



Effects of landslide in Meeriyabedda Estate: A descriptive analysis

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Abstract

This research examines the effects of the landslide in Meeriyabedda Estate which occurred in October 2014. The objective of the research is to analyze the immediate and enduring social and economic effects caused by the landslide. The descriptive analysis was used to analyze the effects using secondary data between the periods of 2010 to 2019. According to the data, totally 79 families were affected by the landslide, among them 37 people died by the landslide. Rest of the people had immediately evacuated from their houses to the main camps. Moreover, after the landslide, people lost their income sources such as agriculture cultivation, animal husbandry, tea plantation, and shops etc. In addition Meeriyabedda estate people face difficulties in accessing medical facilities and schools as a result of the decline of transport and infrastructure due to the landslide. Findings anticipate that Meeriyabedda estate people are still facing many problems in building their economic as well as social aspects. Further, this study will be helpful for the policy makers as it provides recommendations to fix warning devices to detect the landslide at high risk areas for landslide and to provide self-employment and credit facilities to people who have lost their lands, properties and employment as well as building schools and hospitals in close proximity to the resettled areas for the easy access.

Keywords: Meeriyabedda, Landslide, Economic, Social, Effect

01. Introduction

Landslide is one of the most frequent natural disasters worldwide. Landslide is occurring due to factors such as the motion of the Earth's plates, climate change, and human activities (Melanie J. Froude and David N. Petley). A global catalog of landslide events has been valuable for a number of purposes, including estimation of human, social and economic losses (Kirschbaum, D. B. Adler, R. Hong, Y. Hill, S. & Lerner-Lam 2010). Due to landslide, people face various troubles, it has caused major socioeconomic impacts on their homes and possessions, industrial establishments, and lifelines, such as highways, railways, and communications systems (Robert L. Schuster and Lynn M. Highland 2001).

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Although there are many causes of landslides, the prevalence of landslides caused by rainfall is high. In Indonesia, for example, during the ten years, the landslide events have resulted, either directly or indirectly, in more than 537 deaths and economic losses at about US\$ 10 million annually (IOP Conference Series: Earth and Environmental Science, n.d.). Such landslides occur in Central America, North-western South America, The Caucasus region, The Himalayan belt, Taiwan, Philippines, Indonesia, Italy, Japan China, Japan, Switzerland, Nepal and Pakistan (Kjekstad and Lynn Highland, 2009). Example for the major landslide in the world was occurred beyond Africa around the extent of 20000 Km that is Alhaz landslide (Kaleela & Rizwin , 2006).

According to the Sri Lankan context, excessive rainfall typical landform and geology, deforestation and unplanned land-use practices combine to create this landslide hazard, eleven districts in six provinces in Sri Lanka are heavily affected by landslides Moreover, Badulla, Nuwara Eliya, Ratnapura, Kegalle, Kalutara and Matara are the worst affected areas by a landslide in Sri Lanka. In Sri Lanka landslide which occurring during the heavy southwest monsoon rains between 29 May and 5 June (Katupotha & Jinadasa, 2014). Example for Deniyaya Morawaka kandu landslide on 17th May 2003, Wewelkandu landslide in Ratnapura district (Hiru News, n.d.) and Koslanda Nakadiya landslide occurred in October 1997 (Kaleela & Rizwin Reezab, 2006).

This research article examines the effects of the landslide in Meeriyabedda, the background of the Meeriyabedda Estate is situated in Uva province Badulla district. The total population of the Meeriyabedda estate is 2165. Despite minor impacts of the rainy season in the Meeriyabedda area, the property and life of the people have not been affected. Although the October 1997 Nakadiya landslide was the largest not only in the region but also in Sri Lanka. As a result, people around the Koslanda region have met numerous damages. This massive landslide was followed by a landslide in the Meeriyabedda area on October 29, 2014. As a result, the people of the Meeriyabedda area have lost many life and properties. According to that, this research paper find out the economic and social effects of the landslide and the challenges faced by the people in Meeriyabedda estate as well as makes recommendation and suggestions for their problems.

