



An Evaluation of Landslide Risk Assessment Process of Construction Activities in Landslide Prone Areas

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ABSTRACT: In recent times, the threat of landslide shows an increasing trend especially in the hilly areas of Sri Lanka. The increased frequency and magnitude of these landslide events have resulted in higher number of victims, threatened human settlements and even damaged the natural environment. The threat has been aggravated due to construction and land development activities without proper planning and technical guidance. With the objective of minimizing the landslide disaster risk and to increase the safety of life and property from future slope instabilities, National Building Research Organisation (NBRO) has identified and declared ten districts out of twenty five administrative districts as landslide prone districts namely Nuwara Eliya, Badulla, Kegalle, Kalutara, Kandy, Matale, Matara, Galle and Hambantota. The Ministry of Disaster Management has assigned the powers to NBRO to issue Clearance Certificates through Landslide Risk Assessment Process (LRAP) for any construction activity proposed in above landslide vulnerable ten districts and made compulsory for any development activity to obtain NBRO clearance at the initial stage by circular (No. NBRO 2011/1) following a Cabinet decision. With the completion of four years of implementation of the Landslide Risk Assessment Process, it was vital to make an assessment and identify possible improvements to strengthen the system as there are some complaints from the general public and implementing partners; UDA and Local Authorities. Accordingly, study was based on a survey conducted covering both implementing partners and general public who had followed LRAP. Data were gathered from implementing partners through focus group discussions while physical observations and interview conducted for general public for data collection.

This paper discusses the challenges within the process while highlighting the ways of overcoming these challenges.

Key Words: *Construction activities, Landslide prone areas, Building approval process, Implementation process*

1 INTRODUCTION

Increase in the frequency and severity of landslide disasters happens due to several factors, specially related to climate change and unplanned urban growth in risk prone areas. Previous research studies revealed that nearly 80% of the present landslides occurred due to poor land use practices in development and construction (Sugathapala, *et al* 2013). By identifying this as major issue for landslides, the Government of Sri Lanka has introduced Landslide Risk Assessment Process (LRAP) as a part of risk management tool for landslide prone areas of the country.

The Ministry of Disaster Management has given the powers to NBRO to issue Landslide Clearance Certificates when construction activities are implemented in the identified landslide prone areas by Circular No. NBRO 2011/1 as per the Cabinet decision taken on 5th January 2011. Accordingly, any development activity or construction activity

proposed in identified landslide vulnerable ten Districts; Nuwara Eliya, Badulla, Kandy, Matale, Kalutara, Galle, Matara, Hambantota, Kegalle and Ratnapura, is required to obtain the landslide clearance certificate from NBRO at the time of processing the building approval with respective local authority. Main objective of this was to control hap-hazard development activities in landslide prone areas and reduce the landslide risk associated with the human settlements.

However, after four year implementation of the LRAP, it is vital to make an assessment of current implementation process and identify possible improvements to strengthen the system. This paper presents the issues and findings related to the process with the consultation of key stakeholders. Further, it explores the suggestions to resolve such issues and make recommendations to strengthen the system.



2 METHODOLOGY

The study was conducted under two main phases. In the 1st phase of the study, the local authorities of landslide prone districts were interviewed to get their views to improve the LRAP as they are the key implementing partner of the programme through building approval process. Accordingly, about 20 percent of local authorities of a district declared as landslide prone areas were selected. (Refer the table given below for sample sizes on selected districts).

Table 01: Sample size on selected Districts

No.	District	No. of Local Authorities	Sample Size (20%)
1	Galle	20	4
2	Kalutara	17	3
3	Rathnapura	16	3
4	Matara/ Hambanthota	28	6
Total		81	16

Samples were selected based on the volume of applications received for processing. Accordingly, 2/3 of the samples were selected from low performing local authorities while 1/3 was selected from high performing local authorities. Out of 10 disaster prone districts, 4 districts were selected to conduct the survey.

