



Livelihoods at Risk: The Case of The Mphanda Nkuwa Dam



COMMUNITY RISK ASSESSMENT FOR THE PROPOSED MPHANDA NKUWA HYDRDROELECTRIC DAM

Executive Summary

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ABSTRACT

This report examines the risks associated with the construction and operation of The Mphanda Nkuwa Hydroelectric Dam, proposed for The Lower Zambezi in Mozambique. The study focussed on two *bairros* in the vicinity of the proposed dam site and made use of participatory methodologies in a livelihoods framework to generate a rich context for understanding the manner in which local livelihoods are likely to respond to the enormous physical and social changes that would likely be wrought as a result of both the dam's construction, and its operation. In generating this understanding the report has looked at how livelihoods have historically responded to other socio-enviro shocks and stresses (these include those stresses as a result of the construction and operation of Cahorra Bassa) as well as looking to secondary literature to expand on how those individuals living further downstream may be impacted by the dam.

THIS REPORT CONTAINS THE FOLLOWING:

Chapter 1: *Introductory chapter*

Introduces the work through a discussion of the Mphanda Nkuwa Dam and the World Commission on Dams. This chapter also details the outline for the rest of the document

Chapter 2: *Methodology, ethical considerations and limitations of the study*

Details the methods used in the study as well as some of the limitations and ethical consideration of the research.

Chapter 3: *Context: Mozambique and the Zambezi valley*

Details the broader context in Mozambique with an overview of Mozambique's geography as well as a brief economic and social history. It also provides a brief description of the Zambezi River and its basin.

Chapter 4: *Context: Description of the study sites*

Describes in detail the geography of the study sites as well as a description of the dominant livelihood strategies employed by the local inhabitants

Chapter 5: *Wealth, access and power*

Examines the social forces which act to generate differential risk profiles at the level of the individual in the *bairro*.

Chapter 6: *The impact of large dams: contextualising Cahora Bassa*

Details how dams interact with complex riverine systems, and how specifically the construction and operation of Cahora Bassa has already impacted on the people of the Zambezi. This chapter also contains some discussion of dam safety. This last discussion is located in a discussion of the seismic potential of the area and the possible impacts associated with a changing climate.

Chapter 7: *Priority threats and common responses*

This chapter details the priority threats to which the people of the Zambezi consider themselves to be exposed.

Chapter 8: *Mphanda Nkuwa: Impacts and risks*

This chapter examines how the construction and operation of the Mphanda Nkuwa Dam will impact on the environment and people of the Zambezi to generate risk.

Chapter 9: *Discussion and conclusion*

This chapter contains a discussion of the results of the study. It then goes on to conclude the document with reference to the research procedure as a whole

FIELD SITE

The study made use of two rural villages (*bairro*'s) as field sites. These sites were located in close proximity to the proposed dam site with one *bairro* being located just downstream of the dam and the other on a site which would straddle the proposed dam wall.

METHODS

The study focussed primarily on community-level field research and made extensive use of participatory rural assessment (PRA) tools. This work was supported by numerous meetings with institutions working in the area and by a review of available reports and literature on the area. In order to speak generically about the risk pertaining to individuals living further downstream of the dam wall, secondary literature on the impacts of the existing Cahora Bassa Dam was consulted.

The community level field research took on an ethnographic approach in that it involved living in the field for two periods totalling around three weeks. Given the intrusive nature of the research, the team held community meetings as part of their first day in the field. These meetings were coordinated by the *Secretario do Bairro*, with food and drink at these meeting being supplied by the research team. These meeting served as an ice-breaker, and generated a significant amount of trust between the researchers and the people of the *bairro*. These introductory meetings also created a space in which to undertake some of the exercises which would require extensive community involvement and consensus. These included:

- Community, and resource mapping
- Threat listing and ranking
- Seasonal calendars

Other methodologies used in the field included:

- Semi-structured interviews
- Transect walks
- Institutional meetings

LIMITATIONS AND ETHICAL CONSIDERATIONS

Challenges during the fieldwork revolved around access to information – including access to information which is meant to be public – and issues of translation. Documentation on the river and the field sites was often lacking, and when available was often hard to get hold of. Use of the local dialect (Nyungwe) made, sometimes three-way, translation necessary. Problems of mobility also limited the depth and breadth of enquiry possible during the research, as did the limited participation of women in the research.

