



Flood risk in unplanned settlements in Lusaka

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1. Government of the Republic of Zambia (2000), *Zambia Analytical Report: Volume 5, Census Report*, Central Statistical Office (CSO), Lusaka, page 1.

2. "Unplanned" rather than "squatter" is the preferred term used, although in Zambia these areas are also called "peri-urban", despite some of them, such as Misisi, being right next to the city centre.

3. Zimbabwe carried out Operation Murambatsvina ("restore order") in May–June 2005, demolishing shanties in an effort to clean up the urban

ABSTRACT Flooding in unplanned settlements in Lusaka is expected, even in years of normal rainfall. There is always much discussion of needed action when flooding occurs but, as soon as the seasonal rains stop, the incidents are forgotten. Most of the households affected by flooding are poor and the flooding damages or destroys their homes and belongings, which might have taken years to accrue. Poorer groups may be faulted for settling on sites at risk from flooding, but this is usually because they can find no safer alternative. In addition, as this paper shows, reducing flood risks in one settlement can increase flood risks in others. Local authorities need to be vigilant in stopping settlement in unstable zones and they need to increase awareness of the need for action in settlements already built in flood-prone areas. Ways also need to be sought to provide low-income households with alternatives to informal settlements in flood-prone sites. It is hard to stop people from erecting houses where they see vacant land. Since rain in Zambia is seasonal, many marshy areas have been built on during dry periods only to be flooded when the rains come. In the end, it is the poor who lose and a solution needs to be found before more lives and property are lost.

KEYWORDS flash floods / stakeholder responses / unplanned settlements / urban poor

I. INTRODUCTION

Lusaka city, the capital of Zambia, has an estimated population of 1 million (see Table 1),⁽¹⁾ 70 per cent of whom live in unplanned settlements.⁽²⁾ The capital has more than 43 unplanned settlements, which are the legacy of inadequate land delivery systems for the poor, and some date back to pre-Independence times, when the capital had fewer people.

These settlements are part of the city and will remain so, although recent events in neighbouring Zimbabwe have made people in some quarters consider the possibility of demolishing them.⁽³⁾ However, eradicating the unplanned settlements is not only impossible but out of the question, as the people and enterprises within them are a key part of the urban economy⁽⁴⁾ and contribute to the city's economic growth. The city has been faced with a deficit in the housing stock since Independence⁽⁵⁾ and this has resulted in people finding their own solutions to housing. Squatting or illegal settlement has been the easiest and most affordable solution for many. Since Lusaka is a planned capital,⁽⁶⁾ land was set aside for future developments; most of it was strategically located prime land,

TABLE 1
Lusaka's population growth, 1969–2000

	Population growth 1969–2000			
	1969	1980	1990	2000
Lusaka urban	83,625	535,830	761,064	1,084,703
Lusaka district	353,975	691,054	991,226	1,391,329
Zambia	4,056,995	5,661,801	7,759,117	9,885,591

SOURCE: Government of the Republic of Zambia (2000), *Lusaka Analytical Report: Volume 5*, Census Report, Central Statistical Office (CSO), Lusaka.

less prone to flooding, and the rest was farmland. This meant that those who could not afford to enter the formal land market had to use marginal sites, as in many other cities worldwide.⁽⁷⁾ The unplanned settlements are usually on low-lying land, which is prone to flooding during the rainy season when the city experiences flash floods.⁽⁸⁾

On 24 December 2005, parts of Kalikiliki and Mutendere settlements in Lusaka experienced heavy rainfall that lasted several hours.⁽⁹⁾ In the course of this deluge, 50 houses were washed away while a total of 250 houses were affected. This paper gives a brief history of the two settlements and the risks caused by their proximity to an earth dam. The residents' and various stakeholders' perceptions of the risks and solutions to the problem are presented first, and then some conclusions are drawn.

II. PEOPLE ON THE EDGE

As urban populations increase, poorer groups struggle for place and space within cities. Most cities in sub-Saharan Africa have a large proportion of their population in informal settlements, which developed outside of the control of the authorities charged with the regulation of land uses and building construction. Official, formally sanctioned land delivery systems for housing have broken down, and the disadvantaged and poor have little or no access to land for housing through such systems.⁽¹⁰⁾ In Lusaka, one possibility is the allocation of free land in or adjacent to regularized informal settlements, but this requires good political or official connections. Since most unplanned settlements in Lusaka are hidden from the view of those in authority, encroachment is ignored unless or until the land is required by the owners⁽¹¹⁾ or by those in authority. Those who move to informal settlements may do so in full knowledge of existing laws, but this non-compliance is a means of obtaining resources they would otherwise not be able to get.⁽¹²⁾