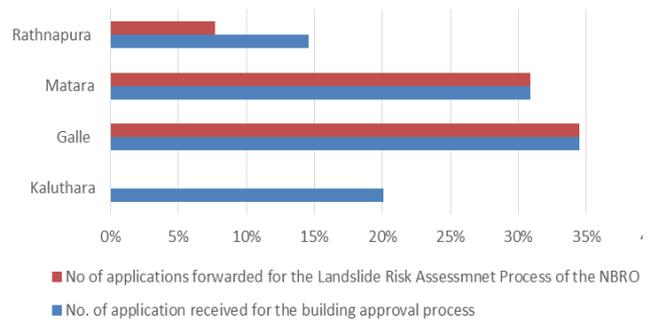
Apart from that, interviews were also conducted with the officers-in-charge of NBRO site offices in selected landslide prone districts to identify their views on the number of applications received for construction in landslide prone areas.

In the Phase 2 of the study, compliance of construction activities to the approved plans in Landslide vulnerable areas was studied. For this, sample houses were selected randomly from landslide prone districts, and accordingly owners of houses were interviewed.

3 RESULTS AND DISCUSSION

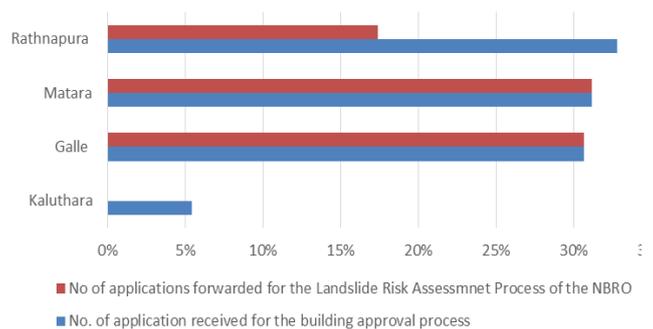
3.1 Progress of the Building Approval Process by total applications received to the Local Authority

During the survey, the number of applications received for the building approval process and also the number of applications received for the landslide risk assessment process of the NBRO were studied and the results are presented by figure 1 and 2 given below.



Note: Kaluthara district did not record the number of applications forwarded to NBRO.

Fig. 1 presents the progress of the building approval process by total applications received to the Local Authority from 2014.01.01 to 2014.12.31



Note: Kaluthara district did not record the number of applications forwarded to NBRO.

Fig. 2 presents the progress of the building approval process by total applications received to the Local Authority from 2015.01.01 to 2015.04.30

3.2 Satisfaction about the number of applications received for the building approval process

According to the officers-in-charge of Kaluthara district office mentioned that very less number of (less than 10) applications are received daily when comparing other districts. Specially majority of applications are from the commercial services such as rock quarries. For the A, B, C grading of rock quarries, they should obtain the consent of the National Building Research Organisation. As a result of that they getting landslide clearance certificate from the NBRO.

In addition to that, most of the owners are applying building applications for the purpose of getting loans. Moreover, community awareness about the system is low, and especially communities recognize National Building Research Organisation as a service organization offering services when a disaster occurs.

The officer-in-charge of the NBRO Galle office is dissatisfied about the amount of building applications received. He mentioned that the applications received from remote were very less. Moreover, he recommended of having a better

system in place of the existing system by enhancing the human resources of NBRO site office. In addition to that, he recommended to charge a maximum 1000 rupees per application in order to cover the cost of an investigation.

Furthermore, Rathnapura officer noted that mostly the low income households do not apply for the applications whereas high income households care less about the legal systems. Hence, only the middle income people have been applying for the building applications.

Upon analysing the data gathered from the expert interviews of Local Authorities, the following challenges were identified for the low number of applications received for the building approval process.

Many of the local authorities were on the agreement that there is no statutory requirement for a local authority and NBRO to issue a completion certificate whether the work is carried out completely while taking all reasonable steps and that the work is satisfactory and complies with regulations.

It has been further noted by local authorities that the local population is less aware about the system and as a result many poor constructions are made in disaster prone areas without taking any approval from the local authorities. Also, people think about the present situation instead of thinking of future disasters.

Moreover, the reason behind the less number of application for LRAP is most of the people live in town areas rather live in landslide prone areas where as people who live in remote areas and they do not come from that far for the applications. Further findings shows, people who live in tax assessment areas only apply for the building applications. In some cases tax assessment area expands only for one km range. As a result, few number of applications were received from that area (eg: Ayagama PS).

Some areas do not have an urban development plan to regulate urban planning and therefore, many individuals do not get their building plans approved prior to construction.