Ethical consideration revolved primarily around the concern that the research might, through a show of greater interest in the project, exacerbate, damaging speculative behaviour.

CONTEXT

Mozambique

The study took place in Mozambique on a portion of The Lower Zambezi, about seventy kilometres downstream of the existing Cahorra Bassa Hydroelectric Dam. Mozambique is a country whose recent history has been dominated by the ending of colonialism, a shift to socialism, civil conflict, the implementation of structural adjustment programmes and the brokering of peace. Mozambique has recently (around 1992) entered the global market as a highly indebted country not accustomed to centralized, liberal democracy with its economy and infrastructure in tatters. It also carried with it a history of conflict which had effectively destroyed the countries social fabric. Since 1992 however, Mozambique has shown positive signs, with economic growth increasing and inflation dropping. Despite this the country remains reliant on external aid and although overall growth figures look positive many people attest to the fact that they are worse off now than they were previously. There have also been ominous incidents of corruption, (especially during the period of privatization), reports of political intimidation and, to date, no reconciliation process for addressing war time atrocities.

The Zambezi Basin

The Zambezi is the fourth largest river in Africa. Its basin comprises of seven countries: Zambia, Congo, Angola, Namibia, Botswana, Zimbabwe and Mozambique. The river drains eastward through Mozambique eventually entering the Indian Ocean. The population of the entire river valley is estimated at about 32 million people, about 80% of which are dependent on agriculture and fishing.

The river is effectively divided into three segments: 'upper', running from the source to Victoria Falls, 'middle', from Victoria Falls to Cahorra Bassa, and 'lower', from Cahorra Bassa to the coast. The section of the river running through Mozambique is located in the south of the Shire trough, which is in an active state of subsidence. This is also an area which has historically experienced significant tectonic instability (Hartnady 2002). As with most large rivers, the basin supports a variety of animal life, this varies from Kapenta in lakes Cahorra Bassa and Kariba, to large terrestrial mammals along remote stretches of the river, to prawns at the coast. Many of the communities living along the length of the river, and at its mouth are reliant on these sources of natural capital for supplementing their subsistence farming livelihoods.

Dams On The River

The Zambezi River has had its flow severely interrupted at two points up stream of the proposed Mphanda Nkuwa Site. These sites refer to the two hydroelectric colossuses: Kariba Dam in Zimbabwe and Cahorra Bassa Dam in Mozambique. Power from the Cahorra Bassa Dam is primarily sold to South Africa's utilities parastatal Eskom.

The impoundment of Kariba and Cahorra Bassa, has significantly altered the river ecology downstream with a declining trend of water flowing into Cahorra Bassa Gorge having been observed since 1975.

GEOGRAPHY

The two field sites were located about twenty kilometres from one another in the arid Tete-region of the basin. The area receives between 600 and 700mm of rainfall annually (Isaacman and Sneddon 2002). Daytime temperatures are often well above 35°C and in summer they frequently exceed 40°C. The area has a well defined summer rainfall season with rains falling between November and March. Rainfall is variable in the area, resulting in very arid conditions during times of drought.

The *bairro*'s were characterised by their remote nature – they are connected to the nearest tar road (70km from Tete) by a very rough 25km track, which is often inaccessible in the rainy season. The only other means of transport is via dugout canoe.

LIVELIHOODS

The *bairro*'s comprise of numerous isolated homesteads, dotted around the hilly terrain. Livelihoods in the *bairro* are, largely self-sustaining and revolve around farming. Farming activities comprise of growing sorghum, millet and a variety of vegetables. These activities are subsidised by: livestocking, fishing, medicinal and spiritual guidance, hunting basketry and pottery, wild fruit and honey collection, brewing alcohol and basic carpentry. Cash needs do exist in the *bairro*, as people require cash for the purchase of goods which cannot be locally produced. Cash is accessed primarily through the sale of livestock, however this income is also supplemented in a small way through the sale of farm produce and fish.

