

Recovery after floods: A Case of Rental Housing Business in Keko Machungwa Informal Settlement, Dar es Salaam, Tanzania

Tumpale Sakijege^{1,3}, Junun Sartohadi¹, Muh Aris Marfai¹, Gabriel Kassenga² and Samson Elisha Kasala³

¹*Faculty of Geography, Gadjah Mada University, Yogyakarta, Indonesia*

²*Department of Environmental Science and Management, Ardhi University, Tanzania*

³*Department of Urban and Regional Planning, Ardhi University, Tanzania
tumpaleg@yahoo.com*

Abstract

In unplanned settlements, it is common for people to use their homes as a source of income. As revealed by this study, the main income generating activity is “Rental housing”. At the same time most of the unplanned settlements are located in risk sites (flood prone areas notably along river banks). This indicates that houses and the environment in unplanned settlements are vulnerable during floods. Therefore, understanding how rental housing business in unplanned settlements is affected by flooding and the factors that influence their recovery is crucial in formulating strategies for disaster risk reduction. This is the main focus of this paper. Findings show that, absence of flood control infrastructure, inaccessibility during floods, dampness and water logging inside the houses are the main factors affecting rental housing in Keko Machungwa unplanned settlement. Desertion by tenants, renting at a price below the market rate and stopping house renting business, are the main factors reported to undermine the rental housing business. The main factors that had significant contribution to the recovery of rental housing business included: number of rooms available for renting, alternative income generating activities, ownership and water logging and dampness. To enhance recovery of house renting business, the findings suggest the following measures to be taken: Conduct vulnerability assessment; settlement upgrading and regularization; Emergency response plans need to include business recovery; enhance individual financial capability through diversification of the sources of income and enhance an early warning system.

Keywords: *Flooding, Rental housing, recovery, business*

1. Introduction

“When floods occur many tenants quit our houses, this situation has been reducing our income, we do not have support because, even those who provide aid, do not see it as a problem”.

The above quote generally represents views of many residents living in the river valley of Keko Machungwa.

There is growing concern among researchers about the contribution of unplanned settlements to minimize house demands [1-3]. Other researchers argue that the advantage of unplanned settlements goes beyond provision of housing; houses in unplanned settlements are extensively used for income generating activities [4-8]. Therefore, a house in informal settlement is a prestigious asset as it serves a double function *i.e.*, for dwelling and for income generating activities.

There are a number of income-generating activities through informal-sector activities that are undertaken by households in unplanned settlements, but rental housing is the predominant income generating activity [4]. Majority of households, who rent in unplanned settlement, occupy just one room [4], therefore the term 'rental housing' which is the focus of this study, is used in this paper to mean renting a room and/or rooms for shelter and other activities.

While from an economic perspective, houses in informal settlements have significant contribution towards improving the income of individual households, from disaster management viewpoint most of these informal settlements are located in risk areas and hence are vulnerable to various types of disasters, notably, disease eruption, floods and fire [9-11]. The current paper explores how flooding affects rental housing, particularly recovery after flooding, in the flood-prone unplanned settlement of Keko Machungwa, in Dar es Salaam City, Tanzania.

The tendency of people to continue living in flood prone unplanned settlements, doesn't mean that they are less affected by floods, as the views of many people living in the valley of Keko Machungwa demonstrates. According to the foregoing discussion, the livelihood activities of many flood-prone communities are homestead-based, mainly 'rental housing'. When a hazard like flooding strikes a community, many families are less able to cope with it, because their income is not robust enough to fulfil all the needs. In this situation therefore, such families are vulnerable [12].

Existing literature on the subject of housing in informal settlements is significant but centred on how a house is used for income generating activities. Published studies focusing on how the income generating activities operated at the household level are affected by flooding, are scarce. Likewise many studies in the field of flood risk management have been conducted. Comparing to the extensive literature on causes and effects of flooding [13], community resilience [14,15], adaptive capacity [16-18] and community recovery [19-21], research on flood impacts particularly on rental housing business at individual level is limited. In reality, from economic point of view, impacts of floods to an individual household are complex and both positive and negative. On the negative side, flood impacts do cause risks to the economy of an individual household and the society at large. Indirect and often long and short-term effects, such as interruption of business due to blocked accessibility, damage to livelihood activities, damage to infrastructure, fatalities and injuries are examples of the impacts.

