GOVERNMENT OF INDIA
MINISTRY OF EARTH SCIENCES
LOK SABHA
UNSTARRED QUESTION No. 2169
TO BE ANSWERED ON WEDNESDAY, SEPTEMBER 23, 2020

OCCURRENCES OF LANDSLIDES

2169. ADV. A.M. ARIFF:
ADV. ADOOR PRAKASH:

Will the Minister of EARTH SCIENCES be pleased to state:

(a) whether the Government is aware that landslide tragedies are frequently occurring in different parts of Kerala in every monsoon and if so, the details thereof;
(b) whether the Government has initiated any studies on the increasing occurrences of landslides in the Western Ghat region of the country including Kerala;
(c) if so, the details thereof and if not, whether the Government proposes to constitute any study in this regard in near future;
(d) whether the landslide hazard mapping for the State of Kerala has been prepared and if so, the details thereof?

ANSWER
MINISTER FOR SCIENCE AND TECHNOLOGY
AND EARTH SCIENCES
(DR. HARSH VARDHAN)

(a) Yes Sir. Geo-environmentally 13 out of 14 districts in Kerala are variably landslide prone. Each year during monsoon, many landslide trigger within the fragile hill slopes of the State. Sometimes, these are impacted as wide-spread and major landslide hazards due to exceedingly high amount of precipitation acting as vital trigger to wide spread land sliding. In recent times, Kerala experienced such type of major landslide hazards in 2018 and 2019 respectively, and most recently on 06.08.2020 a single debris flow event at Pettimudi, Idukki district took a toll of 66 precious lives.

During 2018 Kerala deluge, GSI carried out post-disaster landslide inventory mapping in two phases and collected geoscientific details of 2002 nos. of landslide incidences. Number of houses affected due to landslide events and the number of houses to be relocated were also identified and reported to the State Government along with a detailed list of the landslide inventory. During 2019, GSI carried out post disaster studies of a total of 196 nos. of landslide incidences and also submitted the report to Kerala Government. In 2020, the fatal debris flow event of 06.08.2020 in Pettimudi, near Munnar in Idukki District was also investigated by GSI and a detailed note has already been submitted to the Kerala State Disaster Management Authority for further necessary action.

(b) Since decades, GSI has been involved in studying landslides for the entire landslide-prone areas in Western Ghat region including the states of Kerala, Tamil Nadu, Karnataka, Goa and Maharashtra using various multi-scale landslide hazard analysis tools starting from 1: 50,000 scale landslide susceptibility mapping to the site specific, slope-scale landslide investigations, including, a recent attempt of experimental regional landslide early warning system (LEWS) at Nilgiri district, Tamil Nadu.

(c) and (d) Through GSI's National Landslide Susceptibility Mapping (NLSM) program between2014 and 2020, GSI has completed landslide susceptibility mapping on 1: 50,000 scale of the entire landslide prone Western Ghat terrains (91,755 sq. km.), covering states of Kerala (19,326 sq. km.), Tamil Nadu (10,081 sq. km.), Karnataka & Goa (34,156 sq. km.), and Maharashtra (28,192 sq. km.). A total of 3885 nos. of landslide incidences were recorded in the Western Ghat terrain during the last five years. The landslide susceptibility map categorises vulnerable hill slopes into high, moderate and low based on the likelihood of landslide propensityand can be used as a vital geo-information tool for landuse zoning regulations in landslide prone fragile slopes. The map is uploaded in GSI's Bhukosh map portal (http://bhukosh.gsi.gov.in/Bhukosh/Public) for free downloading and use by any user. In the already-uploaded map of Kerala, 11% areas are "highly susceptible", 33% areas are "moderately susceptible" and 56% areas are "lowly susceptible". Susceptibility maps for the rest 5426 sq. km. areas of Kerala (mostly parts of Idukki district) are under finalisation and the same will be uploaded on Bhukosh map portal of GSI as soon as the work is completed.

GSI has also published Landslide Compendium on Southern Parts of Western Ghat in 2016 and Landslide Compendium of Maharashtra in 2018. These compendiums contain salient details of all types of landslide investigations carried out by GSI till 2014.

Further, in Maharashtra, 225 villages were studied and ranked into four different classes vulnerable to landslide hazards. Out of 225 villages, GSI identified 47 villages to be most vulnerable to landslide (Class-I and II). In addition, GSI studied and identified vulnerable inhabited hill slopes/locations in Mumbai Urban Agglomeration at the request of the Municipal Corporation of Greater Mumbai (MCGM). A total of 74 such sites having moderate to dense habitations were identified and classified under five classes of vulnerability. The relevant findings and recommendations have also been shared with the Disaster Management Unit.

Based on the outcome of the 1: 50,000 scale landslide susceptibility map of the State, GSI has identified and initiated 1: 10,000 scale landslide hazard mapping during 2020-21 in **i)** Kavalappara, Malappuram district, and **ii)** Kattippara, Kozhikode district and 1:1000 scale site specific landslide investigation at Plamoola, Wayanad district.

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