02. Objectives

The main objective of the study is find out the effects of landslide in Meeriyabedda Estate. The sub objectives of the study are,

- * Identify the economic effects of landslide in Meeriyabedda estate
- * Identify the social effects of landslide in Meeriyabedda estate
- * Put forward recommendations and suggestions to reduce the affects caused by landslide.

03. Literature review

Perera, Jayawardana, Jayasinghe, Bandara and Alahakoon (2018), the main objective of the research is aims to estimate the direct impact of a massive landslide that occurred around areas with Kandyan home gardens (KHGs)in Aranayake, Sri Lanka. A multiple regression model was established to estimate the economic value. As well as conclusion of the study is finally, a lack of awareness and unplanned garden cultivation were the main contributing factors that increased the severity of the damage.

Kaleel and Rizwin reeza (2006), the impact of landslide on environment and socio - economy GIS based study on Badulla District, the descriptive methodology used in this research. The researcher attempts to describe how the landslides occur, what causes them to occur and what are the methods to prevent further landslide damage Such as are exploring by the researchers. Their objective was the physical factor what reasons for the landslide are topography and finally, their conclusion is to construct houses, ponds, and buildings in the area only after examining the soil and soil structure of an area.

Jinadasa Katupotha (2014), the landslide hazards and their impact on environment and society, descriptive methodology used in this research. This study giving the solution to Geological investigation of all intermediate and high slope areas should be undertaken for the evacuation of people to protect and conserve the prone areas from future hazards.Jayawardane (2006), disaster mitigation Initiatives in Sri Lanka. Descriptive methodology used in this research. Also, this paper attempts to identify the factors responsible for landslide and their impact



on society and the environment remedial measures to protect the landslide area and to prevent landslide hazards. Siriwardana (2019), Socioeconomic Impacts and Damages Encountered with Re-activated Landslide in Udawatta Area – A Case Study from Hangu Ranketha Area in Nuwara Eliya District. Descriptive methodology used in this research. Conclusion of the research paper is describes the socio-economic restructuring of the people.

04. Methodology

This study comprises the secondary data between the period 2010 to 2019 from the divisional secretariat of Meeriyabedda which includes the demographic features of the study area, economic and social aspects of the affected area. Descriptive Analysis method is used in this study to describe the effect of a landslide in the Meeriyabedda estate from October 29, 2014 to June 2019. Further, MS Excel software is used to analyze the impacts through tables, graphs and charts.

05. Results and Discussion

5.1 Descriptive Analysis of Demographic Features

5.1.1 Total population of Meeriyabedda Estate

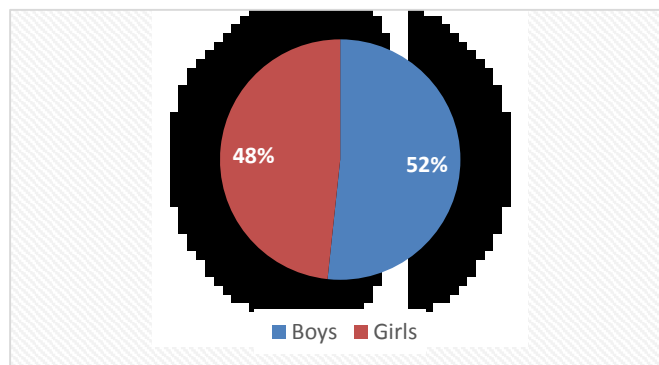


Fig 1: Total Population
(Source: Haldumulla Divisional Secretariat office, 2019)

Fig 1 shows the total population of the Meeriyabedda Estate. There are totally 2165 people are living in Meeriyabedda estate, in this total population 48 percentage of people are females and 52 percentage people are males.