Findings from the current research, will inform on how better to prepare for and recover from flood hazards. Therefore the main objective of this paper is to explore how rental housing business in unplanned settlement is affected by flooding and identify factors that influence their recovery. This objective will generate knowledge which will help to improve rental housing business in flood prone unplanned settlements. Specifically the study aims: (i) To explore the extent to which flooding affects Keko Machungwa informal settlements (the severity of floods); (ii) To examine how flooding affects rental housing business at household level; (iii) To explore factors that determine the recovery of rental housing business and (iv) Spell out policy implications for future stability of rental housing business. In this paper, Keko Machungwa is presented as a case study, whereby individual households have been experiencing economic losses due to flood impacts, on a predominant livelihood activity, 'rental housing'.

2. Methodology

The study started with reviewing various literature. This was done in order to comprehend existing knowledge related to the research topic, justify the relevance of the research, find gaps in the previous studies and devise ways of addressing them. Household interview was the main tool for primary data collection. In the selection of household for interview, both probability and non-probability sampling techniques were employed. Since this paper aims at examining impacts of flooding to rental housing business and the factors that determine its recovery, it was expected that not the entire settlement was affected by flooding, therefore, households who were engaged in rental housing business and live in flood prone areas were potential case studies in addressing the objective of the study. According to Kothari [22], this kind of judgement is referred to as purposive sampling, which falls under non-probability sampling. Probability sampling, mainly simple random sampling, was applied in selecting the sample size for the study. Further, statistical procedures were employed to select a sample size of 70 households for interview. Household interviews were complemented by interviews with a sub-ward leader and a house broker existing in the settlement. The house broker was engaged to confirm the rent price. Moreover, the study identified flood zones to establish extent of flooding, in this case flood zones were mapped. The mapped zones were classified on the basis of contour analysis and physical inventories conducted from April 2013 to Dec 2013. In addition to these methods, measurements of water mark were performed, the idea was to substantiate flood depth. Observation by taking photographs was done in order to document the information and learn about accessibility, physical appearance of the settlement and houses during floods.

3. Results and Discussion

3.1. Severity of Floods

Keko Machungwa is affected by floods due to its location in a flood prone area. The area which is affected by flooding is within the river valley (Figure 1), commonly known as Keko Machungwa bondeni. One of the reasons that contribute to flooding is the presence of several seasonal streams. Keko Machungwa settlement is traversed by several seasonal streams (Figure 1). These streams are regularly in flood whenever it rains heavily consequently increasing vulnerability to residents. The area where Keko Machungwa is situated, was formerly a wetland used for agriculture. As a wetland, it accumulates storm water from different elevated parts directing water towards the Indian Ocean. Like the rest of the valleys in Dar es Salaam City, Keko Machungwa informal settlement's valley was earmarked, by 1968, as a hazard land [23]. This was spurred by the fact that the area was waterlogged throughout the year and hence not suitable for human settlement development [23]. Kiunsi *et al.*, [24] reported that since 1960s most of the valleys in Dar es Salaam City were informally turned to residential areas.

Informal housing development has led to housing densification coupled with inadequate drainage system. Housing densification is among the main factor that has been contributing to the increase in the severity of floods in Keko Machungwa, located about 3 km from the city centre. Its proximity to the central business district (CBD), makes the area attractive for different activities including: trading, settlements and investments. According to existing population statistics, Keko Machungwa has an area of 0.3095km² and a population of 16,648 [25], the population density is 53,790/ km².

This population density is higher than that of Dar es Salaam City (3,133/km²). High housing density is among the factors that limit surface runoff and hence flooding. The results of household interviews and physical measurements indicate that during extreme floods, water depth reaches 1.5 meters high and about 150 houses are affected by floods. A noteworthy example to this is the flood event of December 2011, during that event a number of people had to evacuate to safe places.

In the period of relatively low floods, like the case is in every rain season, houses located in Keko Machungwa bondeni experience flooding with water depth of up to 0.5 meters high. Moreover, many houses located in that area have the problem of dampness and water logging inside the houses. Dampness and water logging take some months to dissipate. Household survey results indicate that 37 (equivalent to 52.9%) of the interviewees experience the problem of dampness as a result of water logging. Technically this problem, referred to as groundwater flooding, is most likely to be a problem in areas that are low-lying [26], such as Keko Machungwa.

