

The aim of this study was to investigate into the existing rural community bonds in the landslide affected areas in Kenya. This was deemed necessary by the fact that when disasters occur, community members in the disaster prone areas are affected in one way or another. The researcher found it necessary to pay attention to the important role played by the existing community bonds when a disaster strikes.

The study gathered information from the respondents by use of questionnaires and tape recorders from two administrative landslide prone districts in Kenya namely Murang'a and Meru. These districts were purposively sampled due to their repeated occurrence of landslides causing deaths and destruction of property in the recent past.

The study anticipated data on the community's perception of what landslides are, their causes, the available resources for landslide hazards prevention in the community and the existing network for disaster management in the community.

Data gathered reveals that although the community is aware of the causes of landslide, they are still vulnerable to landslides because they remain in the landslide risk areas.

Further they have continued with development activities in the areas they mapped as high landslide risk areas. Another important finding is that NGOs and the Government have not played any vital role in reducing vulnerability to the victims of landslide and the community at large. The community expressed their concern that landslides are on the increase even in areas that were not prone to landslides earlier on. It has also been established that the community bonds have weakened with time and therefore there is need for the community/government/NGOs to intervene by strengthening them.

It is hoped that the community members in all landslide prone areas will one day be at peace to be able to carry out their daily activities without being vulnerable to landslides. It is also hoped that the community will one day be able to manage landslide risks by reducing vulnerability.

Introduction

The main objective of this study was to find out how community bonds amongst the rural people can be strengthened with an aim of reducing vulnerability to landslides. Emphasis was on how to maximize the existing community bonds in landslide risk reduction.

Landslides are not a new phenomenon in Kenya. They have been occurring in different parts of Kenya since time immemorial, but in the recent years they have been on the increase in some parts of the country. Their destruction to human life and property has also been on the increase. The most vulnerable areas in Kenya are: Murang'a, Kirinyaga, Kisii, Mombasa island, Nyeri and Meru. These areas enjoy high rainfall of over 1200 mm annually. Most of these areas are very hilly with steep slopes.

In the recent past, Landslides have been recurring in both Murang'a and Meru districts claiming several lives and property. Murang'a and Meru are administrative districts in Kenya. Murang'a is a district in central province of Kenya while Meru is in the eastern province of Kenya. For the purpose of this study, Murang'a and Meru districts were sampled.

In this study, community members in both sites were sampled and mobilized to identify landslide hazards. This was done with the help of local leaders (chiefs, headmen, church leaders and group leaders) in the said areas. These respondents identified actual elements at risk, which included life and property. In as far as life is concerned; several people have lost their lives while others have maintained injuries. Others have to live with the trauma of the landslide experience, having been victims of the landslide or having witnessed their loved ones die in the landslides.

The community is still at risk and vulnerable to landslides. No changes or efforts have been done to improve the situation. For instance, they carry out their daily activities in the same places where landslides have occurred. Worse even is the fact that one can actually see deep cracks on the earth surface that were caused by the landslides that occurred recently.

The community members are aware of the risks involved in these cracks but claim that they have no choice but to live with the fear of landslides occurring there again. Actually, they have carried out their farm activities even on the spots where the actual landslide took place; only leaving out places where cracks are visible. All this suggests that these people are still at risk and very vulnerable to landslides. Landslides that have been occurring in these areas have destroyed a lot of property and more is at risk. In fact the community members disclosed that some of their neighbors are poor because of the impacts of the landslides, which destroy their property. Some of the property

identified as being at risk include, houses, domestic animals, crops, roads, schools and arable land.

This study was carried out during a rainy season. This means that farm activities were being carried out on the farms. The researcher found people on their farms even where landslides had occurred and actually lost some soil. Some respondents argued that it is fate to die in a landslide. That if one is destined to die in a landslide, then there is nothing one can do. Further they argued that they did not have other places safe from landslides where they could migrate to. All this talk can be interpreted to express signs of despair and hopelessness. The fact that they have seen landslides occur and claim lives and property and nothing has been done to salvage the situation has made them give up.

Landslides have been on the increase in Murang'a district, which is hilly and highly populated. Human development activities have activated this hazard that has frequently caused intensive damages to those that have been affected. The community members are vulnerable and continue to lose their lives and property.