III. ACCESS TO LAND FOR THE POOR IN LUSAKA

Informal land delivery systems in Lusaka have precedents in colonial practices. What are considered today as peri-urban settlements began as residential areas for the labourers of nearby farms or industries. This labour force was highly regulated and mostly male. After Independence,

areas and force dwellers to return to the rural areas. It was reported that about 700,000 people lost their homes. See the UN Report of the fact-finding mission to Zimbabwe to assess the scope and impact of Operation Murambatsvina, accessible at <http://www.unhabitat.org/documents/ZimbabweReport.pdf>.

4. Knauder, Stefanie (1982), *Shacks and Mansions; An Analysis of the Integrated Housing Policy in Zambia*, Multimedia Publications, Lusaka, page 17.

5. Government of the Republic of Zambia (1996), *National Housing Policy*, Ministry of Local Government and Housing, Lusaka, page 1.

6. Lusaka was dubbed the "garden city" and was planned by Professor Adshead in 1931 and later by P J Bowling. See Collins, John (1986), "Lusaka: the historical development of a planned capital, 1931–1970", in J Geoffrey Williams (editor), *Lusaka and its Environs*, Zambia Geographical Association, Lusaka, pages 95–137.

7. Gilbert, Alan and Josef Gugler (1992), *Cities, Poverty and Development: Urbanization in the Third World*, Oxford University Press, Second Edition, pages 114–154; also Cairncross, Sandy and E A R Ouano (1990), "Surface water drainage in urban areas", in Jorge E Hardoy, Sandy Cairncross and David Satterthwaite (editors), *The Poor Die Young*, Earthscan Publications, London, pages 158–168.

8. Fourth World Water Forum: Flash Floods Session, 16–22 March 2006, Mexico City, accessible at <http://www.wmo.ch/index-en.html>.

9. Chooma, Bruce (2006), *Times of Zambia*, Ndola, January 17, page 4.

10. Rakodi, Carol and Clement Leduka (2005), "Informal land delivery processes and access to land for the poor: a comparative study of six African cities", Policy

Brief No 6 in the Informal Land Delivery Processes in African Cities Series, University of Birmingham, UK, page 38.

11. The residents of Ngombe, another unplanned settlement in Lusaka, were evicted in 2002 when the landowners required the land. See reference 10, pages 30–31. Similarly, land wrangles continue in Chainta, to the east of the city, where residents have encroached on farmland.

12. Rakodi, Carol and Clement Leduka (2003), "Informal land delivery processes and access to land for the poor in six African cities: towards a conceptual framework", Working Paper 1 in the Informal Land Delivery Processes in African Cities Series, University of Birmingham, UK, page 20.

13. See reference 4, page 18.

14. Rakodi, Carol (1986), "Housing in Lusaka: policies and progress", in Williams (editor), see reference 6, pages 189–209.

15. Hansen, Karen Tranberg (1997), *Keeping House in Lusaka*, Columbia University Press, New York, page 63.

16. See reference 10, page 30.

17. The United National Independence Party (UNIP) was organized in wards, branches and sections with local elections of chairmen and chairwomen and youth leaders at all levels of the party hierarchy. Under plural politics, most residents of unplanned settlements expected the new ruling party (Movement for Multi-party Democracy, MMD) to fill the empty posts of section and branch leaders. For them, in a one-party state the local party organization was seen quite adequately as the lowest level of local government. See Schlyter, Ann (1999), "Recycled inequalities; youth and gender in George compound, Zambia", Research Report No 114, Nordiska Afrikainstitutet, Uppsala, Sweden, pages 49–65.

18. Hansen undertook an intensive study of Mutendere. See reference 15, pages 64–65.

as Zambians acquired the freedom to move and settle that they had been denied under colonial rule, the population and density of these settlements increased. As the number of low-income wage earners increased, more residential areas were needed. Employers could not supply enough accommodation for their workers, and those with lower incomes had to find their own accommodation. The result was the growth of informal settlements. These host both low- and medium-cost housing, as people built according to their incomes on the only land they could find. Demolition was never pursued with much vigour, and upgrading and site and service options were carried out only when international donors were involved.⁽¹³⁾ The upgrading of George compound was funded by a World Bank loan, for instance, while that of Kalingalinga compound was funded partly by the Zambian government (11 per cent) and partly by a grant from the West German Agency for Technical Cooperation (74 per cent). The community contributed the remaining 15 per cent, in cash or kind.⁽¹⁴⁾