Despite the close proximity of the two *bairro*'s, small differences exist primarily to the extent that they engaged in the Renamo-Frelimo conflict. The impact of the conflict was

more pronounced in one of the *bairros*, this has led to greater inequalities in land ownership, and access to resources.

Along the Zambezi, the state of the environment is considered to be intimately connected to people's health, ability to work and spiritual well-being. As such the sustainability of existing livelihood strategies is reliant upon the state of the natural environment.

SOCIAL CONTROL AS WEALTH, ACCESS AND POWER

The *bairro* cannot be thought of as one homogenous social-system in which everyone is thought to be equally wealthy and exposed to an equal risk. Numerous institutions and social factors influence the manner in which different individuals are able to access resources and thus manage their risk. Such factors include:

The manner in which people are able to access land:

Land is not distributed equally in the *bairros*. Some people own vast tracks of productive land, while others own only a little unproductive land. Land is acquired primarily through marriage, however this acquisition is tempered by the relationship of the prospective land owner with both local leadership and the incumbent land owners. As marriage is important in land acquisition, social (un)acceptance of polygamous marriage, and female (in)fidelity limits women's access to land. During times of mass land transfer (such as when refugees returned to their land), land grabs took place. In such instances the ability to intimidate can be used to gain access to land.

The economics of the area:

As access to land is not equal, there are discrepancies in wealth in the *bairro*. A result of this is that poorer individuals often find themselves in the employ of wealthier members of the community. Such employment takes the form of very casual farm labour. This reliance of the poor on the rich, vests power in the rich, and exacerbates the vulnerability of the poor. Thus it is incorrect to view all the people of the *bairro* as reliant on subsistence farming, all of them are reliant on the subsistence economy but many are not themselves subsisting. As a result the system of exchange at the community level in the *bairro* resembles more of a capitalist economic system of exchange (with individuals competing with one another for access to resources) more than it does a system of community networks and reciprocity.

The role of the family in redistributing wealth:

Viewing the whole *bairro* as individuals competing for resources is simplistic; rather the (extended) family is the primary, and vital, means for redistributing wealth. Thus it may be better to conceive of the *bairro* as a functioning capitalist system in which households compete with one another for access to resources with the extended family fulfilling the often vital role of providing social support.

Rule and Justice: The role of 'grey' social control

Due to the lack of state presence in the *bairro*, breaches in the 'law', have to be dealt with internally. This is done through a form of justice tribunal which is responsible for coordinating investigation and apprehension, judgement and sentencing, of criminals. It is comprised of local leadership in the *bairro* and as a result issues of equality and justice are based upon the commonly perceived notions thereof. This has implications for those individuals whose voice is limited in social dialogue (e.g. women) as their ability to determine the rules which govern them is compromised.

Democracy in the bairros:

Although the *bairros* are part of a democratic state and do practice acts of informal ('grey') democracy, the vesting of power (through the processes described above), and its virtually unregulated expression, in certain individuals means that political intimidation is apparent. As such notions of democracy and rational choice may be inappropriate and should be replaced by notions of pledged or coerced allegiance to political structures.

Individuals at risk: Women, children and the elderly

From the context described above, it is evident that certain individuals in the *bairro* are exposed to greater or lesser levels of risk. High-risk population sub-groups include women, children and the elderly. This is primarily due to women's obligatory reproductive role, which leaves them with the double burden of both reproductive and productive roles – essentially excluding them from community maintenance roles. Children and the elderly are at greater risk due to their limited physical, and cognitive abilities. These conditions result in vulnerable groups having to access their resources through more powerful groups. This further vests power in certain groups and places vulnerable groups at greater risk as not only are their resources at risk but so to are their means for accessing these resources.

HOW DAMS IMPACT ON THE ENVIRONMENT

Rivers are interconnected systems, thus a disturbance in one part of the system will create a greater or lesser response over much of the system. Dams alter the rivers on which they are built via two primary processes: Sediment capture and flood attenuation. The impacts of such alteration are felt in the following ways:

- Reduced fertility
- Reduced fish spawning events, and decreased survival rates amongst juvenile fish species.
- Increased deposition downstream which stabilizes dynamic wetland/estuary zones.
- Compromised spawning events and growth cycles at coastal fisheries.
- Exacerbation of flood risk as once mobile human settlements settle permanently in the flood plain.

