



Mozambique

Disaster Risk Management along the Rio Búzi

Case Study on the Background, Concept and Implementation of Disaster Risk

Management in the Context of the GTZ-Programme for Rural Development (PRODER)

Imprint

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Summary

Mozambique is one of the countries in Africa most frequently and most seriously affected by natural disasters such as floods, cyclones and droughts. During the floods in 2000, over 700 people lost their lives, thousands became homeless, and altogether over 4 million people were affected. At the same time, Mozambique is one of the poorest and most vulnerable countries in the world, and there is a close link between poverty, vulnerability and disaster risk.

Today, it is widely agreed that disaster risk management (DRM), poverty eradication and sustainable development are interdependent, and that DRM measures need to be integrated into the development planning of regions at risk. This includes both the vulnerable population at the local level as well as relevant actors at the different political and institutional levels.

The DRM component in the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH Programme for Rural Development in Central Mozambique (Programa para o Desenvolvimento Rural – PRODER) follows this idea.

For the Búzi district, at first a participatory risk analysis was carried out, which identified approximately a third of the district's population as being endangered by the different types of disaster. Subsequently, different measures and activities from the 'disaster prevention' and 'disaster preparedness' components were implemented in order to reduce the vulnerability of the population and – where possible – the hazard risk as well, especially concerning the risk of floods and cyclones. These measures included the construction of new settlements on higher ground further away from the river, cyclone-resistant construction measures in the rebuilding of the damaged infrastructure, a disaster preparedness simulation and the implementation of early warning systems.

A key factor was the sensitisation of the actors on different levels with regard to the topic of DRM and its advantages. This was achieved via numerous workshops, seminars and work meetings in Búzi and the endangered communities, which showed good success at the district level.

Furthermore, the project provided the population at local level with a good basic and advanced training programme, based on GTZ's wide experience with DRM and flood early warning systems in Central America. Important progress was also made with training at the political level, and a concept to integrate DRM measures into the district development plan was formulated in close cooperation with the district administrator of Búzi, who has already presented the positive experiences of the project at international conferences.

The vulnerability of the population in the Búzi district with respect to the dangers of floods and cyclones has clearly been lowered by the implemented DRM concept, which represents an important contribution to sustainable rural development in the region. The selected methodology has proven successful and should be used in other disaster-prone districts.

1. Background and Purpose of the Study

Mozambique is one of the worst and most frequently affected countries in Africa in terms of the impact of natural disasters. Table 1, which lists only the top ten natural catastrophes affecting the largest numbers of people in the past two decades, shows the serious threat that hazards such as droughts, floods and tropical storms pose to vast parts of the population.

At the same time, the social, economic and political structures and institutions in the country, which is still one of the poorest and least developed in the world (ranked 170 out of 175 in the Human Development Index, 2003 figures), are still relatively weak after the war of independence and the following 16-year-long civil war, which only ended in 1992 and still contributes to a particularly high level of vulnerability in relation to natural disasters.

The risk resulting from these factors became very obvious when, in spring 2000, the highest amounts of precipitation for 50 years, in combination with four cyclones, led to a flood disaster of unknown extent. Reaching from the Rio Maputo in the south to the Rio Púngue in Sofala, vast parts of the south and centre of the country were struck, and Mozambique's coping capacities were overtaxed. Between 700 and 800 people died, and many thousands lost their belongings and houses. 4.5 million people in total were affected (see Table 1).

After this event, the German Federal Ministry for Economic Cooperation and Development (BMZ) entrusted GTZ with a reconstruction project that, at the beginning of 2001, was supplemented by a DRM component. A goal of this project was to reduce the disaster risk as far as possible for the villages in question along the Rio Búzi. Therefore, an integral, multi-sector and decentralised methodology was selected. This has proven successful, and has already led to important progress in the way that the region manages disaster risk.

Disaster	Date	Affected
Drought	1980	6,000,000
Drought	Feb 1983	4,750,000
Flood	Feb 2000	4,500,000
Drought	1981	4,000,000
Drought	Apr 1992	3,300,000
Wind Storm	26 Mar 1994	2,502,000
Drought	1985	2,466,000
Drought	May 2005	1,000,000
Drought	Mar 2002	600,000
Flood	Jan 2001	549,326

Top 10 Natural Disasters in Mozambique, sorted by number of affected. Source: EM-DAT: The OFDA/CRED International Disaster Database, www.em-dat.net, 2005

The main goal of this case study is to present and systematise experience with the DRM activities that have so far taken place within the framework of PRODER, with the aim of making recommendations for the further expansion of DRM activities in Mozambique.

Firstly this study presents and illustrates in concrete terms the concept of disaster risk, which comprises the two components of 'hazard' and 'vulnerability', given the specific context of the local physical-geo-



Mozambique is repeatedly affected by floods

graphical and socio-economic conditions of the project region. The necessity for preventive measures derives from the level of risk: sustainable development in disaster-prone areas is only possible in combination with an effective and tailored DRM component.

In a second step, the reasons for and the goals of the integration of DRM into PRODER will be presented, drawing attention to the advantages for the endangered population on the one hand, and for the decentralisation process on the other.

The study pays particular attention to the methodology and implementation of the concept of DRM and its individual components risk analysis, disaster prevention and mitigation as well as the disaster preparedness or preparation for emergency. While oriented towards outlining the achieved impacts, the study nevertheless raises the following questions: Which activities took place in the context of these three complementary components in Búzi and the neighbouring municipalities? Which participants were involved? What kind of structures were created, and what are the impacts? A special aspect briefly considered within this framework is the connection between DRM and poverty.

Finally, the study addresses the relevance and methodology of the concept used in Búzi in the context of international objectives and demands within the range of development aid and DRM.

Answers to these questions were drawn from existing GTZ concepts and studies about DRM in general as well as from reports and documents about the specific structure and activities of the local DRM system in Búzi on the one hand, and from interviews with the involved participants and local investigations on the other.

2. The Búzi District

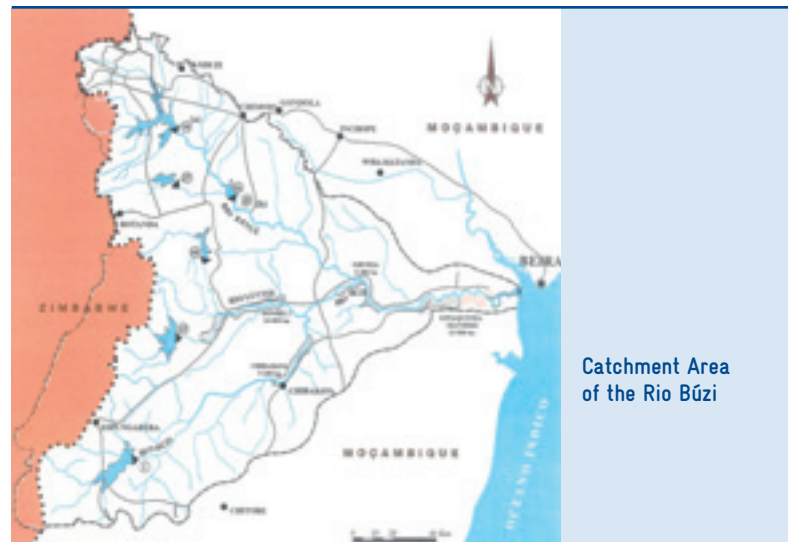
The district of Búzi is one of 13 in the province of Sofala in central Mozambique, and extends in the southeast of this province over a surface of 7,160 km². The Rio Púngue in the northeast and the Indian Ocean in the east represent natural borders; in the north lie the districts of Dondo and Nhamatanda; in the west Sussundenga (the province of Manica) and Chibabava; and in the south Machanga.