Site and service schemes were conceptualized to help deal with the backlog of low-cost housing stock after Independence. Local councils were directed by government to plan 30 per cent of their housing as site and service schemes. The local councils were to provide demarcated plots with water, sanitation and roads; the residents were to build the houses. Designs were provided as well as loans for roofing materials.⁽¹⁵⁾

Today, there is an inadequate supply of good quality housing in the capital, and both planned and unplanned settlements are experiencing growth. The unplanned settlements are growing both through densification in existing areas and through outward expansion, with new land encroachments. Almost all unplanned settlements have overspill areas, and the older settlers will normally have control over the distribution of newly encroached land. In most cases, these are officials of political parties in power.⁽¹⁶⁾ Party control within unplanned settlements is however not as organized as it used to be under the one-party system of the UNIP era.⁽¹⁷⁾ In older settlements like Mutendere, most residents have built or inherited a house. Within such settlements, the role played by party organizations in controlling the settlement is accepted and seen as normal.⁽¹⁸⁾

It has long been recognized that this loss of institutional control over urban settlement often means that informal settlements develop on hazardous sites. Low-income households settling on such sites lack the capacity to invest in homes or infrastructure that would reduce the hazards. Informal settlements can become locations where low-income households invest and build secure homes and asset bases, but the disasters from which their settlements are at risk can undermine this potential. Local government in Zambia seems to have little interest in protecting such settlements: its interest is only engaged when there is a crisis.

IV. BACKGROUND

a. Mutendere and Kalikiliki

Mutendere (also called Mtendere) was established at the Chainama Hills site and services scheme in 1967, which at the time was in the eastern outskirts of Lusaka. It became part of Lusaka in 1970 when the city boundary was extended. The 1974 Statutory and Empowerment Areas Act

meant that residents could obtain occupancy licenses for up to 99 years. Mutendere was meant to provide for 3,000 residents of illegal settlements, but because it was one of the schemes located furthest from Lusaka, settlers were reluctant to move there, services were slow in coming and money set aside for the scheme was inadequate.⁽¹⁹⁾ (In 2005 Mutendere had approximately 40,000 households and 73,000 inhabitants).⁽²⁰⁾ Hansen's 1997 study of Mutendere revealed a self-sufficient, well-organized (both politically and socially) medium-density residential area.⁽²¹⁾ Houses in townships like Mutendere are important economic assets for low-income urban residents,⁽²²⁾ and Hansen's focus on households and home ownership shows how devastating the loss of such an asset can be. Mutendere lies adjacent to Kalikiliki, and the two settlements are separated by Kalikiliki stream. The initial site and service plan left vacant land between Mutendere and the stream (Figure 1), but this land has since been built upon and the watercourse has been disturbed in places.

Kalikiliki developed as a small squatter settlement in the early 1960s (Figure 1 shows the extent to which it had spread by 2003). Local residents suggest that it was started by the men who were employed to dig laterite, which was used for road construction and brick-making. The excavation left by the digging later became the Kalikiliki dam. Kalikiliki means a "rush" or "hustle and bustle" in the local language, and the term evolved from the owner's insistence that the workers do their work quickly. It became the white owner's nickname and later the name of the stream, settlement and dam⁽²³⁾ (although the dam is also sometimes referred to as the Kabulonga dam). The dam borders Kalikiliki to the south, and on the southern side of the dam lies one of the wealthiest neighbourhoods in Lusaka, called Kabulonga, which is why the dam is also called Kabulonga dam.

In the early to mid-1990s, the Mutendere/Kalikiliki area experienced a series of murders, and bodies were being found in the marshes around the stream almost on a daily basis. The communities' self-help solution was to clear the marsh and allow people to put up houses there. This was when Mutendere settlement expanded right up to the stream, while Kalikiliki spread southwards and developed along the stream (Figure 2 shows the extent to which they had spread by 2006).

b. Seasonal rain and flooding

In years when the capital receives normal and above normal rainfall, many of the unplanned settlements and other poorly located places experience serious flooding. Lusaka's rainy season lasts from late November to early April. The total expected rainfall per season is 820 millimetres and the capital is prone to stormy weather.⁽²⁴⁾ Flash storms lasting less than 30 minutes contribute over 70 per cent of the total rainfall in the city. Although storm intensity is generally greatest during the afternoon, storms are more frequent at night, when they last longer and produce more rainfall. Tyrell notes that night storms have considerable economic and social significance.⁽²⁵⁾ Tropical rainfall is generally erosive when intensities exceed 25 millimetres/hour, although the actual erosion will depend on surface conditions. In areas where vegetation has been cleared and there is no ground cover, erosion will be intense.

