to repair the damaged roads network and associated drainage structures.** The provisions for building back better to disaster resilient standards has guided the cost estimations for the recovery and reconstruction needs for the roads and transport sector. Recovery actions include the construction of bridges and drainage structure to ensure speedy access to areas rendered inaccessible because of the disaster. Under reconstruction, earth roads would be built to establish linkages between rural areas with the main roads, such as East Bank Roads, Makhanga and Bangula. In addition, bridges will be upgraded and rehabilitated according to designs that facilitate increased resilience. Based on past incidents, there is a need to establish a logistics emergency staging area in Bangula, in Nsanje district. The staging area would have a marine capacity, with the necessary infrastructure to support air operations

to allow a rapid disaster response. To complement preparedness efforts, there will be a need to establish a specific preparedness working group which should be trained and fully equipped to effectively respond to gaps and needs.

3.5.2 Energy - Electricity

114. **For the energy subsector, it is estimated that US\$4.3 million is required to facilitate recovery.** Strategies will be developed to reduce the impacts of the flood on energy infrastructure. In the immediate future, priority will be given to restoring river and stream banks through tree planting; to the promotion of natural regeneration on the degraded buffer zones of the Shire and its tributaries; to the development of guidelines for the construction of power lines that are resilient to disaster and climate shocks; and to the sensitization of communities regarding the use of alternative sources of energy. There is a need to install trash booms at the hydropower ponds of Nkula, Tedzani and Kapichira; to restore the landscape along the Shire River banks and its tributaries downstream of Kamuzu Barrage; to promote good natural resource conservation farming practices; to promote community forestry to produce firewood; and to promote the use of energy-saving cook stoves and the diversification of power generation sources.

3.5.3 Water, Sanitation and Hygiene (WASH)

115. **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 include the rehabilitation and disinfection of damaged boreholes and protected shallow wells, temporary repairs to the damaged gravity fed systems, and the provision of safe and potable water in IDP camps. Additionally, efforts for the targeted provision of sanitation facilities, especially to meet the needs of members of vulnerable groups in camps, will be made. To build back better, emphasis should be placed on ensuring the adherence to construction standards for the new construction works in the rehabilitation phase. In the medium to long-term, prioritized needs include the implementation of a risk assessment of environmental hazards to evaluate the site location of the damaged

structures, the redesign of the damaged structures based on the findings of the risk assessment, and the training of local contractors to raise an awareness of building standards for sanitation and water supply structures. Efforts should be made to ensure that the public is aware of the importance of compliance with resilient construction standards in the construction of latrines. Behavior change messages to raise awareness related to the proper use of sanitation and hygiene facilities, the promotion of open defecation free (ODF) practices, and capacity building related to the operation and maintenance of water supply structures will be conducted in affected areas to restore the hygiene status communities who have previously achieved ODF status.

3.5.4 Water Resources (Flood Protection)

116. **Water Resources Recovery and reconstruction needs are valued at US\$17.0 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 implemented in accordance with the principles of building back better and smarter. For the recovery of dykes, this includes increasing heights (designing for higher return period), installing grouted-rock protection and aprons along critical sections, and constructing spillways to allow for controlled overtopping. Dams should have upgraded spillways and outfalls (including downstream channels), with grouted-rock protection. For hydrological monitoring stations, it has been proposed that weirs be installed, as they are more robust. The design standards for flood protection structures and dams should be updated to facilitate increased resilience to future natural disasters.

3.6 Disaster Risk Reduction (DRR) and Early Warning Systems (EWS)

117. **The total recovery and reconstruction needs for the DRM and EWS is US\$ 10.9 Million.** Priority will be given to the following activities in the short

term: (i) conducting a gender-responsive disaster risk assessment (including capacity building for stakeholders) and zoning in 15 district and two city councils; (ii) reviewing the implementation of the NDRF to ensure its alignment with the 2019 PDNA recovery framework; (iii) monitoring the implementation of the National Disaster Recovery Framework, with particular reference to the incorporated 2019 PDNA recommendations; (iv) supporting the development of evacuation plans in areas susceptible to disaster; and (iv) reviewing the disaster impact and needs assessment and reporting to include recovery needs (including building the capacity of stakeholders at national and local level). These short-term recovery strategies are costed at US\$ 2.6 million.

118. **To meet medium-term recovery needs, the following strategies would be implemented:** (i) the establishment and strengthening of a community-based flood early warning system, with particular consideration to the needs of women, children, the elderly and PWD; (ii) establishing and training CPCs in DRM; (iii) training and strengthening local search and rescue teams and provide necessary equipment for males and females; (iv) training contractors to conduct activities in accordance with the principles of building back better and smarter; (v) conducting a comprehensive Building Damage Assessment (BDA) to inform the construction/rehabilitation of damaged infrastructure; and (vi) providing support to develop DRM planning. To meet long-term recovery needs, activities would include the construction of four evacuation centers (one in each of Phalombe, Nsanje, Chikwawa and Zomba districts); and the promotion of ecosystem and cross-boundary disaster risk reduction through catchment management

and capacity building for members of communities in catchment and riverbank management, with particular consideration to ensure that the needs of women, men, children, PWD are met.

3.7 Cross-Cutting Issues

119. **The needs for cross-cutting issues were costed and integrated within the sectors in which they were addressed, with the exception of the crop production, fisheries, livestock, irrigation, water resources, transport and energy subsectors.** The crosscutting issues will require a total of US\$ 50.61 million to facilitate recovery activities by the various subsectors. For crosscutting issues, the key strategy will be to ensure that national plans, policies, institutions and budgets reflect the Government's commitments to human rights and to gender equality and social inclusion, particularly the inclusion of vulnerable groups. The post-disaster recovery process presents an opportunity to begin to redress inequalities and social exclusion or, at the very least, not to perpetuate unequal access to power and resources. This will be achieved through the allocation of financial and human resources in a manner that fosters meaningful inclusion and the participation of members of marginalized and/or vulnerable groups at the community level. The specific recovery needs across cross cutting issues include: DRR and EWS (US\$ 10.9 million); Environment (US\$ 1.0 million); Governance (US\$ 1.3 million); Persons with Disabilities (US\$ 0.3 million); Social Protection (US\$ 29.0 million); Gender Equality Social Inclusion (US\$ 4.0 million); Social support for the elderly people (US\$0.3 million) and child protection (US\$ 3.7 million).

4. Key Recommendation for Resilience Building

A number of key recommendations are outlined below. These need to be incorporated and mainstreamed across sector planning and the programming of disaster risk management:

- **Strengthen the organizational, technical, structural and financing arrangement for DRM:** The Government should operationalize the implementation of existing institutional and financial arrangements and further clarify the roles and responsibilities of various MDAs involved in DRM at all levels.
- **Develop a disaster management information system that collects and provides sex and age disaggregated data using Human Rights Based Approach Data (DRBAD) to identify and mitigate risks and to facilitate preparedness, response and recovery.** In particular, there is a need to ensure that the National Emergency Operational Centre is functional throughout the year rather than just during disasters to capture pre- and post-disaster disaggregated data.
- **Implement the Malawi National Social Support Programme II to enable the scalability of shock sensitive interventions where these can be expanded to vulnerable communities during disasters, either vertically or horizontally.** The Government should also develop a system to identify beneficiaries through the Universal Beneficiary Register (UBR) data framework.
- **Strengthen coordination between stakeholders to inform effective decision making and early actions related to the development of the early warning system.** The Government and other stakeholders, including members of communities, should work together to develop a smooth information flow that would enhance national capacities to manage and monitor floods control systems and forecast systems and to communicate information related to extreme weather events.
- **Review, adopt and implement infrastructure design standards, including processes and parameters for the design and construction of roads, bridges, irrigation, and water control systems to ensure the construction of climate resilient buildings.** It is also essential to disseminate and enforce the safer construction guidelines for the construction of housing and school facilities at all levels, with particular attention to ensuring that these facilities meet the needs of members of the most vulnerable groups.
- **Develop a comprehensive hazard mapping and zoning system and a community mapping system to inform the development of climate resilient land use plans.** There is a need to develop zones to define different threshold of disasters to facilitate resettlement planning, with incentives for relocation outside flood hazard zones.
- **Strengthen contract management and quality assurance frameworks:** There is a need to address existing gaps at national and local levels in the contract management of infrastructure projects to ensure the efficient design, implementation, monitoring and construction of resilient structures according to defined standards and guidelines. Further, there is a need to enforce a performance management system for contractors and consultants, with this system forming part of the evaluation process during tendering.
- **Enhance measures to ensure resilient and diversified agricultural production to enable vulnerable households affected by a disaster to generate increased sustainable income is.** The planned measures should be gender inclusive to ensure equal access by men and women.

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Annex I: Detailed Sector Reports

Housing Subsector

1. **According to the 2016-17 NSO survey, 44 percent of Malawi's rural population live in permanent houses; 36 percent live in semi-permanent houses; and 20 percent live in traditional/temporary dwellings.**²⁵

The construction of houses in both rural and urban areas is regulated by the Department of Housing under the Ministry of Lands, Housing and Urban Development, 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, which include issuing regulations and conducting civic education programs. For this reason, much of the population in rural areas lacks the required information and associated skills related to the construction of houses in accordance with government construction standards. Most houses in rural areas are either made of sub-standard, sun-cured clay blocks/ bricks (adobe) or fire cured clay blocks/bricks. Furthermore, in the rural areas, people resort to the use of unskilled artisans to construct houses. These artisans provide cheap labor, but the quality of their work is often poor. Thus, when storms occur, these poorly constructed houses are particularly susceptible to the impact (see Figure 1).

2. **Housing is one of the heavily affected sectors in the 2019 affected, with Machinga, Phalombe, Chiradzulu and Neno being the worst affected.** The needs for the reconstruction of the damaged houses was calculated on the basis that 10 percent of the target population consisted of women and/or members of other vulnerable groups, including the elderly, chronically ill, people with disability and child-headed households.

Effects in the Housing Subsector

3. **Houses were damaged in all the districts affected by the 2019 floods, with the total cost of this damage stand at US\$ 106.9 million.** The category of house that suffered most significantly was traditional houses (88.97 percent), followed by semi-permanent houses

(11.9 percent); and then permanent houses (4.13 percent). A total of 288,371 houses were damaged in the 17 affected councils, representing 13.4 percent of the total number of houses in these councils. Of these, 87,950 houses were completely damaged, while 200,421 were partially damaged. The total cost of the damage to houses, toilets, kitchens and household assets is estimated at US\$ 82.7 million (see Figure 2). According to PDNA calculations, the total cost associated with loss was equivalent to 1 percent of the cost associated with damage. The loss includes loss of rental income and costs associated with removal of debris and piece work for repairs. As can be seen in Summary Table 1 below, the total value of loss stood at US\$ 23.9 million.

Social impact of the effects on the housing subsector

4. **In total, 57 percent of the houses of poor male-headed household families and 34 percent of the houses of female-headed households were either fully or partially destroyed** (Annex Table 1). Seven percent of the houses of people with disabilities were damaged, while two percent of child-headed households had their houses destroyed. Those in these categories are often the poorest members of society, and often have poorly constructed homes. In addition, due to higher poverty levels and labor constraints, households whose members fall into these vulnerable groups are less likely to reconstruct new homes than are male-headed households. This means that 43 percent of the affected households are at a relative disadvantage in terms of their ability to recovery quickly and build back better.
5. **The majority of the damage to the houses could have been prevented if safer housing construction guidelines had been followed.** The use of raised foundations, damp-proof courses to the base of walls, waterproof and sacrificial coatings to walls, the incorporation of large roof overhangs or verandahs to keep the rain off walls, and effective local drainage networks would all have played a significant role in minimizing the damage to housing.

²⁵ IHS-NSO 2016-17 Page103

Annex Table 1: Number of vulnerable groups affected by selected characteristics

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 and Needs

6. **To implement an effective response, it is necessary to facilitate not only rapid recovery, but to ensure that restored housing is resilient to the effects of future disasters** (see Annex Table 2). Some of the key considerations for building will be the promotion of

positive pull factors that include avenues to address housing, land and property rights issues based on cultural practices and/or government regulations. Site planning to allow for different shelter typologies should be adopted, with choices made depending on the soil, drainage and locally available materials in a given case. However, as previously noted, many houses were damaged due to the lack of skilled workmanship and the use of sub-standard construction materials. In order to address this, the Government has developed Safer Housing Construction Guidelines to provide guidance to the construction industry to ensure that they build back better and safer. The total recovery needs are estimated at **US\$ 106.1 million**. A long-term component has been included in the recovery process to build houses for households consisting of poor and vulnerable groups.

Strategies and Recommendations

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

Phase	Key findings	Implications for the sector	Recommendations for resilient reconstruction & recovery
Governance and coordination	The MoL, H and UD Department of Housing has developed Safer House Construction Guidelines which are yet to be disseminated to districts for implementation.	Quality of house construction is varied and often low quality.	Dissemination of the Safer House Construction Guidelines is a high priority.
	The Building Code for Malawi is under development.	Structures at each level of affordability retain vulnerability to hazards.	Develop 'better practice' guidelines for lowest income households who will continue to use local, traditional construction materials and techniques.
	The cost of implementing the minimum Safer House Construction guidelines is likely to be unattainable for many households.		Communicate appropriate best practice for each level of affordability.
Site planning and management	Land use planning for housing is not mapped against known hazards.	A significant number of houses are and will remain vulnerable to risk.	Implement Safe House Construction programs for most vulnerable identified members of communities.
	Many houses are located in areas prone to risk with no viable alternative.	Lack of awareness of hazards / lack of access to data on hazards prevents reduction of vulnerability even in areas where risk reduction is possible.	Mapping of hazards at district level to allow for preparedness.
	The need for adaptation and / or mitigation is poorly understood.		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.

Annex Table 2: Summary of key findings and recommendations of housing reconstruction and recovery. (cont.)