5.1.2 Total population by religion

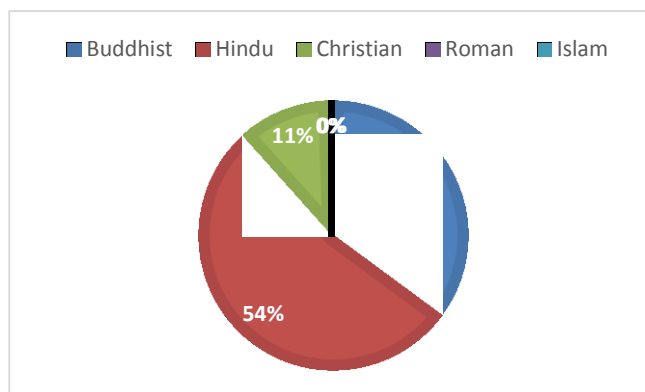




Fig 2: Total Population by Religion
(Source: Haldumulla Divisional Secretariat office, 2019)

According to the Fig 2, in Meeriyabedda Estate, large number of people are Hindus. That means 1154 people. It is 58 percentage in the total population. Next 35 percentage of people are Buddhist and 11 percentage of Christian people are living in Meeriyabedda and also a little amount of Roman and Islam people are living there. According to this this research area has a mixture of culture and religion.

Table 1: Age Population

Age	Male	Female
0-5	30	56
6 to 14	91	133
15 to 18	329	257
19 to 25	200	224
26 to 45	240	252
46 to 60	123	96
Above 60	86	48

(Source: Haldumulla Divisional Secretariat office, 2019)

According to the Table 1, large number of children’s between the age limit of 15 to 18 living in Meeriyabedda estate as well as large number of Youngers also living there between the age limit of 19 to 25, further adults also nearly same amount to Youngers living in Meeriyabedda between the age limit of 26 to 45. According to this there are living with a large number of young people and children, so it is a strength for Meeriyabedda estate.

While observing the plight of the people affected by the landslide on October 29, 2014, in Meeriyabedda estate, we can observe the immediate impact of the landslide and the subsequent consequences

5.2 Descriptive analysis of Immediate Effects

In that respect, More than 1067 people were affected in Meeriyabedda and surrounding area by the landslide, directly affected people are 346 in 79 families. Among them, 37 people lost their lives. (Koslanda DS Office, 2019).

5.2.1 Affected people in Meeriyabedda estate

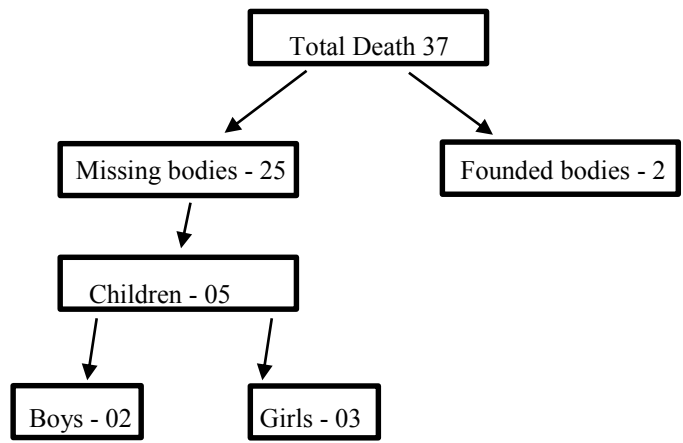


Fig 3: Affected People in Meeriyabedda estate

(Source: Koslanda Grama Niladari Office, 2019)

When we considering this affected people, immediately after the landslide, people were evacuated from the landslide area and the people stayed in six main helping camps. They are,

- Poonagala Tamil Maha Vidyalaya - 934 individuals



- Poonagala Sinhala Maha Vidyalaya – 109 individuals
- Poonagala Primary School – 329 individuals
- LLG Division Kovil – 292 individuals
- Koslanda Tamil Maha Vidyalaya – 818 individual