19. See reference 15, page 63.

20. Interview with Bernard Mumba, Mutendere area ward councillor, on 5 April 2006.

21. See reference 15, page 61.

22. See reference 15, page 94.

23. Interview with survey respondent, March 2006.

24. From an interview with an officer of the Meteorological Department on 22 March 2006.

25. Tyrell, G John (1986), "The climate of Lusaka", in Williams (editor), see reference 6, pages 34-45.

c. Kalikiliki (Kabulonga) dam

As noted earlier, the dam began as a pond on a site used for the collection of laterite for brick works and road construction in the early 1960s. The owner of the plot (Kabulonga No 60) later built an earth dam across the stream that originated in the marsh (*dambo*) area.⁽²⁶⁾ After a number of

26. Interview with Wallace Mumba from Lusaka City Council Engineering Department on 30 March 2006.

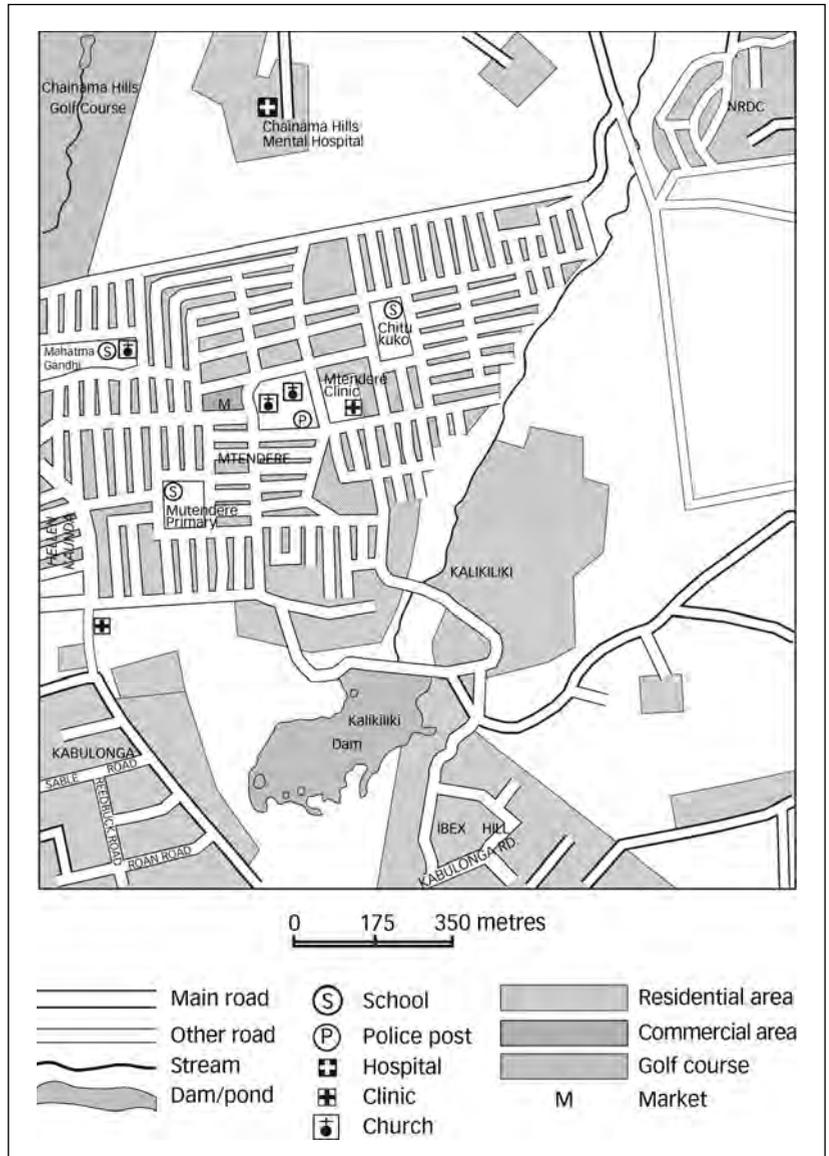
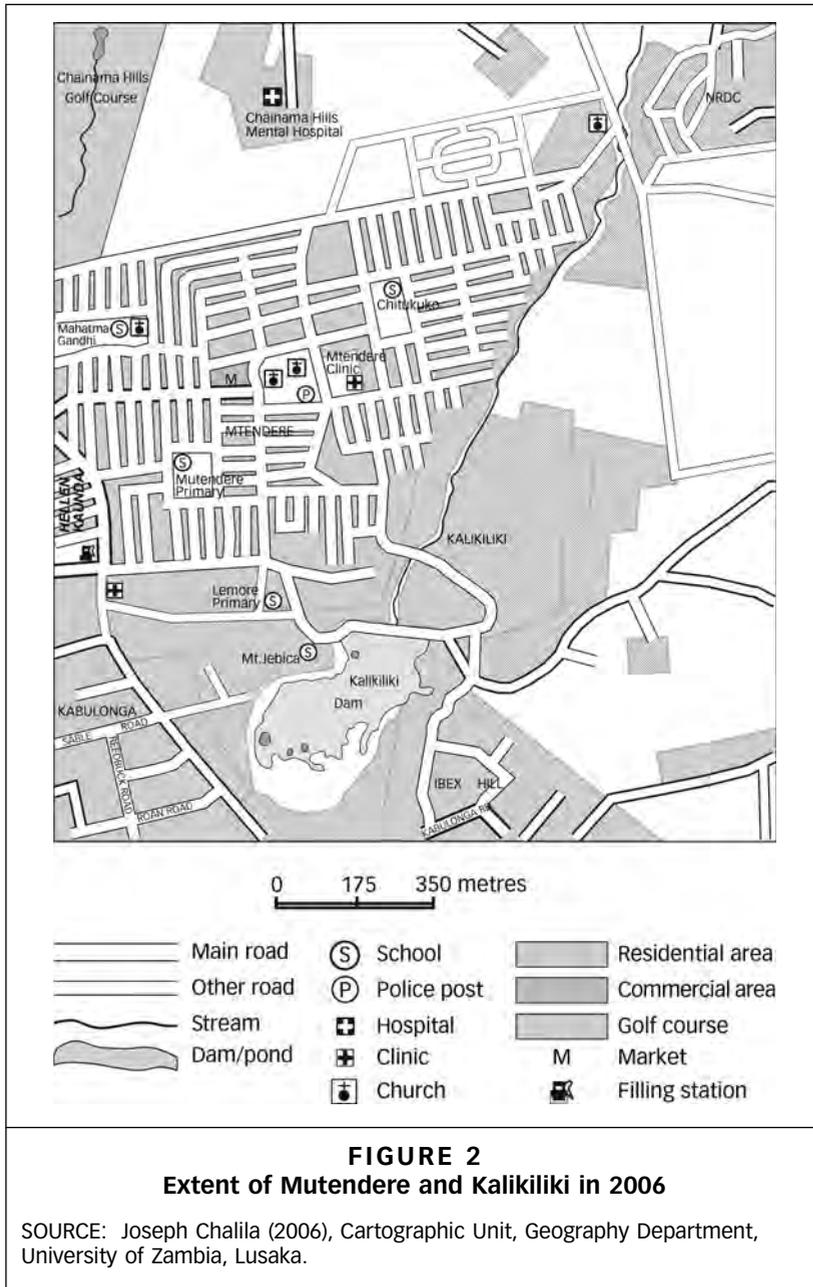