Problem statement

Landslides are a major threat each year to human settlements and infrastructure all over the world. Kenya is not an exception of this hazard and data collected reveals that landslides are on the increase in the country. Landslides have occurred in several administrative districts and the fatal ones occurring in Murang'a and Meru districts. This study is guided by the following research questions:

- What are the causes of landslides in Kenya?
- Why are landslides on the increase in the country?
- What is the level of community participation in landslide risk reduction?
- Are the existing community bonds strong enough to help reduce vulnerability to landslides?
- What resources are available in the community to help reduce vulnerability to landslides?

Goals and objectives of the study

- **Community mobilization for hazard identification.** This includes definition of landslides by the community, establishing historical causes and effects of landslides, and hazard mapping.

- **Establishing the resources available for hazard prevention in the community.** This includes minimizing vulnerability, mitigation and recovery.

- **Establishing network for disaster management.** This includes intra community, NGOs and government.

Justification of the study

It is in the interest of all well wishers to help save lives and also protect property from any kind of destruction. Whenever a landslide has occurred in the named places it has left a trail of death and massive property destruction. To rescue the community members from landslides vulnerability, there was need to carry out this kind of study.

Other than trying to bring in external forces to address issues of how to address landslides in landslide areas, it is important to involve the community itself. This way they will take the project as their own and sustain it.

Whenever a landslide occurs people lose their lives and property is damaged. In order to curb this there was need to investigate into the research topic. This way lives and property will be saved and probably landslide risk and vulnerability be reduced to manageable heights.

Scope and limitation

Although Kenya experiences several hazards including famines, floods, and fires both in rural and urban centers, the study concentrated on landslides. This was necessitated by the available resources and the time frame within which the project should have been completed. However there is need for intensive research in disaster management to establish possible ways of reducing vulnerability to hazards.

Research methodology

Site of the study

As mentioned earlier, this study was carried out in two administrative districts in Kenya. These districts were selected purposively because they had experienced the worst landslide damages (which included loss of lives and massive loss of property) at the time the study was being undertaken. Also people are still vulnerable to landslides in these areas.

Sources of data

Data was gathered from primary and secondary sources. Primary data was gathered by use of questionnaires and tape recorders through individual interviews and focused group discussions. Secondary data was gathered from any relevant works done related to this study through literature review.

Sample size

As stated earlier, this study interviewed respondents through focused group discussions, Key informants and also individual interviews. There were seven focused group discussions, seven key informants, and twenty individual interviews per site. In total there were fourteen focused group discussions, fourteen key informants and forty individual interviews. All these were randomly sampled to create a representative sample.

Community mobilization for hazard identification

Community definition of landslides

Landslides are not a new phenomenon in Kenya. They have been occurring in different parts of the country since time immemorial. However, landslides disasters were not as destructive as they are today. The high destruction of property, lives and livelihood can be attributed to population increase and the weakening of community participation in the prevention, management and response to disasters.

As far as landslides are concerned today, the most vulnerable areas in Kenya are: Murang'a, Kirinyaga, Nyeri, Meru, Kisii, and Mombasa. These places enjoy high rainfall of over 1200 mm annually. Most of these areas are very hilly with steep slopes. In recent past, landslides have been recurring in both Murang'a and Meru (administrative) districts claiming several lives and property. The two districts involved in this study had the following definitions for a landslide:

- It is movement of loose soil that has no support (no vegetation to hold it).
- It is soil erosion.
- It is movement of soil under the influence of too much underground water
- It is a place with too much underground water that has no outlet and therefore forces its way out to the surface and hence a landslide occurs.
- It is massive movement of soil.

Although most of the community members could not define a landslide using the academic language, it came out very clearly that they had full knowledge that it involved movement of loose soil and rock downhill. They were fully aware that this occurred mostly during rainy season or occasionally when people mine sand under the hills. With this, the community members ended up identifying the historical causes of landslides as being.

- Too much underground water
- An earthquake
- A curse/revenge from a supernatural power
- Intensive human activities on weak earth surface
- Heavy rainfall
- The gradient of the landscape

The respondents complained that there is a lot of underground water in their land as a result of heavy rainfall in the area. This water has no outlet and forces its way out and in the process causes a landslide. They attributed this to the fact that their landscape is hilly and with a lot of underground water.