Phase	Key findings	Implications for the sector	Recommendations for resilient reconstruction & recovery
Design	<p>Designs are un-engineered.</p> <p>Design follow local norms / typical practice e.g. 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 communities 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 regulations as well as government regulations – Ministry of lands and housing. Designs should allow for expansions whenever individual families have resources</p>
Procurement & construction	<p>Domestic housing is delivered through self-build or by local artisans.</p> <p>Materials are sourced locally and cheaply with income levels necessitating the use of low-quality materials.</p>	<p>Quality of construction is dependent on knowledge and skill of untrained actors.</p> <p>Structures are made vulnerable through use of poor-quality materials and construction standards.</p>	<p>Locally appropriate ‘better practice’ construction standards should be communicated and demonstrated.</p> <p>Promote / subsidize 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.</p>
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

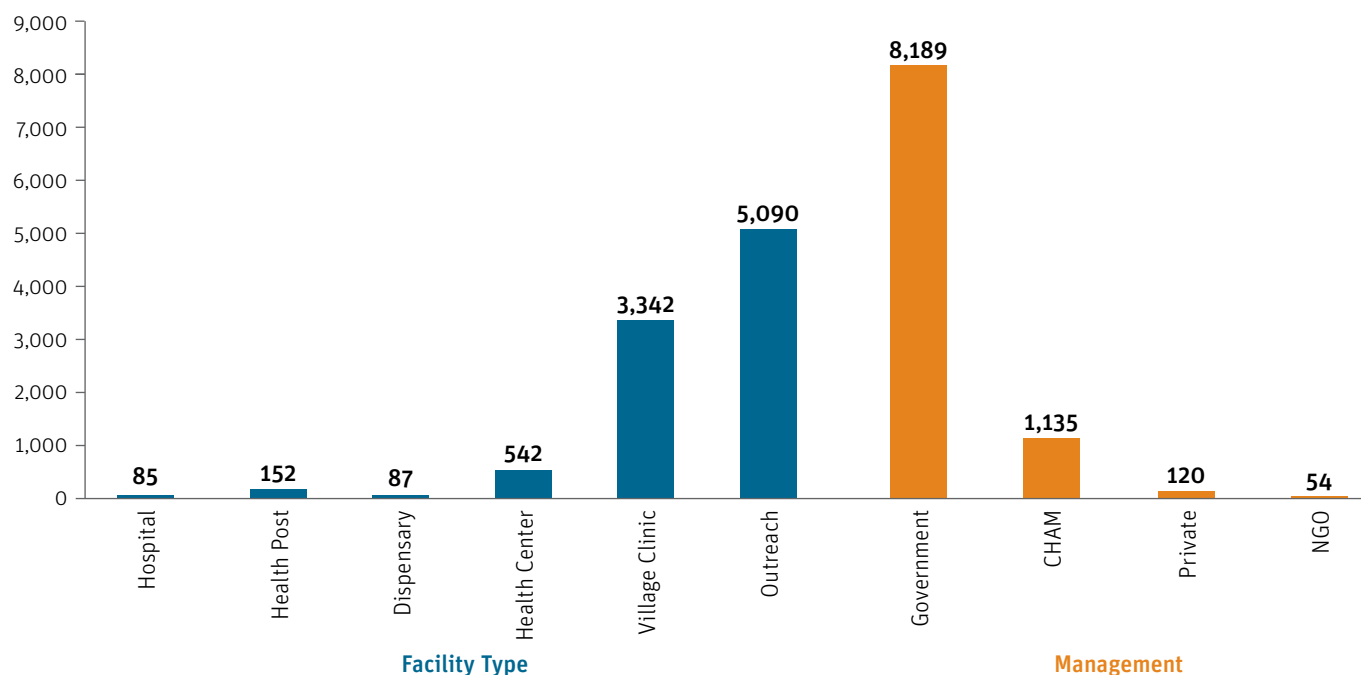
- To facilitate the recovery in the housing sector, an enabling environment should be created, with processes, policies, guidelines and legislations being part of structured software mechanisms to facilitate building back better.** It is important to acknowledge the dynamics of rural society, where communities have been adversely affected. It is also necessary to remain aware of how measures to address housing, land and property rights can enhance recovery. The emphasis should be on the provision of a safe, secure, habitable shelter with stable land tenure to provide both physical and psychological sense of security. These factors would contribute to enhancing active participation in livelihoods activities and lead to increased enrollment in schools by school-aged children. Legal assistance

should be provided to affected communities to facilitate the strengthening of existing cultural, community and government policies to achieve the same purposes. If implemented appropriately, communities will be able to build back better to achieve improvements in both social and economic terms.

Health and Nutrition Subsector

- Public health care services consist of services provided by a range of health facilities under the Ministry of Health and Population (MoH&P), district councils, the Department of Forestry, the police, the prisons and the army.** The Christian Health Association of Malawi (CHAM) is the primary private, non-profit provider of health services. The district councils are responsible for the delivery of health services through

Annex Figure 1: Health facilities by facility type and management.



secondary and primary health facilities. The central hospitals (tertiary level facilities) report directly to the MoH&P at the central level. The Government controls about 69 percent of the country’s health facilities, followed by CHAM (29 percent); the private sector (4 percent); and NGOs (1 percent) (see Annex Figure 1). Table 1 shows the distribution of hospitals broken down by facility type and ownership. Diseases such as malaria, sexually transmitted infections, skin diseases, acute watery diarrhea and malnutrition are commonly reported infections in all the 15 flood-affected districts.

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 damage was estimated at about US\$ 0.2 million and loss at US\$ 2.4 million.** About 4 out of the 15 affected districts had a particularly large number of facilities at least partially damaged by the floods, resulting in disruptions to health service delivery. These districts were Nsanje (3 facilities damaged); Chikwawa (6); Phalombe (6); and Blantyre (7). As of 11 March 2019, 60 deaths; 672 injuries; and three missing people had been reported. As of 9 March, 2019, the MoH had recorded four suspected cases of cholera, two of which were confirmed, with no deaths resulting.

Almost all of the cholera patients lived along Malawi’s border with Mozambique, in the districts of Nsanje, Chikwawa, Mwanza and Dedza.

3. **Most of the health facilities damaged by the floods were public health facilities, with 23 being primary health facilities and one a secondary health facility.** No health officer was directly injured during the disaster and no vehicles were reported to have been damaged. The types of damage ranged from facilities being flooded, a refrigerator with vaccines being destroyed, roofs being blown off, water tank towers being damaged, staff and patients’ toilets being damaged, and perimeter fences being partially damaged and cracked.
4. **Loss in the health and nutrition sector resulted from increased cost associated with the immediate resumption of health services.** In Mangochi, Blantyre, Balaka, Zomba, Nsanje, Mulanje, Phalombe, Chikwawa and Machinga, development partners reached out to the affected districts to provide comprehensive services, including the treatment of common ailments, disease surveillance, vaccinations, laboratory diagnostics, nutrition mass screening, antenatal and postnatal care, referrals for delivery to nearby MoH&P facilities and the establishment of mobile clinics. In addition, the

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

5. **It was noted that some districts recorded an increase in the number of birth deliveries in March.**

For instance, in Balaka, 436 deliveries were recorded in January and about 433 in February. The figure in March was substantially higher, standing at 501, with two recorded maternal deaths and 91 deliveries involving 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 were reported in Nsanje and Chikwawa within the month following the floods. Members of affected communities in IDP camps are at high risk of malaria and other waterborne diseases, with many of them having lost their mosquito nets and with poor hygiene and inadequate sanitation facilities in the camps.

6. **To ascertain the extent of the loss in the nutrition subsector, data related to admissions to the Community Management of Acute Malnutrition (CMAM) program was used.**

The CMAM program is a nationwide program that collects routine data on admission to facilities for the treatment of acute malnutrition, with this data used as an early warning indicator of deteriorating nutritional status. CMAM collects comprehensive data from the Outpatient Therapeutic Programme (OTP); the Supplementary Feeding Program (SFP); and from the Nutrition Rehabilitation Unit (NRU). It was noted that in the post-flood period, the number of admissions 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 the disruption to health service delivery system and to the constraints on community mobilization. On the other hand, data for the OTP shows that in Blantyre,

Dedza, Mangochi and Nsanje, there was an increase in the number of admissions in the immediate post-flood period. Similarly, there was a five percent increase in admissions to SFP. CHAM hospitals incurred an economic loss to a value of about US\$ 0.98 million associated with the cost of treating admissions attributable to the heavy rains and floods in the 15 affected districts.

Social Impact of the Effects on the Health and Nutrition Sector

7. **Out of 868,895 flood-affected people, about 217,224 were estimated to be women and girls of reproductive age, while 57,942 were estimated to be pregnant mothers.** During the post-flood period, referral mechanisms were affected, with some areas being cut off from the mainland and only accessible by boats. This predisposed pregnant women to engage in unsafe home deliveries, resulting in a number of 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, with the women unable to be referred to the main health facility. In Makhanga, a woman with a twin pregnancy delivered on the way home after failing to reach the facility, with one of the twins dying within 24 hours. In general, about 8,691 pregnant women required access to emergency obstetric care services. It was also noted that sexually active men were at increased risk of HIV and STIs.

Recovery Strategy and Needs

8. **The value of the recovery needs for the health and nutrition sector is estimated at US\$ 30.88 million.** The short-term recovery needs include the provision of integrated mobile services through mobile clinics to affected populations to cover service disruption (US\$ 212,000); the provision of medicines, RH kits and other supplies (US\$ 2,300,000); the implementation of 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 polices and strategic plans	120,000.00	MoH&P

Recommendations

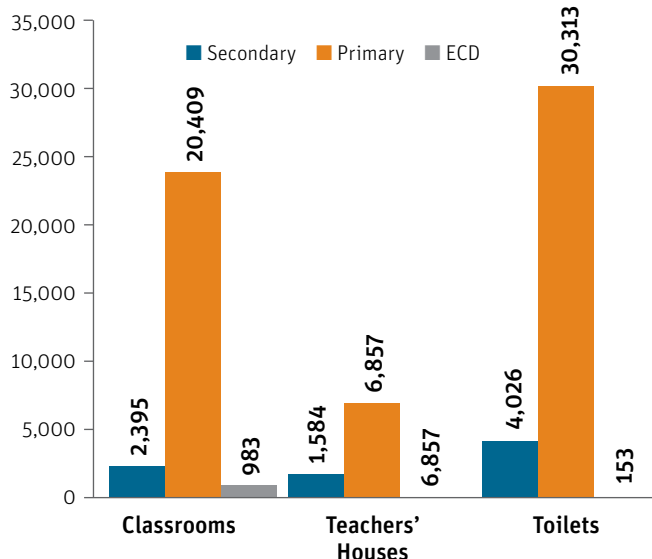
- Partners should support comprehensive health sector activities to ensure the effective and efficient delivery of health services.
- Strategies should be implemented to ensure minimum standards for health care, based on the key principles of equity, access to essential health care, timeliness, results and accountability.
- The medium to long term plan should focus on chronic issues related to the delivery of health service services and to strengthening and sustaining epidemiological surveillance and emergency preparedness.
- During reconstruction, adherence to safe construction guidelines and building back better should strictly be observed to facilitate improved disaster resilience and building back better.

Education Subsector

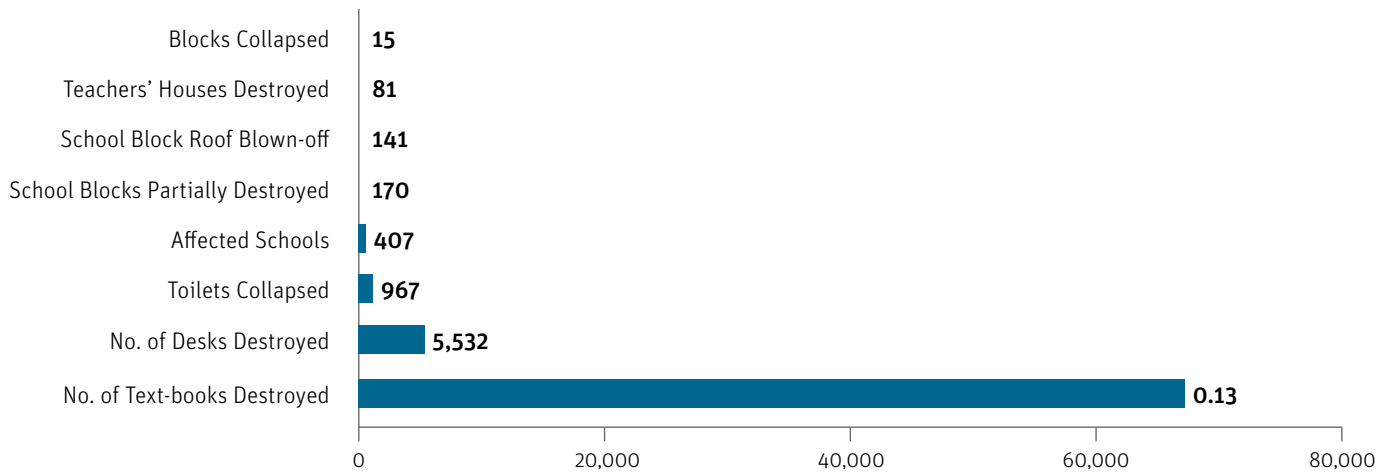
9. **Nationally, more than 5 million children are enrolled in primary education facilities and about 0.35 million in secondary facilities.** About 0.012 million children are enrolled in Early Child Development Centers. There are 6,194 primary schools, of which one eighth have permanent structures. There is a total of 1,469 secondary schools in the country. The 15 districts and two cities affected by the 2019 floods account for

53.31 percent of the enrolment in primary education; 48.7 percent in secondary schools; and 25.7 percent in Early Children Development Centers. About 983 ECD facilities are permanent structures (see Annex Figure 2). There are approximately 37,218 primary teachers deployed in the floods affected area, of whom 40 percent are female. It is estimated that within the affected districts, educational facilities utilize 8.9 million assorted items of school teaching and learning materials.

Annex Figure 2: Number of ECD classrooms, teachers houses and toilets destroyed by floods.



Annex Figure 3: Number of education facilities partially or totally destroyed by floods.