Keko Machungwa informal settlement lacks technically efficient and functional drainage system for flood mitigation. The only available infrastructure that is directly related to flood mitigation is limited to footbridges and individually constructed drainage channels. Absence of flood control infrastructure at the community level has increased vulnerability of the community and individual household in particular. It is common during rainfall to find different parts of the settlement including roads and foot paths being flooded, to the extent of blocking accessibility.

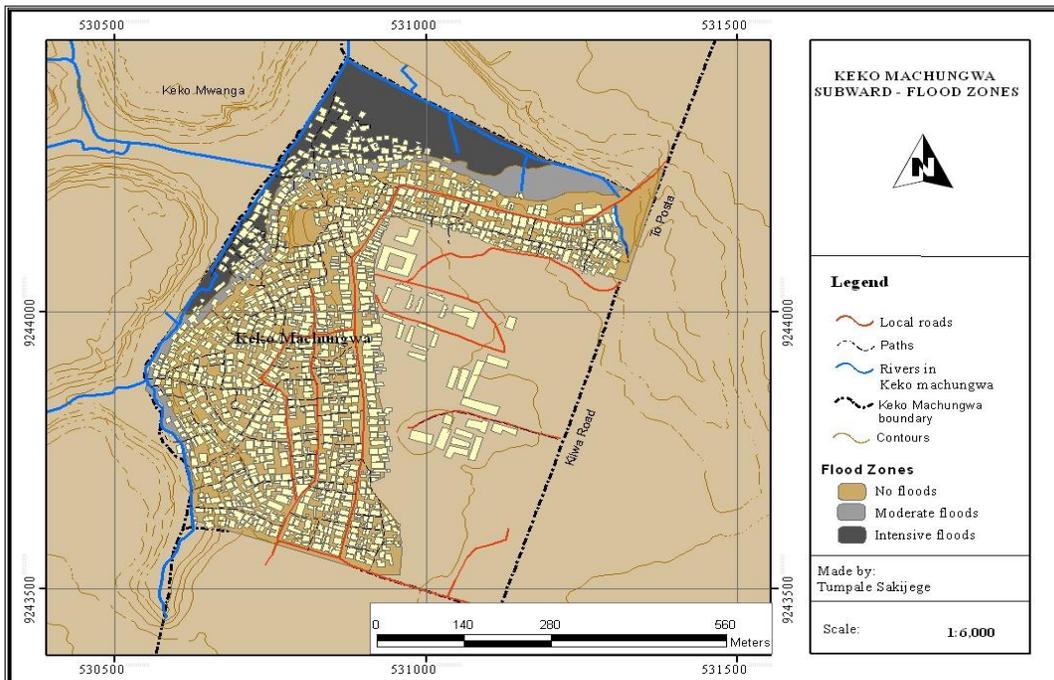


Figure 1. Flood Zones and Rivers in Keko Machungwa

3.2. How Floods Affect House Renting Businesses at Household Level

Household interview results suggest that, low level of education that limits employment in the formal sector, has made the majority residents in the informal

settlements to use their dwellings for income generating activities. The type of income generating activities that were reported and observed include: house renting (71%), household goods retailing (9%), hair dressing and cutting (7%), tailoring (6%), education (nursery school and tuition) (4%), and others (3%). It can be observed that house renting is the most predominant income generating activity. This confirms the argument earlier by Sinai (1998) that, rental housing is among the leading income generating activities in urban informal settlements.

Apart from destruction to household items, the absence of flood control infrastructure, inaccessibility during floods, dampness and water logging inside the houses, were highly perceived as an obstacle to the house renting business. This was reported by about 52.9% of interviewed respondents. A female respondent, explaining how floods affect her income, noted that:

“When a rainy season approaches I become anxious because my house gets flooded and my tenants start demanding refunds of their rents to enable them look for rooms in other areas”

The above statement though an opinion of an individual, it depicts that floods indeed affect house renting business. In response to questions regarding the factors that affect renting businesses, about 62% of the house owners pointed out that they are forced to lower the renting price below the market values so as to retain tenants, 29% lose tenants during flooding, about 9% reported that they have to stop house renting business due to water logging throughout the year (Figure 2).