Some had other explanations. For instance landslides are blamed on supernatural powers. Some people argued that landslides are as a result of human interference with sacred grounds. According to them, sacred grounds should be left fallow for divine purposes. Interfering with them meant annoying the gods and this is why the gods revenge through landslides. They believe that landslides are caused by gods who are on the verge of revenge for having been interfered with. This category of people needs to be educated on the causes of landslides and probably how they can be managed.

The study also established that landslides are caused by intensive human development activities on loose grounds. These activities further the weakness of the soil causing a landslide.

Hazard mapping

In this study, community members in both study sites were mobilized in order to do risk mapping, identification of elements at risk, and planning on how to reduce vulnerability with maximum reliance on the community resources. This was done with the help of local leaders (chiefs, headmen, church leaders, and other group leaders in the said areas).

The respondents proved to be fully aware of the places where landslides had occurred and where they could occur in future. In places they predicted

occurrence of landslides in the near future, there were big crack on the ground threatening to cut anytime. The respondents argued that it is only a matter of time and a landslide would occur in such a place. They are so vulnerable that one can almost tell for sure a landslide will occur any time. They are aware of the danger but have no other alternative other than taking refuge in safer areas when a landslide occurs in their place and return when they *assume* they are out of danger.

The community members are forced to relocate to safer grounds whenever it rains because their lands become impassible, and landslides occur. The safer grounds in most cases are a distance from their homes. They move to the near by safe towns until when they *think* they are safe. However their safety on return is questionable because a landslide can occur at anytime regardless of whether it has stopped raining or not. These people are never advised by experts to return to their homes. They just assume that since the rains have subsided, therefore it is safe to return home. This means that they could still be at risk and this is why some have been victims of landslides even after predicting that it was going to take place.

The questions to ask are: When are these people at peace to carry out there daily activities without fear? What is the social, economic and political cost of a landslide to the victims and the country at large? The respondents argued that they are hardly at peace; any loud bang or unfamiliar sound sends fear throughout their bodies. This means that they are never at ease and more so during the rainy seasons. It was also established that landslides escalate during rainy seasons.

The knowledge held by the community members about the areas that can be affected by landslides is incredible. The community seems to have learned from history about occurrence and reoccurrence of landslides. Some community members warn with certainty that a landslide will occur at a specific place. However all this knowledge has not been put into good use. Although they can map all landslide risk areas in their district, and seem to be aware of the causes of landslides, they are still quite vulnerable. They live and carry out their development activities (construct houses, carry on extensive/unplanned farming activities) in those risk areas.

One can easily deduce that these community members are ignorant or probably are not aware of the consequences of a landslide. The truth is that the people have no option but to live in these areas. In

fact some respondents argued that if they could be relocated to other safer grounds they would be more than willing to settle there. When interviewing them one sees/feels a resigned attitude towards landslide risk reduction amongst the respondents. Some respondents argued that this is fate, while others blamed the government for deserting them. All this boils down to lack of technical know how and resources to reduce their vulnerability.

Although the community members are aware of a landslide, their causes and effects no serious precautions have been taken to reduce their vulnerability to landslides. For instance they identified places where landslides could occur in future and yet people are still living there and carrying on with their development activities in the risk marked areas.

Effects of landslides

Landslides have had several adverse effects on the victims as follows:

- Loss of life (Many lives have been lost through landslides where people have been buried alive for example in January 2001, five members of the same family were buried alive. The two members of the family who survived the ordeal are still traumatized to talk about it.
- Loss and destruction of property (there has been massive lose and destruction of property whenever a landslide occurs. These loses includes, houses and belongings therein, destruction of crops, farming grounds, and infrastructure).
- Traumatizing experiences (Victims of landslides are always traumatized by the ordeal. In most cases the victims are buried alive and those who survive live in fear of going through the same again.
- In the landslide prone areas, the infrastructure is poor. There are no roads. What this means is that whenever a landslide occurs the victims/survivors cannot be rushed to hospitals. For instance in the 2001 landslide that claimed five members of the same family, two were pulled out of the wreckage alive but one died on the way to the hospital. This is because there are no roads and therefore no means of transport to the hospital. The other — a young boy then — survived to tell the tale.
- Disruption of normal life. Whenever a landslide occurs, life can never be the same again and more so for the victims. For example they have to learn to live without their loved ones, lucky survivors may relocate to other safer places if they are lucky to have some, and try to come to terms with reality.