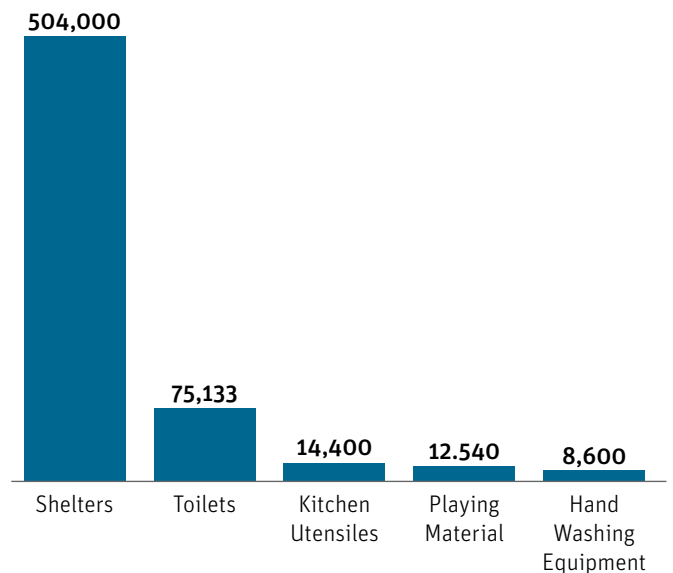
10. **The location of a significant proportion of education facilities in the affected areas makes them vulnerable to natural hazards, including floods, cyclone winds, landslides, land settlements and earthquakes.** Thus, natural hazards have potentially negative consequences on children’s safety and teachers’ wellbeing, with school blocks being susceptible to damage (see Annex Figure 3). Furthermore, the high prevalence of non-engineered community school construction designs makes these educational infrastructures highly vulnerable to both minor and major disasters. To address this, in January 2019, the Government, through the Ministry of Education, Science and Technology, adopted the Malawi Safer Schools Construction Guidelines. These guidelines are intended to guide the selection of construction sites, materials and designs for schools, at both primary and secondary levels.

11. **The disaster affected the delivery of educational services in three ways: (i) disruption to access to ECDs and other educational services; (ii) disturbances to playing and learning services, particularly in schools that were used to accommodate IDPs; and (iii) partial or total damage to infrastructure.** Although much of the damage is attributable to poor designs that did not comply with disaster resilience standards, it was also found that even in the case of facilities with correctly conceived designs, the facilities were often not resilient if construction had been executed by contractors who did not follow the construction guidelines or if the facilities had been inappropriately maintained. Furthermore, at seven percent of primary schools in the affected geographical areas, services

were also disrupted. For example, about 15 school blocks collapsed completely; 150 blocks were partially damaged; and 150 classrooms had their roofs blown off. About 81 teachers’ houses and/or their household items were damaged. The total value of the damage caused by the floods to primary schools is estimated to stand at US\$ 19.7 million, with 62 percent of the damage associated with damage to teaching and learning materials. Annex Figure 4 shows damage to ECD shelters and other facilities.

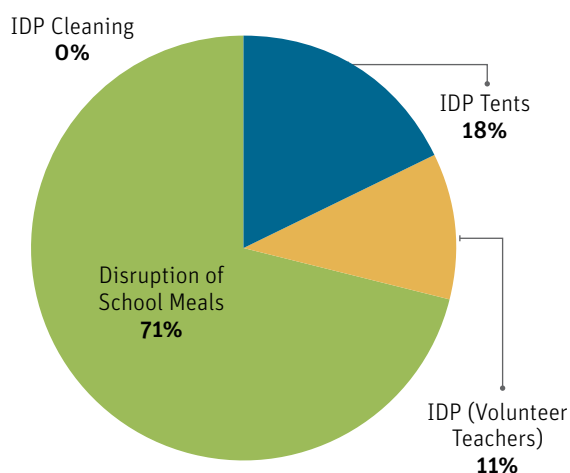
12. **Loss in the education sector was attributable to the cost of bringing back teaching and learning services and cleaning facilities to ensure that they were suitable for their intended purposes.** Accordingly, in

Annex Figure 4: Damage to ECD shelters and facilities in US\$.



this PDNA, loss in the education sector was associated with the cost of cleaning school blocks that were used as shelters for IDP in the affected districts; of purchasing tents for temporary classrooms; and of paying volunteer teachers. Of the loss of US\$ 0.75 million, about 71 percent was associated with the disruptions to school meals; 18 percent from costs associated with purchasing IDP tents; and 11 percent with the cost of paying volunteering teachers (see Annex Figure 5).

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



Social Impacts of floods in the Education Cluster

13. **The floods had a negative impact on the psychosocial well-being and health of girls, boys, PWD and other students due to the disruption to teaching and learning sessions; the damage to playing and leaning facilities; and to their exposure to IDP.** The damage to textbooks resulted in a decline to the quality of the delivery of educational services, as teachers were forced to improvise and teach without reference materials and schemes. Furthermore, students forced to take refuge in camps faced difficulties in studying and doing their homework, particularly without proper lighting and other facilities. Since a large proportion of displaced families had lost household assets, including stores of food, some school children were unable to attend classes, as they were required to engage in piecework to acquire food to supplement the supplies provided by relief agencies. Girls in particular were often required to travel long distances in search for water and firewood, thus limiting their opportunities

to attend classes and exposing them to sexual abuse and other forms of violence. It may be expected that this may result in an increased dropout rate for girls and an increase in the number of girls contracting early marriages.

Recovery Strategy & Needs

14. **In the recovery period, it will be vital to establish a conducive environment for teaching and learning. This will require a number of prioritized short-, medium- and long-term interventions.** (see Annex Table 4). For this sector, the total needs for recovery process is estimated at about US\$ 65.9 million, spread across the short, medium and long term. This section presents the prioritized strategies and interventions necessary to establish a conducive environment for teaching and learning, with a focus on improvements that ensure that educational infrastructure is more resilient to disasters and is built back better and smarter, in compliance with the Malawi Safer Schools' Construction Guidelines.

Recommendations

- Enhance the decentralized capacities of local authorities in rural areas to fulfil their mandate of supervising and managing school construction appropriately.
- Adopt the Safer Schools Construction Guidelines (SSCG), incorporating recommended updates. SSCG Standard design should be regionalized to ensure that they are appropriate for particular local conditions in future revisions to the SSCG. This should ensure that specific regional hazards and available local materials are fully considered when designs are formulated for the facilities in a particular region.
- Consolidate and disseminate hazard data to inform good planning. In addition, ensure the systematic use of hazard information for the physical planning of school infrastructure to ensure that risks are mitigated from the outset.
- Enhance physical planning capacities at the local government levels to effectively address hazards and to mitigate risks. Further, support should be given to the development of hazard- and site-specific designs that enable facilities to be built using available construction resources.

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 centers, 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
Others	7,351,013.00	
Grand total in US\$	65,989,236.99	

Agriculture-Crops Subsector

15. **Agriculture is the main source of livelihood for the majority of Malawi's rural population**, which constitutes 84 percent of the total population (Annual Economic Report, 2018). Crop production contributes to between 28-30 percent of the GDP, providing employment to about 87 percent of total Malawi's work force, and contributing to 90 percent of foreign exchange earnings. The total land area under cultivation in Malawi is about 2.5 million hectares.²⁶ Smallholder farmers generally 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 by the estate subsector. Among smallholder farmers, female-headed households cultivate relatively smaller land holdings than their male-headed counterparts (0.53 ha compared to 0.75 ha).²⁷

16. **The floods struck at the point when most of the crops**

in the Southern Region were at the maturity stage, resulting in a large proportion of the crops being submerged and washed away. The floods affected a total of 91,637.53 ha of land used for the cultivation of crops, with Phalombe (17,774.4 ha); Nsanje (12,572.3 ha); Machinga (10,624 ha); and Ntcheu (10,394 ha) being the most significantly affected districts. The most significantly affected crops 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 in reduced yields due to the germination of matured grain and the rotting of some crops, including maize, millet and sorghum (see Annex Figure 6). Plantations and orchards did not experience direct damage, although they experienced loss due to reduced yields, opportunity costs related to inability to irrigate the total area under schemes, and total crop production loss in cases of wash away crops.

17. **The 2019 floods have led to severe damage and loss in the crop production subsector. The total value of the effects of the floods are estimated at US\$ 11.1 million across the fifteen affected districts.** In descending order, the most significantly affected

²⁶ NSO. 2017. Integrated Household Survey 2016/2017. Zomba, Malawi.

²⁷ GoM. 2016. National Agriculture Policy. Lilongwe, Malawi.

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



districts were Phalombe (US\$ 3.5 million); Chikwawa (US\$ 1.2 million); Ntcheu (US\$ 1.1 million); and Mulanje (US\$ 1.0 million). To calculate the effects, data was primarily derived from the Agricultural Production Estimates Survey (APES), produced annually by the Ministry of Agriculture. Based on an analysis of the APES figures, a five-year average figure was derived to serve as a baseline to calculate the effects. 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 the economic loss.

Economic and Social Impacts

18. **As a result of the effects of the 2019 floods, crop yields have declined due to rotting and loss through washaways** (see Annex Figure 6). The reduced crop production will affect the availability of food and the ability of community members to generate income, which may put the affected households at increased risk of malnutrition, especially affecting children under the age of five and pregnant women. In many cases, the affected households' sources of livelihood were disrupted, which may lead to increased vulnerability and to the adoption of negative coping strategies, with female-headed households being disproportionately affected.
19. **The price of maize, which is the Malawi's staple crop, increased by 12 percent in the immediate post-flood period due to constraints on physical access resulting from the heavy flooding, which rendered key supply routes dysfunctional.** The increased price of the staple had an impact on food access for affected households. In addition, the floods had an impact on the quality of some agricultural commodities, such as cotton, where the lint was dented. As a result, this crop may attract lower prices, with an impact on farmers' incomes.
20. **The floods have affected 308,702 farm households, of which 47.9 percent are male-headed households and 52.1 percent female-headed households.** With the total number of farming households standing at 2,300,363, the floods thus affected 13 percent of this total. With the disproportionate impact on female-headed households, it is clear that these households will require particular additional support.

Recovery Needs

21. **The cost of the subsector's recovery needs amount to a total of US\$ 19.6, which US\$1.3 million is available from the Government through the Ministry of Agriculture and Water Development.** This represents a gap of US\$ 17.7 million. These recovery needs can be classed in three categories, short-term (up to one year); medium-term (2 years); and long-term (3-5 years).
22. **To address the damage and loss from the floods to the sector, the following recommendations have been made:**
 - Population pressure has led to river banks and riverbeds being cultivated and settled, despite the fact that they are highly vulnerable to flooding. Therefore, there is a need to harmonize and enforce riverbank guidelines.
 - The limited uptake of soil and water conservation techniques to improve the drainage of excess water was identified as another exacerbating factor. There is a need to build the awareness of communities regarding the importance of adopting soil and water conservation practices.
 - Increased deforestation and cultivation in the marginal areas increases the risk of run off. There is a need to promote reforestation and natural regeneration on marginal lands.

Agriculture: Livestock Subsector

23. **The livestock subsector contributes to an estimated 11 percent of GDP and plays a vital role in food and nutrition security, especially for poorer households.** In times of crisis, poor households often sell livestock 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). Almost 45 per cent of the country's 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 was minimal, with the value of this damage amounting to US\$ 0.5 million. Loss was significantly higher, standing at US\$ 7.7 million.** The damage and loss were attributable to deaths and the washing away of livestock, constraints on access to livestock products (meat, milk, hides, skins and eggs) and partial or complete destruction of livestock infrastructure, including slaughter houses, dip tanks, kraals and livestock markets.

Impact Analysis

25. **The disaster has had a negative impact on the production capacity of affected households, as the following points indicate:**

- **Reduced or failed livestock production:** The overall production of livestock products has been negatively affected by the floods. After the disaster, 47,899 livestock of different types is estimated to have died, infrastructure has been washed away, and 2,802,723 animals are susceptible to increased risk of disease. This has resulted in transient food shortages and disruptions to the livelihoods of households dependent on livestock.
- **Reduced employment opportunities:** The floods have resulted in reduced household incomes for casual laborers, who normally derive employment from livestock owners.
- **Deterioration of food security (potential increase in malnutrition rates):** The floods have resulted in a loss

of food stocks (immediate term) and loss of future production (medium term). The assessment anticipates that this situation will be relatively higher in the Lower Shire areas.

- **Disruptions to service delivery:** The damage to infrastructure, especially livestock slaughter houses and dip tanks, in affected districts has disrupted the delivery of agricultural services.
26. **In addition, the extreme wet weather and flooding has created environmental conditions conducive to the proliferation of mosquitoes, predisposing livestock to zoonotic vector-borne diseases such as Rift Valley Fever; emerging infectious diseases such as dengue fever; and exposure to anthrax spores in the soil.** Given the unfavorable weather conditions in Southern Africa over the past three months, migratory wild birds will tend to migrate from drier areas in the region to the wetter parts of Malawi, Mozambique, Tanzania and Zambia in search of food and water. This will lead to a higher congregation of multiple wild bird species, resulting in an increased risk of outbreaks of highly pathogenic avian influenza. A dog population has built up around IDP camps, increasing the risk of rabies and creating additional demand for the scarce human anti-rabies stocks available at regional referral hospitals.

Recovery and Reconstruction

27. **For this subsector, the total cost of recovery requirements for the 15 affected districts is estimated at about US\$ 2.4 million** (see Annex Table 5). The overall priorities of the recovery and reconstruction identified through this PDNA are to restore affected households to the pre-disaster production levels by protecting remaining livestock through the provision of vaccinations and veterinary care to sick animals; vector control; and the distribution of small stock livestock (goats, rabbits, guinea pigs and poultry). Livestock vaccinations against foot and mouth disease (FMD), lumpy skin disease (LSD) and Newcastle disease (NCD) should be prioritized. All cattle, goats and sheep should be dewormed, as the worm burden is likely to increase with flood waters receding and with animals grazing on previously flooded areas. If this is left unattended, production is likely to be directly affected. The distribution of livestock, especially in the case of rapidly multiplying species such as rabbits, guinea

Annex Table 5: Reconstruction needs in livestock sub sector

Subsector	Intervention	Value (in US\$)	Responsible Agency
Short term needs	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 term	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 term	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

fowl, chicken and, to a lesser extent, goats and sheep, should be supported at the recovery stage to boost livestock production at the household level.

Agriculture: Irrigation Subsector

28. **To facilitate the development of smallholder irrigation, the promoted technologies include gravity-fed irrigation systems, motorized pumps, treadle pumps and watering cans.** According to the Department of Irrigation (DOI, 2017), the total extent of irrigated land held by smallholder farmers is 56,868 ha. This land is held by 39,238 farmers, of whom 179,322 are males and 156,199 are female.

Effects of Disaster

29. **The total value of damage and loss to the irrigation subsector has been estimated at US\$ 13.8 million.**

The recent floods have caused tremendous damage to irrigation infrastructures, depriving 35,180 farmers (17,255 males, 17,925 females) from accessing irrigation services. About 4,901ha of land has been lost due to sand deposits, the erosion of soils suitable for crop production, and disrupted irrigation as a result of flood damage.