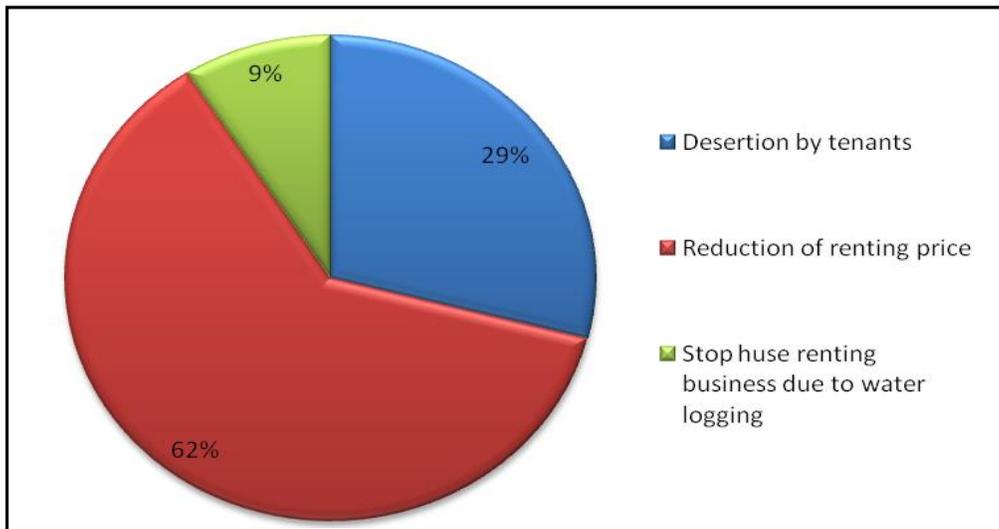


Figure 2. Effects of Floods to House Renting Business at Household Level

3.2.1. Reduction of Renting Prices: Flooding, particularly water logging conditions, has made tenants have the views that a flooded house is of little value, than the non-flooded one. Failure to comply with this view, a house owner faces the danger of losing tenants. Therefore, in order to retain tenants, landlords whose houses experience flooding, are forced to rent a room or house at prices below the market value. This situation has contributed to a decline in income. In an interview held with a key informant dubbed a “house broker” the following were revealed. A rental price of a room in a house which is in a good condition and connected to water and electricity

supplies is Tshs. 50,000 (USD 31)¹ per room per month. As a result of flooding, rental price drops by 40% (from Tshs. 50,000 (USD 30) to Tshs. 30,000 (USD 18)) per room per month. About 62%, of the interviewed households expressed that they have to lower renting price so as to retain existing tenants and attract new ones.

3.2.2. Desertion by Tenants: Desertion by tenants was another factor that affected house renting businesses. It was noted that, tenants living in highly flooded houses usually terminate their contracts with their landlords during extreme flood events. Desertion by tenants was reported by 29% of the respondents as one of the main effects of flood to house renting business. It was further reported that, in most cases desertion by tenants resulted into conflicts between tenants and landlords as a results of the failure by landlords to refund tenants. It takes some months for resolving such conflicts. In a discussion with a Chairman of Keko Machungwa Sub-Ward, it was reported that, the Sub-Ward office has received many complaints pertinent to house rent refunds and contract termination.

3.2.3. Abandoning of House Renting Business Due to Water Logging Throughout the Year: Through observation (see Figure 4) and interviews, it was established that, 6 (9%) of the interviewed households abandoned house renting business because their houses could not attract new tenants due to water logging. As a measure to minimize flooding impacts, some house owners have constructed protective walls to put flood water at bay (see Figure 3). In most cases these efforts have proven to be futile as houses continue to be flooded permanently (Figure 3). Flooded houses are not rented and consequently the owners and their family members lose their most important source of livelihood and as such their socio-economic welfare is seriously compromised.



Figure 3. Stagnant Water Inside and Surrounding the Houses, which are No Longer in Use Due to the Problem of Water Logging

¹ 1 USD is equivalent to about TShs. 1629 as on March 4, 2014, available at <http://www.dse.co.tz/>

3.3. Factors that Determine the Recovery of House Renting Business

The four factors include: ownership, alternative income generating activity, number of available rooms for renting and water logging and dampness, have to a large extent influenced the recovery of housing rent business. Figure 4, is the graphical representation of the survey results.