2.1 Environmental Conditions

The relief of the district is dominated by a vast and flat lowland plain that reaches from the coast to the inland plateau made of granite and metamorphic rock, which in the Búzi district reaches a maximum elevation of 130 m above sea level at Grudja. There are large uninhabited surfaces near the coast as well as between the Rio Búzi and Púngue which lie below the middle sea level and are regularly inundated in the rainy season and then turn into marshland. The few elevations in the downstream area are the result of erosion and accumulation in different phases of sedimentation.

The potential natural forest and grass savannah vegetation is strongly over-formed by anthropogenic use (i.e. agriculture, slashing and burning). The Rio Búzi, which rises in the mountains of Zimbabwe, dominates the hydrology of the district and is, on its 437 km-long journey to the ocean, joined by two other major affluents, the Rio Lucite and Rio Revue, whose catchment areas extend likewise partly into Zimbabwe (see maps). In the upper run of the Rio Revue in the province of Manica, there is a dam at Chicamba which forms a large artificial lake and serves as a source for hydroelectric power. Further downstream, the Rio Búzi meanders cross from west to east of the entire plain of the district, producing the typical phenomena of erosion and accumulation. It is perennial, though near the coast the water level depends on the tide and thus varies daily around several metres. In the rainy season precipitation creates numerous smaller seasonal tributary streams in the district.

The district has a tropical semi-humid coastal climate. The annual average air temperature is 24.4°C, the average annual amount of precipitation lies at scarcely 1,000 mm, while the annual potential evapotranspiration



rate is at 1,860 mm. There are two main seasons, a cooler dry season and a hotter rainy one. The former stretches from April until October/November, with daily temperatures averaging about 20°C and only sporadic and low levels of precipitation. In the vicinity of the river and the sea, however, morning fog can provide a certain entry of humidity.

With the arrival of the Inter-tropical Convergence Zone in December, the rainy season begins, bringing daily average temperatures of 28°C and above, together with substantial precipitation which can be extremely strong in the catchment areas of the Rio Búzi, Rio Lucite and Rio Revue in the mountainous region of Manica province.

2.2 Socio-economic and Cultural Conditions

The Búzi district numbers 145,638 inhabitants, which corresponds to a population density of around 20 inhabitants per km according to official data from 2005. Just over half the population (50.3%) are under 18. The majority are Catholic, followed by Muslims and then animists. The local language used in the district is (Ci-) Ndau, a dialect from the family of the Shona languages.

Apart from a few public service employers (the district administration, hospitals and schools) and com-

panies in the private sector (e.g. trade, handicrafts, transport and catering), which are almost exclusively concentrated in the town of Búzi and seven larger localidades, there are practically no jobs outside the primary sector. Production at the Companhia Colonial do Búzi, a plantation where sugar cane, coconut and later cotton and sunflowers were cultivated during the colonial era by means of irrigation, has come to a standstill.

Relief and important rivers in Central Mozambique



This explains the high proportion of people dependent on subsistence farming. Typical cultivation products include rice, manioc, millet and corn, which together make up more than 85% of the entire culti-

vated area.¹ The keeping of livestock, especially of smaller animals (i.e. chickens and goats), is operated by some families as an additional source of income or food. Along the river and the coast, fishing also plays a role.

Poverty is another important issue: 69% of the rural population of Mozambique were living below the poverty line in 1997, Sofala being the poorest province with 87%.² Recent studies however suggest that the number of the poor has been reduced to 54%³ by PARPA, the national Poverty Reduction Strategy Paper (PRSP).

The district's road system of 500 km is in relatively bad condition as there are no tarmac roads, which means that communities are partly cut off in the rainy season, and the river becomes the only means of transport to the province's capital, Beira. Búzi is the only municipality in the district that is connected to the national grid, with an overhead power line that connects in Tica to the main power line, running between Chicamba dam and Beira. However, it only supplies approximately 300 connections in Búzi due to the small capacity of the transformers. The supply of drinkable water in the district, at a total of 243 wells (= 1 well per 600 inhabitants), remains below the goal of the national water policy, which envisages one well per 500 inhabitants. In Búzi itself, however, a water tower and a pipe system for running water provide private supply for some 400 connections.

Women and children in a village



2.3 Environmental Hazards and Vulnerability

The physical-geographical conditions of the district described above lead to an endangerment of its population regarding different types of natural phenomena. However, these hazards only turn into an actual disaster risk if at the same time the population is vulnerable: these events would not turn out to be

1 From the Búzi District Development Plan, October 2003.

2 Data from 1997 taken from PNUD: Moçambique. Mulher, género e desenvolvimento humano. Uma agenda para o futuro. Relatório do Desenvolvimento Humano de Moçambique, Maputo 2001.

3 Poverty and Well-being in Mozambique: The Second National Assessment, March 2004.

disasters for an accordingly well-prepared and protected population. Before the project's DRM activities, however, the socio-economic and cultural conditions of the population in the district of Búzi translated into a high level of vulnerability, accompanied by a high level of disaster risk. The following sub-sections list the most important demands, together with the crucial vulnerability factors.

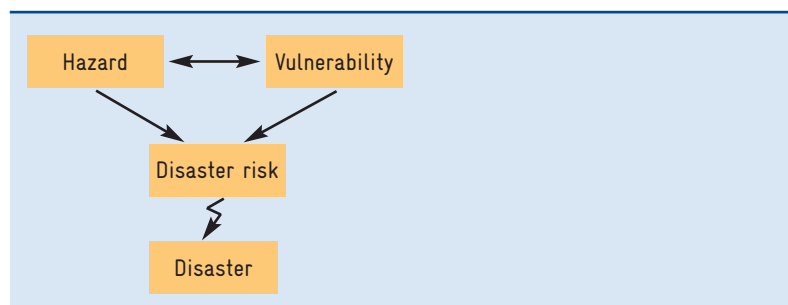
2.3.1 Floods

Hazard:

- Heavy rainfall within the headwater of the Rio Búzi and/or the other rivers can lead the water level in the lower reaches to rise considerably within only a few days, even if no or only low levels of precipitation were registered there.
- With continuous or particularly violent rainfall, in particular towards the end of the rainy season, the flood gates of the concrete dam at Chicamba would possibly have to be opened in order to protect the dam, which will lead to disproportionately high discharge quantities along the Rio Revue.
- High precipitation in the district can cause the riachos (= small side streams of the Búzi which run dry or contain only trickles of water during the dry season) to rise so they become impassable obstacles.
- The daily tidal course of the ocean periodically influences or prevents the Rio Búzi waters from running off.
- In combination with the flat geographical relief of the district, these events can therefore lead to the inundation of wide areas.

Vulnerability:

- Due to the population's low level of education, there is a lack of fundamental knowledge about the origin and cause of floods (risk perception), as well as how to prepare for these events (i.e. by using DRM).
- Several municipalities in the district, including the district capital of Búzi, lie in direct proximity to the river. Many houses and/or loam huts stand only a few metres from the banks of the Rio Búzi.
- There are no artificial dams and only a few natural elevations in the plain where people might seek refuge in an emergency.
- The majority of the population do not know how to swim, and there are not enough boats available locally for any evacuation.



- There is still no effective and well-functioning early warning system capable of warning the whole endangered population reliably and in time.
- The poor infrastructure makes access more difficult for external assistance.
- The masses of water flood the simple latrine holes in the villages, causing faeces and animal carcasses to contaminate the drinking water in the wells, which represents a severe health danger.
- In emergency accommodation, where the evacuated population lives only provisionally, close together and under poor hygiene conditions, susceptibility to contagious diseases and the danger of an outbreak of an epidemic (e.g. cholera) is particularly high.
- Due to poverty and dependence on agricultural products, the disaster does not end with the ebbing of the flood: supplies, personal belongings and the harvest are lost, houses destroyed and cattle drowned; people do not have monetary reserves or savings. The future is thus uncertain for the survivors.