This study was carried out during a rainy season. This means that farm activities were being carried out on the farms. The researcher found people on their farms even when landslides had occurred and actually left some loose soil. Some respondents argued that it is fate/destiny to die in a landslide. That if one is destined to die in a landslide then there is nothing one can do. Further they argued that they did not have other places safe from landslides where they could migrate to. All this talk can be interpreted to express signs of hopelessness. The fact that they have seen landslides occur and claim lives and property and no efforts have been done to salvage the situation has made them give up.

Establishing the resources available for hazard prevention in the community.

It was deemed necessary to establish the resources available in the community for hazard reduction/prevention. This study investigated what the community had to enable them minimize vulnerability. This was done by asking the participants to name all the possible resources in their community that can be channeled to prevention of landslide hazards.

It was established that there are no funds set aside for reduction/prevention of landslide hazards. Further there are no formal plans to fight this hazard that has claimed lives and property severally in these communities.

The community members however, try to help their neighbors by giving handouts to them whenever they are affected by a landslide. For instance they give them accommodation, food and clothing until things get to normal again. They also give them psychological support whenever necessary.

As stated earlier, infrastructure in these areas is very poor. For instance there are no roads where landslides have been occurring. The dry weather paths that are there are impassible during the rainy seasons. It is during the rainy seasons that landslides have been occurring. When a landslide occurs, it is very difficult to rescue the victims and more so to rush them to the hospital. The place is quite hilly, and with no proper roads. The community members have found it unnecessary to own vehicles and this makes it more difficult to save lives when a landslide occurs. People are forced to walk for long distances with victims in order to get any medical help. This is to suggest that the hospitals are very far and there are no quick means of transport.

The community members actually confirmed that victims of 2001 landslides died because of lack of medical care. It took the neighbors quite some time to pull them out of the mounds and carry them to the nearest hospital.

It is important to note here that the rural society just like its urban counterpart has lost its traditional community bonds that tied it together. These bonds were very helpful in times of hazards because people could help one another and also look for solutions together. This study established that these bonds have weakened over time and with further frustrations from landslides one can almost conclude that they are too strained to be of great help. What this means is that community members cannot for sure count on one another for help in case a hazard strikes. This is not to dismiss totally the importance of the role played by these bonds. These bonds are very important and the study highly recommends that there is an urgent need to strengthen them and use them to reduce hazard risks.

The respondents also express their disappointments with the government. According to them, the government has not been of help and especially so where deaths have not occurred. For instance, this study established that the only thing the government did during the 2001 landslide that claimed several lives in Murang'a, was to hold a fundraising in the area. The proceeds that were realized were used to build a house for the surviving victims and support them financially, which they claimed lasted for only two months. They also received help from their neighbors for a short while and now they are on their own. The problem is that all they had was destroyed by the landslides leaving them poor.

The community blames the whole issue on the government, which they argue has neglected them. According to them, the solution to this problem would be to relocate them to other places where there are no landslides. Others feel that they can continue living in these landslide prone areas since they have lived there for many years so long as there is a good infrastructure. Others would like to live elsewhere but be able to access their farms as needed.

In fact the community added that the government should be in apposition to know when a landslide will occur and warn them in advance to move out of the risk areas. They added that the government should be able to warn them early enough and also share any research findings about landslides with

the community. This way the community is kept informed of any possibilities of risk and vulnerability.

All these opinions do not provide a solution to this problem of landslides. There is need for all stakeholders; the community, the government, NGOs, researchers and all other well wishers to come up with a good strategy to address this problem as discussed later.

Establishing network for disaster management

This includes intra community, NGOs and government. This study established that although landslides have been destructive and fatal there is no networking between the stakeholders. For example as discussed earlier, community bonds are weak, the government seems to have ignored its role in disaster management, and the non governmental organizations have also not taken any action in risk reduction. The result of this has been deaths and property destruction. There is need to bring all the stakeholders together to strategize on the way forward.