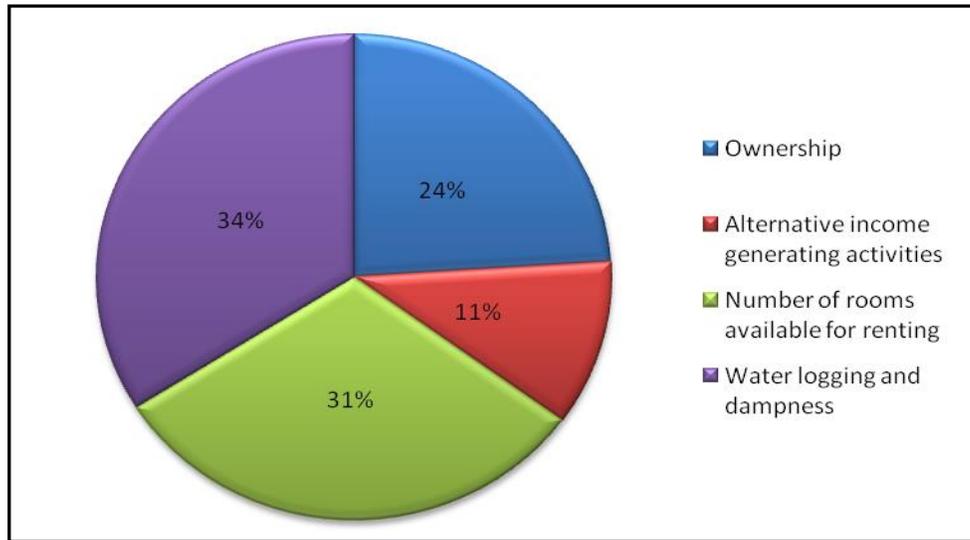


Figure 4. Factors Influencing Recovery of Rental Housing Business

With regard to ownership, the study revealed that houses which are owned through inheritance have more than one owner. Such houses hardly recover to resume renting business. This situation is contributed to by poor condition of the houses caused by lack of maintenance. In order to maintain a house with multiple owners, they have to agree on the type of improvements to be done and the cost implications. Reaching consensus on these aspects was reported to be difficult. The trend is “we agree to disagree”. This has perpetually undermined the renting business. About 24% of the interviewed households reported to own houses jointly (through inheritance). The rental housing business that gets undermined because of lack of maintenance increases vulnerability of the houses to flood disaster and hence discourage tenants. The situation is however different for houses which are owned by a single person. Single house owners, depending on affordability have a habit of improving their houses as a way of attracting tenants.

In addition to house renting business, 11% of the interviewed respondents reported to have other sources of income. It was revealed that, income from other sources (like tailoring, shops and food vending), have significantly contributed to the increase in the household income. The household income in turn helps in the improvement processes of houses and hence easily recovers the renting business. Findings show that respondents who have other sources of income apart from house renting, use the income from other sources to improve the condition of their houses. This practice helps them to recover the renting business for a period of not more than 3 months after the flood season.

“I have only two rooms for renting, the money I get from these rooms is very little. It is not enough to support house improvement and extension. It is enough for food”. This statement was reported by one of the interviewed respondent.

It can be learnt from this quote that, the number of rooms available for renting have an influence on recovery of house renting business. When asked about the number of rooms available for renting, about 31% of the interviewed households reported to have more than three rooms for renting. In fact, the more the number of rooms available for renting the more the income generated for house improvement and hence influences recovery of house renting business. According to interviews held with respondents, it was revealed that, households which have between two to three rooms for renting tend to recover slowly (up to six months) unlike those with more than three rooms (it took a period of three months to resume the house renting business).

Water logging and dampness is another factor that determines recovery of house renting business. Because of house densification and lack of drainage channels, during rainfall, large parts of Keko Machungwa settlement, becomes flooded and hence accessibility is blocked (See Figure 5). Some of the houses are faced with the problem of water logging and dampness inside the houses. The problem of water logging and dampness continues even after the rainy season ends. In areas where the problem of water logging and dampness is experienced temporarily, rental business took a period of six month to recover. In areas where the problem of water logging and dampness is experienced throughout the year (as it was reported by 9% of the respondent), rental housing never recovered. This is because many tenants terminate the renting contract for the fear of health hazards, which might be caused by stepping into flood water which is mixed with human excreta. About 34% of the interviewed households reported that their rental housing business is not performing well due to the problem of water logging and interior dampness.