30. **The floods washed away a significant proportion of pipelines and the canals. A number of solar-based pump irrigation schemes were significantly damaged, with pumps and accessories being completely washed away** (see Annex Table 6). The surge of overland also damaged infield irrigation structures, scheme roads and related structures,

Annex Table 6: Summary of flood effects 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

flood protection bunds and water storage reservoirs. The floods damaged irrigation infrastructure to an estimated value of US\$ 4.2 million. This has resulted in loss of US\$ 9.6 million, since about 3,328.75 ha will not be able to utilized for irrigation. The impact of the disaster will result in the loss of employment and income generating opportunities for a significant number of members of the affected communities.

31. **Social Impact of damage and loss:** According to the DOI, almost 7,230.5 ha of land will not be able to be utilized for irrigation because of the damage cause by the disaster. This will result in loss to an estimated value of US\$ 8,090,160.71.

Recovery Needs for the Irrigation subsector

32. **To reduce the extent of the loss, the damaged irrigation infrastructure will need to be repaired within the shortest period possible.** Prioritized recovery and reconstruction actions include the provision of motorized and treadle pumps to affected farmers as a temporary measure before the reconstruction of the damaged schemes, and the

reconstruction and rehabilitation of the partially damaged irrigation infrastructure. Reconstruction actions will include conducting surveys, the production of designs, the construction of schemes, and the procurement of equipment. The estimated total recovery and reconstruction needs for irrigation sector are estimated to reach a value of US\$ 17.9 million (see 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 Subsector

34. **The fisheries subsector consists of capture fisheries, aquaculture and the aquarium or ornamental fish trade.** The subsector accounts for about 4 percent of the national GDP. It contributes to more than 70 percent of Malawi’s animal protein intake, and 40 percent of its total protein intake. The sector directly employs more than 60,000 fishers and 15,465 fish farmers, of whom 38.5 percent are women. The sector supports or is supported by ancillary activities, including fish processing, fish marketing, boat building and engine repair, among others. The total current fish production from capture fisheries and aquaculture is estimated at 199,454 metric tons (from all water bodies), worth US\$ 235.7 million to the fishers. The total production from on is in cages is estimated at 12,217 tons per annum, worth US\$ 33.1 million to the fish farmers.

Assessment of Disaster Effects (Damage and Loss)

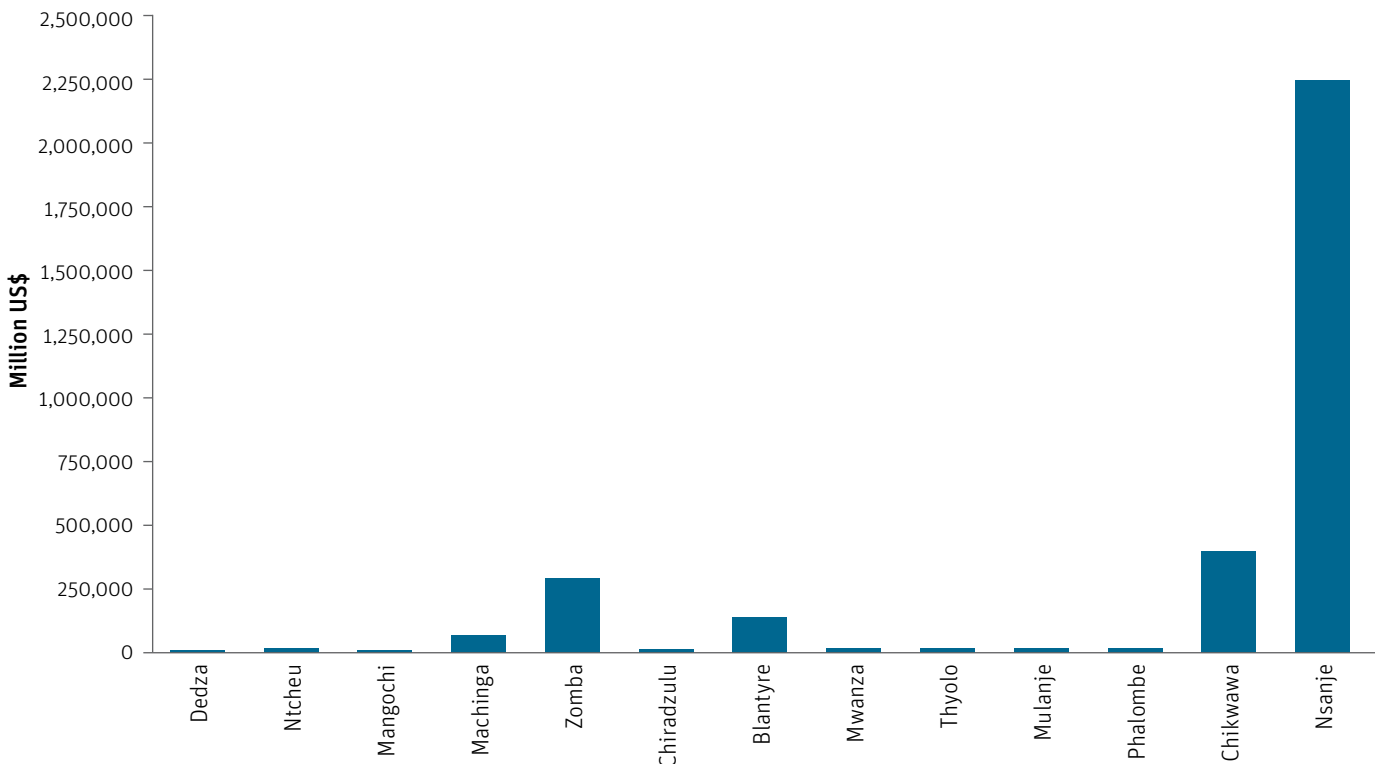
35. **A total of 574 fishers were affected by the floods, of whom all were males. In addition, 104 fish farmers were affected, of whom 49 were female and 55 male.** Overall, the floods damaged 287 fishing boats; 6,589

sets of fishing gear; 189 fish ponds; one smoking kiln and more than 50 drying racks used for fish processing. For the sector, the estimated loss mainly relates to the opportunity cost to fishing and fish farming as a result of the impact of the floods. The assessment considered the total number of direct beneficiaries from fishing (fishers) and fish farming (farmers). The damage and loss due to floods is estimated at the value of US\$ 1.8 million and US\$ 1.4 million, respectively, representing a total of US\$ 3,209,671 (see Annex Figure 7). The collected information on the post-disaster situation was validated through a process of triangulation and comparison with well-established means of data collection, notably fishery surveys, aquaculture inventory surveys, and data from National Statistical Office, among other sources. All the affected properties were privately owned by fishers and fish farmers.

Social Impact of Damage and Loss

36. **Due to the damage caused by the floods to fishing boats and gear, it is expected that there will be reduced production from capture fisheries and fish harvests from aquaculture.** Reduced fish production will lead to an increase fish prices, which

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



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

Subsector	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	

has implications for consumption of fish protein at the household level and thus for food and nutrition security. In the post-disaster period, it was not possible to resume fishing in most of the affected areas. This will lead to transient food fish shortages and disrupted household incomes for the majority of the households that depend on fish production. To address this, it will be necessary to rehabilitate the fish ponds of the affected households prior to restocking. There is the potential for an increase in malnutrition rates resulting from loss of fish protein source in the immediate term.

Recovery Strategy and Needs for Fisheries Sector

37. **The total recovery needs for the fisheries sector are estimated to reach a value of US\$ 1.4 million** (see Annex Table 8). Given the impact of the floods, the prioritized needs for the sector are: the repair and reconstruction of fishing boats and landing sites; the supply of fishing nets and other gear; the rehabilitation of fish ponds; the repair and construction of infrastructure for fish processing; and the supply of fingerlings and fish feeds to affected fish farmers. Most of the damage to the fisheries sector affected private property.

Recommendations

- Fish farmers need to be supported through the provision of appropriate fishing boats and gear, as recommended by experts from Mpwapwe Boat Yard in Mangochi, prior to accessing or assembling the boats and gear

for fishing operations. This will enable the boats to be both seaworthy and sufficiently strong to withstand the impacts of the floods.

- The capacities of the fish farmers in the areas of large deep pond technology need to be built through expert consultation with National Aquaculture Centre to ensure the resilience of the ponds to disaster. In addition, fish farmers should be provided with access to good quality fingerlings and fish feed to restock their ponds following the disaster.
- There is also need for the prompt dissemination of key messages to serve as an early warning system for fishers, fish farmers and the general public regarding extreme weathers events. These warnings could be disseminated through the internet, mobile phone messaging services (SMS alerts) and WhatsApp platforms, among other channels.

Commerce and Industry Subsector

38. **Prior to occurrence of the disasters, most of the businesses in this sector were operating effectively and efficiently, with most subsectors showing potential for growth in 2019.** In Malawi, the commerce and industry sector includes more than 11 sectors subsectors, with individual enterprises operating on either the small, medium or large scale. Prior to the floods, many of these businesses were on a positive trajectory. Of Malawi's major economic sectors, agriculture continues to drive the economy, contributing to around 30 percent of the total national

GDP. In the 15 flood affected districts, the most common commercial activities included sugar and tea plantations in Chikwawa, Thyolo, and Mulanje; fish farming in Zomba, Mangochi and Machinga; fruit and vegetable production 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 manufacturing in all districts.

Damage and Loss in the Commerce and Industry Sector

39. The floods had a significant impact on Malawi's commerce and industry sector, directly affecting around 120,000 business enterprises.

A number of large-scale and small-scale enterprises incurred damage and consequent loss, with the total value of these effects estimated at US\$ 2.1 million. Of these effects, large-scale enterprises accounted for 58 percent of the total (see Annex Table 9). The cost of the damage to the large-scale subsector is estimated to stand at US\$ 0.88 million, or 72 per cent of the total damage. The heavy rains and the floods caused damage to plants and machinery, especially in Blantyre. Some of these were washed away, while others were submerged in water during the flooding. In the case of the SMEs subsector, the damage occurred in nearly fifty trading centers, with the most severely affected districts being Chikwawa (8 trading centers), followed by Phalombe (4), Nsanje (5), Zomba (10) and then Dedza, Ntheu, Mangochi, Machinga, Zomba, Chiradzulu, Blantyre, Mwanza, Thyolo, Mulanje, Phalombe, Chikwawa, Nsanje, Balaka, and Neno. In these places, commercial properties and other infrastructure owned by private traders were destroyed or damaged. Markets around the trading centers were also partially or completely destroyed.

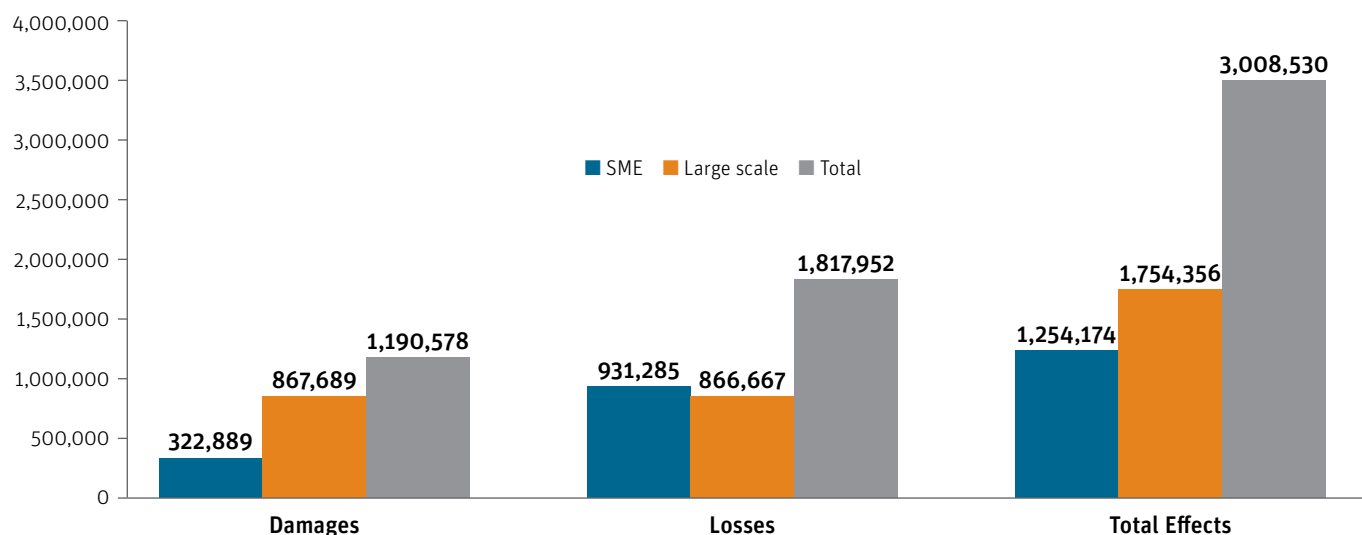
40. **The SMEs incurred significant business losses as a result of the floods.** The heavy rains and the resulting flooding resulted in loss to an estimated value of US\$ 0.93 million, or 51 percent of the sector's total loss (see Annex Figure 8). The degree of loss in the SME subsector varied across districts, with some districts being relatively more seriously affected. For example, Nsanje accounted for 15 percent of this loss, while Chikwawa accounted for 13 percent. In many cases,

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

market stocks (fish, vegetables and other market goods and groceries in shops) were washed away and stored food was destroyed by the floods. Consequently, Government revenue was lost due to market inactivity and low sales. The large-scale subsector incurred loss to a value of US\$ 0.89 million, or 49 percent of the total loss. The loss experienced by the large-scale sector mainly related to costs associated with repairing damaged plant and machinery. There were disruptions to the production of goods during the disasters, with firms experiencing constraints on the supply of raw materials, such as at Nchalo Sugar Plantation.

41. **It is estimated that the sector needs US\$ 3.1 million to facilitate recovery and reconstruction the post-flood period.** Of this, 83 percent is required to support the reconstruction of damaged market facilities and to construct entirely new markets (one in Chikwawa and one in Nsanje). Other prioritized actions include the provision of relief items to ease pressure on business, the provision of cheap loans (preferably with annual interest rate of 20 percent or less, rather than the

Annex Figure 8: Damage and Loss across commerce subsector in US\$.

rates of 30 to 40 percent currently charged by banks and of more than 100 percent charged by microfinance institutions), the provision of training on business start-up and management to enhance the capacity of the affected traders and support to mobilize traders or affected communities to form cooperatives. The Government, the private sector players and the donor community could collaborate to ensure that affected businesses receive support within the shortest time period possible. Efforts should be made to rebuild bridges and roads as soon as possible to provide affected areas with access to external markets.