2.3.2 Cyclones/Tropical Storms

Hazard:

- Cyclones occur over the Indian Ocean or the Strait of Mozambique if the water temperature increases to temperatures over 26.5°C down to a depth of > 50 m. They usually move in a westerly direction and can reach velocities of over 300 km/h in gusts, giving them a tremendous destructive potential and thus making them a serious threat.
- They are usually accompanied by heavy rainfall, which can additionally lead to floods.
- For the settlements near the coast in particular, cyclones represent a significant threat, since their intensity is greatest here, whereas their destructive impact weakens further inland.

Vulnerability:

Many of the vulnerability factors concerning floods are very similar to those concerning cyclones, particularly since they tend to occur together. People do not know when or why such storms occur, and nor do they have the knowledge or the means or materials to resist them.

- Due to the low level of education, people do not know about what causes cyclones (risk perception) and therefore are unable to prepare for these events (via DRM).
- Traditionally built houses in the municipalities are not cyclone-resistant.

2.3.3 Drought

Drought, in contrast to the other two threats described above, is more a “creeping” or “slow onset” disaster, which is difficult to define spatially and temporally in a precise way: instead, various different definitions can be used. First of all, a dry period with arid conditions (i.e. when potential evaporation is higher than precipitation) beginning in April and continuing until October is a completely normal phenomenon characteristic of the climate of the semi-arid tropics. A drought in the meteorological sense is defined as when the amount of precipitation in one year remains at least 25% below the long-term average value; by contrast, we can speak of a hydrological drought if the watercourses run dry; and a drought in the agricultural sense when soil humidity is not sufficient to provide appropriate plant growth. Drought can only be considered a disaster when “a disruption in the normal functioning of a society [...] exceeds the ability of the affected communities to cope unaided”.⁴ This can be the case in particular if the necessary precipitation stays below average expectations continuously for more than a year.

Hazard:

- Climatic variability in Mozambique can always lead to one or more consecutive years with below average precipitation. The reasons for this are to be

found in the global climate system, in particular the “El Niño” phenomenon, which arises in certain years and is caused by increased temperatures in the Pacific Ocean. It leads to high temperatures and low precipitation in southern Africa, whereas its counterpart, “La Niña”, leads to disproportionately high precipitation and thus the danger of floods.

- Without a necessary minimum amount of rain, even drought-resistant crops can fail to grow.
- With the water level of the Rio Búzi dropping low in a heavy drought, there is the risk of an intrusion of saline seawater into the groundwater and the soils due to strong tides (their influence reaches 80 km inland) and the flat relief.

Vulnerability:

- Subsistence farmers are directly dependent on their harvest as a source of income and food supply. With insufficient crops, no supplies can be stored to serve as seeds for the next year.
- A second year of drought can lead to famine because no capital reserves are usually available to purchase food or seeds. Other forms of food production, e.g. fishing, small animal/cattle breeding or honey production, do take place, but not to the extent that they could serve as alternatives for the securing of food supply. Hardly any methods of irrigation are used, neither traditional nor modern and, moreover, negative effects could occur as a result of the intrusion of seawater.

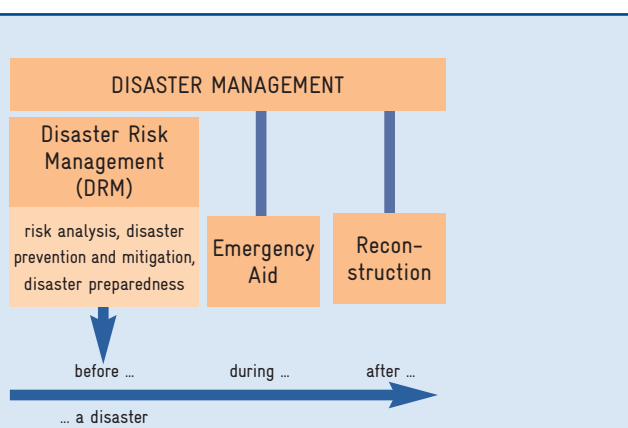
Erosion and uncontrolled bush fires represent further local or regional problems or hazards. Erosion features are formed along the banks of the Rio Búzi and along the coast, and lead to the loss of valuable and fertile soil. They are intensified through anthropogenic influence and are closely linked to the disaster types specified above. So, for example, houses or fields situated close to the river might be eroded and completely flushed away by floods. Fires lit by humans in order to hunt animals or to practice slash and burn agriculture can spread in the dry season, in particular during a drought, turning into uncontrollable bush fires and causing widespread damage.

⁴ See definition from the “GTZ working concept Disaster Risk Management”.

3. Disaster Risk Management – A Part of Sustainable Rural Development

The main focus of activities in the context of DRM in the district of Búzi lies in the reduction of vulnerability of the population in relation to floods and cyclones.

The flood of 2000 clearly showed the local population of Búzi the devastating intensity with which natural disasters can strike and the negative and severe consequences that can entail. It certainly opened the eyes of the population, the local administration, the national institutions and the federal state government, the international partners and organisations as well as the world press. And only one year later, the region was again struck by floods, although not to the extent of the previous year.



On one hand, the natural occurrences that led to this disaster cannot be prevented. On the other hand, the frequency of this type of phenomena can be expected to increase in the future, intensified by global climate change and the rising temperatures of the oceans. All responsible persons should therefore feel obliged to take some form of action.

The population's disaster risk must be reduced, and people need to be better prepared for future extreme natural events in order to keep the number of victims and casualties as well as material losses – and thus setbacks in the efforts for development – as low as possible; this insight has become generally accepted by the responsible persons at different levels of the Mozambican government. It is neither sufficient to supply emergency aid during a disaster (which in the worst case even has to be requested from abroad), nor to rebuild everything that was destroyed after a

disaster, only to begin the same procedure again after the next disaster. This would be neither economically sensible, nor would it correspond to the postulate of sustainable development. But how can this goal be achieved, considering the permanent nature of the threat and scarce financial and human resources?

3.1 Concept and Components of Disaster Risk Management

An elementary component in the course of sustainable rural development of a district exposed to the risk of different natural disasters, and therefore the first and most important step of an efficient disaster management, is a DRM process adapted to the location. Since it is however very difficult and expensive – or even impossible – to reduce the hazard risk, disaster risk must be reduced by lowering the vulnerability of the population. This can be achieved with the help of numerous different measures and activities, structured around the following three components:

I. Risk Analysis

The first step in the course of a systematic implementation of DRM activities in a region is a detailed and comprehensive risk analysis. This consists of analysing the hazard risk, a vulnerability assessment as well as an analysis of the population's coping capacities (human, technical and scientific), and should always include the experience and knowledge of the local population in a participatory manner. The aim is to evaluate the probability of the occurrence of extreme natural events, their possible intensity as well as their consequences and potential damage to a subpopulation and its assets. Only on this basis can measures to reduce risk and disastrous effects be planned and implemented. A precondition for existing disaster risk (see Section 1.3) is the simultaneous presence of hazards and vulnerability.

II. Disaster Prevention and Mitigation

Disaster prevention and mitigation designate those activities that prevent or reduce the negative effects of extreme natural events on a medium and long-term basis. These include political, legal, administra-

tive and infrastructure measures regarding hazard risk on the one hand, and the influence on lifestyle and behaviour of the population with the aim of reducing their disaster risk on the other. In this field in particular there are connections with the development targets of the following primary development cooperation sectors:

- Rural Development,
- Decentralisation and Community Development, and
- Poverty Eradication.

