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Monographic issue

Mozambique's Disaster Risk Profile

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Letter from the editors

The Emergency and Disaster Reports is a journal edited by the Unit for Research in Emergency and Disaster of the Department of Medicine of the University of Oviedo aimed to introduce research papers, monographic reviews and technical reports related to the fields of Medicine and Public Health in the contexts of emergency and disaster. Both situations are events that can deeply affect the health, the economy, the environment and the development of the affected populations.

The topics covered by the journal include a wide range of issues related to the different dimensions of the phenomena of emergency and disaster, ranging from the study of the risk factors, patterns of frequency and distribution, characteristics, impacts, prevention, preparedness, mitigation, response, humanitarian aid, standards of intervention, operative research, recovery, rehabilitation, resilience and policies, strategies and actions to address these phenomena from a risk reduction approach. In the last thirty years has been substantial progress in the above mentioned areas in part thanks to a better scientific knowledge of the subject. The aim of the journal is to contribute to this progress facilitating the dissemination of the results of research in this field.

This monographic issue is about disaster risk profile of Mozambique.

Mozambique is a country at the southeastern African coast in tropical and subtropical latitudes, bordering Tanzania, Malawi, Zambia, Zimbabwe, Swaziland and South. Its 2700km-long coast is limited by the Indian Ocean section known as the Mozambique Channel. The country is estimated to have a surface of 799,380 km².

Due to its climate and geographical situation, and considering the actual climate change, Mozambique is prone to various hazards of different types. The actual number of hazards has increased in the past decades.

The present monographic issue gave an overview of the various hazards and corresponding vulnerabilities across the country and the national disaster risk management.

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Acronyms

CENOE	National Operating Center in Emergencies
CERUM	Center for Resources and Multiple Use
CRED	Center for Research and Epidemiology of Disasters
DPPCN	Department for Prevention and Fight of Natural Disasters
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EM-DAT	Emergency Database
ENAMMC	National Strategy for Climate Change Mitigation
ENSO	El Niño Southern Oscillation
Frelimo	Mozambique Liberating Front
GACOR	Coordination Cabinet of the INGC
GDP	Gross domestic Product
HDI	Human Development Index
HFA	Hyogo Framework for Action
HIV	Human Immunodeficiency Virus
INAM	National Weather Institute
INE	National Statistics Institute
INGC	National Institute for Disaster Management
Km	Kilometer
km ²	Squared Kilometer
MDG	Millennium Development Goals
MEA	Ministry of External Affairs
MSA	Ministry of State Administration
OCHA	Office for Coordination of Humanitarian Assistance
PARPA	Plan for Absolute Poverty Reduction
PDPMCN	Director Plan for Prevention and Mitigation of Natural Disasters
Renamo	Mozambique National Resistance
UN	United Nations
UNAPROC	National Unit for Civil Protection
UNDP	United Nations Development Program
US	United States of America
USAID	United States Agency for International Development
USD	United States Dollar
WHO	World Health Organization

Overview

Mozambique, a former Portuguese colony in southeast Africa, is one of the poorest countries in the world, but with one of the fastest growing economies. Since its independence in 1975, Mozambique has been battered by civil war, economic mismanagement, and an increasing number of natural disasters.

The present disaster risk profile aims for a quantitative and integrative description of the disaster situation and management in the country of Mozambique. It may be seen as a support document for planning and intervention at different levels. It will shortly contextualize the country in a geographical, climatological, demographical and economical perspective. Then, it will identify disasters occurred in the past 50 years, as well as their impact, and detect risk and vulnerabilities. Finally, it will revise actual strategies and policies for disaster risk reduction and make recommendations for improvement.

This document has been developed using secondary data obtained from the databases and literature reviews. Data and information were collected from official national and international institutions. Population, economic and health statistics were retrieved from the National Statistics Institute (*Instituto Nacional de Estatística* – INE), the World Bank Database, the World Health Organization (WHO). Disasters classification, information and statistics were mainly assessed through international databases, mainly the Emergency Database (EM-DAT) of the Center for Research and Epidemiology of Disasters (CRED). Other disaster Databases were used to fill some information gaps, such as DESINVENTAR and Glide.

National documents issued by the Mozambican National Institute for Disaster Management (*Instituto Nacional de Gestão de Calamidades* – INGC) were reviewed. Legal Documents were found in the country's Official Journals of the Republic archives.

A thorough review of the available literature, official documents and reports was executed. Scientific articles were retrieved from the Science Web tool. Technical reports, factsheets, audits, manuals, and other information materials were obtained by thorough exploration of Prevention Web, Relief Web, WHO, INE, InfoRM, and Google websites. National social communication media, government-dependent and independent, were also assessed. Finally, national health documents and plans, as well as some health-related academic projects, were kindly provided by the Lisbon Institute of Hygiene and Tropical Medicine.

I. Country Context

1. Geography

Mozambique is a country at the southeastern African coast in tropical and subtropical latitudes, bordering Tanzania, Malawi, Zambia, Zimbabwe, Swaziland and South. Its 2700km-long coast is limited by the Indian Ocean section known as the Mozambique Channel. The country is estimated to have a surface of 799,380 km². Maputo, formerly known as Lourenço Marques under Portuguese colonization, is Mozambique's capital and biggest city.

The Zambeze River divides the country in two different topographical regions. The north of the Zambeze River is characterized by a wide plateau and hills in the inlands, and a narrow coastal strip, which is surrounded by choral riffs. There are highlands further west, from the Great Rift Valley. The Southern part is characterized by wide coastal lowlands, covered by savannah and cut by rivers' valleys. There are 10 river systems, many of them international, that cross the country from west to east and drain into the Indian Ocean (1).

Administratively, Mozambique is divided in 10 provinces, which in their turn are divided in districts. The 10 provinces are, from north to south: Cabo Delgado, Nampula, Niassa, Zambeze, Tete, Sofala, Manica, Inhambane, Gaza and Maputo province, being Niassa the widest of them all. The 10 provinces are then subdivided into 129 districts. The city of Maputo is often considered as a province itself, therefore it is frequent to refer to Mozambique as having 11 provinces (2).

2. Climate

The climate in Mozambique varies from sub-tropical to tropical, from south to north. It is influenced by the Indian Ocean monsoons and the warm current from the Mozambique Channel. Dry season occurs from May to September, rainy season is between October and April (3). The average annual precipitation is 1200mm (4). The northern region is more humid and experiences heavy rains more often, whereas the southern region is drier and can experience many months without relevant precipitation.

The climate in Mozambique is highly influenced by the El Niño and La Niña events. El Niño events are associated with droughts especially in Southern and Central provinces, whereas La Niña events are associated with heavy rain. Mozambique is prone to heavy rainfall specially in river catchment areas, but also due to tropical cyclones that travel up the Mozambique Channel during the wet seasons (5).

Because of its climate and geographical situation, and considering the actual climate change, Mozambique is prone to various hazards of different types. The actual number of hazards has increased in the past decades (6).

3. History, Independence and Civil War (7,8)

The first inhabitants of Mozambique were hunters and collectors, ancestors of the Khoisani people. Between the 1st and 4th centuries A.D., people speaking the Bantu language migrated from the north through the Zambeze river valley, and gradually occupied the plateaus and coastal areas.

The Portuguese arrived at the eastern African coast in the beginning of the 16th century, and ruled the country for more than five centuries.

In 1962 the *Frente de Libertação de Moçambique* (Mozambique Liberation Front - Frelimo) was founded to free the country from the Portuguese colonial rule, and it led the fight for independence. After the military revolution in Portugal in 1974, there was a transition government between the Portuguese authorities and the Frelimo. In 1975 Independence was declared with Frelimo in the power, being its leader Samora Machel the first president of Mozambique.

Initially, the Frelimo followed Marxist-Leninist ideologies, and it was violently fought against by the National Resistance of Mozambique, the Renamo, founded in 1976 with the support of the Rhodesian Government. When the minority regime from Rhodesia was removed from the power, Renamo was supported by South Africa. This led to a 17-year civil war and to an extended period of destabilization by South Africa.

The war resulted in at least one million deaths and devastated many parts of the country and its already fragile infrastructure. Over one third of the population was displaced at some point, and 1.7 million lived as refugees in neighboring countries. Sixty percent of primary schools and 40 percent of primary health posts were destroyed.

The South African politic changes and the change of Frelimo's ideology helped reaching a peace agreement, signed in Rome in 1992. Elections were held in 1994 and the United Nations (UN) supervised the return of refugees and internally displaced people, and the demobilization of 92,000 ex-combatants.

Since then, there have been many times of political instability due to hostilities between the Renamo and the elected government. In October 2013 the peace agreement was broken by the Renamo resulting in an armed conflict that lasted until August 2014.

4. Demographics

According the Mozambican National Statistics Institute (*Instituto Nacional de Estatística* – INE), the country's population in 2014 was estimated to be of 25,041,922. The population has been growing considerably in the past decades, with an average estimated yearly population growth of 2,7% in the last eight years.

In 2014, more than half of the population was under 20 years old, and less than 20% over 40 years old. The total life expectancy at birth in 2014 is estimated to be 53,5 years; 55,6 years for women and 51,3 years for men (9).

Around 68% of Mozambique's population live in rural areas, but the urban population growth is higher than for the rural population. Sixty percent of the population is concentrated in the coastline and this number is only expected to increase, because it is where the main cities are located (4,6,10).

The total population density of Mozambique is 30 inhabitants per km². The city of Maputo, however, has an estimated population density of 4,033 inhabitants per km² (4).

5. Economy

Ranked 178 out of 187 countries in the Human Development Index and being part of the low income group, Mozambique is one of the poorest countries in the world (11).

However, it is one of the fastest growing economies of the world, with growth rates of Gross Domestic Product (GDP) between 6 and 7% since 2007 (4). The country's economy is mainly based on agriculture products such as sugar, cashews, and oil-bearing seeds, but new sectors such as extractive industry and energy have emerged lately and gained weight for the country's GDP (4,10). The rural majority of the population lives mainly on subsistence agriculture and natural resources, which does not make it productive or efficient enough to be competitive (6,10,12).