Figure 5. Flood Water Surrounding Houses, Covers Foot Paths thus Blocking Accessibility

When asked about the support they receive outside their individual efforts, 73.4% of respondents reported to receive no support from other places. Instead, they were

optimistic that one day, as a community, they will receive support from the Government. This understanding is born out of the belief that once the problem of flooding is controlled by the government at the community level, vulnerability of individual households will decrease and hence rental housing business will operate smoothly. One of the respondents stated that:

“Try to walk around different areas of our settlement, you will be surprised to observe the situation of our infrastructure, most of it is in poor condition below minimum standards, and individually constructed”

This statement emphasizes the situation of flood control infrastructure.

3.4. Rental Housing Business Recovery Period

This study revealed that the period for the rental housing business to recover ranges from 3 up to 6 months. In addition, some of the households never recover to normal rental housing business due to the problem of water logging and dampness inside the houses throughout the year Table 1.

Table 1. Rental Housing Recovery Period

Recovery time	Respondent	Percentage
3 months	35	50%
3 – 6 months	29	41%
Never recovered	6	9%

It is apparent (in Table 1) that, about 50% of the respondents recover to rental housing business after three months, followed by 41% who recover for a period of between 3 to 6 months and the rest (9%) never recovered their rental housing business. This finding corresponds to the findings by other researchers [27], [27] who studied about disaster recovery and small business continuity. [27] Established that recovery period for small business in Pakistan ranges from 1 week to 35 weeks, [27] also established that some of the business never re-opened after the disaster. It can be concluded that, although recovery of business after flood disaster is a positive indication, the recovery duration is relatively long and thus their sources of income are compromised.

Generally, this study has examined how rental housing business in informal settlement is affected by flooding. The study also has analyzed factors that determine the recovery of house renting business. The findings of this study indicate that, the informal settlement of Keko Machungwa is particularly vulnerable to flooding events due to a number of reasons. They include: location in the flood prone areas (river valley), and informal housing development. The latter has led to housing densification and lack of acceptable and functional drainage system. This finding agrees with the findings by UN Habitat [9] and Satterthwaite *et al.*, [10] that, most of the informal settlements are affected by flooding due to their close proximity to or located in flood prone areas. These factors contributed significantly to lower performance of rental housing and hence decrease the income of individual households. The challenge therefore is how developers, city managers and other development partners can mitigate flooding in informal settlement so as to enhance the living condition in general and rental housing in particular.

Previous studies [4-8] have shown that individual households who own houses in unplanned settlements are more likely to have a positive effect on the average

household income. This is because of the use of the dwelling for generating income and the kind of business undertaken lack legal obligation. This is the question of difficulties in enforcing relevant laws. However, this study found different results. In analyzing how floods affect rental housing business, the findings show that the entire interviewed household were affected. They were affected economically due to problems associated with flooding. About 62%, of the interviewed households rent a room at a price below the market price. A total of 29% of the interviewed households were affected by the problem of desertion by tenants immediately after floods. The rest (9%) mentioned that they are no longer engaging in rental housing business due to the problem of water logging throughout the year. While some of the respondents never recover to rental housing business, others recover to rental housing business for a period of between 3 to 6 months.

These findings can be clarified by several reasons. First the lack of a robust flood control infrastructure increases the effects of flooding. Consequently these increase the vulnerability of rental housing business. Neither at the community nor at the household level there are effective flood control infrastructure. Second is lack of financial resources to invest in flood control infrastructure and improve houses. Most of the houses are of poor condition and they are improperly maintained. This situation increases vulnerability to flooding, also, diminish the quality of rooms for renting and thus discourage tenants. Third, tenants have an upper-hand over landlords in deciding when to terminate a rental contract and in negotiating the rent amount to be paid. Poor housing condition and flooding were reported to significantly contribute to breaching rental contracts. In view of these findings, income from rental housing in flood-prone unplanned settlements is highly compromised by flooding and its associated risks.