In this particular instance, there is a special connection with PRODER's goal to integrate, among other things, DRM into district development planning. So disaster prevention measures lead to synergies which also positively affect these goals.

III. Disaster Preparedness

The intention of disaster preparedness is to prevent or minimise deaths or other losses, as well as damage in the case of an extreme natural event. Its activities comprise early warning systems, the establishment of a deployment and coordination apparatus, the drawing up of emergency plans and their simulation, as well as training measures.

3.2 Disaster Risk Management in the Búzi District

The Búzi region was selected as a role model for the introduction of DRM owing to its high degree of disaster risk and the poverty of the population, its geographical location and the relatively manageable size of the district⁵, combined with the existing interest and motivation of the population and the district government in taking precautionary measures. At the time of the disastrous floods of 2000, the organisational structures in Búzi and the affected municipalities had not been sufficiently prepared for the extent and the consequences of the event. People primarily lacked an awareness of the danger of their situation and the consequences they should draw from it, and therefore there were neither political, legal, administrative nor infrastructural mechanisms that could have responded locally to this situation.

GTZ has supported rural development in central Mozambique since the 1990s. After the floods at the

beginning of the decade, first aid and reconstruction measures were supported. In 2003 these different initiatives were combined into one common programme, PRODER, whose emphasis is on the promotion of district development plans. PRODER consists of the following four components:

- District development planning
- Strengthening of local government and the civilian population
- Adapted/innovative technologies and sustainable use of natural resources
- DRM.

The integration of DRM into these plans is a particularly important issue.

Therefore an integrated, multi-sector and decentralised approach was followed, whose individual measures, due to their broad range, not only help to reduce the vulnerability of the population at risk in relation to natural disasters in the long run, but also create synergies which positively affect the superordinate development targets of Rural Development, Decentralisation and Poverty Eradication.

Integrated:

More than one DRM instrument was supported (e.g. risk analysis, early warning and emergency accommodation); risk was reduced with the help of a broad range of risk analysis tools; preventive measures were introduced and preparations were made, adapted to the region's special needs. The reason for this approach is that disaster risk consists of different factors, so that one can also contribute to reducing this risk at many points. Isolated measures are often insufficient or can even turn out to be counterproductive if they produce a false sense of security.

⁵ The dimension of a trans-border river system (e.g. that of the Zambezi) would have been less apt as a pilot region. In the case of the Rio Búzi, only about 13% of its catchment area lies outside Mozambique's borders in Zimbabwe.

Decentralised:

To strengthen DRM in the region, cooperation with participants from the village, district, province and other levels was and is necessary. The aim is to create a network in which all relevant participants can contribute to supporting risk reduction according to their authority, capacities and resources. It is also important to secure the integration of efforts into national processes and structures and to anchor them in order to:

- receive additional support;
- benefit from the decentralised capacities and existing know-how; and to
- make sure that the process is sustainable and self-supporting, and can continue autonomously after the end of the active phase of cooperation with (and financing by) GTZ.

Village level:

Population, CVM and GRC volunteers, Régulos

District level:

Administrator, ETP, CCD, MADER and other sectors, INGC, CVM, ÖEZA

Provincial level:

Governor, INGC, EPAP, INAM, ARA, UCM

Other levels:

Subordinate Administration Posts
(postos administrativos), Radio Comunitario do Búzi,
Radio Moçambique, Press

Multi-sector:

Given the various possibilities of reducing disaster risk, it is necessary to include the relevant actors from the different areas of society (public and private, administration, sectors, régulos, population, non-governmental organisations (NGOs), etc.)

The following sections present the application of this approach and its individual activities in the pilot district of Búzi.

3.2.1 Integration of Disaster Risk Management as a Political Learning Process

The process of decentralisation that Mozambique is currently going through gives more power to the district administrators. A National Institute for Disaster Risk Management (Instituto Nacional de Gestão das Calamidades – INGC) has been (re)opened, a national DRM policy was decided upon (Política Nacional de Gestão de Calamidades, 1999), and a political council at ministerial level (Conselho Coordenador de Gestão de Calamidades – CCGC) was established. Since 2003, for example, there has been a law stipulating that it is the task of district administrators and governments to coordinate and implement measures concerning DRM.

The Mozambican Ministry of Planning and Finance has defined requirements for the conception of district development plans, which should be drawn up by a team of multi-sector experts (Equipa Técnica de Planificação – ETP) under the management of the district administrator and with the active participation of the local population for a period of five years, thus representing the basis for yearly plans of action as well as for the planning process at the province level, as they contain all planned activities. Other important actors in this process are the district consultancy council (Conselho Consultivo Distrital – CCD) and the teams of planning experts (Equipa Provincial de Apoio à Planificação Distrital – EPAP) sent by the provincial government and installed by a World Bank programme in 2003.

The financial resources of the districts for implementing important measures are still extremely limited as the national structures are still very centralised, so to ensure successful progress, the financial support of sector ministries (e.g. of infrastructure, health, education, etc.) or from external sources would be necessary. DRM and its integration into district development plans lie within the responsibility of INGC, but conditions there are similarly limited regarding financial and human resources.

Abstract terms such as hazard, vulnerability or risk, or complex scientific topics such as climate change will at first be difficult to understand for the rural

This does not mean however that these subjects cannot be communicated in a straightforward way. For a farmer, for example, even if he can neither read nor write and possibly only speaks his local language, the water that washes away his house or the storm that destroys his harvest are not abstract ideas but instead concrete events which he has already experienced – and he has a very great interest in protecting himself and his family from them. Once this self-interest is awakened and a basic understanding of the connections achieved, there will usually also be the motivation to learn and use suitable prevention measures. Similarly, the need for a district administrator to act responsibly is strong: although individually less vulnerable than a subsistence farmer, whose house and fields may lie directly in a flood-prone area, as a democratically elected politician he is nevertheless responsible for the well-being of his fellow citizens and dependent on the favour of his potential voters. With these suffering regularly from the consequences of natural disasters, the support of DRM measures not only represents an investment in sustainable development in his district (which on a long-term basis also pays off financially, as cost-benefit-analyses have demonstrated), but is also a suitable and legitimate means of gaining popularity and respect. It is the task of PRODER on the one hand to communicate and promote understanding of

At the national level, GTZ/PRODER and the district administration in Búzi work actively together with INAM (Instituto Nacional de Meteorología) and ARA (Administração Regional de Aguas). These are the two Mozambican institutions that collect and evaluate meteorological and hydrologic data in order to forecast floods, droughts and cyclones (the latter only INAM). Austrian development cooperation (ÖEZA), the Red Cross (Cruz Vermelha de Moçambique – CVM) and several NGOs are also based in Búzi and are actively contributing to the implementation of the concept.

Creating this conviction and responsibility are the goals of the three components of DRM and their measures and activities, which are described in the following section.

The map displays the Buzi River catchment area, which is divided into several administrative districts: GOONDA, ESTAQUINHA, SOFALA, and MUXUNGUE. The Buzi River is shown flowing through the catchment, with its extent in 2000 highlighted in a darker blue. Various community centers are marked with red dots, and roads are indicated by thin black lines. The map also shows the extent of the Buzi River flood in 2000, which is shaded in a darker blue. The legend identifies the symbols for Community Center, Roads, Buzi River, Hydrology, Flood Extent of 2000, Chibabava administration, and Buzi Administration.