Mozambique has received high levels of international donor support and is substantially dependent on foreign assistance, with over 50% of its public spending and about two thirds of public investment coming from external sources (13).

II. Natural Disasters

Because of its climate and geography, Mozambique is highly prone to many kinds of natural disasters.

Since 1965, there are 99 registered natural disasters in Mozambique in the CRED/EM-DAT database. The histogram in figure 1 shows the annual number of natural disasters in Mozambique in the last 50 years. An increasing trend of number and frequency of natural disasters can be perceived (14).

The Mozambican National Institute for Disaster Management (*Instituto Nacional de Gestão de Calamidades – INGC*) reported that the number of natural disasters has more than doubled in the last decade (6).

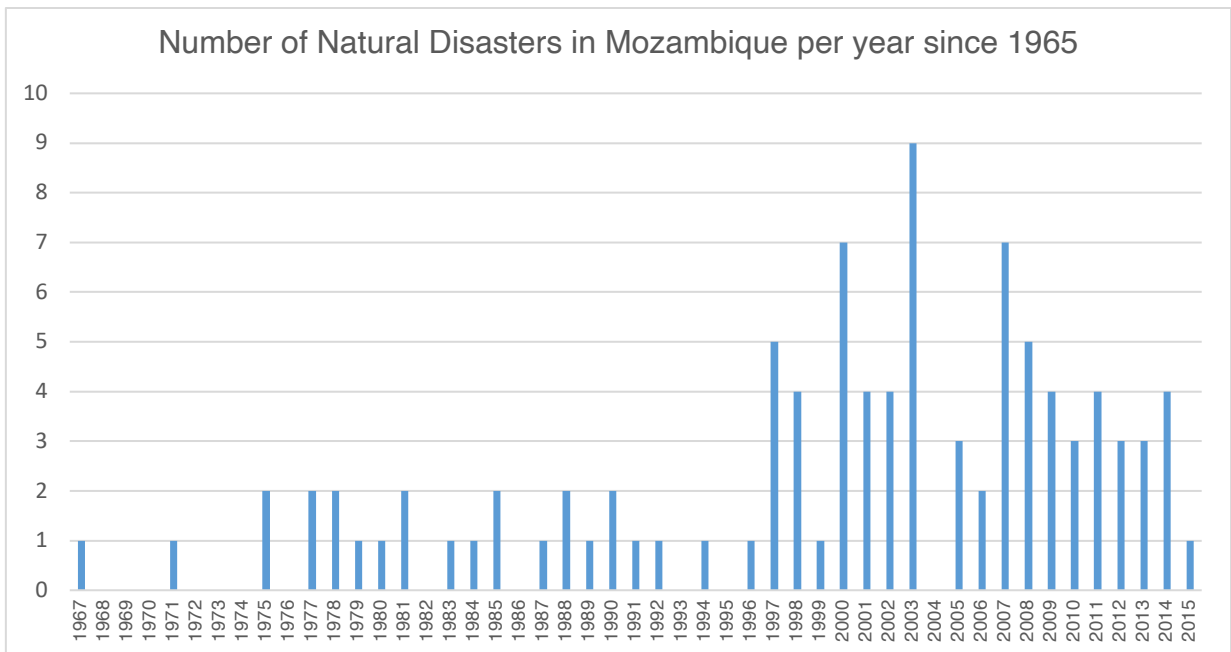


Figure 1: Number of Natural Disasters in Mozambique per year since 1965
(Source of Data: CRED/EM-DAT, 2015)

According to climate and geographical characteristics, the type of disasters varies according to the region. Central provinces are more prone to floods, tropical cyclones, and epidemics, followed by northern provinces, whereas the Southern region is more frequently affected by droughts (15).

Floods are the most frequent natural disasters in the country, with 35 occurrences in the last 50 years. Epidemics, with 27 occurrences, follow immediately after. Storms (including tropical cyclones) and droughts are respectively the third and fourth most frequent hazards. The 2006 earthquake in Mozambique was the only reported one in the last 50 years

Droughts alone are the deadliest event mainly because the severe 1981 drought was a very prolonged one, that lasted more than one year. In events with shorter duration, floods and epidemics are the deadliest ones (14).

The tables show the top 10 major disasters regarding deaths, affected and estimated economical losses. Caution must be taken when looking at the

presented economic losses, which are very unreliable and based on assistance appeals made by the government after the event (16).

The impact of disasters on development, particularly on the Millennium Development Goals (MDG) efforts to eradicate extreme poverty and hunger and to ensure environmental sustainability is very evident in Mozambique.

Table 1: Effects of the 10 major Disasters in Mozambique between 1965 and 2015

Total Deaths 1965-2015 (10 major reported events)			Total Affected 1965-2015 (10 major reported events)			Total Damage 1965-2015 (10 major reported events)		
Year	Disaster type	Deaths	Year	Disaster type	Affected	Year	Disaster type	Damage (x1000 USD)
1981	Drought	100,000	1979	Drought	6,000,000	2000	Flood	419,200
2000	Flood	800	1981	Drought	4,750,000	1967	Flood	180,000
1990	Epidemic	694	2000	Flood	4,500,000	2007	Flood	100,000
1997	Epidemic	637	1991	Drought	3,300,000	1984	Storm	75,000
1992	Epidemic	587	1994	Storm	2,502,000	2007	Flood	71,000
1971	Flood	500	2005	Drought	1,400,000	1978	Flood	63,000
1977	Flood	300	2002	Drought	600,000	1977	Flood	55,500
1994	Storm	240	2001	Flood	549,326	1991	Drought	50,000
1998	Epidemic	209	2007	Drought	520,000	2001	Flood	36,000
1983	Epidemic	189	1971	Flood	500,000	2013	Flood	30,000

Source of Data: CRED/EM-DAT, 2015

1. Floods

Floods are the most frequent hazards in Mozambique. Many times, they occur very fast and have a short duration – flash floods. However, the 2000 floods show their potential to affect great proportion of the population. The January 2015 floods alone resulted in 163 deaths, 370,906 affected people, 52,714 internally displaced persons and an estimated post flood recovery and reconstruction plan of 423 million USD by the humanitarian country team (17). Several studies show that flood events cause an average annual reduction in GDP of about 0.5 points in Mozambique (18).

The impact of flooding on health cannot be minored, as it is associated with outbreaks of communicable diseases that also become a natural hazard. Cholera and Malaria epidemics are well-known to increase their incidence after heavy rains (6,19).

The 2000 and 2001 floods

Mozambique's floods in 2000 were the result of a succession of tropical storms, with depression Connie in the beginning of February followed by cyclones Eline and Gloria later that month. Heavy and persistent rain across southern Africa resulted for the first recorded time in the simultaneous flooding of the Limpopo, Incomati, Umbeluzi, Save, Buze and Pungoe rivers. At least 800 people died and 4.5 million were affected, totaling about a quarter of Mozambique's population. Around 650,000 were displaced (14).

The flooding devastated the agriculture sector, partly because of its prolonged duration: 140,000 hectares of crops were destroyed or seriously damaged, irrigation systems were destroyed, an estimated 350,000 livestock were lost or seriously injured, and 6000 fishermen lost 50% of their boats and gear (20). These floods led to a reduced GDP for the subsequent two years.

A massive national and international relief operation avoided greater loss of life with 16,500 people rescued by aircraft and over 29,000 by boats (21). The displaced were accommodated in 100 temporary centers, the largest with a peak population of 80,000. An interesting feature of the international aid coordination was that it was set up within the INGC, showing the will to build the country's own capacity.

The Government of Mozambique made three successive appeals totaling 160million USD for emergency assistance during February and March 2000 with a response of over 100% (8).

The 2001 floods mainly affected Zambezia, northern Sofala, then Tete and Manica provinces in Central Mozambique, in February and March. The floods were caused by prolonged heavy rains at the end of 2000 and in early 2001 in central Mozambique, and by neighboring countries' increasing flows from the Kariba and Cabora Bass dams. In march, coastal Nampula was hit by cyclone Dera (8). Around half a million people were affected, of which 223,000 displaced (14). Loss of life was much less than the previous year because of the slower onset of the disaster (8).

That same year the government declared a flood emergency and appealed to the international community for 30million USD.

Agencies were better prepared to respond to the 2001 floods because the systems and contacts established in 2000 were in place. The rolling nature of the disaster made it a somewhat less daunting emergency. The government, the UN system, and major agencies, had all developed contingency plans. Contact with neighboring countries also resulted in some coordination of discharges from shared dams (8).

2. Epidemics

Epidemics were more lethal than floods and were the second most frequent hazard. Most epidemics are bacterial diseases (14). Some of these epidemics are believed to be associated with other natural disasters, namely floods and droughts: for instance, after the floods in 2000, a 4 to 5-fold increase in malaria cases was reported in the Gaza province (6). Frequency and intensity of

extreme climate events influence the incidence of diseases related to water and rodents (5).

In the past 5 years, epidemics were due to many cholera outbreaks, but also measles and meningitis. In 2010 a measles outbreak in the country register 3,500 cases (22).

Cholera outbreaks occur periodically, specially after floods and elevated temperatures (6). It has been present in the country since 1973, and for many years the notified cholera cases in Mozambique have represented between one fifth and one third of all African cases. Beira, the second biggest city in Mozambique which is located in Sofala's province coast, has faced many cholera outbreaks since the early 1990's, most notably an outbreak in 1998 with 42,672 cases reported and 1,353 deaths (Case Fatality Rate 3.2%) after a storm that affected the area destroyed already poor sanitary facilities. Cholera epidemics only occur during the period between December and June, coinciding with the rainy seasons. The outbreaks appear to occur more frequently in areas with poor sanitary conditions, overcrowding, and major flooding (19).

Since the beginning of 2015 there has been an ongoing outbreak of Cholera which has been very hard to contain and has affected neighboring countries such as Malawi and Zimbabwe (23).

3. Storms

Storms are the third most frequent natural hazard, and are mostly due to tropical cyclones. They kill less than floods or epidemics, but are considered to be very damaging (16).