Social impact of the damage and loss caused by the floods on commerce and trade

42. **The effects of floods on businesses were evenly distributed between women and men.** However, it is possible that women will experience these impacts more substantially, as in many cases most of their livelihoods depended on proceeds from these businesses. However, there were few or no reports on the effects of the damage and loss on businesses operated by youths and members of other vulnerable groups in the visited districts. The most significant social impacts of the effects of the disaster included: (i) disruptions to infrastructure that supported business operations in the affected areas, such as by temporarily

cutting off electricity; (ii) damage to markets and shops and the consequent disruption to business activities led to a loss of livelihoods and a reduction in purchasing power, leaving communities economically vulnerable; (iii) the displacement of people from some of the trading centers from their homes; and (iv) the loss of livelihoods and reduction in purchasing power among 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 a significant proportion of the population facing increased vulnerable.

Recovery Strategy and Needs for Commerce and industry subsector

43. Annex Table 9 shows the value of the short-, medium- to long-term recovery needs and the total needs for the commerce and industry sector is valued at about MK 2.4 billion.

Recommendation

- There is need for a collaborative effort between both the private and public sector in order to speed up the processes associated with recovery and to avoid the continued loss of revenue for business operators and to reduce constraints on access to goods and services by end users.

Transport Subsector

44. **Malawi's transportation sector facilitates trade, exports and imports, facilitating internal freight and passenger movements.** It also provides access to social sector facilities (health and educational facilities) at both the international and local level. As a landlocked nation, Malawi relies on overland transportation (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, with more than 70 percent of internal freight traffic and 99 percent of passenger traffic. The country's classified road network is 15,451 km long, of which about 28 percent is paved. The road network is divided into five categories: main roads (3,357km); secondary roads (3,125km); tertiary roads (4,121km); district roads (3,500km); and urban roads (1,348km) roads. 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. The main focus of this report is on the road transport network in the 15 districts and 2 cities affected by the 2019 floods. No damage was reported to the rail network.

Damage and Loss to Roads

45. **Approximately 1,841 km, or 11.9 percent of the total road network, was partially or totally destroyed due to water run-offs, with the impact exacerbated by the lack of vegetative cover, steep gradients, bad condition and aging 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.

46. **A total of 129 bridges were affected by the floods, out of which 122 were totally destroyed and seven were partially destroyed.** However, the partially destroyed bridges need to be fully reconstructed to cater for changing catchment characteristics and on the basis of traffic safety considerations. Bailey Bridges were urgently required on some roads that were rendered impassable, resulting in the isolation of a number of communities. Consideration should also be given to deepening river channels by dredging to avoid future infrastructure loss. A total of 68 culverts and drifts were completely washed

away by the floods. In terms of loss, the transport sector suffered loss related to the necessity to repair damaged sections of the roads, culverts, drifts and bridges to provide temporary access. The total value of damage to the sector was estimated to stand at US\$ 33.1 million, while the value of loss was estimated at US\$ 0.9 million. The loss is calculated on the basis of the actual costs incurred in implementing the emergency works. Roads were severely damaged in Nsanje, Chikwawa, Mangochi, Phalombe and Thyolo districts.

47. **The roads sector suffered damage amounting to a value of US\$ 36 million dollars in all the 15 affected districts, including Blantyre city.** Chikwawa, Mangochi and Nsanje were the most significantly affected districts in terms of damage to road infrastructure. At the time of the compiling of this report, data for Zomba City was not available. Additional damage may be reported once the data for Zomba City becomes available. For the roads subsector, all the affected infrastructure consisted of public roads. Therefore, this report does not consider the impact on private roads.

Social-economic Impact of Infrastructure Damage

48. **The damage to the transport infrastructure had a significant impact on access to social sector and economic facilities, including schools, health facilities, trading centers and other social services.** A large proportion of school-going children and teachers were not able to cross rivers due to the damage to bridges, culverts and drifts. It can be assumed that this had a negative impact the quality of education of those affected. Similarly, the business sector was adversely impacted by vehicles, both cargo and passengers not being able to operate normally.

49. **In some cases, vehicles had to take longer routes due to damaged structures and sections on shorter routes.** Women and children were most significantly affected, experiencing significant challenges related to the unavailability of road infrastructure. In other areas, people were forced to pay to use locally erected temporary crossings, with a consequent impact on household income levels. The impact arising from road infrastructure damage is captured in the relevant sector reports, including the reports for the health, education and commerce sectors.

Recovery Needs and Strategy

50. **The road transport sector requires about US\$ 42.6 million for the short and long-term recovery and reconstruction of damaged roads.** The short-term strategies include the construction of diversions, the launching of bailey bridges, grading and reshaping of damaged road network and backfilling of scoured approaches. The long-term strategies are required to ensure that the road networks are built back better to disaster resilient standards. Most of the costs are for recovery efforts in Chikwawa, Nsanje and Mangochi Districts, which experienced most of the effects of the flooding in this subsector.

Recommendations

- There is a need to revise design standards; to conduct regular inspection, maintenance and replacement; to enforce environmental and catchment management practices and to develop a database for all road infrastructures.
- There is a need to prioritize reconstruction and recovery efforts for bridges and drainage structure to ensure access to inaccessible and hard to reach areas.
- There is need to develop a robust program to upgrade and rehabilitate the earth roads that provide linkages between rural areas and the main roads.
- The East Bank Road and the bridges require additional resources to fully upgrade the road to bitumen standard and to make it more resilient to flooding.
- In the case of the districts of Makhanga and Bangula, a comprehensive design should be developed to ensure that reconstructed structures are resilient to any future disasters.
- Construction regulators need to develop tools to monitor the performance of contractors and consultants to enforce responsibility and to ensure that completed works are of adequate quality.

Energy/Forestry Subsector

51. **In Malawi, electricity and biomass energy (firewood, charcoal and agricultural residues) are the main sources of energy for cooking, heating and lighting.** The total installed electricity generation capacity is 490.35 MW, with the vast majority being derived

from hydro (362.65 MW), which covers 98 percent of the base load. In addition, diesel powered generators (127.7 MW) are used for peaking load. In the pre-flood period, the average power generation was 202 MW due to limited flows in the Shire River. Electricity is used to produce power for industrial and domestic use, for cooking, heating/cooling and lighting. The National electricity access rate is low, at 11 percent of the total population, although this is growing at an increasing rate (IHS, 2017).

52. **Biomass energy is predominantly used for cooking and heating in both urban and rural areas.** Fuel is supplied from both natural and planted forest. The total forest cover in Malawi is 28 percent (GoM, 2016). However, the volume of biomass used to produce energy 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 to stand at 8.9 million metric tons of wood equivalent, which accounts for 88.5 percent of gross annual energy needs (BEST, 2009). Almost all households (98 per cent) use solid fuel for cooking (see Figure 1). The most common source of cooking fuel is firewood (81 percent), followed by charcoal (16 percent), electricity (2 percent) and crop residue (1 percent). It is estimated that on average 81.7 percent of the households affected by the floods use firewood for cooking, with the rate of use of electricity being very low, except in Zomba and Blantyre Cities, where 13.7 percent and 15.5 percent of households use electricity for cooking respectively.

Assessment of Disaster Effects

53. **The 2019 disaster resulted in the flooding of the Shire River, thus impacting the hydropower plants on the river.** The flooding also destroyed electricity distribution facilities and natural resources, including a significant number of trees. The main cause of the damage was the trash carried along by the runoff water due to change in landscape use. The trash blocked the screens at the power generating plants, causing them to dislodge from their original position. The trash also caused differential pressures, which necessitated the shutdown of the power plants. The 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 districts.

The electricity generation facilities were completely shut down three times, for a total of 109 minutes in the period from 7-9 March 2019. To restore the electricity supply, it 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 used to facilitate the electricity distribution network and about 35 percent of newly planted trees were damaged. In terms of the impact on forestry, 7,400,000 tree seedlings planted during the 2018/19 National Forestry Season were damaged, representing a 35 percent loss. There are reports that a number of trees were cut down for the construction of temporary shelters for IDP, exacerbating the degradation of forests. The total value of the damage to this sector is estimated at US\$ 2.8 million, while the value of loss is estimated at US\$ 0.3 million (see Table 1). The disaster caused significant loss to the power generation and distribution companies, mostly due to loss of revenue resulting from nonproduction and no sales of electricity. Commercial users of electricity also suffered loss in revenue due to the non-availability of electricity.

Social Impact of Damage and Loss

54. **The social impact of the damage and loss to the energy sector is related to the following:** lack of entertainment in areas using electricity; impact on health service delivery for hospitals using electricity to store drugs and other items; loss of perishable food stuff in households using electricity; loss of livelihoods

for those operating businesses such as barber shops and salons; impact on education as students study period was reduced due to the lack of lighting; disruptions to water supply due to loss of electricity (for electricity driven water pumps); increased risks and vulnerabilities to disease outbreaks; and loss of revenue leading to poverty.

Recovery Strategy & Needs and Strategies

55. **The damaged facilities have already been repaired or replaced using the utility companies' resources, so the requirements for recovery are minimal.** Therefore, recovery strategies will focus on addressing the causes of the damage to the power generation facilities and on building disaster resilient structures. The recovery strategies will focus on rebuilding and maintaining the natural regeneration of the landscape, promoting good natural resource conservation farming practices, promoting community forestry for firewood, encouraging the use of energy saving cook stove, and diversifying power generation. The total needs are estimated at a value of US\$ 4.3 million (see Annex Table 10). The proposed interventions will be implemented through other sectors, such as the agriculture sector.

Recommendations

- There is need to restore degraded forests and deforested areas, including through measures to stabilize the river/stream banks through tree planting and the management and promotion of natural regeneration processes.

Annex Table 10: Energy Recovery Strategies

Subsector	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

- Agricultural production technologies and practices in the Shire River catchments should be reviewed in order to promote best practices to reduce soil erosion and water runoff and to increase the productivity of available land.
- Community forests or woodlots should be promoted through the introduction of incentives to conserve areas.

WASH Subsector

56. **The Ministry of Agriculture, Irrigation and Water Development (MoAIWD) has been mandated with the responsibility of ensuring the sustainable and equitable provision of water supplies and sanitation services for the people of Malawi.** Under MoAIWD, 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 through Water Boards in urban centers.
57. **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. In the pre-flood period, the proportion of the population with access to improved water sources was estimated at 86 percent in rural areas and 93 percent in urban areas;²⁸ however, only approximately 56 percent of these water points were fully functioning with 21 percent partially functioning but in need of repair.²⁹ Following the flood, the mWater Portal database was used to assess the functionality of all the water points in the 15 affected districts. Based on the proportion of the population with access to an improved water source and on the functionality status of the water points per district, a pre-disaster baseline was derived (see Table 1 below).
58. **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 requirements of the country's legal frameworks. The main purpose of hygiene and sanitation promotion activities is to prevent the transmission of diarrhea and other water-related diseases by educating

communities on the safe disposal of excreta and by promoting hygienic behaviors. At the end of 2018, the proportion of the population with access to improved sanitation was estimated at 68 percent in rural areas and at 81 percent in urban areas, with 37 percent 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 (particularly the rainy season), is a major challenge that needs to be addressed.³⁰

Assessment of Disaster Effects

59. **The total value of the damage is estimated at US\$ 3.7 million, calculated on the basis of replacement value. The total value of the loss is estimated to stand at US\$ 2.7 million, with this loss due to disruptions to service and an increase in operations to supply potable water. Therefore, the total value of the effects is US\$ 6.4 million.**
60. **The 2019 Floods disrupted the supply of safe water in all the affected districts.**³¹ A total of 396 boreholes and 81 protected shallow wells were reported to be damaged to varying extents. In addition, by using GIS data to determine the extent of floods and by mWater Portal to locate water points and combining the two sets of data, it was determined that 332 boreholes and 19 protected shallow wells were likely to be contaminated and to require disinfection, with this conclusion confirmed by a number of water quality tests. It was also determined that a significant number of 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, with most edge to the pipeline at river crossings, where underbed and overhead pipe crossings were washed away. The rains and flooding contributed to the reported collapse of more than 258,000 household latrines and more than 140 health facility latrines, resulting in many people temporarily resorting to the practice of open defecation, due to the lack of alternatives. Much of the loss to the water supply sector was derived from loss of revenue to the

²⁸ ATKINS and Wellfield, *Water Resource Investment Strategy*, 2011

²⁹ mWater, *Malawi Water Point Functionality*, 2019

³⁰ Ministry of Health and Population, 2018

³¹ for the purposes of costing damage and loss, 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.



Water Users' Associations and Water Point Committees due to service disruption; from impacts to public health associated with the use of contaminated water sources and practicing open defecation; and from the costs associated with temporary need to provide water and sanitation supplies to displaced populations.

Social impact of Damage and Loss

61. **With a substantial number of water facilities damaged or submerged, 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 conducted in Nsanje district following the floods showed that 81 percent of 44 tested boreholes were contaminated. In addition, as stated previously, 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 used to temporarily relocate IDP have limited access to safe water supplies and sanitation facilities.
62. **Factors contributing to damage and loss in sector include the following:**

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

Recovery needs for the WASH subsector

63. **The total recovery needs for the WASH subsector is estimated to reach US\$ 12.3 million.** A number of recommended short-, medium- and long-term recovery needs are outlined below to address immediate needs and to facilitate the integration of long-term resilience strategies to improve planning and implementation processes for the reconstruction and for of the future development of WASH facilities (see Annex Table 11).

Annex Table 11: Recovery needs for WASH

Subsector	Intervention	Value (US\$)	Responsible Agency
Short Term Needs			
Water	Rehabilitation and disinfection of partially Damaged boreholes.	1,960,000.00	DWSS
	Rehabilitation and disinfection of partially Damaged protected shallow wells.	46,667.00	DWSS
	Temporary repairs on the Damaged gravity fed water systems.	320,000.00	DWSS
	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	
Medium Term Needs			
Water	Assessment of the environmental hazards and climate risks to inform the appropriate site selection of reconstructed infrastructure.	300,000.00	DWSS
	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
	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	
Long Term Needs			
Water	Reconstruction of the Damaged Gravity fed water supply systems.	1,740,399.00	DWSS
	Risk-informed relocation and installation of new boreholes in the affected areas.	286,667.00	DWSS
	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 centers.	1,392,000.00	DWSS MoH
	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 Subsector

64. **The growing threat posed by water-related disasters, particularly floods, underscores the need for the better and smarter management of water resources.** The need for flood control structures has become increasingly evident over the years, with the increasing frequency and intensity of flood events, including in 2015, 2016 and 2019. To address this, the department focuses on the 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, NGOs or local communities. The dykes constructed to date typically use earthen material, with the works having typically been completed by conventional methods or by hand.
65. **For major rehabilitation works, communities are advised to seek assistance from government agencies, NGOs, and other development partners. To date, the Department of Water Resources (DWR) has installed 45 automated gauging stations and 101 manual gauging stations across the country.** NGOs have also constructed additional gauging stations for 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 downstream communities. Through an Operation Decision Support System (ODSS), DWR also provides early warning messages to various stakeholders, including members of local communities.