5.2.2 Detail of evacuated people

Table 2: Main Camps

Camps	Males	Females	Families	Pregnant Mothers	Infants	1-5 Years Olds
Poonagala TMV	473	456	286	2	16	90
Poonagala Primary School	169	160	87	3	9	46
Poonagala Lower Division Kovil	107	77	55	1	7	40
Poonagala Sinhala Vidyalaya	47	57	34	0	8	11
Koslanda TMV	203	197	116	3	7	42
Total	999	947	578	9	47	229

(Source: Koslanda Grama Niladari Office, 2019)

Table 2 illustrates about the immediate action after the landslide. Affected area people and the surrounding area people of the landslide were evacuated. Most of the families spited to Poonagala Tamil Maha Vidyalaya and Koslanda Ganesha Tamil Maha Vidyalaya. Also, there were already done for the facilities for the pregnant lady, infants and children. Food, clothing, medicine, and toilet facilities were immediately arranged for the affected people. All of these are the immediately action undertaken for affected people after a landslide. But then there are economic and social problems that people are facing continuously.

5.3 Descriptive analysis of Economic Effects

Similarly when look at the economic problems faced by the people, before the landslide of Meeriyabedda estate people participate in many economic activity like collecting milk, animal husbandry and vegetable agriculture but after the 2014 landslide directly affected people in Meeriyabedda area 79 families’ people was immigrated to **Maakantha junction area**. As a result, the people of the area were not able to engage in the above mentioned economic activities and their livestock were killed and the lands and the houses were damaged by the landslide.

5.3.1 Animal husbandry of Meeriyabedda estate

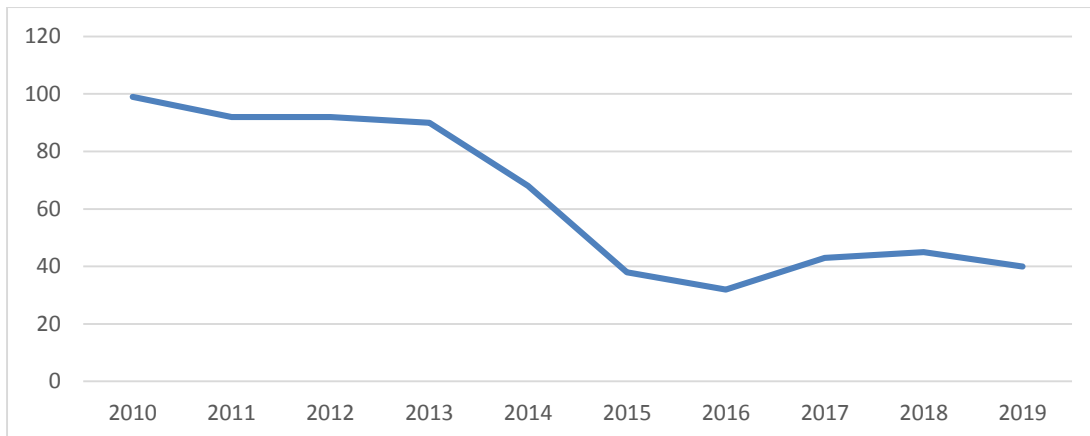


Fig 4: Animal Husbandry Members



(Source: Milk Society Meeriyabedda, 2019)

Moreover, in animal husbandry field after 2014 landslide totally 40 members only participating this animal husbandry economic activity but other people are immigrate to Makantha junction area, including immigrate people before near to 100 members annually participated the animal husbandry field. Likewise, According to the data of 2011, before the landslide through the milk collecting activity Meeriyabedda people earned annually Rs. 9002662.27 (Milk Society, 2019) amount of income but now Meeriyabedda people struggling to earn the money. According to the data of 2019 it is Rs 1535590.10

In addition before the landslide 35 families were participated in the vegetable agriculture activity in Meeriyabedda Estate but now 35 families are have to carry out their economic activities by going to per day salary work daily.

5.4 Descriptive analysis of Social Effects

Still, the affected people and those who have been relocated from Meeriyabedda are facing difficulties in obtaining health, education and access to transport infrastructure.