Out of 56 cyclones and storms that passed through the Mozambique Canal between 1980 and 2007, a total of 15 (25%) affected the coast. Four of them affected northern provinces, eight affected the center, and three southern provinces. Only 4 happened between 1980 and 1993, whereas the other 11 occurred between 1994-2007. Two cyclones were considered of categories 3 to 5 between 1980 to 1993, compared to seven in 1994-2007 (6).

4. Droughts

Droughts are phenomena with a slow-onset and longer duration, but its effects are probably deeper and last more in terms of human development. Although they are less frequent, with a strong relation to ENSO events, they are the hazards that affect the most people (5). Around 1,35 million people are potentially exposed to drought effects(16).

The drought in the 1980's affected one third of the country's population and 8 of 11 provinces. The drought of 1991 to 1992 aggravated even more the precarious living conditions of Mozambicans, who also were affected at that time by civil war, forcing them to seek refuge in urban areas and causing accelerated population growth in the major urban centers of the country (5).

Drought is strongly related to limited food supplies, and has a direct impact on the nutritional status of populations and on increased population vulnerability to epidemics (5).

In 1981, a total of 1,102 cases of spastic paraparesis were reported in Mozambique, associated with the consumption of insufficiently processed bitter cassava during drought. Another, although less intense, outbreak occurred in the droughts of 1992-1993.

Droughts are associated with cholera outbreaks as well. The highest incidence of cholera in the history of Mozambique was reported in 1992, precipitated by the severe drought compounded by precarious and vulnerable conditions under which people live in major urban centers. At that time the major urban centers affected by cholera suffered a very significant shortage of water supply. People were forced to improvise new sources of water – some shared with animals – and for multiple purposes.

Droughts are also associated to cholera and other waterborne diseases, because of decline of personal hygiene and lack of drinking water (5,6).

5. Earthquake

As previously mentioned, Mozambique is crossed by the East African Rift Valley. In 2006 a 7.5 in Richter Magnitude Scale Earthquake was felt in the country, including in the cities of Maputo and Beira. It is believed to be one of the largest in the region since 1900 (24). (Four dead and 36 injured were reported (14), but 288 houses were destroyed, and the province of Manica reported that hospital, education centers and main roads were destroyed (25).

It is believed that this earthquake opened a crater near its epicenter in a low populated district with scarce infrastructures. The governor of the province of Manica stated the earthquake was not as devastating as it could have potentially been because the epicenter was in a non-urbanized are with low population density (26).

III. Risks and Vulnerabilities

Mozambique is considered to be a country at very high risk for disasters. The INFORM Risk Index ranks Mozambique as the 21st most vulnerable country in the world, being peered by countries such as Bangladesh and India, and one of the most vulnerable in Africa (27). As figure 2 shows, the country’s vulnerability and lack of coping capacity contribute the most to its overall risk. The main weaknesses are development issues, and fragility in communication, physical, and healthcare infrastructures.

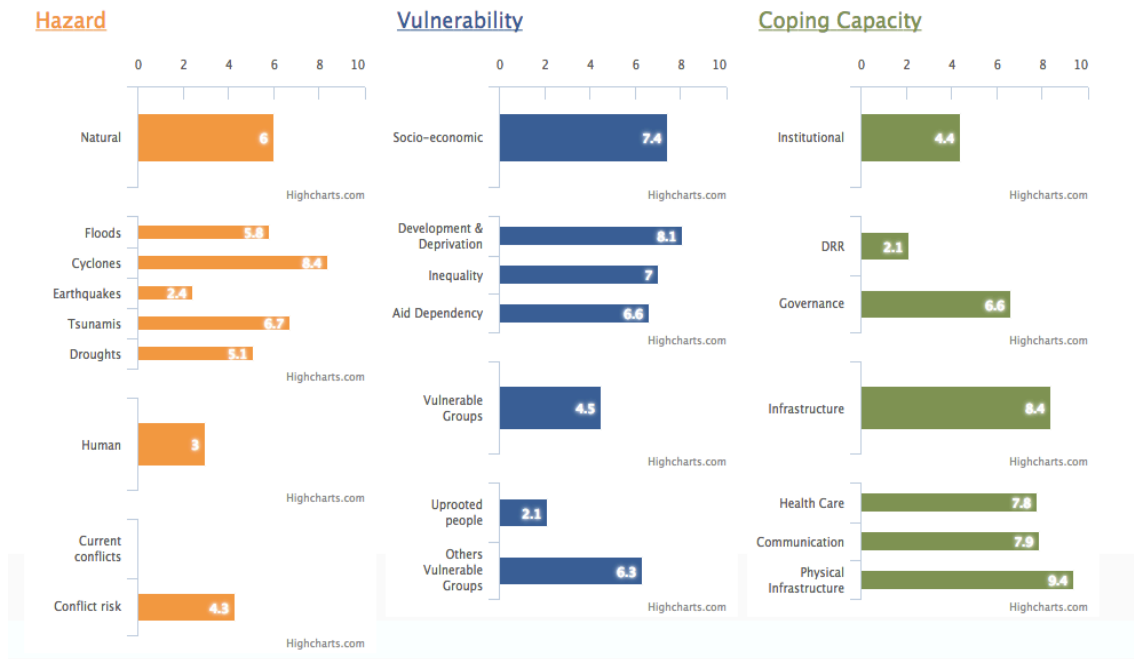


Figure 2: Mozambique’s risk components and dimensions (Source: InoRM Risk Index)

Mozambique’s highest 5 risk indicators in the INFORM global ranking are the frequency of drought events, tuberculosis prevalence, physical exposure to storm surge, gender inequality index, and physical exposure to surge from tropical cyclone of Saffir-Simpson category 1 (27).

The country’s commitment to address vulnerabilities was clear when, in 2009, the INGC stated that “understanding future vulnerability means taking socioeconomic as well as climate factors into account” (6).

Vulnerability is expected to increase in the next two decades, as climate impacts reduce people’s maintenance goods (health, water, infrastructures), and impose food production.

Some of the factors that make Mozambique particularly vulnerable to natural phenomena and disaster occurrences are fixed and immutable, such as its geographical situation, its hydrological profile and precipitation variability. However, some vulnerabilities are related to Mozambique’s socioeconomic characteristics and to the nature of the ongoing development processes (16).

1. Poverty

Mozambique, ranked 178 in 187 countries in the Human Development Index (11), is therefore one of the poorest countries in the world. Defined as “the impossibility due to incapacity or lack of opportunity of individuals, families or communities to have access to minimal conditions, according to society’s basic standards” by the government (28), it has been the base for policies in the past decade through a succession of plans for poverty reduction.

Poverty plays an important role in vulnerability, because i) poorer communities are many times located in major risk areas, ii) poorer communities are highly dependent on primary natural resources for subsistence, and iii) the capacity to respond and recover from an environmental shock is relatively low (16).

A study from 2001 showed that there was a similarity between the normal annual rainfall distribution pattern and the occurrence of absolute poverty in Mozambique. Poverty abounds where rainfall is scarce and it lessens where rainfall is abundant. But many areas with good rainfall and prone to food insecurity have high levels of poverty (29).

Many mozambican communities live near the river bank, and 60% of the population lives in the coastal line (6), which makes them extremely vulnerable to natural hazards, specially because their living infrastructures are not strong enough to overcome adverse weather events. Communities living near river deltas and estuaries are even at higher risk, since those geographical areas are usually located below the sea level (6,30).

Table 2 presents poverty indicators for Mozambique that represent great development challenges and increase vulnerability. Many of these poverty indicators are simultaneously individual risk factors for other disasters. For instance, poor access to improved sanitation facilities and to an improved water source increases spreading of epidemics such as cholera. Gender inequality, represented here as the significant difference in literacy rate between men and women, is also related to poverty and is one problem addressed in poverty reduction plans.

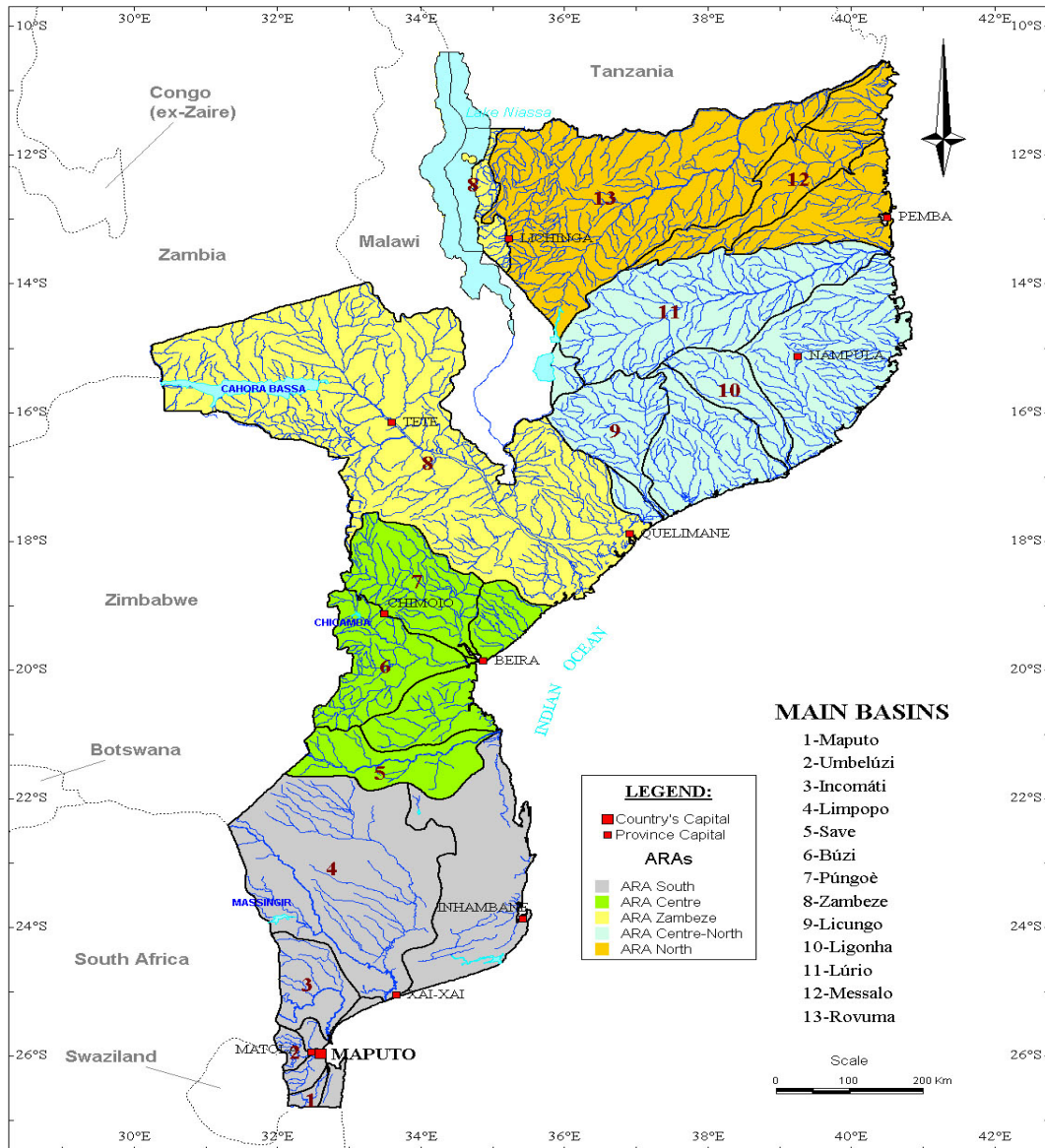
Table 2: Poverty Indicators in Mozambique