Assessment of Disaster Effects

66. **The total estimated cost of damage to water resource infrastructure stands at approximately US\$ 5.1 million.** The effects of the damage to water resources were largely due to the failure of dykes and dams, primarily from severe erosion which lead to breaches

or the complete wash-out of assets. Reports indicate that ten dykes, seven dams, two excavated storage tanks and 11 hydrological meteorological stations were either partially or completely destroyed. It is estimated that a total length of 14.8 km of dykes was damaged. 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 these assets. Loss incurred due to the reporting for other sectors water resource infrastructure is captured within the reporting for those sectors.

Social Impact of Damage and Loss

67. **The damage to flood early warning systems and flood protection infrastructure creates significant unease among local communities, as they will be exposed to future storm events.** The extensive damage caused by the recent floods now leaves the communities 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 and Needs for the Water Resources Subsector

68. **The water resources infrastructure needs include the rehabilitation and reconstruction of dams, dykes, and riverbanks (at Mwanza river) and the development of strategies to build back better and smarter.** In the case of dykes, this includes increasing their heights (designing for a higher return period) and installing grouted-rock protection and aprons along critical sections in front of dykes embankments and at the toe and spillway and spillways to allow for controlled overtopping. Dams need upgraded spillways and outfalls (including downstream channels) with grouted-rock protection. For hydrological meteorological stations, weirs need to be installed to control flows during storm events to allow for more accurate data collection and robust assessment through retention of a consistent channel profile (rating curve). The rehabilitation of upstream catchments has also being proposed. The total needs for recovery are estimated to stand at US\$ 17 million (see Annex Table 12).

Annex Table 12: Recovery and reconstruction needs for water resources

Water Resources Sector	Program of Activity	Value (in US\$)	Responsible Agency
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 standardized 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 centralized flood model	400,000	MoAIWD – DWR
Sub Total		1,198,085	
Grand Total Recovery Needs		16,989,542	

Key Recommendations

- Develop a framework for improved coordination between Department of Water Resources and relevant stakeholders.
- Purchase modelling tools (1d or 2d modelling) and provide training for staff from the 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 levels of service
- Ensure continuity in specific environments for drainage and introduce requirements for the certification and testing of materials.
- Ensure appropriately trained representatives are on-site to supervise works.
- Implement a consistent inspection regime, which should be appropriately recorded, with recommendations provided for maintenance with specified timeframes and with defined responsibilities to ensure that action is taken.

Disaster Risk Reduction and Early Warning Systems Service Delivery Sector

69. 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 to implement and provide: (i) flow and flood forecasting and early warning; (ii) seasonal forecasts for agriculture; (iii) forecasts for water infrastructure operations; and (iv) 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 Department of Water Resources (DWR), Department of Climate Change and Meteorological Services (DCCMS) and Department of Disaster Management Affairs are mandated with the responsibility for operating the ODSS.

Effects and Impacts

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

1. Inadequate resources are available to support the operations of the national and district technical staff to ensure service providers comply with construction guidelines and standards to construct disaster resilience structures.
2. Ineffective or fragmented institutional coordination within and across sectors exacerbates the impacts of disasters. The lack of coherence between policies across sectors has led to poor coordination in the mainstreaming of disaster risk reduction and resilience building. For instance, the land resources and irrigation policies are not harmonized to protect the river buffer.
3. The lack of disaster risk assessments in the affected sectors results in the high prevalence of poor or non-existent hazard-informed site selection and physical planning in the construction of school sites, leaving buildings exposed to adverse environmental conditions and extremes, with little or no site mitigation measures to address residual risks through, for instance, well-conceived drainage plans.
4. Design flaws, compounded by lack of adherence to existing construction standards and guidelines,

exacerbate the impact of disasters. Many of the dykes that were completely destroyed were constructed using non-mechanical means, resulting in dykes of reduced structural strength that were susceptible to failure during a flood event. Some dykes had a lower return period, which was challenged by the volume 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 degree of 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 measures. There is need to review these instruments to ensure the integration of emerging issues, including environmental degradation and the siltation of rivers.

5. Most of the contractors hired to construct infrastructure across sectors have insufficient capacity to properly execute the designs correctly, with many of these contractors ignoring specifications and details, leading to the failure of larger structures. In many cases, construction is characterized by inadequate workmanship, resulting in buildings with increased vulnerability.
6. Damage to some of the infrastructure could be attributed to a lack of maintenance that progressively diminishes the capacity of buildings, bridges and culverts, roads and dykes to withstand heavy rains, floods and strong winds, leading to shorter longevity and an increase to accumulated risks. For the future, increased resilience requires a holistic approach to address weaknesses in the design, construction and operation phases.

DRR and EWS Service delivery

71. A range of stakeholders are involved in offering DRR and EWS services. These stakeholders include Ministries, Departments and Agencies (MDAs) such as the Department of Climate Change and Meteorological Services (DCCMS), Department of Water Resources (DWR), Department of Disaster Management Affairs (DoDMA) and Civil Protection Committees (CPCs); as well as NGOs such as Emmanuel International, Goal Malawi, Islamic Relief, World Vision,

Care Malawi, Action Aid, CADECOM, Malawi Red Cross Society, Catholic Relief Services, Christian Aid, Self Help Africa and CARD. These stakeholders offer DRR and EWS services including capacity building of CPCs, DRM planning, 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, the installation of riverine gauges and community awareness campaigns related to seasonal forecast, hazards, vulnerabilities and disaster risks, the development and dissemination of early warning messages, be installation of river line gauges to monitor the rising levels of water, the distribution of phones to facilitate communication related to early warning messages, and the distribution of drums and whistles in communities and villages to sound an alarm in case a disaster strikes. This diversity implies a significant degree of fragmentation in the approaches and, importantly, the sub-optimal use of the outcome and outputs of the projects.

72. According to the EWS baseline survey (2016), 42.74 percent of the population have access to improved climate information, of whom 83.37 percent receive the information in a timely manner. About 89.95 percent of the population that has access to this information uses it to prepare plans, including contingency plans for weather-related natural hazards. Prior to the 2019 floods, access to information was enhanced through the use of national and community radio stations, mobile phone messaging services, district and community meetings, and bulletins. These media were all used to widen the coverage. The utilization of EWS services was low, as witnessed by the lack of contingency plans and evacuation plans in some communities, which contributed to the high level of impact of the flood. The delivery of the DRR and EWS services during the rainy season was conducted effectively in the targeted areas, as evidenced by the pre-positioning of relief items and the formulation of contingency plans. However, significant challenges remained, including the lack of coordination; inadequate financial resources; and constraints on mobility. However, the response, including search and rescue operations, were conducted in a timely manner in collaboration with a range of stakeholders, including the MDF. It should
- also be noted that the floods have had an impact on the delivery of DRR and EWS services, resulting in disruption to service delivery and damage to some the equipment used to facilitate it.
73. Communities in areas where DRR projects were operational at the point when the floods struck were relatively more involved in the dissemination and delivery of DRR and EWS services. The same was the case with evacuation plans, which were available only in project focus areas. All districts indicated that they have formulated contingency plans. It is also interesting to note positive experiences related to utilities and community water management. For instance, it could be seen that a number of decentralized local water supply schemes acted independently to manage their own water service provision. The Zomba East Rural Water Supply Scheme used reserved tariffs to stockpile spare parts and materials in preparation for emergencies. Therefore, when five pipe river crossings were damaged in the flooding, this scheme was able to immediately mobilize temporary repairs to reinstate water supply services within 20 days, serving over 120,000 beneficiaries relief items.

New and emerging risks

74. It is important to understand that a number of new and emerging risks may threaten the recovery process. Considering the climatic outlook, DCCMS has indicated that there is a high likelihood of persistence of el nino-related phenomena this coming season, most likely resulting in floods in some areas and dry spells in others. These events are likely because the country has experienced a weak el nino this season. It is also important to note that projected hazards' value-changes may compound the incremental risks accumulated by the impact of the current event on infrastructure, even if the infrastructure was not destroyed. For instance, bridges that have accumulated large amounts of sediment or that have absorbed shocks will be less likely to be able to withstand future shocks. The same applies in the case of building infrastructure, including school blocks and buildings. This situation will be exacerbated if remedial measures and improved retrofitting and reconstruction is not conducted as a matter of urgency.
75. A number of environmental risks have emanated from the disaster, including the loss of trees along

river banks, especially trees that were planted in the 2018/19 season. For instance, Chikwawa has lost 30 percent of its river-line tree cover, while Nsanje has lost 50 percent. There is an increase in demand for and consumption of trees for the construction of temporary shelters, for use as firewood and to produce charcoal. The disruption to the livelihoods of members of communities in the affected areas has resulted in the increased production of charcoal and firewood.

76. 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 motorized traffic and humans may result in the increased occurrence of accidents, especially on roads and bridges that have not been maintained. In the health sector, the congestion in camps has increased the risk of outbreaks of epidemics and of increased malnutrition cases due to poor hygiene and sanitation facilities. In the agriculture sector, the affected districts included those receiving lean-season support from the MVAC. The communities in these areas were already at risk of food insecurity, with the disasters having created conditions that increased levels of vulnerability. In the health and WASH sector, outbreaks of disease are likely to increase as a result of the seepage of waste from latrines causing water pollution and affecting water bodies, as a result of poor solid and liquid waste management practices.

The performance of the DRR and EWS system

77. According to the DCCMS, most rainfall stations in the Southern Region recorded heavy rainfalls in the immediate pre-disaster period, with rainfalls of 239 mm at Limbuli station on 5 March; of 255.5 mm at Mpemba on 6 March; and of 220.8 mm at Tsangano on 7 March. These rainfall events generated enormous run-offs in the Shire River catchment, which led to riverine flooding, particularly along the Shire, Mwanza, Livirivi, Lilangwe, WankuluMadzi, Thuchira, Lichenya and Phalombe rivers. These events were accurately forecast by the ODSS, which is an integrated early warning and real-time multifunctional forecasting, with data obtained in real time from hydrological stations. This system supports government personnel and stakeholders to conduct the following: (i) flow and flood forecasting and early warning; (ii) seasonal forecasts for agriculture; (iii) water

infrastructure operations; and (iv) drought monitoring

78. It is important to note that hazard data and modelling exists that can significantly improve the knowledge of risks and vulnerability. However, data is often 'projectized' and either unavailable or difficult to access. The fragmentation of data use and applications between sectors diminishes its effectiveness.

Recovery Strategy

79. This section highlights the following recovery strategies (see Annex Table 13 for details):

- Improve the governance of sectoral bodies operating in this region, which have been repeatedly affected by disasters of increasing intensity and frequency, in order to cut across administrative boundaries and institutional mandates, and enforce technical cooperation at the spatial level.
- Enhance risk governance through the development of an integrated data management system linked to land-use planning and sectoral investments (particularly infrastructure).
- Homogenously define resilient integrated management of services and infrastructure for the region around the watershed through a process of resilient spatial planning at sufficient scale and across all sectors.
- Enhance all phases of typical service and infrastructure delivery in the region, particularly: (i) 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; (ii) technical design, which should be adapted to the environment in this region with consideration 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.
- Improve operation and maintenance, to ensure that all infrastructures are able to withstand and absorb expected future shocks and to continue to perform effectively for the longest possible duration.
- Improve the dissemination of information from hydrological and meteorological early warning systems. The hydrological and meteorological early

Annex Table 13: Recovery and reconstruction needs in the DRR and EWS

Sector	Program of activity value	US\$	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
	Support development of evacuation plans	350,000.00	DoDMA
	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
	Provide a return package to households in displacement sites	500,000.00	DoDMA
	Implement a national recovery and resilience public awareness program	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
	Establish, revamp and train CPCs in DRM	350,000.00	DoDMA
	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
DRR	Conduct Comprehensive Building Damage Assessment (BDA) to inform construction/rehabilitation of Damaged infrastructure	100,000.00	DoDMA and Housing
	Support development of DRM plans	300,000.00	DoDMA
Long-term recovery needs (three to five years)			
DRR	Construct 4 evacuation centers one in each Phalombe, Nsanje, Chikwawa and Zomba districts	1,300,000.00	DoDMA
Long-term recovery needs (three to five years) (cont.)			
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	

warning systems provided timely, consistent and accurate severe weather warning information related to the cyclone. However, they failed to provide timely information regarding flooding in the 17 councils. This could have been due to the lack of adequate

equipment, particularly for dissemination. River gauge readers are deployed on a voluntary basis, with their capacities questionable in most districts. In addition, the capacity of local-level personnel to issue early warning messages was challenged. The

lack of coordination between upland and lower stream communities exacerbated the impact of the floods on communities in the affected areas.