FIGURE 1
Extent of Mutendere and Kalikiliki in 2003

SOURCE: Joseph Chalila (2006), Cartographic Unit, Geography Department, University of Zambia, Lusaka.



people drowned there, hostility towards the owner (a white man) caused him to give the plot and dam to someone else, who later died. Because the dam is on private land, it has not been maintained since 1990.

The current condition of the dam is hazardous. According to Lusaka City Council Engineering Department, seepage has been detected at the base over the past few years and it is in danger of collapsing. The dam wall

27. See reference 26.

28. See reference 26. Meetings with the stakeholders were held at Lusaka City Council.

29. Stakeholders include the Disaster Management and Mitigation Unit (DMMU), Lusaka City Council, the Water Board and the District Water Affairs (Ministry of Energy), the District Commissioner's Office, the Office of the Permanent Secretary, Lusaka Province and the local community.

30. See reference 26.

31. See reference 20. The households at risk are those whose houses were closest to the stream.

32. The Kalikiliki dam residents' development committee was formed specifically to sensitize the community.

33. The Disaster Management and Mitigation Unit (DMMU) is a government department that falls under the Office of the Vice-President and is charged with coordinating national responses to disasters of any nature that might befall the nation. The unit is funded by central government and is expected to help those suffering from the effects of calamities, be they natural or man-made.