Poverty Indicators	
<i>Poverty headcount ratio at national lines in 2008 (% of population)</i>	54.7% (56.9% rural, 49.6% urban)
<i>Access to improved sanitation facilities in 2015 (% of population)</i>	20.5% (10.1% rural, 42.4% urban)
<i>Access to improved water source in 2015 (% of population)</i>	51.1% (37% rural, 80.6% urban)
<i>Access to electricity in 2012 (% of population)</i>	20.2% (5.4% rural, 54.5% urban)
<i>Literacy rate in population over 15 years in 2009 (% of population)</i>	50.6% (67% of men, 36% women)
<i>Prevalence of stunting in 2011 (% of population onde 5)</i>	43.1%
<i>Prevalence of undernourished in 2013 (% of population)</i>	27.0%

Source of Data: World Bank Data, November 2015

2. Hydrological Resources

Mozambican territory has around 104 hydrographic basins in its whole, 14 of them with a draining surface of over 10,000 km² (31). Of these basins, 9 are shared with neighboring countries. Because of its geographical situation (view map in figure 3), Mozambique is considered to be a “downstream” country and, consequently, highly dependent on these shared hydric resources. Lack of coordination in the opening of dams has been pointed as a challenge, and combined with a lack of adequate water storage and flood control infrastructures, this leads to a high flow variety of water in Mozambique, which can lead to hydrological shocks: floods or droughts (16).



Source: JNF da Costa 1999, adapted from Serviços Hidráulicos, *Bacias Hidrográficas* (1976)

Figure 3: Mozambique's main basins

The sharp drop of altitude from the interior to the coast increases speed of the surface draining, causing flashfloods when high precipitations occur upstream. Also, variable precipitation patterns not only throughout the country, from north to south and from the interior to the coast, but also throughout the same year and different years, complicates the planning process in disaster risk reduction.

The importance of water management cannot be underestimated: frequent hydrological shocks that affect Mozambique contribute to a 5.6% loss in GDP in the years they occur, meaning that the average yearly GDP loss due to these phenomena is 1.1%. The 2000 floods caused heavy economic losses, which led to reduced GDP for the subsequent two years.

The government of Mozambique estimates the damage cost for the 2013 floods at 322million USD, the equivalent to 4% of GDP(31).

3. Agriculture dependency

An estimated 70% of the population is dependent on subsistence agriculture, and the agriculture production accounts for 24% of the GDP. Over 95% of the food culture in Mozambique is produced in dry farming conditions. The average family income per surface, between 1986 and 2007, for major cereal culture, such as corn and rice, and for mandioca, peanut and bean, is very low (approximately 1 ton per hectare), and it is not expected to increase (6,31).

About 25% of the cultivated soils are located in low altitudes, which become inundated during floods, leaving many families without regular livelihood incomes (6).

4. Food Insecurity

Some reports estimate that 30-35% of the population in Mozambique suffers from chronic food insecurity, whereas an additional 20-25% is highly vulnerable to transitory food insecurity (31). During times of low food security, families adopt survival strategies, such as (16):

- a. Excessive sale of agricultural stocks
- b. Reduce number of meals per day
- c. Integrate "hunger food" in their diets
- d. Reduce total cultivated surface
- e. Sale of livestock
- f. Seek of complementary sources of income, such as sale of traditional drinks, fishing, coal sale.

Food insecurity is highly variable in Mozambique and can change drastically from one year to the other. Districts located in the center and south of the country are particularly susceptible, facing regular periods of food insecurity, some of them severe.

Natural disasters have both short- and long-term effects on the food security of a household, specially if farmers do not access seeds and agricultural tools on time. Wide surfaces of crop fields are endangered by inundation, and floods and storms may destroy nets and fishing boats necessary for the practice. Loss of livestock, that can be caused by different natural disasters, equally affects households, as they constitute a primary investment in provision of basic household items.

4. Climate Change

The growing evidence of climate change and the consequent increased exposure to natural hazards, which are also growing in intensity, is maybe the most important aspect that Mozambique's disaster coping mechanisms are facing, as it is considered to be one of the most vulnerable countries to climate change.

In a period of 45 years (1960-2005), the average temperature has increased in most of the country, although not uniformly: 1.6°C increase in the center and

1.1°C increase in the north. Also, the heat wave duration has increased an average of 9 days per year between 1960 and 2005. There have been some changes in precipitation patterns but they have not proven any significance. Estimates point to an increase of 2.5-3.0°C in temperatures until 2046. Precipitation alteration estimates for the future are not that clear, but it is expected to increase, specially near the coast (6).

It is believed that climate will be perceived as more extreme, with longer drought periods and more unpredictable rainy seasons. Provinces in the center of the country will be most affected. In general, more hazards affecting more people and with greater economic losses, but less lethal, are expected in the future (6,16).

5. Weak constructions and infrastructures

Many events cause such a high disruption of the communities in Mozambique because, in some cases, the destroyed infrastructures did not respect the national planning legislation or because there was no risk mapping for constructions in areas prone to flooding or tropical cyclones. Also, areas near rivers or the coast have witnessed removal of vegetation and destruction of ecosystems, enhancing erosion and the consequent risk for disaster (10).

The construction material for housing is also a factor of vulnerability: in 2007, 70% of the Mozambican houses were made of straw (32), 15% of cane and wood sticks, and 10% of bricks and concrete (33). The 2007 census also suggested overcrowding in private houses, as 85% of them only had 1-2 rooms for an average household size of 4.4 persons (22,32).

Finally, the country's low investment in advanced technology is also a factor that contributes to the overall weakness of infrastructures (10).

As infrastructures are highly prone to destruction in adverse weather conditions, the humanitarian response can be endangered. In a 1998 Cholera outbreak in the city of Beira, a high Case Fatality Rate of 3.2% was reported mainly because most of the sanitary facilities were destroyed (19). Many times the communities most at need are very isolated, and teams cannot access them due to bridge and road destruction (34).

As a consequence, the loss of important infrastructures may further increase the number of affected people, the mortality, and the economic impact of natural disasters.

6. Health Challenges

Health conditions are an important vulnerability for Disasters in Mozambique (27). The epidemiological status is mainly one of pre-transition, meaning it is dominated by communicable diseases, namely malaria, HIV/AIDS, diarrhea, acute respiratory infections and tuberculosis.

Mozambique is one of the 10 countries most affected by malaria, which causes 44,000-67,000 deaths annually in all age groups, and it is the main cause of

mortality among children (35). Additionally, 682,000 pregnant women and 2.8 million children under 5 are at risk because of malaria (6).

The burden of HIV infection is high, with an estimated prevalence in 2014 of 106 per 1000 adults aged 14-49 years. Sadly, means to treat with antiretroviral therapy only cover 45% of the eligible candidates (13).

Tuberculosis is also a big health fragility in Mozambique, as its incidence rate in 2012 was estimated at 553 per 100,000 (35). As noted previously, it is one of the country's top 5 indicators globally (27).

As previously mentioned, the country periodically faces serious outbreaks, some of them of preventable diseases like the measles outbreak in 2010. Immunization for communicable diseases is hard to achieve, since only 30.8% of births are registered (WHO 2014), and rough estimates for 2013 state Measles-Containing vaccine coverage is of only 85% (35).

Other neglected tropical diseases exist in Mozambique and, although they are not a high cause of mortality, they cause a high morbidity which is sometimes incapacitating. High prevalences of trachoma, intestinal parasitic diseases (53%), lymphatic filariasis (13%) and schistosomiasis (47%) contribute to an increase in disease burden and social stigmatization, which aggravates the correlation between disease and poverty (22).

Despite the slight decrease between 2003 and 2011, malnutrition is a serious issue in the country and still registers a high prevalence (see table 2). It is believed that 30% of deaths in children under 5 years of age have malnutrition as an underlying cause (22).

Recently, specially in urban areas, there has been an increase of non-communicable diseases: cancer, cardiovascular disease, etc. The burden of these diseases is also expected to increase in the following years (35).

Disease distribution is not uniform across the country and between population groups. Those living in rural areas and in urban suburbs, who also are the poorest, carry great part of the disease burden.

7. Healthcare System Fragilities

A relevant weakness for reducing the risk for disasters but also for coping with their impacts is the fragility of healthcare.

In 2012, only 2.84% of the country's GDP was spent on health, and more than half of the total expenditure on health came from external resources (35).