3.2.2 Implementing the Disaster Risk Management Components

I. Risk Analysis

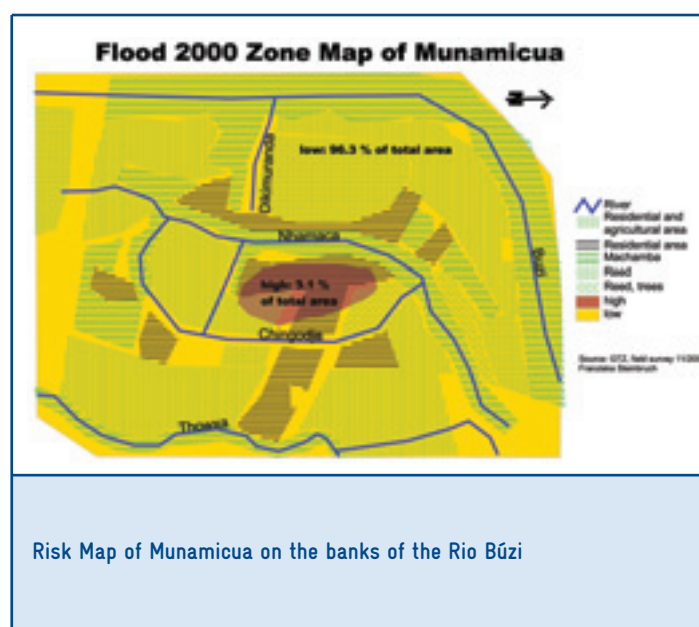
The first step in the course of systematic implementation of DRM activities in a region has to be a detailed and comprehensive risk analysis. For the district of Búzi as well as the neighbouring western district of Chibabava, such a participatory risk analysis was accomplished in cooperation with the Geo-information System department of the Catholic University of Mozambique (UCM). This project identified nine municipalities in the Búzi district as being disaster-prone, with altogether approximately 38,000 inhabitants, as well as the district capital of Búzi itself (with around 15,000 inhabitants). This represents about a third of the total population of the district. The municipalities are represented on the map, which shows the extent of the flood in 2000 (for the hazard and vulnerability factors, see Section 1.3).

Primary data were collected using a participatory approach, using various different methods (semi-structured interviews, transect walks, participatory schematic production of risk maps of the municipalities). These data were supplemented by individual interviews with district members and local authorities as well as the CVM, and were then submitted to a statistical and spatial analysis by means of a geo-information system. Furthermore, indicators were developed which allow the vulnerability of the different municipalities to be compared. The study confirmed that the levels of economic, socio-cultural and political-institutional vulnerability are all generally very high, although some differentiation needs to be made between the municipalities. For example, Muchenessa is overall the most endangered municipality, whereas Ampara is particularly vulnerable in relation to cyclones due to its proximity to the coast.⁶

As a provisional final product, the maps produced in the participatory risk mapping were digitalised, and have since been made available to community members. They show in dark brown which areas of the community are more elevated and would provide safe ground in case of a flood with a similar extent as that of 2000. The maps were mainly needed in

order to set up emergency evacuation plans, but can also be used to select new building sites or to designate fields to be cultivated again.

This scientific approach in the form of cooperation with the university made detailed analyses possible and allowed robust results to be generated. Within the process of expanding the integration of DRM into



other districts' risk analysis, from now on this will be the task of the district administrations and/or the local team from multi-sector experts (ETP). In the district of Chemba in the north of Sofala province on the Zambezi, this already seems to be functioning well.

II. Disaster Prevention/Mitigation

On the basis of the risk analysis, a number of measures and activities to reduce the hazard risk and vulnerability of the population were planned and implemented for the Búzi district. The components of disaster prevention and disaster preparedness are rel-

⁶ From: Hazard Risks and Vulnerability Assessment of the Búzi River Basin/Central Mozambique, Franziska Steinbruch, September 2003.

atively closely connected. For example, sensitisation measures as well as training measures can be found in both components. In this study they are outlined in this chapter as prevention measures.

As already stated in Section 3.1, disaster prevention or mitigation designates those activities that are primarily supposed to prevent or reduce the negative effects of extreme natural events from a medium and long-term perspective. These activities include political, legal, administrative and infrastructural measures regarding the hazard posed. Other activities are designed to exert an active influence on the lifestyle and behaviours of the endangered population with the goal of reducing their disaster risk.

Building codes and regulations

One prevention measure with sustainable impact was the implementation of regulations for cyclone-proof building during the reconstruction of public infrastructure in several districts. Schools and administration buildings that had been built according to these instructions, using simple local materials such as rope or wire to secure the rooftops, have proven their efficiency: during a cyclone in 2002, only build-

ings that had been rebuilt without paying any attention to cyclone-proofing were damaged or destroyed once more. These building instructions were adopted by the Provincial Ministry of Sofala as compulsory measures for all future construction projects.

Resettlement

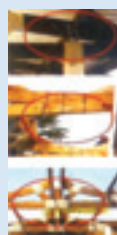
One of the first prevention measures was the construction of new settlements (campos de reassentamento) on higher ground further away from the river for some of the families worst affected by the floods. As their new surroundings are not suitable for farming, they continue to farm on their fertile soils by the riverside, up to 15 km from their new homes. Therefore they return daily, or weekly in labour-intensive times, to their old homes. Their property and relatives however (in particular older people and children) mostly remain in the new safer settlement. In this way, it proved possible to reduce disaster risk for the most vulnerable parts of the population. This example clearly shows the connection between the local and political levels: decision-making and financing take place at the political level, whereas concrete actions are taken at the local level.

A cyclone and its results



Without prevention

anchorage
reinforcement
durability



With prevention

Sensitisation

The sensitisation of both the population concerned and the local political and administrative decision-makers regarding the topic of DRM in terms of the causes and connections of extreme natural events and vulnerability are crucially important if disaster reduction measures are to be successfully implemented. The aim is therefore to reach two different target groups on two different levels with these sensitisation measures: on the one hand the endangered local population in the rural communities, and on the other hand the decision-makers, politicians and institutions concerned with relevant tasks regarding DRM, such as coordination of land use planning.

In Búzi, numerous sensitisation measures took place in the form of workshops, seminars and work meetings which addressed not only DRM, but also the causes, consequences and dangers of climate change. These measures have proven very successful at the district level. The district administrator, a key figure, is personally convinced of the importance of the topic, has recognised his central role within the process, and contributes actively to integrating DRM into the Búzi district's development plan.

This plan implicitly already contains several DRM-relevant activities, e.g. the constitution of the disaster risk management or GRC (Comités locais de Gestão de Risco de Calamidades) groups, the construction and repair of drainage systems under the responsibility of the district administrator, the procurement of a lifeboat by the Delegação Marítima, or different measures to address the problem of drought and bush fires under the direction of the District Management for Agriculture and Rural Development (Direcção Distrital de Agricultura e Desenvolvimento Rural). However, DRM at present does not play an explicit role in the development strategy.

A further important point, both in the context of sensitisation and early warning, was the cooperation with a local radio station, "Radio Comunitario do Búzi". The radio transmits interviews and short plays for radio concerning DRM topics. In the Búzi region around 90% of the population listen to the radio. Radio Comunitario is the most popular of the stations, and has already played an important role during the floods in 2000, spreading the early warning alert. It is important to mention the fact that transmissions are both in Portuguese and in the local language, Ndau. There have also been interviews broadcast on "Radio Moçambique" at provincial and national level.



Together with the population, a detailed risk analysis was conducted in eight flood- and tornado-prone villages of the Búzi district

Numerous articles in national newspapers have commented on the natural disasters and DRM activities in the Búzi district, thereby contributing to the sensitisation and spreading of the idea of DRM.

In order to build awareness among the population concerning the causes and dangers of bush fires, plays were performed in several communities by a local theatre group from Beira in combination with an instructional film. This led at the local level to a successful awareness-raising of the communities with regard to DRM issues, and at the international level encouraged donor organisations to broaden and extend their support for the project.