The local authorities in landslide prone areas were given 1:50000 scale maps for take the decisions related to the LRAP. Local authorities realised once distributing these Landslide Hazard Zonation Maps among the LA, they received less number of applications. It emphasized, 1:50000 scale maps are not an effective decision making tool in LRAP at the Local authority level.

In many cases, the community seeks building applications of local authority only when they require getting a loans. Other than that, their involvement with the local authority is somewhat low.

However, it has been noted that some of the local authorities are located in flat land and their contribution for LRAP is less especially in case of Baddegama area.

Political powers and their influences is another major issue which affects less number of building approvals. Due to these corruptions even after getting the planning permission, construction may not proceed as per the approved plan.

Noteworthy, some of Pradeshia Saba (PS) do not have a Planning committee. Hence, that LA's are not issuing development permits for buildings and lands.

3.3 Difficulties faced by Local Authorities in forwarding applications received for the recommendations of the NBRO

According to the survey results, more than 50% of local authorities are satisfied about the services of the NBRO while others are not satisfied about the services and faced number of difficulties listed below;

- The process of getting recommendations from NBRO for building applications is time consuming due to delay in receiving reports.
- Unnecessary burdens on the person carrying out the work due to high prices for the service.
- No legal base for the NBRO to take necessary actions against unauthorised construction.
- Difficulty of reading the application forms.
- Some areas are more disaster prone compared to other areas and there are always different levels of human resource requirements for different local governments.

3.4 Suggestions to resolve such issues

In order to overcome the above issues stakeholders suggested the following to strengthen the Landslide Risk Assessment Process.

- Issuing of certificates of conformity to ensure that the construction compiles with the approved plan.
- Changes to the existing system which aim to reduce burdens, improve compliance and encourage community to take greater responsibility for their actions.
- Give larger scale maps to identify the risk areas more precisely.
- Revise the system to strengthen the legal base; especially strict rules need to be introduced to prevent corruption and other unlawful activities happening in the process.



- Awareness programmes are also required for the local community to make them more aware about the disaster risks specially by distributing hand-outs among the community on this approval process.
- Awareness programs for secretaries and politicians to educate them on the importance of resilience.
- NBRO needs to look at this system and where possible revise the system to make it easier for people or for developers to obtain clearances for building.
- Recommendation to have a proper system to reduce the payment of the NBRO service.
- Resources of the NBRO should be enhanced further.
- Implement planning committee with the local authorities and encourage people to apply for the applications.
- Need more practical guidance on landslide. For instance standards on cuts in the river bank.
- Workshops for officials who are involved in the construction process such as technical officers, surveyors, architects, engineers, draftsmen and other relevant officers.
- Furthermore, school/university students should be made aware through the subjects of Disaster Management.
- After relocations, disaster-prone areas should be conserved with the ownership of the government.
- Making safe land available for development so that people can build in areas that are less exposed to hazards.
- As urban areas continue to grow in coming years, especially in the areas having high potential for landslides, introduce safe new housing schemes.
- Circulate the applications through GN/Economic Development Officer.

Findings of the 2nd survey reveals that the majority of houses were constructed without considering the guidelines of NBRO. In some occasions the application were applied for houses, but the owners used the buildings for business purpose. One of the households mentioned that the instructions have not been given to them by authorities.

4 CONCLUSION

Findings highlighted that the majority of local authorities (more than 80%) are dissatisfied on the number of applications received for the building approval process due to low awareness about the system among the community as well as politicians

operate in local context. Higher prices for the service also recorded as the main reason not to follow the approval process. In many cases, the community seeks the applications only when they require getting a license or permit. Also, it was revealed that the most of construction proposed on flat terrain do not tend to follow NBRO approval process assuming landslide risk for those areas are minimum.

Results of the survey reveals that the process of getting recommendations from the NBRO for building applications is time consuming and it's imposing unnecessary burden on its clients. Therefore, need to change the regulations to reduce confusion and any unnecessary burden on the community is necessary.

When considering the compliance of construction activities with approved plan in Landslide vulnerable areas majority of houses were constructed without following the guidelines of the NBRO. For that reason, after giving the approval by NBRO a system is needed to monitor the construction activities in accordance with the NBRO guidelines and make the issuing of completion certificates mandatory in all circumstances for local authority building control, when the work has been completed.

5 REFERENCES

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