In 2014, there were 1,500 health units with public access for the entire population, with 1,437 health centers and health posts (4), meaning one health center or health post serves around 17,500 people. The country counts 47 district hospitals, less than 0.5 per district, and 16 Central and Province Hospitals (4).

According to a national survey realized in 2008, less than half of the families reach any type of health unit in less than 45 minutes (36).

During periods of natural disasters many of these healthcare facilities are also destroyed or suffer great damage, keeping them from providing appropriate care. This is partly because constructions are weak, but also because they may be located in risk areas, as it is the case for the Beira Central Hospital (Figure 4).

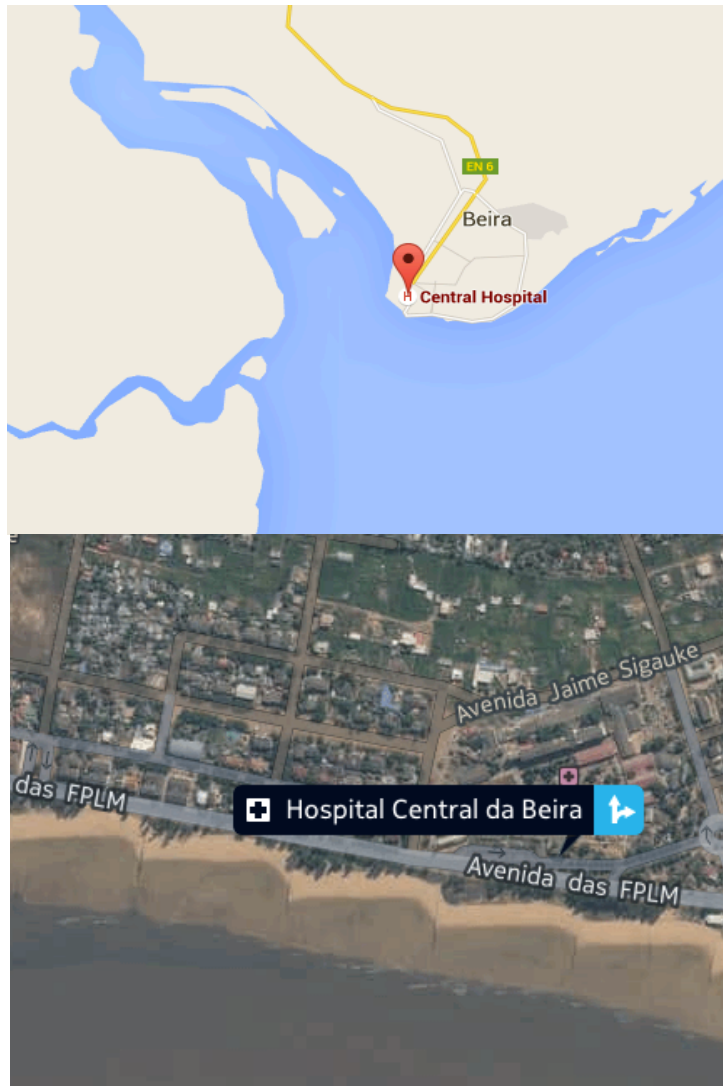


Figure 4: Beira Central Hospital Location (Sources: GoogleMaps and Here.com)

Based on national statistics data for 2014, the number of doctors is of 0.80 per 10,000 inhabitants, about 32% of them being foreigners; and the density of nurses and midwifery personnel was approximately 4.4 per 10,000 (9).

For cultural and healthcare access reasons, most of the population is first observed by traditional medicine practitioners, as their activities reach about

70% of the communities, and is many times their only choice of healthcare. It is estimated that one traditional medicine practitioner serves 200 people (22).

Many services and treatments are very centralized and only available in some centers, isolating even more people from sometimes life-saving treatment. In 2014, the only available hemodialysis treatment unit in the country was in the Central Hospital of Maputo (37).

8. Fragile Political Stability

Regular political tensions and the latest conflict that lasted until 2014 may cause further displacements of population, increasing the risk exposure. The possibility of disruption of the political system and therefore its implemented policies and strategies for disaster risk reduction is also an issue that has to be taken into account.

Additionally, in the presence of an internal conflict, resources are reallocating to address that priority, leaving other development issues in a second plan.

IV. Disaster Risk Reduction (DRR) Strategies

1. Legal Framework: context and evolution

Shortly after its independence, in a context of war and drought, Mozambique's need for a legal framework to fight against natural disasters was rapidly identified. The Presidential Decree 44/80 created the Council for Prevention and Fight of Natural Disasters, with its executive organism being the Department for Prevention and Fight of Natural Disasters (*Departamento de Prevenção e Combate às Calamidades Naturais* – DPCCN), which was under the Ministry of External Affairs and Cooperation. The main mandate of the DPCCN was to provide humanitarian assistance to refugees, internally displaced people and population who was affected by droughts (38).

Years after the end of the civil war, in June 1999, two important legal documents for the Disaster Risk Management in Mozambique are issued.

The resolution 18/99 by the Council of Ministers approved the **National Policy for Disaster Management**, which had the main goals to avoid loss of human lives and goods caused by natural or man-made disasters, to integrate disaster prevention measures in the national development process, to promote internal and external solidarity, to ensure an effective coordination and participation of public and private sector in disaster management, to contribute for conservation of the environment, and to promote regional and international coordination on disaster management, specially disasters caused in neighboring countries.

This policy enumerated specific strategies to decrease the risk and vulnerabilities, such as involving the civil society and implementing the elaboration of sectorial plans (39).

Simultaneously, the Presidential Decree 05/99 replaces the rescue and response-targeted DPCCN by a new **National Institute for Disaster Management** (*Instituto Nacional de Gestão de Catástrofes* – INGC), which was also subordinated to the Ministry of External Affairs (MEA). This institute had the aim to manage disasters and coordinate prevention actions, rescue teams, and recovery (40). This led to the institutionalization of the inclusion of annual contingency plans in the State's Budget (41).

However, after the massive floods that hit the country in the year 2000, the country faced the fragility of short-term reactive plans, and the need to create a more solid and durable response was felt. That is when the Government requests the UNDP to assist with the development of a DRM policy (42).

In 2005 the INGC was transferred to the Ministry of State Administration, and in 2006 the National Operative Center in Emergency (*Centro Nacional Operativo em Emergência* – CENOE) was founded to coordinate the emergency operations and the humanitarian support in general, and a Unit for Civil Protection (*Unidade Nacional de Proteção Civil* – UNAPROC) to realize search and rescue operations (43).

Simultaneously, the INGC was supported by a legal framework improvement, reinforcing its leading role for disaster prevention and mitigation, and reduction

of vulnerabilities, as well as in emergency response and recovery. The role of the INGC at the provincial, district and local level and their operating centers were also established (44).

This allowed a tighter collaboration with other Ministries and provincial governments not only during emergency and recovery phases, but also on a long-term perspective.

In this context the key-document for Disaster Risk Management, the **Director Plan for Prevention and Mitigation of Natural Disasters** (*Plano Director de Prevenção de Mitigação de Calamidades Naturais 2006-2014 – PDPMCN*) (41), was created. Its main focuses were the reduction of vulnerability through change of attitude regarding cyclical floods and droughts, and prevention and mitigation of natural disasters. It also established and structured the emergency response mechanism and an early recovery plan. Between 2005 and 2009 the INGC gained credibility as the leader and manager in emergency situations, specially after demonstrating its response capacity to the 2007/8 floods in the basins of the Zambeze, Buzi and Save Rivers.

Table 3: Chronology and Evolution of legal Framework

Year	Legal Document	Result
1980	Presidential Decree 44/80	Council for Prevention and Fight of Natural Disasters. Executive organ: DPCCN.
1999	Resolution 18/99 by the Council of Ministers	National Policy for Disaster Management.
	Presidential Decree 05/99	Replaces DPCCN by the INGC, subordinated to the MEA.
2005	HFA (42)	Mozambique signs the HFA.
	Presidential Decree 27/2005	INGC is transferred to the MSA.
2006	Master Plan for Prevention and Mitigation of Natural Disasters	Plan elaborated by the INGC and approved by the Council of Ministers.
	CENOE creation	Alert levels creation, activation protocols, leading roles definition.
2007	Presidential Decree 52/2007	INGC internal reorganization. Creation of regional delegations. Decentralized structure includes CERUMs.
2014	Law 5/2014	Law on Disaster Management approved by the Parliament.

CERUM – *Centro de Recursos e Uso Múltiplo*; DPCCN – *Departamento de Prevenção e Combate às Calamidades Naturais*; HFA – Hyogo Framework for Action; INGC – *Instituto Nacional de Gestão de Calamidades*; MEA – Ministry of External Affairs; MSA – Ministry of State Administration; CENOE – *Centro Nacional Operativo em Emergência*.

Years after advocacy coming from different sectors, a law was finally adopted by the Parliament in 2014 that established the legal status of Disaster Risk Management. This represents an institutional mandate for multidisciplinary activities to improve response efficacy and readiness, as well as prevention of future occurrences and their harmful effects. In sum, it is considered to be a proactive measure for DRM, based on decentralized institutions, mutual help and central support (45).

Mozambique is also signatory to the Hyogo Framework for Action (HFA) for 2005-2015 and the Sendai Framework for Disaster Risk Reduction 2015-2030(42).

Many international donors are supporting the government in relation to DRR, including GFDRR, DFID, Government of Denmark, GIZ, UNDP, ECHO and USAID (18).

2. DRM organization

a. INGC institutional framework (12,16)

The Master Plan for Prevention and Mitigation of Natural Disasters (PDPMCN 2006) clearly enhances the coordinating role of the INGC. Its institutional framework has evolved since its creation in 1999, as well as its internal organization, specially in 2005 and 2009. One of the main achievements was that provincial and district governments had to create additional structures for disaster management in their jurisdiction.