Creation of local disaster risk management committees

A central point in prevention and preparation at the local level was the creation of the GRCs, the local DRM committees. In all nine endangered villages, the community members selected six representatives, making each one responsible for a certain task in case of an emergency. So for example, one person is responsible for early warning, i.e. receives information in an emergency via the radio and then informs the entire municipality, while another is responsible for organising transport and evacuation measures or for supplies. Most selected representatives are usually respected community members, such as teachers,

Integration of DRM in district development planning, Búzi workshop, September 2004

Phase of district development planning		Recommendations for the integration of Disaster Risk Management	Central actors and their contributions
I	Expert team (ETP) and publication	Sensitisation of district government, EPAP and ETP for the need for and possibilities of DRM	EPAP – Sensitisation and training INGC – Technical advice District administrator directs the process
II	Analysis of the initial situation and quality control	Analysis of vulnerabilities, dangers as well as of endangered regions and existing capacities in endangered areas	ETP – Data collection and evaluation with disaster risk Population – Identification of endangered areas CCD – Checking the quality of the analysis
III	Drawing up the development strategy	Develop strategies to reduce vulnerabilities, paying particular consideration to capacity-building	ETP – Drawing up the strategy, taking the identified disaster risk into account EPAP – Technical and methodological support CCD – Review and approval of the strategy
IV	Drawing up the action programme	Defining activities with responsibilities and possible sources of financing for DRM	ETP – Drawing up on the basis of the strategy INGC – Technical advice Participation of the population
V	Reviewing and approving		
VI	Implementation and monitoring	Integrating DRM into the monitoring system	Reviewing commission (CPS)

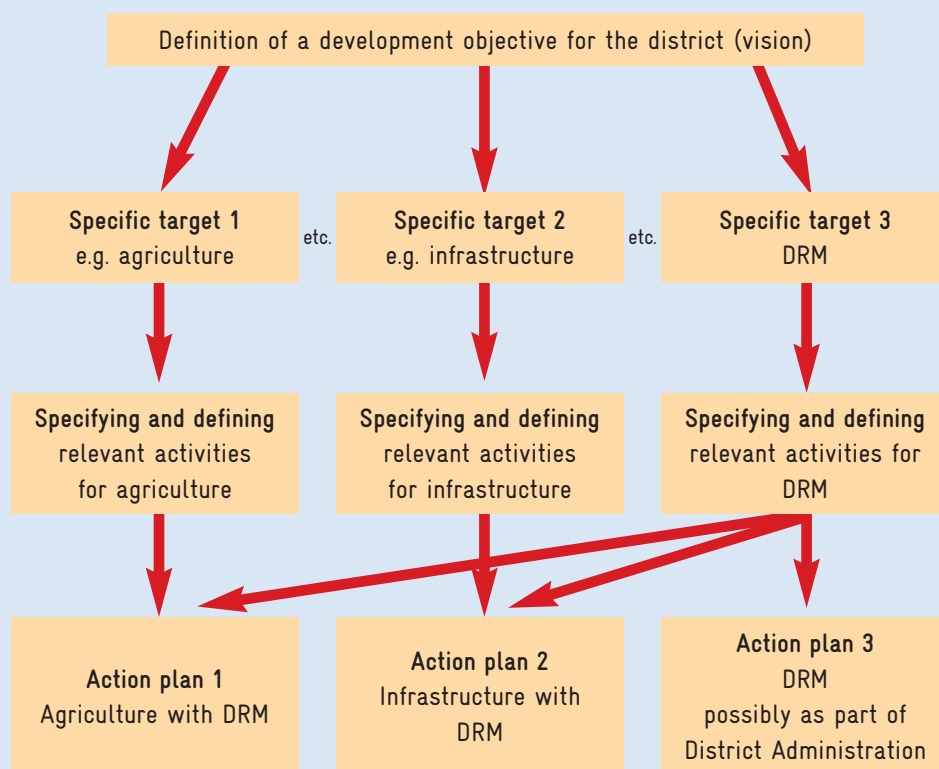
doctors or traditional leaders (so-called líderes comunitários), who take on these tasks as unpaid volunteers.

These groups were equipped with the necessary technical materials (e.g. flashlights, life jackets, a radio, shovels, a megaphone, a bicycle and a first-aid kit), and – this being most important – sensitised to the dangers posed by natural disasters, in particular floods and cyclones, and trained to use concrete disaster prevention and preparedness measures that have been adapted to the local conditions. At present, the trained people are still working in their positions and the technical materials are still in use. The necessary repairs and maintenance have been carried out. These are not only positive results concerning impact orientation, but also indicators of the project's sustainability.

Basic and advanced training measures

A particularly important measure was the employment of a consultant from Costa Rica who had already gained several years of practical experience in DRM in Central America. She passed on her own experiences to the community members with the help of adapted teaching methods in several field workshops, creating a familiar and confidential atmosphere that encouraged group members to perceive the training not as abstract theory, but as being directly applicable to their own circumstances. They in turn were extremely interested and showed a high level of motivation.

A further measure in the context of this South-South exchange of experiences was an educational journey to Central America in order to present GTZ's DRM projects there, in which different INGC representatives participated.



Furthermore, GTZ also closely cooperated with the CVM and trained its members and volunteers in DRM methods, which go beyond mere first-aid measures and emergency response. In cooperation with CVM, INGC and Capacity Building International (InWEnt), a brochure was published including many drawings, cartoons and photos. Designed as training material, this brochure makes the population aware of the causes and effects of their vulnerability, suggesting concrete prevention measures and explaining the tasks and responsibilities of the GRC committees and their members.

Integration into district development planning

An important question is how to achieve the aim of integrating DRM in a sustainable way into other disaster-prone districts without active and permanent support from GTZ/PRODER. The achievement of self-sufficiency is therefore one of the main aims of training measures at the political level.

During a workshop in Búzi in September 2004, an exchange of information and experiences took place between the representatives and planners of different districts on the one hand, and national as well as international DRM planners on the other.

The goal was to define core elements and to develop a model for the integration of DRM into district development plans. The suggestions compiled there are presented in the following table in six chronological phases. It is of special significance for the success of the scheme that the actors of the initial phase are very familiar with the topic of DRM and convinced of its importance. This would usually only be the case after intensive sensitisation measures.

Furthermore, the question arises whether DRM should be integrated as an independent sector or as a cross-sectional task in other relevant sectors of the development strategy and the plans of action. As an independent sector, DRM would of course contain aspects from other different sectors (e.g. in the infrastructure sector, the inclusion of instructions for cyclone-proof building of schools; or in the agriculture sector, the consideration of drought-resistant crops) which would lead to a certain overlapping and possible ambiguity at the point of financial responsibility. As an integrated cross-sectional task, the danger is that DRM might not receive the necessary and required attention.

During the workshop a two-stage model was developed. In the first stage, DRM is treated as a separate sector within the district development plan. Only in the second stage, at the level of the plan of action, are the deduced measures assigned to their associated sectors.

Since the conception of and permission for the district development plan are not yet final in Búzi, nothing can yet be said about the current conditions of the procedure. For Caia, in Phase II (analysis of the starting situation) the district was divided into different areas, and currently DRM measures are being integrated as a cross-sectional component in the areas close to the Zambezi River.