Social Protection Subsector

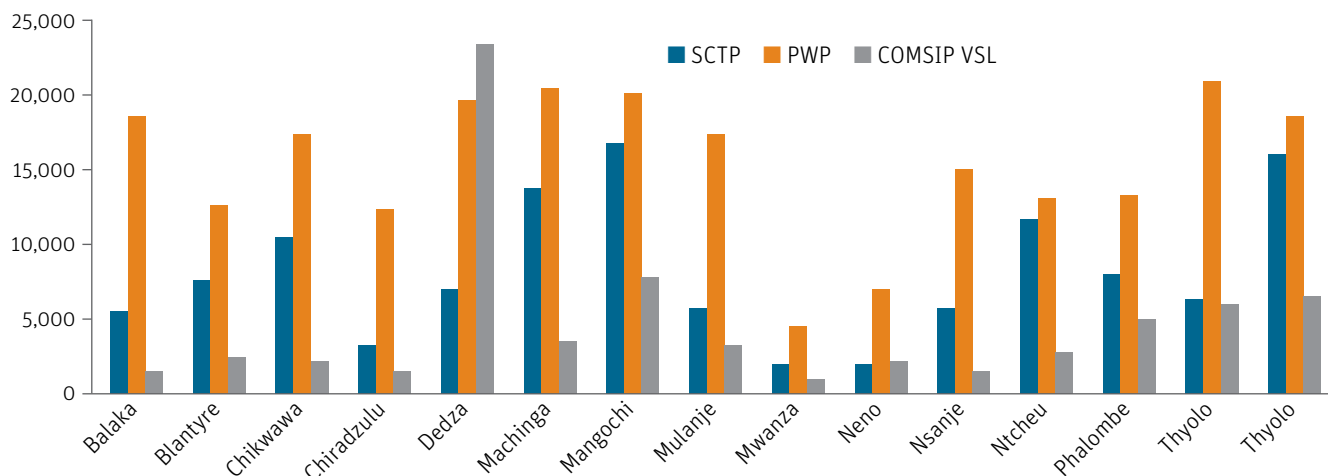
80. Before the floods’ occurrence, four key social protection interventions were being implemented across the affected districts, reaching out to extremely and moderately poor households: (1) Social Cash Transfer Programme (SCTP) as a flagship social protection intervention is currently implemented across all the flood affected districts except for Blantyre and Zomba cities; reaching out to 159,738 extremely poor and labour constrained households in these districts (approximately 665,140 people). Three quarters of the beneficiaries in the affected districts come from female headed households; with a quarter of the households, headed by those living with disabilities. Across these districts over half of the beneficiary households’ heads have chronic illnesses; (2) School Meals Programme (SMP) is being implemented in all flood affected districts and cities and offers meals to primary school going children to increase school enrolment and meet nutritional needs. Out of a total of 2770 primary schools in the affected areas, 1569 schools have a running program of which 70 percent had permanent kitchens; (3) MASAF IV Public Works Program (PWP) was implemented across all affected districts and cities until December 2018, engaging 259,989 beneficiaries within the affected communities in the creation and maintenance of community assets including small road infrastructure; land, water and soil

conservation. PWP Implementation concluded before the disaster, however assets created may have been affected and the infrastructure cluster will incorporate such an assessment and (4) Savings and Loan Groups (SLGs) which were mainly mobilized under Community Savings and Investment Promotion (COMSIP) Village Savings and Loan (VSL) approach. Across the affected districts COMSIP mobilized 70,436 members with total accumulated savings of MK 2 003 456 828, of which close to three quarters (72%) were women.

Damage and loss

81. Due to the rapid nature of a PDNA and data limitations, damages were easily quantifiable for SCTP and SMP. Slightly over three quarters or 122,687 SCTP beneficiary households located in the affected districts (see Annex Figure 9) have lost some household assets acquired through cash transfers; SCTP passbooks to enable them get payments and national ID cards for ease of identification. SCTP operations have been affected through damages to public buildings used for service/ payments delivery, as well as increased fuel costs due to some roads’ inaccessibility. Total SCTP operational losses are US\$9,434. In addition, destruction to community assets (rural roads) that were created through public works was also registered, however this has been taken up as part of the transport infrastructure assessment. School meals program has been affected through damages to school kitchens and lost school meals food stuff, a total loss of US\$28,500. Accessibility challenges have also affected group mobilization to facilitate VSL transactions and most likely will result

Annex Figure 9: Affected Social Protection Beneficiaries by Program.



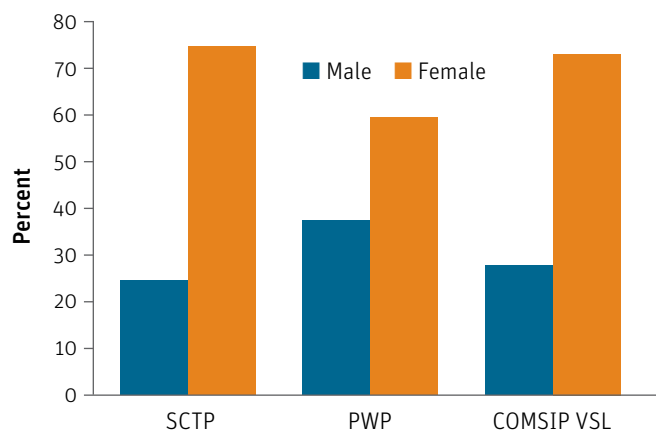
in increased default rates on loaned amounts. Despite this, it is largely expected that with moderate effect on key safety net operations, regular safety nets will continue providing benefits, especially SCT.

Social-Economic impact

82. Considering the dominance of female beneficiaries in key social protection interventions (75% for Sctp; 72% for VSL and 61% for PWP); the effects of floods on social protection beneficiaries have disproportionately fell more on women, refer to Annex Figure 10 below. Those with existing vulnerabilities, including those

with chronic illnesses and disabilities who for instance make up more than half of Sctp beneficiaries in the affected districts were further exposed to the impact of the floods. Negative impact on markets accessibility and functionality also has potential risk of driving higher market prices within the localized economies thereby eroding social protection beneficiaries-who are among the poorest-of their purchasing power. Damages to other socio and economic infrastructure such as roads, schools and health centres also weakened complementary linkages between social protection and other socio-economic interventions. Ultimately general welfare and livelihoods of the already poor social protection beneficiaries was most likely negatively affected.

Annex Figure 10: Affected Social Protection Beneficiaries by Gender.



Recommendations

83. Going forward it is crucial that the following key recommendations and recovery needs (see Annex Table 14) are considered

- Develop and implement expanded safety net or “Cash Transfer Plus” programs as a platform for complementing disaster response and building household level resilience crucial to minimizing impacts of disasters.
 - In the short term, ensure that safety nets become more shock responsive, allowing flexibility for both vertical-delivering higher benefits to existing

Annex Table 14: Social Protection Recovery Strategies.

Sub-sector- Social Protection	Program of Activity	Value (in US\$)	Responsible Agency
Short to medium term	Vertical expansion of Sctp for existing affected beneficiaries	5,305,384.00	Ministry of Gender, Children, Disability and Social Welfare
	Horizontal expansion of Sctp to additional 122,687 Households	10,047,070.00	Ministry of Gender, Children, Disability and Social Welfare
	Build SMP kitchens destroyed by floods	28,500.00	Ministry of Education, Science and Technology
Medium to long term	Expand and modernize Social registry (Unified Beneficiary Registry (UBR)) to enable rapid identification and assessments.	94,594.00	Department of Economic Planning and Development
Long term	Complement Safety Nets (Sctp & PWP) with Livelihoods Interventions (Expanded Safety Nets)	40,540.00	Department of Economic Planning and Development
	Establish Contingency Financing Mechanism linked to Sctp to ensure rapid Sctp vertical & horizontal expansion during disasters	13,513,513.00	Department of Economic Planning and Development
Total		29,029,601.00	

beneficiaries- and horizontal- reaching out to an increased number of beneficiaries-expansion during disasters.

- In the medium term complement safety nets with productive inclusion interventions, especially higher income earning and climate resilient livelihood interventions that minimizes household negative coping strategies during disasters.
- In the medium to long term, expand and modernize social protection delivery systems including the social registry (Unified Beneficiary Registry) and payment mechanism for faster targeting and delivery of benefits to affected households in post-disaster settings.
- In the long term, develop and implement a contingency financing window linked to safety net interventions. To this end, such a contingency financing mechanism is proposed to provide immediate resources for rapid vertical and horizontal scale-up of the SCTP. This would enhance the instruments propping up Malawi's Disaster Risk Financing strategy.

Cross Cutting Issues

84. The majority of households affected by the 2015 floods had not yet fully recovered or implemented measures to enhance their resilience³² before the 2019 disaster struck. Malawi's total population stands at 17.5 million, of whom 49.0 percent are male and 51.0 percent are female. Children below the age of 18 constitute 51 percent of the population, while people with disabilities account for 7.4 percent.³³ The average household consists of 4.4 people,³⁴ with 31 percent of these households being headed by females.³⁵ Literacy rates for those aged between 15-24 years has 69 percent for males and 58 percent for females.³⁶ The infant mortality rate stands at 42 per 1000 live births,³⁷ with the maternal mortality rate at 439 per 100,000 live births.³⁸ Overall, 22 percent of farming households

are headed by females.³⁹ On average, female farmers are 28 percent less productive than their male counterparts, due to their relative lack of access to land, labor, knowledge, fertilizer, improved seeds and mechanization. A female worker works for an average of 16 to 17 hours per day, spending 10 times as much time as men on housework.⁴⁰ In a survey, 69 percent of women reported that in the pre-disaster period, their husbands made decisions related to major household purchases without their input.⁴¹

85. According to the Malawi Demographic Health Survey, 28.2 percent of women aged 15-49 have experienced physical violence and 25.3 percent women aged 15-49 experience have experienced sexual violence in their lifetime. According to the Violence Against Children Study, 42.4 percent of girls and 64.5 percent of boys have experienced physical violence and 21.8 percent girls and 14.8 percent boys have experienced sexual violence or abuse. The management of SGBV cases is estimated to cost Malawi at least MK 877 million (US\$ 2,698,462) per year.

Effects of the Disaster

86. Disasters tend to have a disproportionate impact on women, older people, and people with disabilities, children and other vulnerable groups compared to other segments of the population. The inter-agency assessment baseline findings show that in the districts Machinga, Mangochi, Balaka and Zomba, 63 percent of the female population and only 37 percent of the male population was affected by the disaster, with the disaster also having a disproportionate impact on people with disabilities. The assessment also shows that 77 percent of households that were beneficiaries of the Social Cash Transfer Programme (SCTP) and 1.2 percent children that were beneficiaries of the School Meal Program (SMP) had also been affected. Despite inadequate disaggregated data, a rapid analysis shows that women are less likely to be able to engage in income generating activities due to lack of opportunities and loss of livelihoods assets.

87. There is an increased risk of SGBV in the IDP camps, due to the crowded conditions, lack of adequate

³² World Bank 29/11/2016; Burunga 11/3/2019; GFDRR 2015.

³³ World Bank Report - 2010.

³⁴ Integrated Household Survey. 2010-2011. Republic of Malawi. http://siteresources.worldbank.org/INTLSMS/Resources/3358986-1233781970982/5800988-1271185595871/IHS3_Report.pdf. 8

³⁵ DHS 2015.16

³⁶ Ibid. 5

³⁷ Malawi Demographic and Health Survey: Key Indicators. 2015-16. <https://dhsprogram.com/pubs/pdf/PR73/PR73.pdf>. 20.

³⁸ 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.

³⁹ CARE Gender in Brief.

⁴⁰ Closing the Gender Gap in Agriculture, UNW and PEI.

⁴¹ CARE International.

lighting and shortage of basic needs. All of these factors increase the risk of violence and other threats to women, children, the elderly and PWDs. Annex Table 15 presents a breakdown by district of the number of PWDs affected by the floods. Women, PWDs and the elderly are particularly vulnerable to the financial effects of the floods, as many of them operate shops and other micro-businesses from their houses to generate income. With the lack of housing insurance schemes for the general population, rural women and members of vulnerable groups have no social or institutional safety nets to protect them in cases such as this.

Annex Table 15: Table of affected people with disabilities by 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

88. Despite their vulnerabilities and their disproportionate exposure to risk, the aftermath of the emergency and the early recovery phase creates new opportunities for measures to promote more progressive gender roles and relationships. This will be achieved by implementing gender responsive disaster management and preparedness, with equitable access to decision making, livelihoods and service delivery.

89. In the 15 flood-affected districts, it is estimated that there were a total of 4737 people with disabilities, of whom 43 percent were male and 57 percent were female. These disabilities included albinism, physical impairment, visual impairment, hearing impairment, epilepsy, psychiatric impairment and intellectual disability. Therefore, it will be necessary to implement specific measures to meet the needs of these people. To achieve this, the recovery program should be designed and implemented on the basis of an affirmative approach, with targeted actions and with participation of civil society actors with specialized expertise and the communities.

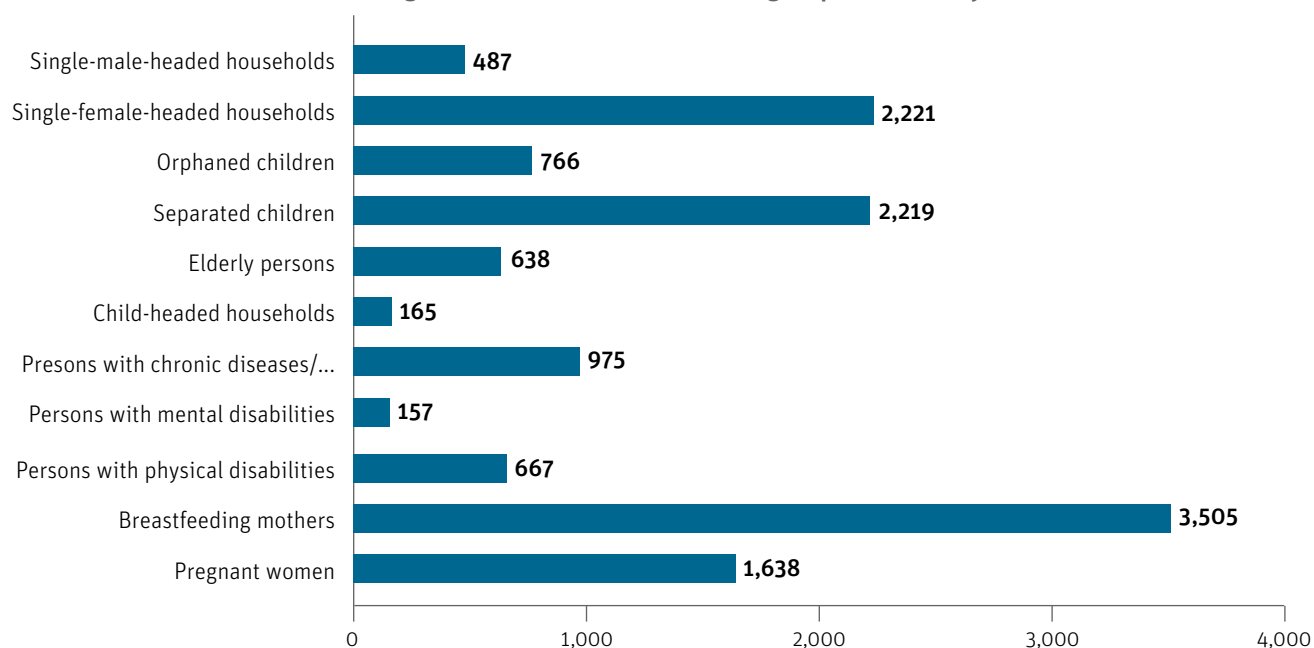
90. In addition, the elderly also face additional challenges in accessing livelihood opportunities because of age discrimination or lack of recognition and underutilization of their skills. Therefore, there is emerging need to consider the elderly as a special group during the recovery programming.