The organigram in figure 4 represents the position of the INGC in the central government. It is subordinated to the Ministry of State Administration and has a government council, the **Coordinating Council for Disaster Management** (*Conselho Coordenador de Gestão de Calamidades – CCGC*), chaired by the Prime-Minister. The Minister of State Administration is the vice-president, and there are 13 other members, including the INGC. This team meets regularly during emergencies for political decisions on disaster management, and its roles are:

1. To propose projects, policies and strategies for prevention and mitigation to the government;
2. To approve the content of disaster management, recovery and development programs, including humanitarian assistance and rehabilitation of damaged infrastructures;
3. To approve the revision of the Director Plan for Disaster Management;
4. To advise the president of the republic when state of emergency needs to be declared;
5. To mobilize national and international community for its participation in assistance and reconstruction;
6. To advise the Council of Ministers about the creation of an emergency fund

The CCGC is advised by the **Technical Council for Disaster Management** (*Conselho Técnico para a Gestão de Calamidades – CTCG*), which is chaired and coordinated by the INGC, and is the national platform for disaster management. It is constituted by technical experts such as national directors and department chiefs designated by the respective Ministry. This structure is replicated at the province and local level, where Technical Councils are presided respectively by province governors and district administrators. During emergencies, a focal point of each ministry can be nominated to integrate the CENOE.

The CTCG and the CENOE are organized in four sectors:

1. Information and planning – coordinated by the Ministry for Planning and Development;
2. Communication – coordinated by the Information Cabinet;
3. Infrastructure – coordinated by the Ministry of Public Construction and Housing;
4. Social Services – coordinated by the Ministry of Health.

The CENOE and the CTCG are involved in resource mobilization, ensuring the link between emergency and rehabilitation phases, keeping the CCGC informed. The international humanitarian team clusters are integrated in these sectors and support ongoing operations.

To ensure coordination with communities in the event of a disaster, the government created **Local Risk Management Committees** in high-risk zones. Members of these committees are elected by communities themselves, and are respected members of the community or local leaders. They have the responsibility to receive and transmit information about early-warning, and they also coordinate the response to emergency in their community. Since 2006, simulation exercises have been implemented to increase and preserve preparedness in high-risk areas.

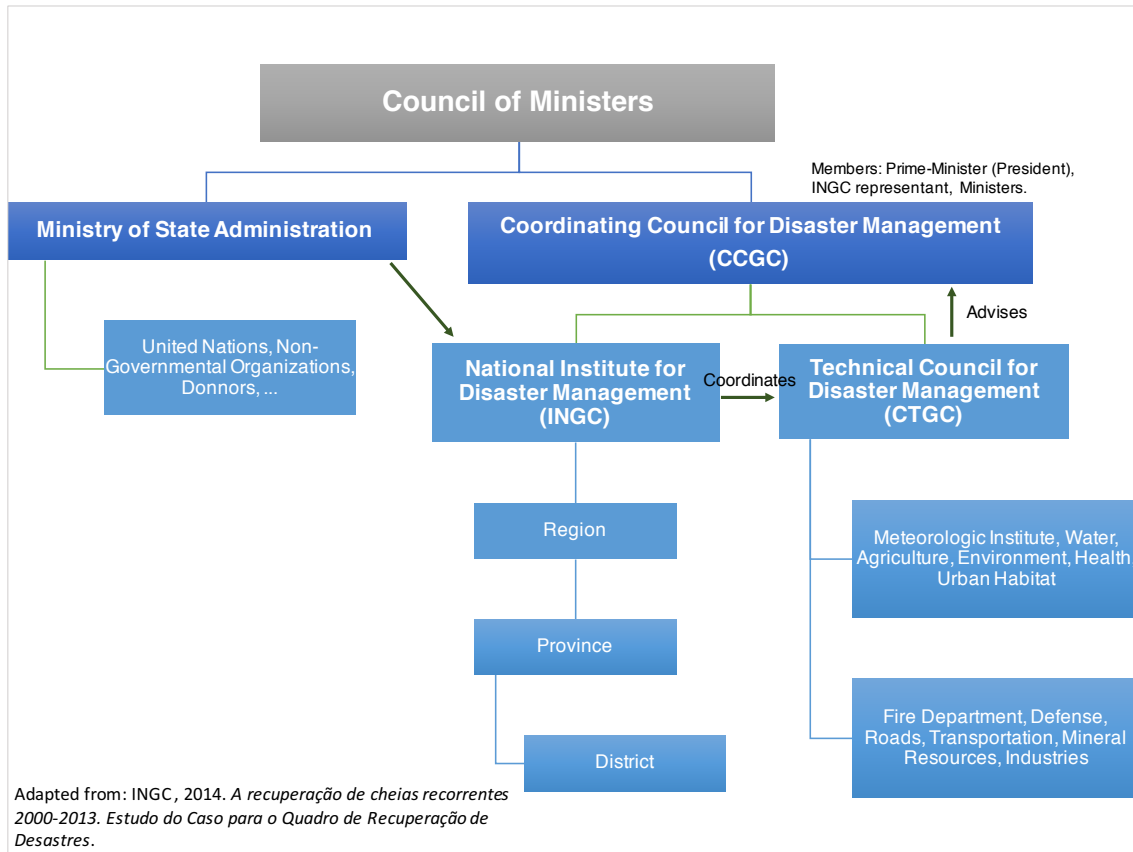


Figure 5: Disaster Risk Management Government Organization in Mozambique

b. INGC internal structure (12,16,43)

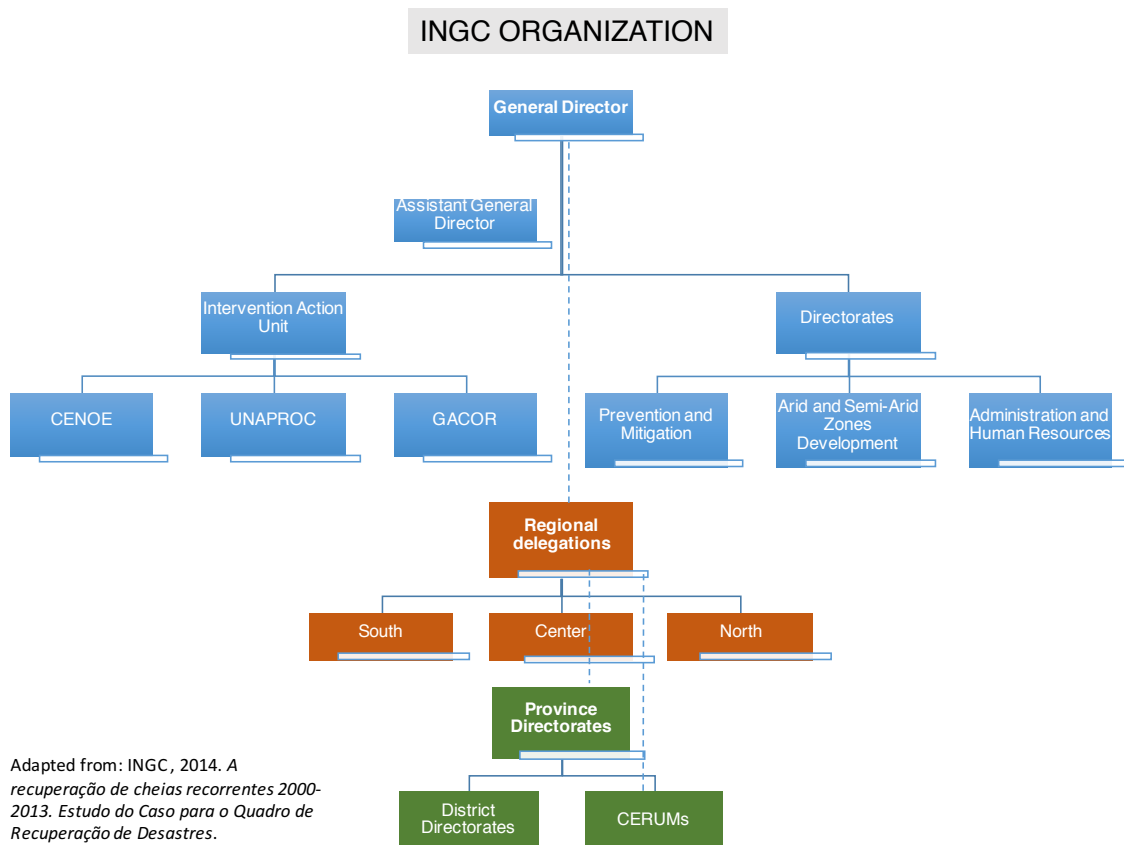
Figure 5 shows a general vision of the INGC structure. Elements for risk reduction and prevention, as well as for administration, are on the right side of the organigram. Subordinated structures for operational response and post-disaster recovery are on the left side.

The General director and his associate are responsible for leading planning and supervise the INGC activities. The Coordinating Cabinet has a wide variety of functions: it is a link between the INGC elements and with the government and civil society partners, it is responsible for public relations, but it also has technical assistance functions, specially related to monitoring and planning.

The Prevention and Mitigation Directorate has three main departments. The Prevention Department focuses on i) education in disaster risk reduction; ii) information management; and iii) early warning. The Mitigation Department is mainly related to i) support logistics; ii) customs services; and iii) control of existing material and emergency goods reception. The third department is an administrative support.

The Directorate for Arid and Semi-Arid Areas Development is responsible, as explicit in its name, for development in regions with low precipitation. A technical department focuses on water supplying, agriculture and food security; whereas a study and project department is responsible for research and focuses on non-agricultural economic activities for development and on climate change.

The Human Resources and Administration Directorate is based on departments focusing on human resources, accounting and finances, and wealth. Province Delegations are part of the INGC central structure, although they are not centrally located. They elaborate and implement a province Contingency and Prevention Plan, coordinate multi-sector activities at the local level, mobilize human, financial and material means for a rapid response, and they execute activities mandated by the General Director of the INGC. A Province Center for Emergency Operations is responsible for response; whereas a Technical Department has 38 functions regarding disaster prevention and mitigation.