III. Disaster Preparedness

The intention of disaster preparedness is to prevent or minimise deaths or other losses and damage in the case of an extreme natural event. Disaster preparedness activities comprise early warning systems, the establishment of a deployment and coordination apparatus, the drawing up of emergency plans and their simulation, as well as training measures. An important precondition for the functioning of these measures, which has already been discussed in detail regarding the prevention activities, is the successful sensitisation and specific training of the participating actors (among others, GRC committee members, the district administrator, radio stations, etc.). The following measures were or are still being implemented in the Búzi district:

Early warning system on cyclones

In 2002 the US Agency for International Development (USAID)/FEWS NET MIND established a new cyclone warning system⁷ in cooperation with INAM und INGC. It is based upon a direct information flow from the World Meteorological Organization's Tropical Cyclone Committee for the South West Indian Ocean to INAM and INGC. It transmits the intensity and direction of the cyclone, and uses a system of

7 "Mozambique Integrated Information Network for Decision-making (MIND)", within the scope of its ongoing "Famine Early Warning System Network (FEWS NET)".

coloured banners at the local level to inform the population in the communities at risk. A blue flag indicates that a tropical cyclone may affect the area within 24 to 48 hours, yellow that it is moving closer and is highly likely to affect communities within 24 hours, and red that high winds are either imminent (within six hours) or may even be already happening. People in Búzi are aware what the respective colours indicate and what actions they have to take to avoid damage. (For the early warning system on floods, see below).

Disaster preparedness simulation

A fundamental understanding of the causes and connections of extreme natural events and the region's own vulnerability has been created, and the communities now know what actions they have to take in an emergency. This was demonstrated in a large-scale disaster preparedness simulation carried out in December 2003 in the community of Begaja. Within this framework, GTZ-PRODER also cooperated with the existing structures of CVM, and first performed a disaster preparedness exercise in which the emergency rescue of non-swimmers with motorboats in case of a flood was simulated. Subsequently, the GRC committee and the village population acted out the procedures that they had been trained to follow if a red alert announces a tropical cyclone that will hit the community: ensuring the communication and information flow, hoisting the red flag, evacuating the population at risk to safe places, registering them



Disaster preparedness simulation on the Rio Búzi

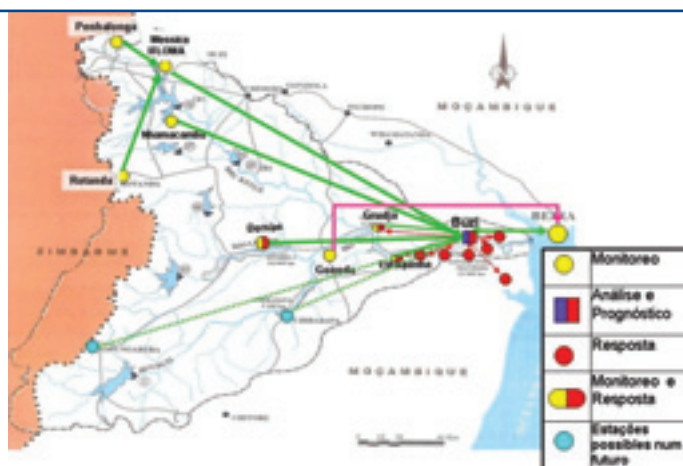
in emergency accommodation, distributing food and organising first-aid measures.

During the emergency simulation, an instructional film was shot which documents how DRM works and the activities in an emergency; this is now used in the project as a further instrument of sensitisation. It has already been presented at international events and also used for training purposes at the University of Cape Town.

Fortunately, there has so far been no further flooding in the Búzi area. But when threatened by cyclones, the responsible persons and committees went onto full alert and prepared the necessary actions for an emergency situation.

Early warning system on floods: SIDPABB

An early warning system cannot prevent extreme natural events, but it can save lives, minimise damage and thus at least keep the disaster within limits when a well-prepared population receives precise and reliable warning information in time.



Model of the SIDPABB system with its three components

In the case of floods, early warning is more feasible than with suddenly occurring disasters such as earthquakes. The geographical and hydrological conditions of the Búzi district (described in Section 1.1) permit a sufficiently long period of time, since the floods caused by extreme rainfall in the ranges of the head-water only arrive at the lower reaches approximately two to three days later.

As GTZ has already acquired considerable experience in people-oriented early warning systems in Central America, a South-South knowledge transfer was initiated, with the aim of installing a “people-oriented inter-district early warning system for the catchment area of the Rio Búzi” (Sistema Inter-Distrital de Pré-Aviso pela Bacia do Rio Búzi – SIDPABB).

A consultant from Honduras, who normally works as a farmer but has also taken over a coordination role in the local early warning system in his home district on a voluntary basis, was contracted for a four-week period of employment in Mozambique. Several presentations were held in village communities in cooperation with members of INAM and ARA. Their aim was to sensitise the directly concerned vulnerable population to the tasks and the chances of such a participatory early warning system. In addition, part of the knowledge transfer included the advanced training of the members of INAM, ARA and local employees of GTZ/PRODER from Búzi, including for example the construction of simple scales, or the organisation and management of an early warning system. A final workshop was held in Beira to present the concept at province level as well as to sensitise the district administrations and civilian representatives.

The SIDPABB early warning system consists of three components and is based on the continuous cooperation of persons on a voluntary basis, since financial resources are neither available for the employment of special personnel nor for the installation of expensive automatic measuring instruments.

The first component consists of the operation of several weather observation stations to measure relevant climatic data such as precipitation and temperature, as well as scales to monitor river levels. The once very good network of INAM’s weather observation



Scale in Búzi



Measuring precipitation



stations in the country is very poor nowadays and therefore does not permit reliable and specific regional forecasts and warnings. It was destroyed by floods and the civil war after independence in 1975 and thereafter neglected, so that today for example in Sofala, instead of formerly eight stations, only three still exist, two of them repaired with GTZ support, and a new one installed in Nhamacamba (Manica). In future the data will be gathered regularly by volunteers and transmitted on a specially installed SIDPABB radio frequency to an analysis and forecast centre in Búzi. Some of the private farmers from South Africa and Zimbabwe who possess vast landed property in the catchment areas of the Rios Búzi, Lucite and Revue have also been sensitised to the topic and have agreed to transmit their precipitation measuring data by radio to this centre.

The second component is the above-mentioned centre, which is to be set up in Búzi. Here the climatic and river level data of all observation stations will be received via the radio and will then be analysed by a group of well-trained volunteers. On the basis of these analyses, a specific forecast for the district will then be generated, providing information about the expected arrival and estimated severity of a possible flood. In case of an approaching disaster, the district administrator, being the responsible person in such a case, can issue a precise alert via public radio, thereby informing the third component – the GRC committees in the endangered communities – and giving them enough time to conduct the necessary preparation and evacuation measures.

The implementation of all necessary preparation measures for the three components is at present being executed, and an initial test run in the form of a simulation is planned to take place at the end of the year, before the beginning of the rainy season.

3.3 Disaster Risk Management as a Contribution to Poverty Eradication

For the rural population in Mozambique, natural disasters do not represent the greatest concern in their daily life. The most serious problem is surely poverty in its different dimensions, i.e. the economic dimension, although this also has ecological, social and political dimensions. Against poverty, concrete measures can be adopted in terms of food security and supply, promotion of economic development, infrastructure improvement, sustainable use of resources, health care, education and good governance, as well as in many other areas. Combating poverty is a complex task that has to be fought resolutely and simultaneously on several battlefields if poverty is one day to be eradicated.

In countries and regions at risk of natural disasters, DRM is a crucial component in this fight, although it has not received adequate recognition in the past. Newly erected schools and hospitals are of little use if a cyclone destroys them again the following year or if doctors and teachers drown in the floods. Natural disasters can destroy the achievements of years of development efforts in an instant, setting in motion a fatal vicious circle: it is the poor who are especially vulnerable to the effects of disasters due to their lack of information and knowledge and lack of alternatives. At the same time, they are also the ones with the least developed coping strategies.