Lessons learned

Preparation of a landslide hazard map

- It is important to locate areas prone to landslides. This permits planners to determine the level of risk and to make decisions regarding avoidance, prevention or mitigation of existing and future landslide hazards. These techniques rely on past history, topographic maps, bedrock data and aerial photographs.
- The most effective way to reduce damage caused by landslides is to locate development on stable ground and to utilize landslide susceptible areas as open space or for low intensity activities. Land use control can be enacted to prevent hazardous areas from being used for settlements or as sites for important structures. The controls may also involve relocation away from the hazardous area particularly if alternative sites exist.
- Public education programs will help people understand the causes and the effects of landslides, identify unstable areas and avoid settling or having any developments on them.

Monitoring, warning and evacuating systems

- Areas susceptible to landslides should be monitored to allow timely warning and evacuation.
- Monitoring and warning systems should place inhabitants on alert when heavy rains occur or if ground water levels rise.

Mitigation efforts

- Mitigation involves not only saving lives and injury and reducing property losses, but also reducing economic activities and social institution.
- To reduce physical vulnerability, weak elements may be protected or strengthened. To reduce the vulnerability of social institutions and economic activities, infrastructure may need to be modified or strengthened or institutional arrangements modified.
- The focus of mitigation policies must be on reducing the vulnerability of the elements and activities at risk.
- All members of the community should be aware of the hazards they face, know how to protect themselves and should support the protection efforts of others and of the community as a whole.
- It is important to empower the community by promoting, planning and management of its own defenses and obtaining outside assistance only where needed.

Summary, conclusions and recommendations

Landslides are one of the many hazards that occur in Kenya. Other hazards include; frequent droughts and famines, floods, fires, environmental pollution, and deforestation. As discussed in the text, landslides have been occurring since time immemorial but are reported to be in the increase and are more fatal and destructive than any other time in the Kenyan history. The study also revealed that community bonds have weakened hence the weakening of strength in reducing community's risk reduction strategy.

Conclusions

There is need to strengthen rural community bonds as a means of reducing vulnerability to any hazard in Kenya.

Recommendations

- The community should participate in all efforts to reduce risks and vulnerability to all hazards in their society. This way they contribute in helping them get helped and at the same time a level of ownership of the project by the community is created. This goes along way in making the project sustainable because the community already owns it and will take care of it.
- In order to fight hazards successfully, there is need to involve all the stakeholders in these projects. This is in line with the fact that resources are few and sometimes we see replication of projects that are done haphazardly. There is need for serious consultations amongst the stakeholders.
- There is need for proper infrastructure (roads, telephone, hospitals etc) in hazard prone areas.
- Research findings should be disseminated to the stakeholders. This may help them understand the hazard more and learn how to deal with it. The respondents requested that the findings of this study should be disseminated to them.
- There is need for more research in disaster management area. The data collected could help to come up with good policies which if implemented well, could help reduce vulnerability.

Areas of further research

Hazards in Kenya are on the increase and more destructive than any other time in the history of country. For example, landslides, floods, famine and fires have caused and continue to cause a lot of damages to property and more often cause deaths.

This year alone there has been a wave of fire breakouts in the main towns of Kenya causing massive destruction of property and life. Fires in the slums of Nairobi are almost a daily routine. This suggests that those living in these areas are always vulnerable. Floods in the country are also an area of concern. For instance 'Budalangi' floods are worth some attention to establish a lasting solution to the problem. Every year a lot of property is destroyed in this district whenever it rains and people are left homeless and poor. Famines strike most of the north eastern province and some parts of the eastern province causing deaths of both people and livestock. More often victims of hazards are given handouts in form of food and later left on their own. These hazards recur almost every year and no permanent solutions have been found. This is to suggest that there are victims of hazards every year in Kenya and there are no viable plans in place to reduce this vulnerability and therefore manage disasters. As a result of this, many people in the risk areas continue suffering and becoming more and more poorer and this hinders development.

One of the greatest obstacles in this area of disaster management is the dearth of information regarding the extent of the damages caused by hazards, vulnerability and the possible solutions to these hazards that have caused people to remain poor. Further there is the problem of uncoordinated activities between those involved in this field and therefore information is not shared. This calls for intensive research in the area of disaster management to establish the causes and solutions to the increasing risks and vulnerability to hazards.