34. Mwango, Thompson (engineer, Lusaka Province Water Affairs) (2006), "Kalikiliki dam floods", Report to the Technical Unit, Ministry of Energy and Water Affairs, Government of the Republic of Zambia, Lusaka, March.

35. At an exchange rate of Zambian Kwacha 4,020 to one US\$.

36. A visit to the site in November 2006 found that the dam had been allowed to dry up. It would appear that the stakeholders agreed to decommission the dam as the final solution to the problem.

has also been heavily eroded as people have built right into it; they have even used soil from the dam wall for construction purposes. The current structure of the wall would not withstand strong currents were the dam to be allowed to fill up. The dam wall stands straight (at a 90° angle) and is not convex, as required.⁽²⁷⁾ The fact that it is an earth dam, and not made of stronger material, also compromises its strength and durability. Previously, the water board had been siphoning water from the dam in order to keep the level low and stop the dam wall from breaking.

In October 2005, the Lusaka City Council Engineering Department was alerted to the fact that in order to avert a major disaster, something urgent needed to be done about the dam wall before the rains started. The realization that the wall could easily collapse if the pond were to become full led to a series of meetings⁽²⁸⁾ with various stakeholders⁽²⁹⁾ to try and come up with a solution. One alternative was to decommission the dam, which would mean letting it dry up,⁽³⁰⁾ and a snap survey was undertaken downstream to assess the possible repercussions. It was found that in some areas people had built over the stream, and in others had forced it to change the course of its channel. In some places it even passed through people's properties. The final assessment by the Engineering Department was that downstream flooding was inevitable, even if measures were taken to deal with the dam. The approximate number of households from both Mutendere and Kalikiliki that were at risk if the dam were to burst was between 2,000 and 2,500.⁽³¹⁾ Furthermore, the stream's channel had been constricted and clogged by garbage, and PUSH, a local NGO, was engaged to employ women to clean up the channel and widen it. As the project to solve the problem was to be a major one, the houses that were to be demolished were identified and the community was sensitized to this effect through the residents' development committee.⁽³²⁾ The Department of Water Affairs (DWA) advised that 100 metres of land either side of the stream should be left undisturbed. After the community was sensitized, work began and a 900-millimetre diameter pipe culvert was placed in the middle of the dam wall (Photo 1). This was done while waiting for a final decision to decommission the dam. The Disaster Management and Mitigation Unit (DMMU)⁽³³⁾ provided the pipe and it was put in place in November 2005 (although somewhat hastily because the rains had started).⁽³⁴⁾

The culvert released water into a narrow channel that formed the remains of the Kalikiliki stream. As predicted, however, as soon as the rains increased in intensity the houses downstream started to flood, as the stream could not contain the large quantities of water being released through the culvert. The people located there, although forewarned, did not understand and blamed government for their plight. What was not foreseen, however, was the storm on 24 December 2005, which brought the situation in Mutendere/Kalikiliki to the attention of the whole nation. A team of stakeholders was formed, but unfortunately it did not include the Meteorological Department; the technical team still meets to try and come up with a lasting solution, although the DMMU has not disbursed the 43 million Kwacha (approximately US\$ 10,696)⁽³⁵⁾ they had promised. It seems that after the culvert was put in place, no more progress was made to mitigate further disaster.⁽³⁶⁾ The flooding, however, caused increased activity in terms of the responsible departments holding frequent meetings and visiting the affected site.



PHOTO 1
Culvert in the middle of the dam wall

V. MUTENDERE AND KALIKILIKI SURVEY⁽³⁷⁾

a. Method

Following media reports early in 2006 concerning the flooding in Mutendere and Kalikiliki, a survey covering 56 affected families was carried out. Those households whose houses had been totally washed away were not covered because most of them had moved out of the area and residents did not know where they had gone. Even the whereabouts of those still in the area was unclear, and trying to locate them would have taken too much time.⁽³⁸⁾ Information was collected on ownership, plot acquisition and the effects of the 24 December floods on households; also on what they thought were the causes of the flooding and what should be done. Information was also collected from the council office and the settlement's residents' development committee. The information was analyzed and is summarized in this paper.

b. What happened on 24 December 2005?