Pregnant mothers and children who have undergone medical tests through the Health Service Center in Meeriyabedda area before the landslide have now been forced to go to the Koslanda General Hospital for their medical needs. After the landslide access to such medical facilities is becoming increasingly challenging because the road transport in the Meeriyabedda area has been severely affected by the landslide

5.4.1 Medical facility after the landslide

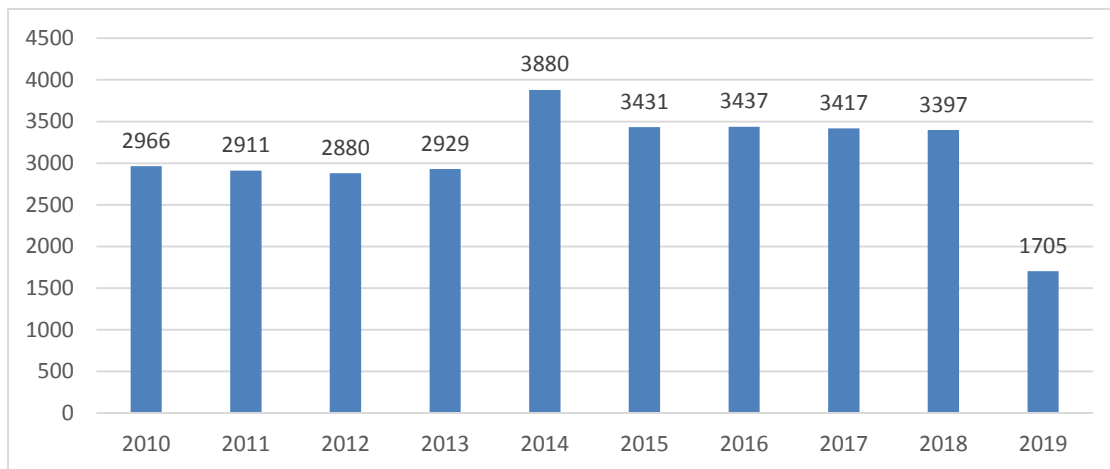


Fig 5: Getting medical facility after the landslide

(Source: District Hospital Koslanda, 2019)

Here we can see clearly after the landslide a large number of people getting outside to get their medical facilities. In 2014 due to the landslide, 3880 people visited the hospital to get their health services, after that the level of people visiting to the Koslanda hospital amount has been increased.

Further, when we considering to the school students after the landslide large number of school students faced difficult to continue their studies especially ordinary level student in Meeriyabedda Tamil Maha Vidyalaya faced difficult to ready for their final examination because of this landslide. We can easily identify the different between the student involvements in Meeriyabedda TMV in before the and after the landslide