In Mozambique precisely these preconditions can be found: large parts of the country are disaster-prone in terms of cyclone, flood and drought risk, while poverty – especially in the rural areas – is a common problem, resulting in a high degree of vulnerability of the population, and minimal recovery and development perspectives after a disaster. The floods in 2000 confirmed this again very clearly: overcoming poverty and achieving sustainable development progress in the long term is not possible in such regions without the integration of DRM measures into development planning. PRODER will therefore strengthen its support for the integration of DRM strategies into PARPA, the Mozambican PRSP.

4. Búzi in the Context of the International Discussion on Disaster Risk Management

The importance of DRM has been recognised at all international conferences and summits in recent years, and is confirmed in the international discussion on the role and relevance of DRM.

Thus the German government's scientific Advisory Council on Global Change (WBGU) explicitly recommends the "consideration of disaster risk in Poverty Reduction Strategy Papers (PRSPs) and the integration of disaster risk management into the conversion of the Millennium Development Goals." It even states that "disaster prevention should become a new main focus sector in development cooperation".

PRODER's DRM component is already meeting the concerns caused by the adverse circumstances in Mozambique. In the Búzi district DRM has been exemplarily integrated into the concept as an essential component of sustainable rural development following the approach described in this study.

The so-called Búzi Approach therefore explicitly recognises the interrelation, expressed in the second point of the Hyogo Declaration at the World Conference on Disaster Reduction (WCDR) from 18-22 January 2005 in Kobe, Japan: "[...] the intrinsic relationship between disaster reduction, sustainable development and poverty eradication, among others, and the importance of involving all stakehold-

ers, including governments, regional and international organisations and financial institutions, civil society, including non-governmental organisations and volunteers, the private sector and the scientific community."⁸ A core statement of the WCDR was that disaster reduction is a necessary condition for reaching the Millennium Development Goals (MDGs). Five of the eight MDGs show close connections with the need to reduce the impact of natural disasters.

Furthermore, the approach fulfils the demands formulated at the Second International Conference on Early Warning (EWC II) in Bonn, Germany, which called for the "integration of early warning systems into the policy of the governments of countries concerned by natural disasters and the spreading of the relevant guidelines that were suggested on the conference on all authority levels."⁹ The approach also orients itself according to UN-ISDR's "Guiding Principles for Effective Early Warning", which were set up during the International Decade for Natural Disaster Reduction (IDNDR, 1990-1999).

In the context of these two conferences, the district administrator of Búzi presented his experiences. In this way the experiences and recommendations regarding DRM in Mozambique were made accessible to a broad international specialised public.

8 Hyogo Declaration – Extract from the final report of the World Conference on Disaster Reduction (A/CONF.206/6), 2005.

9 Conference Statement, The Second International Conference on Early Warning (EWC-II) in Bonn, 2003.



Poverty eradication by means of cyclone-resistant construction measures

5. Conclusion

If DRM measures are to be successful on a long-term basis, it is essential to ensure sustainable sensitisation and motivation, thorough training of all actors at the local level, a quick and efficient flow of information between institutions on the basis of reliable data, and a clear distribution of tasks and competences at the different political levels. This requires the successful integration of DRM into district development plans and national DRM structures.

This integration process is a long-term goal; however, much progress has nevertheless been made in the Búzi district owing to PRODER's intensive support.

The vulnerability of the population in the district to cyclones and floods has been reduced, and awareness has been created. This represents an important contribution to the sustainable rural development of the region. This finding was confirmed by an independent evaluation report in March 2005, which examined the results so far achieved in three of the communities at risk, and then compared them to an equally disaster-prone community in a neighbouring district where no DRM measures had been implemented.

At the local level, the DRM component has made an important contribution to the upgrading of the participating communities, especially with the foundation and training of the local GRC committees. The training of community members and their inclusion in the development process enhanced their status with the different authorities. Community members are no longer perceived as mere helpless beneficiaries, but rather as active partners with their own knowledge who are able to contribute to reaching the goals within the scope of DRM and beyond.

At the district level, sensitisation measures regarding DRM and basic and advanced training of the actors with their different backgrounds, interests and capacities have been successfully implemented. The district administrator, a key stakeholder, is firmly convinced of the importance of the topic of DRM, and has accepted his central role in the process, participating actively in the integration of DRM into the district development plan.

Building codes for cyclone-resistant construction were adapted and have proven sufficient, and re-settlement measures contributed to decreasing the risk for particularly endangered families.

By cooperating on the subject of DRM with INAM, ARA, INGC, UCM, CVM, radio stations and other institutions during the implementation of early warning systems and the disaster preparedness exercise, it proved possible to conduct successful cross-linking and network building beyond the district level.

At the international level, the Búzi approach meets all relevant criteria within its financial budget and personnel resources, and can be regarded as an exemplary model for the integration of DRM in Mozambique and elsewhere. However, the approach has still not considered DRM measures to tackle droughts, which represent at least as large a problem for many communities as floods and cyclones.

There is still a long way to go before the necessary expertise and motivation exists that would permit an independent introduction of DRM in all disaster-prone districts of Mozambique. The national government also needs to be able to afford to provide the necessary financial means; a clear legal framework is lacking; and DRM needs to become an integral component of district development planning in all districts. The example of Búzi, however, shows that the path already taken is the right one, and that it is necessary – as well as possible – to pursue it to the end. So far the impact and success of the Rio Búzi project have led to DRM implementation in the districts of Caia and Chemba along the Zambezi River as well as in Govuro along the Rio Save. Many more years of mutual cooperation and work are still however required.

Abbreviations

ARA	Administração Regional de Aguas / Regional Water Administration
BMZ	German Federal Ministry for Economic Cooperation and Development
CCD	Conselho Consultivo Distrital / District Consultancy Council
CCGC	Conselho Coordenador de Gestão de Calamidades / Coordinating Council for Disaster Risk Management
CVM	Cruz Vermelha de Moçambique / Red Cross Mozambique
DPCCN	Departamento de Prevenção e Combate às Calamidades Naturais / Department for Natural Disaster Management
DRM	Disaster risk management
EPAP	Equipa Provincial de Apoio à Planificação Distrital / Provincial Support Team for District Planning
ETP	Equipa Técnica de Planificação / Expert Team for Technical Planning
EW-C-II	Second International Conference on Early Warning
GRC	Gestão de Risco de Calamidades / Disaster Risk Management
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit GmbH / German Technical Cooperation
HDI	Human Development Index
IDNDR	International Decade for Natural Disaster Reduction
INAM	Instituto Nacional de Meteorologia / National Meteorological Institute
INGC	Instituto Nacional de Gestão das Calamidades / National Institute for Disaster Management
InWEnt	Internationale Weiterbildung und Entwicklung gGmbH / Capacity Building International
MADER	Ministerio de Agricultura e Desenvolvimento Rural / Ministry for Agriculture and Rural Development
MDGs	Millennium Development Goals
NGO	Non-governmental organisation
ÖEZA	Österreichische Entwicklungszusammenarbeit / Austrian Development Agency
PARPA	National Poverty Reduction Strategy Paper of Mozambique
PRODER	Programa de Desenvolvimento Rural, Sofala / Programme for Rural Development, Sofala
PRSP	Poverty Reduction Strategy Paper
SIDPABB	Sistema Inter-Distrital de Pré-Aviso pela Bacia do Rio Búzi / Inter-district Early Warning System for the River Búzi Delta
UCM	Universidade Católica de Moçambique / Catholic University of Mozambique
UN-ISDR	United Nations – International Strategy for Disaster Reduction
USAID	US Agency for International Development
WBGU	Wissenschaftlicher Beirat der Bundesregierung Globaler Umweltveränderungen / German Advisory Council on Global Change
WCDR	World Conference on Disaster Reduction (in Kobe)



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