4. Policy Implications for Future Recovery of Rental Housing Business

Among the factors that influence recovery of rental housing business, the study found that the community had perception that the Government could support them in terms of flood risk minimization. However, there was no significant influence from the Government towards rental housing recovery. Instead, number of rooms, alternative income generating activities, ownership and accessibility had the biggest influence towards recovery of rental housing business.

In Keko Machungwa, houses are playing a double function; they are used for dwelling and extensively used for income generating activities. However, based on the findings and discussion in the previous sections, it appears that the main income generating activity “rental housing” is not performing well due to problem associated with flood disaster. Therefore, for future stability of house renting business in flood prone informal settlements, the following measures are suggested:

4.1. Conduct Vulnerability Assessment

Because settlements vary significantly in their vulnerability to flood disaster impacts, disaster experts need to work with local community to conduct vulnerability assessment within their community. Vulnerability assessment should identify among others, the available flood control structures and its capacity to minimize flood impact. This information will be very useful to provide guidance to the community and other stakeholders in developing innovative programs for reducing flood disaster impacts at the community level. The program can be in the form of maintenance of existing infrastructure or construction of the new one in areas which do not have any.

Vulnerability assessment will, as well, help actors at the district level to initiate effective flood control strategies. Once the flood impact at the community level is controlled, vulnerability of individual household will be reduced and hence return the house renting business to normal operations.

4.2. Settlement Upgrading and Regularization

From planning point of view, recovery of house renting business in informal settlements is very volatile compared to the ones in the planned areas. This is because of the difficulties in enforcing relevant laws in unplanned settlements. This is particularly unfortunate because unplanned settlements are fundamental contributors to minimizing the housing demand needs of many people in developing countries. Although informal settlements have contributed to the reduction in the housing demand needs, disaster research has repeatedly shown that these settlements are highly vulnerable and very difficult to return to normal when an extreme event occurs. Major causes of the vulnerability of the informal settlements include poverty and informal housing development [13] and poor infrastructural services [9], among others. For these reasons, it is recommended that settlement upgrading and regularization is of paramount importance for the improvement of infrastructure and to minimize flood problem.

4.3. Emergency Response Plans Need to Include Business Recovery

In order to lessen the impact of disasters, most policy initiatives in emergency response plans, put much emphasize on the preparedness plans and recovery of the community (for example through infrastructure improvement) as well as recovery of individual household up to a subsistence level [28, 29]. Although recovery of individual household is given priority, their sources of income are not given priority. This situation has contributed to the decline of income and hence decline of the coping capacity of the individual household. There is a need therefore for emergency response plans to incorporate policy initiatives which will enhance business recovery of individual household living in flood prone unplanned settlement.

4.4. Enhance Individual Financial Capability through Diversification of their Sources of Income

The study found that, there is a significant relationship between presence of alternative income generating activities and recovery of renting business. In other words it means that, households with alternative sources of income in addition to rental housing business secure enough funds to improve their houses and hence easily recover the rental housing business. This suggests that, local government, NGOs and other experts needs to help individuals to diversify their sources of income through imparting them with skills related to alternative income generating activities.

4.5. Enhance Early Warning System

Residents in informal settlements need to be informed of the threatening flood hazard and the appropriate adaptation strategies to be taken. Local governments and other partners in disaster risk reduction should work together and ensure that early warning is effectively disseminated to the local community. Early warning system will help to prepare people to take appropriate measures before flooding.

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Authors



Tumpale Sakijege, Assitant Lecturer, Department of Urban and Regional Planning, Ardhi University, Tanzania.
Ph.D Candidate, Faculty of Geography, Gadjah Mada University, Indonesia. tumpaleg@yahoo.com



Junun Sartohadi, Professor, Faculty of Geography, Gadjah Mada University, Indonesia. panyidiksiti@yahoo.com



Aris Marfai, Professor in the Faculty of Geography, Gadjah Mada University, Indonesia. arismarfai@yahoo.com



Gabriel R. Kassenga, Professor in the Environmental Science and Management Department, Ardhi University. kassengagr@yahoo.com



Samson. E. Kasala, Lecturer, Department of Urban and Regional Planning, Ardhi University, Tanzania. samson.kasala@gmail.com