5.4.2 Students school attendance in Meeriyabedda estate

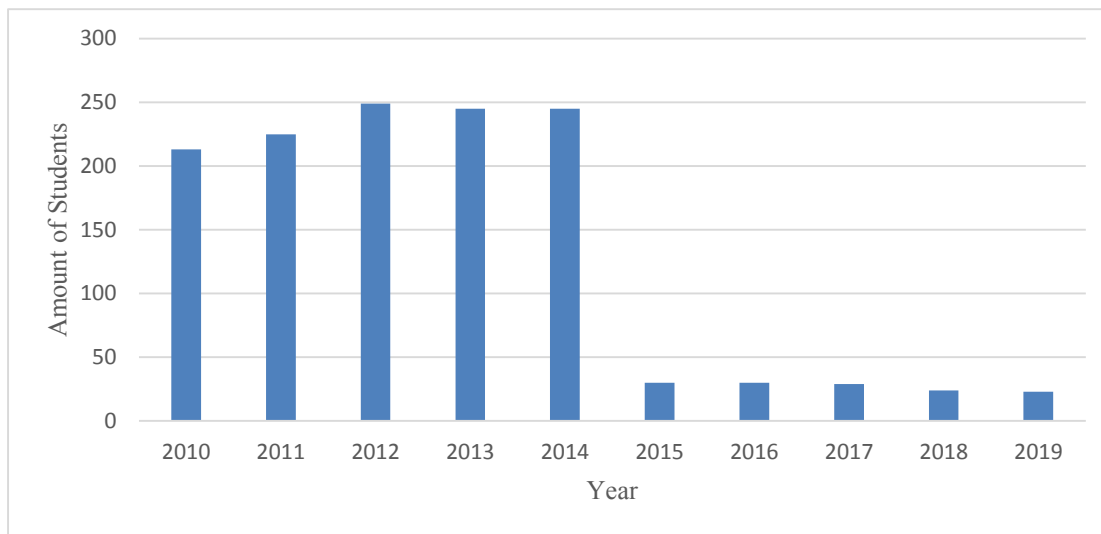


Fig 6: Students School attendance
(Source: Meeriyabedda Tamil Maha Vidyalaya, 2019)

Before the landslide near to 250 students went to the Meeriyabedda TMV. The students' amount mentioned here is between to grade one to grade eleven but after the landslide the Meeriyabedda TMV spited to the old hospital building in Meeriyabedda area and nearly 30 students only studying in this school. Among them 15 boys and 15 girls were studying between to grade one to grade five.

In the affected area Meeriyabedda school only 17 students continue their studies, the 17 students are ordinary level students, 8 of them are girls and 9 of them are boys. After the landslide the 250 students went to the Koslanda Tamil Maha Vidyalaya to continue their study. In this case students facing transport cost, some of the students walking to the school like between 8 to 9 Km per day. As well as the working people of the area still facing same problem because of the impact of landslide. These are the enduring social aspects affecting the Meeriyabedda Estate people after the 2014 landslide.

6.0 Conclusion

In general, the landslide has continued to cause many effects. We can see the effects of landslide worldwide and in Sri Lanka. Although there are several measures taken by the government to address the awareness and the prevention mechanism of landslides in Sri Lanka, landslides are continue to happen. Accordingly, Meeriyabedda estate people are still recovering from the effects of the landslide, but sill they do not recover from there social, economic and other affects.

According to the findings, if we considering the economic affects after the landslide more than 35 families totally lost their own agriculture cultivation land animal husbandry tea plantation work and their small grocery shops and their own vehicle. In this affect they still facing many problems in build their economic aspects. Especially, in 2013 around 90 people involved in the animal husbandry milk production. But, after the landslide in 2015 only 38 people involve in the animal husbandry milk production. So. More than 50 percent of the people left their work due to the landslide find difficulties in earning income.

As it is school students facing difficulties on transportation and some students withdraw their school activity. In 2014, 245 students attended the Meeriyabedda TMV. But, after the landslide students' amount decreased tremendously and reached 30 in 2015 and it is continue to decrease in the latter years. Moreover people facing difficulties in accessing to the medical facilities. Before the landslide people were access to the nearby medical center, due to the destruction of the medical-center now people face a difficulty in access to the medical purposes.



Now people has to go to the city's hospitals fulfill their medical needs. Before 2014 there were around 2900 people get medical facilities for the past few years and suddenly the Out Patient Admission increased to 3900 due to the landslide and it is continue at a range of 3400 for the next few years. However, Meeriyabedda people find difficulties in transportation to access to the District Hospital of Koslanda.

So the following are the suggestions to the above mention problems. Providing warning devices to detect the landslide, we can spread the message quickly and also prevent deaths from landslides. The government can also provide self-employment and credit facilities to people who have lost their land, property and employment. Build schools and hospitals in close proximity to the resettled areas so that the affected people will have access to the most important medical and educational facilities easily in the newly resettled area. There is no doubt that by doing so, the livelihoods of the affected people will be rebuilt and if the socio-economic conditions of the people are found to be stable, also it will be beneficial to the development of the country.

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