Adapted from: INGC, 2014. *A recuperação de cheias recorrentes 2000-2013. Estudo do Caso para o Quadro de Recuperação de Desastres.*

CENOE – Centro Nacional Operativo de Emergência, UNAPROC – Unidade Nacional de Proteção Civil; GACOR – Gabinete de Coordenação da Reconstrução;

Figure 6: INGC internal organization

The **CENOE**, or National Operative Center in Emergency, coordinates disaster response development and execution, and is functional 24 hours per day, every day of the year. It gathers people with government decision-power, international partners and civil society actors involved in disaster response in Mozambique. Its functions vary according to the alert level, but it is only activated and directed on the national level, when a disaster overwhelms province capacities.

The **UNAPROC**, or the civil protection national unit, is subordinated to the CENOE and is considered as a very important element of response.

When natural hazards that can provoke a disaster occurs, the CENOE is activated according to the institutional alert levels:

Table 4: Alert levels and triggered responses

Alert Level	Definition	Functioning	CENOE response
Green	Normal situation	Surveillance without alert	Surveillance and monitoring of possible disaster risks. Prevention, mitigation and preparedness activities. Response plans actualization and spreading.
Yellow	Imminent emergency	Surveillance/ Partial Alert	Permanent situation monitoring, prepare response activation according to specific protocols, communication to population and to Coordinating Council. Activation of Local Risk Management Committees.
Orange	Imminent Disaster with possible reversion	Partial Alert	Partial Activation. Mobilization of material and equipment to risk zones. Inform and recommend communities to seek for safe shelter. Communication to population, keeping it aware of alerts. Communication to the Council of Ministers.
Red	Disaster, decreed by the President of the Republic	Total Alert	Total activation of the CENOE and UNAPROC. Seek for donations. Coordinate immediate response, privileging search and rescue and humanitarian assistance. Convoke CCGC members. Communication to population on response activities. Gather damage information.

Adapted from INGC (2006), Estabelecimento e Funcionamento do CENOE

c. The Director Plan for Prevention and Mitigation of Natural Disasters for 2006-2016 (16,41)

The Director Plan for Prevention and Mitigation of Natural Disasters 2006-2016 was created due to a need to create a mid and long-term plan to reduce vulnerability of exposed communities to natural disasters. It is considered as a key-document for disaster risk management. Because many strategies are common to the fight against poverty, it must be seen as a complement to the Plan against Poverty of the time (*Plano de Acção para a Redução da Pobreza Absoluta 2006-2009 –PARPA II*), and therefore as part of the Government's 5-year plan. With this relation, the aim to contribute to the Millennium Development Goals (MDGs) is explicit.

This Director plan directly addresses water accessibility, sanitation and food security goals, mainly filling strategic gaps previously felt, so its actions must be seen together with other sectors.

The main objectives of the Director Plan for Prevention and Mitigation of Natural Disasters were i) to decrease the number of human victims and property loss; ii) to consolidate prevention culture; and iii) to capacitate the country with prevention and mitigation means.

In order to achieve these objectives, the Director Plan for Prevention and Mitigation of Natural Disasters identified primary actions to achieve while main goals were not reached: i) risk zone mapping; ii) early warning systems strengthening; iii) mobilization of resources for prevention and mitigation; iv) inter-institutional coordination strengthening; v) regional and international coordination, particularly on hydrographic basins management; vi) creation of a database enabling possible further studies; vii) promotion of water stocking systems construction and use in catchment areas; and viii) intensification of civic education and training.

The plan is based on structural strategies addressing three key issues: hydric misbalance, food and nutritional misbalance, and emergency management. These structural strategies then have their main goals (table 2), which are then adapted to measurable indicators used in the 10-year action program.

Finally, the implementation strategy of this plan is based on the participation of communities and authorities and self-confidence construction, adequate institutional rearrangement and district capacity strengthening.

The plan intends to strengthen local authorities' competences, to prevent a prejudicial dependence on the central government.

To that purpose, the Multiple Use and Resources Centers (*Centros de Recursos e Uso Múltiplo* – CERUM) are created at the provincial level, which assume functions of information gathering and analysis, technology improvement, risk management, and experience-sharing. Additionally, the engagement of civil society is seen as a key for capacity building and implementation of the plan. It is then suggested that It is represented in the **National Technical Council for Natural Disasters Management**, and that it is actively involved in early warning system implementation.

Table 5: National Director Plan for Prevention and Mitigation of Natural Disasters: Key Issues, Strategies and Aims

Key issue	Strategies	Aims
Water misbalance	1. Water Stocking for Drought Mitigation	<p>V. To ensure every population exposed to cyclic drought has access to at least 50% of individual water needs</p> <p>VI. Available water must be as close as possible to affected communities</p> <p>VII. Ensure maintenance of water sources</p> <p>VIII. Small dams for irrigation and fish cultures</p> <p>IX. Dams for livestock water stocking</p> <p>X. Wells and cisterns for human consumption</p>
	2. Flood Control and Prevention	<ul style="list-style-type: none"> • Construction and rehabilitation of dams in critical basins • Formulation of management plans for critical basins • Dam construction • Drainage improvement in the city of Beira
	3. Reforestation	<ul style="list-style-type: none"> • Sustainable use of forest resources
Food and nutrition misbalance	1. Food and grain stocking	<ul style="list-style-type: none"> • Agricultural commercialization and stock rotation • Stocking network at familiar, district and provincial level
	2. Drought tolerant cultures	<ul style="list-style-type: none"> • Establishing specialized units for research
	3. Non-conventional cultures	<ul style="list-style-type: none"> • “Domestication” of nutrient rich wild species
	4. Industrial cultures	<ul style="list-style-type: none"> • Adapting agriculture for other purposes than food, e.g. biofuel.
	5. Non-agriculture economic activities	<ul style="list-style-type: none"> • Exploit resources such as tourism or minerals • Private investment must involve communities
Emergency management	1. Preparedness	<ul style="list-style-type: none"> • Early Warning Systems improvement • Information Management System • Communication System
	2. Search and Rescue	<ul style="list-style-type: none"> • Suggests the creation of a structured and specialized Unit
	3. Disaster definition and responsibilities	<ul style="list-style-type: none"> • Suggests creating legal documents defining different types of emergencies and responsibilities

Adapted from: PDPMCN, 2006

3. The Disaster Management Law (45)

The 2014 Disaster Management Law implemented the jurisdictional identity for disaster management, understood as the combination of policies, plans and strategies. Solidarity, justice, efficacy, participation and cooperation are its principles to achieve a proactive approach, reaching the entire national territory and in accordance to international engagements. With this legal instrument, every sector is mandated to develop disaster risk management measures and to cooperate with the state in accordance to pre-established plans. Appeal for support when means are not sufficient becomes an obligation.

As **mitigation and prevention measures**, it states that the Central Government is responsible for regulating hydrographic basins, seismic activity control, weather changes surveillance and early warning systems. It is also in charge of promoting drought-resistant cultures and risk areas mapping and to approve annual contingency plans. The Council of Ministers approves legislation regarding edification and construction, in order to make infrastructures more resistant to the impact of disasters. Provincial Governments must inform the Central Governments about construction forbidden zones in their territory. The Disaster Management Coordinating Unit promotes training for local public and private entities.

An operational **preparedness** is intended, and for that permanent means are mentioned: technological and financial equipment, specialized staff training, simulation exercises, stocks, corrective actions, early response, and administrative issues. Strategic preparedness includes the identification of climate change, legislation, education, planning and training.

An **Early Warning System** is coordinated at the central level and integrates different institutions responsible for prediction and monitoring of potentially harmful phenomena. Warning can be local or national, and the government decides who gives the warning.

The **Alert System** is activated by the Government, who also regulates the behavior that should be expected from people, private and public institutions, national or foreign organizations. It includes three different levels:

- The Yellow level is activated when a potentially harmful hazard is predicted
- The Orange level is activated when a potentially harmful hazard is imminent
- The Red level is activated when human and material harms are occurring in such proportions that they can become a disaster

Disasters can then trigger a state of Emergency. A local emergency is defined when it affects territorial unities until the province level. A national emergency affects more than one province simultaneously.

The Council of Ministers can establish exceptional measures in case of disaster occurrence or imminence, such as imposing limitations for circulation or permanence of people and vehicles, occupy installation facilities, displace financial means to support rescue and assistance.

Finally, a **Disaster Management System** is defined, where the Government plays a core coordinating and organizing role. It mandates for the participation of civil protection services and strengthens the responsibility of province governors and district administrators. Social communication entities are also committed to provide information and diffuse alerts.

The Government regulates international help and promotes disaster insurance culture. It also annuls insurance contracts that exclude responsibilities in case of a formally declared disaster.

A permanent and decentralized budget for disaster management should also be created, dependent on the Council of Ministers. Funding comes from donations and from the State's Budget.

Technical and scientific research institutions must cooperate with disaster management entities in order to prevent disaster impacts and to improve response.

Risk zones are classified according to the level of exposure and measures should be taken accordingly. Citizens in risk zones have special rights regarding risk reduction, protection, and evacuation means and support; they also have the duty to obey to construction rules. Compulsive evacuation is also considered.

4. Related Strategies

Disaster Risk Management is explicitly included in the Government's 5-year plan for Development since 2005 and in the (absolute) **Poverty Reduction Action Plans** (*Planos de Ação para a Redução da Pobreza Absoluta – PARPAs*) since 2006 (12,28,46).

To this date, three PARPAs have been elaborated, although the last one, known as PARPIII, has a different name, addressing Poverty in general and not only Absolute Poverty.

The first plan, PARPA I, disaster management was considered complimentary to other development measures. The second, PARPA II, disasters were included as a transversal subject, and three clear goals are described: i) to reduce the number of human victims and loss of property; ii) to consolidate prevention culture; and iii) to capacitate the country with prevention and mitigation means. The only direct outcome of this plan was the creation of the UNAPROC.

Finally, the PARP III, which was approved in 2010, indicates that there should be an even higher integration of concepts and activities for Disaster Risk Reduction.

Through these documents the government acknowledges not only that an efficient disaster management lightens the negative impact of natural hazards, but also that risk reduction is related to poverty alleviation in population most exposed to this type of disasters.