In the late afternoon of Friday 24 December 2005, clouds gathered and the sky grew dark above the city. This was not unusual as it was the middle of the rainy season and the capital city usually experienced rain at around five o'clock. When the rain came, it was a sudden and sustained downpour

37. The survey was undertaken following the author's interest in the Kalikiliki dam situation.

38. There were financial and time constraints. The survey was undertaken at the author's expense, who also had other pressing research commitments.

that continued for about the next three hours (depending on which part of the city you were in). This was a typical tropical storm, characterized by thunder and lightning and heavy downpours. Two hours after the rain had started, disaster struck in Mutendere and Kalikiliki. The gravel roads in the settlement turned into streams of rapidly flowing water, as the marsh became increasingly waterlogged and as the stream was unable to contain either the rainwater or the water coming from the culvert that was being released from the dam. Although the culvert contributed to the flooding, it averted the greater risk of the dam wall collapsing. Houses could no longer withstand the force of these streams or the winds (Photo 2). In all, 250 houses were damaged, including 100 that were extensively damaged and 50 that were completely demolished.⁽³⁹⁾ Those whose homes were demolished accepted shelter from the community and from relatives and friends in other areas, while others sought refuge in churches. There was one fatality and a number of injured. A child was swept away and drowned in the running water, one person lost both legs, another had a broken collarbone, and a child was scalded by boiling porridge that was spilt during the flood. There were many others with fractures and minor injuries who were not taken to medical institutions.

Many households suffered major losses. Given that this was the day before Christmas, people had been preparing for the following day's festivities. The prepared food, along with essentials such as mealie-meal (maize meal) and other dry foods that are bought in advance, was washed away. To compound the disaster, looters helped themselves to household goods from the houses that had collapsed. The government did not declare this a national disaster because the DMMU felt that the ministries involved could sort out the problem without the government requesting international assistance.⁽⁴⁰⁾

c. The households

Of the 56 people interviewed, 36 were female and 20 were male, and 48 were between 24 and 43 years old. Younger families were mostly tenants who had lived in the area for a shorter period (only five of the 29 tenants had lived in the affected area for more than five years). The average age

39. See reference 9.

40. A national disaster is declared only when the situation is beyond the capacity of the country, or when the government ministries involved are unable to handle it. The Disaster Management and Mitigation Unit (DMMU) recommends to Cabinet, which assesses the capacity of all the strategic ministries. It is only when Cabinet feels that the strategic ministries cannot handle the situation that it recommends that the president declare a national disaster. Interview with Mr P K Kangwa, DMMU – Office of the Vice-President.



PHOTO 2
Affected houses in Mutendere and Kalikiliki

of tenants was 29 whereas that of homeowners was 35.7, and only three homeowners had lived in the area for less than five years. One of the affected, a single female head of household looked after 11 people. All the homeowners had built their own homes with their own or borrowed resources, and only four of those affected had ever been affected by flooding in the same area before. Only one of those interviewed had had her house totally demolished but her family did not live there. The house had been let out to tenants for extra income.

d. People's views on the causes of flood risk

From the survey, it would appear that residents are aware of the causes of flooding in the area. Most people blamed the dam, while others recognized that the area was on low land and was waterlogged. Very few residents attributed the flooding to inadequate drainage and water from upstream.

A large number of residents (36) said that they had no prior knowledge that the area faced the risk of flooding, and had they known this they would not have settled in the area. Those who were aware that the area faced the risk of flooding, but still settled in the area, were predominantly renters (out of 20 who had prior knowledge 12 were renters).

Residents were, however, aware of the constraints faced by those with low incomes, and gave reasons why they thought people still settled on unstable land prone to flooding (Table 2). The fact that there was no other land available, and high levels of poverty were the most prevalent responses. No homeowner had received land free of charge and no respondent had chosen to live in this area because of proximity to employment.

e. Possible solutions

The community gave a number of possible actions that could be taken to reduce the risk of flooding (Table 3). They also suggested possible individuals or organizations that they thought should play an important role in reducing the impact of flooding. The construction of adequate drainage was the most frequent response, suggestions to close the dam elicited 16 responses and the construction of good roads was third, with 10 responses.

TABLE 2
Why people settle on land that is prone to flooding

Reason for occupying flood-prone land*	Respondents
It is free	0
It is cheaper	6
There is no other land available	24
It is close to places of employment	0
Poverty	19
There are few formal houses available	4
Low rental/ high cost of living	2
Like the neighbourhood	1

*The first four responses appeared on a questionnaire, while the rest came from respondents.

TABLE 3
Suggested solutions from the residents

Suggestions	Respondents
Build proper bridges	9
Close the dam	16
Build proper roads	10
Improve the drainage system	18
Appeal to government for help	1
Get the council to raise the level of the land	5
Get the community to participate	1
Relocate people	1

When asked who should be involved in solving the problem of flooding, the council (28 responses), the government (21 responses) and the community (five responses) received the highest number of mentions. Other actors identified were the area member of parliament (two responses), the ward chairperson (three responses) and the ward councillor (two responses).

