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## EFFECTS OF FLOOD DURING THE LAST DECADE IN SRI LANKA

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### 1. INTRODUCTION

Climate change and its consequences are the most important topics argued throughout the world. Global warming, change in rainfall pattern, hurricanes, floods, droughts, landslides, loss of vegetation, etc. are some of the well-known impacts of climate change, and people are facing difficulties in their day-to-day life because of these disasters. Present study intended to investigate the effects of flood in the small island Sri Lanka. Flood is one of the natural disasters and it is caused by either direct factors or indirect factors and natural factors or manmade factors. Geomorphology, socio-economic development and environmental factors play a role directly or indirectly in flood incidences. Whereas, high intensity of rainfall within short period, deforestation, destruction of water catchment areas or water bodies, inappropriate land use patterns and landfills are considered as natural or manmade factors contribute to the floods (Tingsanchali, 2011). Whatever it is, floods become a huge burden to the affected people and the government such as, loss of lives, full or partial damage to the properties, disease epidemic, damage to the infrastructures and so on. Sri Lanka receives rainfall from the southwest and northeast monsoons. Rainfall is confined to the southwest region of the island during the Southwest monsoon (mid May to September); however, rainfall occurs in the north and east of the island during the Northeast monsoon (December to February). In Sri Lanka, floods are the most common natural calamity where, localized and seasonal flooding is common especially during the monsoon seasons. There were almost 1,000 flood incidents between 1974 and 2008, including riverine, urban, and flash flooding. The predicted increase in hydro-meteorological hazards due to climate change is raising the flood risk profile in Sri Lanka. Furthermore, in Sri Lanka Anuradhapura, Batticaloa, Badulla, Puttlam and Polonnaruwa are identified as highly vulnerable districts as a result of the extreme flooding that has been occurring since December 2019 (IFRC, 2019).

### 2. METHODS

All the primary and secondary data and information obtained from Internet sources, official government databases, journal articles and some other literature materials in order to support the present study

### 3. RESULTS AND DISCUSSION

Damages and other losses due to frequent flood incidences in Sri Lanka can be categorized into several fields such as, education, houses and infrastructures, economy of the country, agriculture, transport, water supply and drainage and power supply. The detailed discussion of damages in each sector is given in this section.



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### **a) Education**

All the schools, universities and educational institutes located in the areas highly threatened to the flood are being affected due to extreme flood during monsoonal rainfall seasons. Substantial damages occurred to infrastructures such as, classrooms, laboratories, home science units, art rooms, sports and fitness units and auditorium and their flooring, walls, fencing, drainage facilities, water supply units. Furthermore, furniture, books, stationeries and other equipment and tools are damaged or spoiled because of flooding in the schools, universities and other educational institutes. In 2017, due to flooding, a total of 382 pre-schools were affected, out of which 118 schools were in Matara, 113 schools affected in Ratnapura, 90 schools in Kalutara, 59 schools in Galle and 2 schools in Hambantota districts, and approximately 11,460 students were affected in all over the island (Dissanayaka et al., 2017).

### **b) Houses and infrastructures**

People live in flood prone areas are continuously affected in every year. They face lots of inconveniences such as, need to abandon their houses until the flood drains, damages to the houses, loss of electrical and electronic utensils, mud and dirt accumulation inside the house and surrounding areas, water logging in low lands near to the residency areas, bad odour and so on. The flood occurred in May 2017 causes damage to 77,309 houses in total where, 74,301 residences were damaged partially and 3,008 houses were fully collapsed which means physical damage to the houses is more than 75% (Dissanayaka et al., 2017).

### **c) Damage to economy of the country**

Frequent flood situations in the country will cause huge economical impacts in long term. Because during period of disaster government need to spent for people's wellbeing and safety. However, government needs to do these things without any benefits. And also, there is a huge responsibility to reconstruct the damaged infrastructures with the reduced income from industries during the flood situations. Based on the above-mentioned scenarios, floods in Sri Lanka causing drastic damage to the Sri Lankan economic status (IFRC, 2019).

### **d) Agriculture damage**

Agricultural lands are affected by the flood water in the sense of, bringing the debris and unwanted garbage to the fields, pest and disease spreading to the crops, washing off the soil nutrients, salt accumulation in agricultural lands and sand accumulation and erosion (Wickramasinghe et al., 2021). And also flooding during the harvesting stage causes the economical losses to farmers and demand the food security. Afterwards farmers' need to spent money and time to recover the spoiled agricultural lands to cultivatable stage. In 2017, approximately 10,033,164,074 hectares of lowland cultivation lands were inundated with floodwater for a certain period of time during the 2017 flood incidence. More than 3,035 hectares of tea estates were affected due to the flood in 2017 and it caused huge impact on plantation and export industries. As adverse effects of flood, livestock farming such as cattle, swine, buffalo, goat, and poultry sectors also affected in considerable manner. In 2017, 257,174,000 LKR was the decrement for livestock sector (Disaster information management system, Sri Lanka, 2020).