91. The health sector also remains seriously affected by the impact of the disaster, including through its impact on maternity homes and under five shelters. The data analysis from 64 camps in four districts shows that a total 13,438 extremely vulnerable individuals will require special medical attention during the recovery phases (See Annex Figure 11).

92. It has been noted that the number of reported cases of STIs was significantly higher in March 2019 (12,368) than in March 2018 (11,665). In 2019, the proportion of females who were affected was 41 percent higher, while the proportion of males who were affected was 15 percent higher. This disparity can be attributed partially to the fact that significant number of women and girls have adopted negative coping mechanisms, including engaging in sexual transactions in exchange for food or money. This reflects girls' and women's' increased vulnerabilities due to poverty and decreased agency, particularly in the case of adolescent girls, as a result of the disaster.

93. The floods have heavily affected the housing sector, as indicated by the figure below. During the recovery programming, immediate affirmative action will be required to meet the special needs of members of vulnerable groups, including single female-headed households, widows, child-headed households and people with disabilities. Annex Table 16 shows key cross cutting sectoral recovery needs.

Annex Figure 11: Number of vulnerable groups affected by floods



Annex Table 16: 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	29,361,673.00
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	50,608,417.00

Cross Cutting Sector Recovery Strategy

94. The Ministry of Gender, Children, Disability and Social Welfare (MoGCDSW) will take the lead role in the area of cross-cutting sector coordination, planning, programming, implementation, monitoring and accountability, with the involvement of relevant stakeholders, including government ministries, donors and partners.
95. The cross-cutting sector strategy will be implemented to ensure that national-level plans, policies, institutions and budgets reflect the Government's commitments to gender equality and are translated into tangible benefits for women and members of vulnerable groups. The post-disaster recovery presents an opportunity to begin to redress inequalities or, at the very least, not to perpetuate unequal access to power and resources through the allocation of recovery financial and human resources. Therefore, it is recommended 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.
96. The team for crosscutting issues as formulated the following recommendations:
- **The Need for Sex, Age and Vulnerability Disaggregated Data:** There is a need for adequate mechanisms to ensure the collection and use of sex, age and vulnerability disaggregated data and for gender analysis to facilitate effective recovery planning and programming. There is a need to design and conduct gender-specific rapid assessments to provide updated baselines and recommendations to meet needs of women and members of other vulnerable groups amongst the affected population to promote social protection and sustainable livelihoods in key productive sectors.
 - **Ensuring effective social protection and responses to SGBV:** To address the increased risk of SGBV, there is a need to strengthen the community policing structure through the provision of alternative livelihoods to ensure and sustain monitoring. There is a need for the institutional representation of vulnerable groups in all recovery programs to ensure they receive a fair share of the benefits from the recovery intervention.
 - **Economic empowerment:** There is a need for a non-conditional cash transfer support program that targets most vulnerable households to reduce the pressure to adopt negative coping mechanisms and to institutionalize the gender responsive budgeting mechanism. Small-scale income generating activities should be revitalized through VSLs and other structures. MFIs and commercial banks should be engaged to create specific products for women to ensure their access finance. Measures should be developed to support women and vulnerable groups, to promote access to and control over land, including through ownership and tenure rights.
 - **Support for people with disabilities:** Rehabilitation centers for PWD should be supported to provide assistive devices, skill development programs and livelihood enhancement support. Specific efforts should also be made to ensure that PWD have access to identity documents. Financial assistance and other forms of support, including protective sunscreen and specialized classes, should be provided to people with albinism. People living with HIV/AIDS should be provided with special support to ensure the sustained access to antiretroviral therapy.
 - **Support for the elderly:** Elderly people's associations in the affected districts should be provided with financial and other support to ensure that measures to facilitate food security and resettlement take account of the special needs of this group. There should be institutional representation of vulnerable social groups in all recovery programs to ensure that members of these groups receive a fair share of the benefits from the recovery interventions.
 - **Support for gender equality and social inclusion:** A well-resourced Gender Equality and Social Inclusion (GESI) Unit should be established under the Department of Disaster Affairs Management (DoDMA) and aligned with Ministry of Gender, Children, Disability and Social Welfare (MoGCDSW) to support effective and well-coordinated gender responsive planning, implementation, monitoring and evaluation processes, with a clear definition of this unit's role and responsibilities.
 - **Shelter:** Support should be provided for the construction of individual houses, with priority given to meeting the needs of female-headed households, child-headed households, and households headed by the elderly, people with disabilities, the chronically ill, and/or other vulnerable groups. Measures should be taken to build awareness regarding safer house construction guideline,

with gender-responsive DRR for members of affected communities in all local languages. IEC material should be developed, with pictorial messages and charts for affected women and members of vulnerable groups and with effective dissemination mechanisms. Affirmative action mechanism should be developed for people with multiple vulnerabilities, with additional cash grants for construction to be used for skill and unskilled labor.

- **Health:** Mobile health units should be deployed at targeted locations to ensure safe deliveries for pregnant women. Special nutritional support should be provided to pregnant and lactating women and children. Dignity kits should be provided to adolescent girls and women.
- **Environment:** Measures should be taken to build the capacity of communities in soil and water conservation

technologies and high energy saving technologies. Environment screening should be conducted, with the development and monitoring of ESMPs at all rehabilitation works. A Community Resilience Adaptation Fund should be established.

- **Education:** Second-chance educational activities should be provided to women and the elderly, including adult literacy programs. Gender-disaggregated WASH facilities should be installed in schools and EDC centers. Education continuation scholarships should be provided to vulnerable children. All schools designed should be prepared and approved by certified engineers, with consideration given to DRR to protect children from additional harm and to ensure the sustainability of the facilities.

Annex II: Distribution of Damage and Loss across districts

Annex Table 17: Distribution of Social Sector Damage and Loss in Million US\$ across districts

District	Housing		Health		Education		-Total social effects
	Damage	Loss	Damage	Loss	Damage	Loss	
Dedza	3.44	0.91	0.00	0.03	0.35	0.03	4.75
Ntcheu	3.1	0.82	0.01	0.02	5.14	0.02	9.11
Mangochi	1.82	0.39	0.00	0.12	0.34	0.01	2.68
Machinga	17.01	4.89	0.00	0.06	3	0.03	24.98
Zomba	7.65	2.43	0.01	0.1	0.55	0.04	10.78
Chiradzulu	6.75	2.36	0.01	0.04	0.28	0.03	9.47
Blantyre	5.94	1.3	0.04	0.05	0.26	0.03	7.61
Mwanza	1.8	0.54	0.00	0.01	1.08	0.01	3.44
Thyolo	5.7	1.94	0.00	0.02	0.27	0.00	7.94
Mulanje	3.61	1.15	0.00	0.17	0.65	0.03	5.61
Phalombe	7.42	2.59	0.09	0.08	6.05	0.03	16.26
Chikwawa	4.48	1.26	0.02	0.08	0.4	0.02	6.26
Nsanje	4.07	1.15	0.02	0.07	0.13	0.15	5.58
Balaka	2.08	0.43	0.00	0.04	0.69	0.00	3.24
Neno	1.51	0.33	0.00	0.02	0.6	0.04	2.49
Zomba City	0.38	0.15	0.00	0.2	0.01	0.00	0.75
Blantyre City	5.94	1.3	0.00	1.31	0.49	0.28	9.33
Total	82.71	23.93	0.19	2.42	20.29	0.75	130.29

Annex Table 18: Distribution of Productive Sector Damage and Loss in Million US\$ across districts

District	Crops		Livestock		Irrigation		Fisheries		Commerce and Industry		Total Productive sector effects
	Damage	Loss	Damage	Loss	Damage	Loss	Damage	Loss	Damage	Loss	
Dedza		0.59	0.00	0.11	0.16	0.2	0.00	0.00	0.00	0.04	1.12
Ntcheu		1.08	0.04	0.32	0.08	0.93	0.00	0.02	0.00	0.00	2.46
Mangochi		0.38	0.02	0.2	0.17	0.34	0.00	0.00	0.03	0.01	1.15
Machinga		0.97	0.02	0.2	0.55	0.05	0.00	0.09	0.06	0.01	1.94
Zomba		0.34	0.11	0.39	0.37	0.94	0.03	0.27	0.01	0.03	2.5
Chiradzulu		0.01	0.00	0.18	0.11	0.01	0.00	0.00	0.00	0.09	0.4
Blantyre		0.18	0.00	0.35	0.07	0.08	0.02	0.12	0.00	0.01	0.82
Mwanza		0.17	0.01	0.21	0.13	0.01	0.00	0.00	0.01	0.03	0.56
Thyolo		0.38	0.00	0.19	0.36	2.79	0.01	0.01	0.01	0.04	3.79
Mulanje		1.01	0.00	0.15	0.05	0.15	0.00	0.00	0.01	0.04	1.42
Phalombe		3.5	0.08	0.64	0.15	0.00	0.00	0.00	0.04	0.09	4.52
Chikwawa		1.19	0.06	2.77	1.02	2.72	0.05	0.34	0.05	0.00	8.2
Nsanje		0.92	0.19	1.56	0.71	1.19	1.69	0.55	0.06	0.00	6.87
Balaka		0.28	0.01	0.12	0.13	0.14	0.00	0.00	0.01	0.37	1.05
Neno		0.12	0.01	0.27	0.15	0.06	0.00	0.00	0.01	0.00	0.62
Zomba City		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	0.98	0.98
Blantyre City		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.02
Total		11.11	0.55	7.66	4.2	9.61	1.81	1.4	0.32	1.75	38.41

Annex Table 19: Distribution of Infrastructure Sector Damage and Loss in Million US\$ across districts

Districts	Transport		Energy-Electricity		WASH		Water Resources		Total Infrastructure sector effects
	Damage	Loss	Damage	Loss	Damage	Loss	Damage	Loss	
Dedza	0.4	0.00	0.00	0.00	0.11	0.0	-	0.00	0.51
Ntcheu	0.23	0.00	0.00	0.00	0.17	0.01	0.13	0.00	0.54
Mangochi	2.85	0.32	0.00	0.00	0.15	0.0	1.88	0.00	5.2
Machinga	1.7	0.00	0.00	0.00	0.14	0.01	0.00	0.00	1.86
Zomba	1.53	0.00	0.0	0.00	0.23	0.01	0.3	0.00	2.07
Chiradzulu	1.56	0.00	0.00	0.00	0.23	0.0	0.23	0.00	2.03
Blantyre	2.17	0.00	0.07	0.31	0.19	0.0	0.4	0.00	3.14
Mwanza	1.89	0.00	0.00	0.00	0.47	0.0	0.00	0.00	2.36
Thyolo	2.44	0.00	0.00	0.00	0.21	0.47	0.00	0.00	3.12
Mulanje	0.27	0.00	0.01	0.00	0.31	0.48	0.13	0.00	1.2
Phalombe	2.44	0.00	0.00	0.00	0.32	0.46	1.53	0.00	4.76
Chikwawa	5.43	0.51	2.69	0.00	0.57	0.48	0.43	0.00	10.12
Nsanje	10.11	0.03	0.02	0.00	0.27	0.47	0.01	0.00	10.92
Balaka	0.32	0.00	0.00	0.00	0.15	0.0	0.00	0.00	0.47
Neno	1.05	0.00	0.00	0.00	0.16	0.0	0.0	0.00	1.22
Zomba City	0.00	0.00	0.00	0.00		0.01	0.00	0.00	0.01
Blantyre City	1.72	0.00	0.00	0.00	0.02	0.23	0.00	0.00	1.97
Total	36.1	0.87	2.79	0.31	3.72	2.65	5.05	0.00	51.49

Annex Table 20: Distribution of Total Effects of Floods in Million US\$ across districts

Districts	Commerce and Industry										Total		
	Housing	Health	Education	Crops	Livestock	Irrigation	Fisheries	Industry	Transport	Energy-Electricity		Water Resources	WASH
Dedza	4.35	0.03	0.37	0.59	0.11	0.37	0.00	0.04	0.40	0.00	0.00	0.12	6.4
Ntcheu	3.92	0.03	5.16	1.08	0.35	1.01	0.02	0.00	0.23	0.00	0.13	0.18	12.1
Mangochi	2.22	0.12	0.34	0.38	0.22	0.51	0.00	0.04	3.17	0.00	1.88	0.15	9.9
Machinga	21.90	0.06	3.03	0.97	0.22	0.60	0.09	0.07	1.70	0.00	0.00	0.16	28.8
Zomba	10.08	0.11	0.59	0.34	0.51	1.31	0.30	0.04	1.53	0.00	0.30	0.23	15.3
Chiradzulu	9.11	0.05	0.31	0.01	0.18	0.12	0.00	0.09	1.56	0.00	0.23	0.24	11.9
Blantyre	7.24	0.08	0.29	0.18	0.35	0.14	0.14	0.01	2.17	0.38	0.40	0.19	11.6
Mwanza	2.34	0.01	1.09	0.17	0.22	0.13	0.00	0.04	1.89	0.00	0.00	0.47	6.4
Thyolo	7.64	0.02	0.28	0.38	0.19	3.15	0.02	0.05	2.44	0.00	0.00	0.68	14.9
Mulanje	4.76	0.17	0.68	1.01	0.15	0.20	0.00	0.05	0.27	0.01	0.13	0.78	8.2
Phalombe	10.02	0.16	6.08	3.50	0.72	0.16	0.01	0.13	2.44	0.00	1.53	0.79	25.5
Chikwawa	5.74	0.10	0.42	1.19	2.83	3.74	0.39	0.05	5.94	2.69	0.43	1.05	24.6
Nsanje	5.22	0.09	0.28	0.92	1.75	1.90	2.25	0.06	10.15	0.02	0.01	0.74	23.4
Balaka	2.51	0.04	0.69	0.28	0.12	0.27	0.00	0.38	0.32	0.00	0.00	0.15	4.8
Neno	1.84	0.02	0.64	0.12	0.28	0.21	0.00	0.01	1.05	0.00	0.00	0.17	4.3
Zomba City	0.53	0.20	0.01	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.01	1.7
Blantyre City	7.24	1.31	0.78	0.00	0.00	0.00	0.00	0.02	1.72	0.00	0.00	0.25	11.3
Total	106.64	2.61	21.04	11.11	8.21	13.81	3.21	2.07	36.97	3.10	5.05	6.36	220.2



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