THE IMPACT OF CAHORRA BASSA

Cahorra Bassa has already acted to significantly reduce the fertility of the areas downstream of the dam. It has also generated large scale erosion downstream and forced farming practices down onto the river bed which has exacerbated the threats posed by flooding, hippopotamus attacks and malaria. Through flood attenuation it has limited access to safe drinking water as well supply points are not replenished regularly. Coastal fisheries have experienced a 60% decline in prawn catch rates for the period 1978 – 1995, while flood-plain-subsistence fishing has also been heavily impacted.

The Zambezi Delta (a declared RAMSAR site) has experienced significant stabilisation, shrinking from a width of 600km to 150km since the construction at Cahorra Bassa. This has in turn facilitated (by increasing access) both the loss of wildlife (poaching and the civil war are largely responsible for this as well) and encroachment of alien plant species.

DAM SAFETY

Dam safety is related to two primary issues: Dam overtopping and dam wall failure (these two events are of course related). Dam overtopping is an issue intimately connected to climate change while Dam wall failure is connected to both dam overtopping and seismic risk. Climate change is expected to manifest in more extreme weather events occurring more often. Locations in the lower reaches of a river basin are particularly vulnerable to this. The area is also in a particularly volatile seismic zone which has experienced earthquakes in the recent past. As a result of poor record keeping in the area, the building

specifications of Cahorra Bassa are cause for concern, as is the continued lack of recording of seismic activity (by Cahorra Bassa) in the area. The specifications for the proposed Mphanda Nkuwa Dam are also alarming given their capacity to only deal with very small earthquakes and conservative estimation of the potential for reservoir triggered earthquakes.

EXISTING THREATS TO LIVELIHOOD SECURITY AND ASSOCIATED RESPONSES

The following threats were considered a priority in the area:

- Drought: is an exceptionally damaging threat, which due to its strong ties to food security has the ability to generate significant levels of vulnerability in the area. Agricultural drought has been exacerbated as a result of reduced fertility associated with the operation of Cahorra Bassa.
- Crocodiles: are aggressive and will attack both livestock and humans. They are considered a priority due to the stress they generate and their ability to deplete both financial and social capital.
- Health: is a major concern which impacts livelihood sustainability in a number of ways such as generating stress and causing hardship while at the same time reducing available labour (permanently in the case of a death) and disposable income
- Flooding: is a highly destructive threat with the capacity to destroy crops and houses. People also reported that flooding results in sickness and often encourages pests, which further threaten food security.
- Hippopotami: Are not seen a threat to human safety, but rather threaten food security by destroying vegetable gardens – made more vulnerable by being forced onto the riverbed.
- The following were also considered minor threats in the area: pests, wind, cattle sickness, baboons and snakes

People in the *bairro* do take measures to combat these threats, the most sophisticated of which pertain to drought, crocodiles and hippo's.

VULNERABILITY: FOOD SECURITY, WATER AND HEALTH

One cannot view the above threats as acting in simple isolation. Both threats and their ensuing impacts should be viewed as acting synergistically to generate vulnerability. This is achieved through mechanisms such as those described as the ratchet effect. As such, one needs to understand the impacts associated with the dam in terms of the manner in which they will interact both with one another and with existing shocks and stresses.

IMPACTS AND RISKS ASSOCIATED WITH MPHANDA NKUWA

The impacts associated with the Mphanda Nkuwa Dam can be separated into two broad categories: construction and operation. The risks associated with construction can then further be broken down into two more broad categories: the risks associated with the influx of migrant labour and the risks associated with the resettlement scheme.