A good number of residents realized that most projects are unsuccessful because of low or no funding. They therefore mentioned the sourcing of funds to do the necessary work as a priority action by the stakeholders (24 responses). Only one respondent suggested relocation as a solution, while others thought building bridges and closing the dam should be undertaken by the relevant actors.

VI. GOVERNMENT’S STANCE ON FLOOD RISK

Because of Lusaka’s geology, most areas are prone to flooding.⁽⁴¹⁾ The water table in most parts of the city rises easily in a year of normal rainfall. Conveniently, the higher schist ridge (the Ridgeway) was used for houses for the white population of the city, while the lower-lying lands were left to the Africans. This means that flooding is a problem the city authorities should have learned to manage, as floods have been part of the city since it evolved in the early 1900s. There are a number of actors involved in dealing with floods in the city, and government is the main one.

a. The Disaster Management and Mitigation Unit (DMMU)

In order to respond to disasters that arise within the country, the government set up the Disaster Management and Mitigation Unit (DMMU), which is under the Office of the Vice-President. It was set up to take a leading role when disaster strikes, be it flood or famine, and is expected to put in place mitigating factors to reduce the suffering of people affected by natural or man-made disasters, and to coordinate the activities of relevant government ministries. In the case of the floods in Mutendere and Kalikiliki, the DMMU was to provide money for the culvert and also any other necessary work. The money for the culvert was not released on time and the money for clearing the waterway and relocating selected homes has yet to be released. The money for the culvert amounted to Kwacha 43 million (US\$ 10,696) but only Kwacha 29 million (US\$ 7,213)

41. Kay, George (1967), *A Social Geography of Zambia*, University of London Press, London, 170 pages.

was released. The unit claimed not to have received enough funding from central government, hence the shortfall.⁽⁴²⁾ Government's response in this case came after the event. Usually, very little attention is paid to areas that are under the risk of flooding until the flooding actually occurs. This results in loss of property and, sometimes, in loss of life.

b. Other actors

Other actors included the local authority, the Department of Water Affairs and community representatives. The local authority, in this case the Lusaka City Council, played the role of coordinator. The council's Engineering Department worked with the Department of Water Affairs, which is under the Ministry of Agriculture, in order to find feasible solutions to the problem. They suggested putting in the culvert and worked out the cost of the work. They also suggested widening the stream downstream to improve drainage. The community was also involved in the form of the residents' development committee chairperson and the area councillor. They helped organize sensitization workshops within the communities to help the affected people understand that the dam could collapse and, therefore, work needed to be done. This was in order to reduce any resistance from the community.

The Meteorological Department was unfortunately left out. It seems that no one had thought about the importance of having them as part of the team. When asked, an officer from the DWA said it had been an oversight.

VII. CONCLUSION

The rains ended in March and it is hoped the Mutendere/Kalikiliki area has not been forgotten. The main constraint in this case is the slow release of funding from the DMMU. The DWA and the council are both ready to carry out the work needed to strengthen the dam to stop it from collapsing. The residents have been made aware of the risk and want the dam to be allowed to dry up completely so that the risk is totally removed. This, however, is not possible until the dam is decommissioned by the DWA. Until this is done what is needed is a comprehensive flood management plan so that people will be prepared in the event of another flooding incident. In this case, the Meteorological Department should be co-opted quickly so that they can provide forecasts for rainfall and flooding. The main actors, however, are the residents, who must be made aware of the fact that they have settled on unstable land and need to take necessary measures, such as keeping the stream clear of all rubbish that might block it and cause flooding. They should also avoid any further constriction of the stream by building close to it, thus preventing it from finding its natural course.

The affected community consists of both homeowners and tenants, and many of the residents were not aware of the flood risk before they settled in the area. The main reason why areas such as Mutendere and Kalikiliki are attractive is because land is scarce and most people cannot afford to buy land in the formal land market. However, residents are now aware of the causes of flooding in their area and have suggested that the

42. An official from the District Water Affairs (DWA) said the Disaster Management and Mitigation Unit (DMMU) claimed not to have been given enough money by central government. Another factor could be that the flooding disaster in the southern part of the country earlier in the year had depleted available funds. The DWA had to meet the shortfall.

dam should be closed and proper roads and bridges should be built. The residents expected the council, government and the community itself to solve the problem.

Finally, the initial step of forming a team to solve the problem was good but this needs to be improved and consolidated by constant monitoring of the community to avoid further weakening of the dam wall and disturbance to the stream.

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