The **National Strategy for Climate Change Mitigation** (*Estratégia Nacional de Mitigação das Mudanças Climáticas – ENAMMC*) was prepared and elaborated

by an inter-institutional group on Climate Change, which included different Ministries, the private sector and the civil society. Its main goal is to create resilience, including to climate risk, in communities and in the national economy, and to promote low-carbon development and green economy. It recognizes DRM and climate change adaptation as national priorities for the next 15 years. It does specifically address risk reduction through the strengthening of an early warning system and how it will increase resilience in hydric resources, agriculture, health, social protection, biodiversity, forestation, infra-structures, and low-carbon development. A detailed implementation strategy with description of tasks to be achieved by different actors and a clear monitoring and evaluation plan with measurable indicators and fixed timelines close this document(10).

Other complementary plans that address identified vulnerabilities are the Health Sector Strategic Plan for 2014-2019 (22), and the Multisector Action Plan for Chronic Malnutrition Reduction for 2011-2015 (47), although they do not specifically highlight the disaster context.

V. Discussion

Mozambique's exposure to natural disasters will significantly increase in the coming years, as a result of climate change (6). It is vital that the government is aware of this situation and acts accordingly to include risks in its planning and investment in infrastructure.

The historical context of Disaster Management in Mozambique, with the creation of the DPCCN shortly after the independence, shows how present and important disasters are in the country. It is also interesting how, already in the 1980's, disaster prevention was already taken into account being present in the name of the operative organism, although as seen preventive measures were not concretely developed. The creation of the INGC and its later transition from the Ministry of External Affairs to the Ministry of State administration, proves an intention to decrease dependency on external aid, increasing local capacity.

Despite its poverty levels, Mozambique is often viewed as a leader in relation to DRR and an example of best practice in the region. One recent report on DRM strategies assessed that key informants felt there has been good progress in the last 10 years regarding DRM and there has been a shift towards prevention at the national, provincial and local levels (18).

However, some flaws or opportunities for improvement in the country's DRM system still need to be pointed out.

Women

One of the HFA general considerations is the need to empower women in the disaster setting (42). Although gender inequalities are addressed in the Poverty Reduction Plans, they are barely mentioned in any disaster management document. In fact, when women are mentioned they are consistently described as a vulnerable group, and not as an opportunity for improving prevention, preparedness and response.

The INGC

The benefits of the creation an institute like the INGC and its subordination to the Ministry of State Administration mainly relate to an increase in the country's capacity. Some examples of success are the CENOE's coordination capacity to evacuate over 100,000 people in 2007 and 2008 (16); the yearly updated contingency plans, the decentralizing trend, the civil society involvement; and the inclusion of disaster prevention and preparedness in school education (48). However, as an institution, the INGC currently lacks of any kind of strategic plan on which it can base its activities on a long term basis, and how it intends to develop in the future.

Regarding its internal structure, the following aspects were detected:

- The **Coordination Cabinet (GACOR)** has six focus areas that by nature need completely different qualifications and capacities, some of them needing their own independent institution. When an important element

like GACOR has such a big diversity of functions, efficiency and efficacy are endangered.

- The **Civil Protection Unit**, considered a very important element of the response, is not technically a legal entity, as no legislation defines its specific functions.

The **PDPMCN** does not have any monitoring and evaluation specifications, making it unclear how progress being made will be measured and how strategic goals will be evaluated.

Additionally, implementation strategies do not focus on how the plan will be executed, they mention instead which conditions are necessary to ensure the implementation. Also, the proposition about general conditions needed for the execution does not give an alternative in case it is rejected, and a calendar for specific measures is lacking.

Finally, the role of ministries outside the INGC is not mentioned at all in the implementation strategies. It gives the idea that the INGC will execute the plan on its own without the involvement of other sectors. This questions the leadership role of this institution, when it is not able to delegate responsibilities and to share tasks with other ministries.

Some contextual key-factors may explain some of the weaknesses of the PDPMCN: 1) at the time the plan was elaborated there was no legal framework based on multi-sector involvement for disaster management; 2) internal rearrangements of the INGC were still in course when the plan was approved.

The **Disaster Management Law** was a big step towards disaster reduction, putting its management in a central position for the country's development. Fundamental concepts like disaster classification were finally defined, giving the opportunity to harmonization between different sectors and improving basis for action. Disappointingly enough, it does not mandate the INGC with leading responsibilities, nor does it even mention this core institute. Also, focus given to prevention and mitigation means was very much reduced in this legal document, when compared to response planning.

With this upgrade of legal institutionalization of Disaster Management, all previous documents become outdated. As they give specific indications on how strategies should be implemented and goals achieved, they are of utmost importance for action and achieving concrete results. It appears that there is an urgent need to re-adopt them in a revised version taking into account the new needs.

Parallel Strategies Overlap

Disaster risk reduction, poverty alleviation and climate change mitigation are interrelated, and as a consequence strategies and goals sometimes overlap or even contradict each other. To avoid duplication of efforts and wasting resources, clarity is needed regarding mandates and functions of each organism: the INGC, the Ministry for Environment Coordination, Ministry for Development, among others. Cooperation and synergy require much more effort but the results are clearly superior.

Towards Decentralization and Local Capacity Building

Great efforts have been made in order to establish disaster management structures at district and province level. Local Disaster Management Committees were created to decentralize prevention and response responsibilities and activities towards province and district governments. It is implicit that these are multi-sector responsibilities and must be addressed with corresponding mechanisms. However, no clear policy or strategy for decentralization has yet been established.

The knowledge of communities and their resilience capacities can still be improved. For instance, communities regularly monitor water level using traditional methods, different from those used by the government. They may work effectively as evacuation alerts.

In Mozambique the local risk management committees are made up of community volunteers, established and equipped by the INGC. They provide an important link between community level DRM and the government (49). Although they are trained and capacitated for DRM, the fact that they are volunteers and don't get paid for the amount of work they have leaves the doubt whether this system is sustainable.

VII. Recommendations

Mozambique certainly is on the right track for reducing disaster risk, but because of the high frequency of threatening natural hazards, all types of delay or flaws must be avoided or reduced. Based on the information gathered through the elaboration of this risk profile and on international guidance documents for good-practice and commitment in disaster management, some recommendations for improvement in the country of Mozambique can be made.

Data and information improvement

Official data on population are not very reliable due to scarce human and material resources, a consequence of civil war and natural disasters. Shortage of qualified personnel, loss of infrastructures, internal displacements, led to the loss and deterioration of registration archives and capacities. It is estimated that more than 2.5 million children are unregistered and the causes of over 300.000 deaths are unknown. However, efforts have been made to improve the quality of available data through plans addressing the civil registration and vital statistics needs of the population (50).

These data, together with information about the hazard itself and its impact, are crucial for assessing the intensity and magnitude of the event. Only with this knowledge will it be possible to develop appropriate measures for prevention, early warning, response, and recovery.

Data analysis and an information product such as a report should be centralized with the participation of all the involved sectors, avoiding duplication of efforts. Many attempts for creating a national database were made but unfortunately did not last. In 2015, Mozambican Government, the USAID, and the US Embassy in Mozambique agreed to a common project to create and implement a practical database that could efficiently generate information about natural disasters in Mozambique, in order to monitor and evaluate current policies (51). Efforts must be made to keep such a tool viable and sustainable.

Improve mainstreaming with relevant policies – health, education, labor law

Having a law about disaster management is not itself enough for a transversal consciousness of the matter. Advocacy and mainstreaming with relevant policies may represent useful tools to raise awareness and inform and train people.

In the health sector, for example, to improve training of basic healthcare unit personnel or even traditional healers in one hand, and to decrease distance and time to the nearest health unit can be decisive in the first approach after striking of a fast-occurring disaster but also for detection of malnutrition in drought context.

Including disaster preparedness and prevention and mitigation measures in school curricula can also be of great importance in the desired mentality shift towards a more proactive attitude. In order to accomplish an effective measure, education staff must be trained and provided with appropriate skills and even appealing tools, infrastructures or instruments.

Of vital importance is the need of resilient buildings such as healthcare facilities and schools. When these are damaged during a disaster the whole response may be compromised. As seen in figure 4, when a hospital is in a high risk area for flooding measures should be taken in order to avoid endangering the facilities and its scarce but costly technology. Audits should be organized in order to assess compliance to guidelines.

Another possible recommendation is to include DRR in the workplace. For example, each work place nominates worker or workers, the number depending on the total number of workers, responsible for evacuation in case of exposure to a dangerous hazard.

Improve effective implementation of strategies

Operational documents for DRM are now outdated and they do not have effective strategies for implementation. An adequate reformulation is urgent, with a more detailed description of specific measures to be taken and the expected or desired timeline to be followed.

Monitoring and evaluation using measurable indicators needs to be taken into account, as well as planned responses to certain outcomes or results. Leadership needs to be properly established so that tasks can be given to the different actors.

Assessing compliance to risk reduction measures is also important to evaluate and monitor improvement.

As the private sector is more and more involved, private companies should have their contingency plans and preparedness measures. Incentives to enterprises and organisms that adopt appropriate measures through for example reduction of taxes can also be an interesting way to achieve preparedness. It is also questionable whether some measures are merely indicative or mandatory, and if so whether sanctions should be applied.

Seeking for inclusiveness

One last but very important recommendation is the path towards inclusiveness. All branches of society must be part of the Disaster Risk Reduction.

Groups considered vulnerable must be adequately informed of available help and need to be appropriately assisted not only in the emergency setting but also in pre-disaster phases like prevention, mitigation and preparedness.

Some other groups can represent great opportunities. Young people, for example. Almost half of the population of Mozambique is under 20 years old, it is therefore a potentially strong target group. Empowering young people in disaster risk reduction can be a very interesting strategy. To that purpose practical formal and non-formal trainings can be used.

Interaction with key community personalities, such as leaders or traditional healers, can never be undermined. Traditional and community knowledge are invaluable when preparing a response or developing early warning systems. Providing these people with appropriate training and means may be very beneficial.

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