Migrant Labour and Access to Cash:

Due to the gendered nature of migrant-labour the majority of migrants arriving at the dam site looking for work will be men. This event has the potential to significantly disrupt the social fabric of the currently stable, although admittedly un-utopian, society. This will occur in the following ways:

- 'Grey' social control will struggle to cope with the influx of people who do not necessarily know or respect the current institutions of power in the *bairro*
- The influx of cash into the agrarian economy has the potential to destabilise the existing power structures, thus undermining law and order in the area

- Substance, especially alcohol, abuse and sex labour is likely with the influx of cash
- Women's position in sexual relationships could be compromised
- Under these circumstances the dangers associated with HIV/AIDS are likely to be substantially exacerbated
- The likely erosion of traditional practices and institutions will isolate the elderly
- Such conditions are likely to undermine the notion of community thus putting at risk existing emergency measures such as the provision of food aid which is currently reliant on the community structure for distribution.

Essentially, with the influx of migrant labour, sinister elements of society will have room to evolve in the cash-strapped, gendered, unregulated and isolated *bairro*.

Resettlement:

Resettlement schemes represent another abrupt social and environmental change which serves to potentially stress both the host and resettled communities. As described above the flux of people associated with a resettlement scheme could easily give rise to land grabs in the politically intimidatory *bairro*. Resettlement may also interfere with the vital means of social support – the extended family. This is so due to the limited level of physical mobility in the *bairro* which with resettlement may place existing support networks under strain as people are moved away from their families.

Dam operation:

The operation of the dam is likely to induce the following impacts:

- Mini-flood generation, a result of the dams peak-power-production flow regime, will destroy the vegetable gardens which are currently being cultivated on the river bed – this will be disastrous as such vegetables form a crucial aspect of people's existing dry season livelihood strategy.
- Further disruption of the river's flow regime
- Further removal of sediment from the river
 - o Both these are likely to generate negative impacts for both subsistence fishing and agriculture in the area
- Further drying up of the Delta

Currently the downstream communities, who will experience these impacts, are due to receive no compensation – this is in conflict with the recommendations of the WCD.

INSTITUTIONAL CAPACITY AND POLITICAL WILL

It is conceivable that many of these impacts could be mitigated against, however, there is no guarantee that those tasked with resettlement (currently the Mozambican government) are in possession of the political capacity and/or will required to ensure a successful resettlement and mitigation programme. This paper has termed this possibility of failure 'political risk' and has suggested the following as indicators of that risk:

- Current reliance on land-for-land swaps.
- Current level of state control in the area (local reliance on grey social control).
- Lack of maintenance on existing formal, physical infrastructure in the country.
- Current problems regarding existing dams.
- Lack of provision for compensating downstream communities despite acknowledging that they will be affected.
- The current lack of an explicit resettlement plan.
- Lack of a formal position on the WCD.
- Lack of a compliance plan¹.

¹ See Dams and Development 2000 for more on compliance plans.

- Reports of political intimidation in the area.
- The currently high level of corruption reported in the country
- The current lack of formal social safety nets and social services.
- The current level of governmental accountability.

CONCLUSION

The social and environmental impacts associated with the Dam could leave those individuals living in the immediate vicinity of the dam far worse off than they were before the dam was built. Too often the decision of whether or not to build a dam is simply made by examining whether or not the projects' simplistic gains outweigh its simplistic losses. Even when this framework is expanded (through reductionist measures of quantification) to include potential social and environmental losses, scant attention is paid to who wins and who loses. Herein lies the problem, as too often it is those who so dearly need the potential gains from the dam who end up losing - entrenching poverty and deepening the divide between rich and poor. Such circumstances only serve to further exclude the poor from both free market and interventionist mechanisms for social redistribution.

In the case of the Mphanda Nkuwa Hydroelectric Dam, the risk of project failure is being borne disproportionately by those individuals who have the least power in determining the success of the project. The project has also failed to make provision for the rectification of the unequal distribution of benefits and losses and in terms of seismic risk, it has not been able to suitably gauge the risk (which therefore must be assumed to be of an unacceptable level). Thus this study and methodology makes apparent that given the current compensation plan, the apparent indicators of political risk and level of local participation, this project (in its current form and context) represents a developmental initiative which is neither just in terms of the level of risk it will generate nor equitable in terms of its likely distribution of potential gains and losses. As such funding should be withheld from the project.