### **e) Damages to transport**

Transport on the land is seriously affected due to the flood, because it damages the roads, block the ways, submerge the roads and collapsing the bridges. The degree of damages to the roads may vary according to the varying geographical regions and severity of flood. In 2017, post-disaster evaluation revealed that, national roads in five districts namely Kalutara, Galle,



Matara, Hambantota and Ratnapura were damaged due to the severe flood. Damages to the roads might be listed as, 55 roads accounts for carriageway damage, 42 incidences of earth slips and soil heaps on road, partial or full damage to 14 bridges, collapse of 20 drainage systems and 3 river erosions, and all of these damages reported only in Kalutara, Galle, Matara, Hambantota and Ratnapura districts. 6,258.8 million LKR is estimated as the total cost needed for the national road damages, while only carriageway damages account for 36 percent (Sri Lanka. Flood, 2020).

**f) Damages to water supply and sanitation**

The flood has affected dug wells in huge manner while dug wells are being used as primary source of drinking water in Sri Lanka. Accumulation of floodwater in either covered or uncovered dug wells makes the dug wells not suitable for use after flood because floodwater might carry trash and contaminants (micro-organisms, toxins, other hazardous chemicals and physical contaminants) (Wickramasinghe et al., 2021). 4.9% of dug wells in the southern province were affected and abandoned after 2017-flood disaster. Although domestic wells are in large number, after the flood incidences, flood damages to the domestic wells are not evaluated in an in-depth manner however occasionally considered for the assessments. The municipal council and responsible organizations provide instructions and equipment for cleaning the damaged wells as early as possible to make the wells useable. During the inundation, residential toilet facilities were subjected to damage. While the damage to the toilet foundation (compartment) was obvious, even though there were no the long-term dangers of a malfunctioning faecal matter disposal system (IFRC, 2019).

**g) Power Supply**

Power disruption during flood season is frequently occurred, because the electricity distribution networks are physically damaged due to severe flood, and uprooted trees. Bulk-supply energy meters, transformers, MCCB’s (moulded case circuit breakers), distribution lines, electricity poles (both low tension and medium voltage), MCCB cut outs and normal energy meters are few main pieces of electricity supply network which were affected by floods and landslides. In 2017, Sri Lankan electricity board evaluated 652.46 million LKR loss in total where, 426 million LKR were allocated to reconstruct the damaged electricity network due to the flood, also approximately 330,000 electricity consumers were affected by power disruption and disconnection in the southern province.

**h) Damage to Environment**

Despite the fact, that the ecosystem has suffered significant losses, as described through this text, these losses are not effectively and systematically collected and recorded.

**Table 1: Losses due to flood in Sri Lanka from 2017 to 2021**

<b>Incidence</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
People affected	658,490	174310	64,608	111,659	266923
Deaths	213	26	02	04	15
Houses – fully damaged	2788	53	62	106	15
Houses – partially damaged	18,417	2270	1463	3783	915

(Sources: Sri Lanka flood operation report 2021, International Federation of Red Cross and Red Crescent Societies)



Natural resources are challenged in high degree due to the frequent flood incidences. Forests, wildlife, biodiversity, wetlands, agricultural land, soil fertility, water logging, etc. are few elements of environment threatened by the high incidences of severe flood (IFRC, 2019). In May 2017, South-West Monsoon carried excessive high intensity precipitation in the southeastern regions of the country, and caused large number of casualties and loss of lives and properties. Matara, Kalutara, Galle, Ratnapura, Gampaha and Colombo districts are the severely affected districts among 15 districts affected due the heavy rains, strong winds and landslides (Sri Lanka. Flood, 2020).

In 2019, central hill countries in this island came under high risks of severe floods due to the continuous inter-monsoon period followed by onset of the northeastern monsoon. Anuradhapura, Badulla, Batticaloa, Polonnaruwa and Puttlam are highly affected districts due to the severe flood due to the high intensity of precipitation. In 2019, North, North-central and Eastern provinces were forecasted for increased risk of flooding where, central province was alarmed for and landslides and slips (IFRC, 2019).

From December 2<sup>nd</sup> to 5<sup>th</sup>, 2020, the Northeast monsoon and the formation of a cyclone in the south-east Bay of Bengal intensified rainfall in Sri Lanka, with the northern region of Sri Lanka being the hardest hit. In 2020, the Northern Province especially in Jaffna and Kilinochchi districts were received up to 279.8mm precipitation and schools and other organizations in the province were closed due to cyclone and flood (Sri Lanka. Flood, 2020).

#### 4. CONCLUSION

Sri Lanka is the tropical country receives rainfall from South-West Monsoon, Northeast monsoon, inter-monsoon and turmoil in the Bay of Bengal, and flood incidences also in place due to this pattern of rainfall. However, severe flood incidents cause effects on various sector of our country. Flood effect in education sector affects the students in many ways. Damages to schools, universities and other educational institutes, loss of books and stationeries and reduction in academic days are few effects experienced in educational field. Loss of livelihoods, full or partial damage to the houses, loss of income, spread of diseases, loss of livestock and crop production, damages to the infrastructures, disturbances to transport facilities, damages to the environment and loss of lives or casualties are the major risks due the flood incidences. Losses due to the flood or natural disasters can cause ill mental and physical health to human. Therefore, appropriate flood mitigation strategies must be implemented to reduce the worst effects of flood in the country.

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