

GOVERNMENT OF INDIA
MINISTRY OF WATER RESOURCES,
RIVER DEVELOPMENT & GANGA REJUVENATION
LOK SABHA
UNSTARRED QUESTION NO. 1707
ANSWERED ON 20.12.2018

USE OF GEOGRAPHIC INFORMATION SYSTEMS FOR FLOOD FORECASTING

1707. DR. KIRIT P. SOLANKI

Will the Minister of WATER RESOURCES, RIVER DEVELOPMENT AND GANGA REJUVENATION be pleased to state:

- (a) whether the Government has the details of the loss of life, property and livestock reported in flood prone areas for the current as well as the last year and if so, the details thereof;
- (b) whether the Government has adopted advanced technologies such as mapping based on satellite imagery and Geographic Information Systems for flood forecasting and if so, the details thereof; and
- (c) whether the Government has issued any standard operating procedures to ensure the safety of dams and conduct their post monsoon inspections and if so, the details thereof?

ANSWER

THE MINISTER OF STATE FOR WATER RESOURCES, RIVER DEVELOPMENT AND GANGA REJUVENATION & PARLIAMENTARY AFFAIRS

(SHRI ARJUN RAM MEGHWAL)

(a) Central Water Commission (CWC) compiles the damages due to flood and heavy rains after confirmation by the respective State Governments. The statement showing State-wise flood damage during the year 2017 is given at **Annexure-I**. During the year 2018, the tentative assessment of loss of life and cattles lost as per National Emergency Response Centre website of Ministry of Home Affairs is 881 and 50348 respectively.

(b) Advanced technologies like mapping based on satellite imagery & Geographic Information Systems (GIS) for flood forecasting are being used for finding flood extent, development of mathematical models and verification of model outputs. Google Earth Engine for Satellite Data Analysis and ARCGIS/QGIS software for spatial data processing are also being used.

(c) The responsibility of operation and maintenance of the dams lies with dam owners. Most of the dam owners are the Irrigation/ Water Resources Departments of State Governments. CWC provides technical assistance to dam owners and has issued following guidelines as part of Standard Operating Procedures (SOP):

- Guidelines for safety Inspection of Dams.
- Guidelines for preparation of Operation and Maintenance Manuals of Dams.
- Guidelines for Developing Emergency Action Plans for Dams

Ministry of Water Resources has constituted National Committee on Dam Safety (NCDS) under chairmanship of Chairman, CWC in which most of the States/dam owners are members. In NCDS meetings, apart from discussing numerous dam safety related issues, the dam owners are also advised to prepare Operation and Maintenance (O&M) Manuals of dams, Emergency Action Plan (EAP) for their dams and inspect them regularly before and after monsoon in accordance with guidelines issued by CWC. Every dam requires separate O&M manual and the consolidated status on preparation of O&M manuals is at **Annexure-II** as reported by the dam owners.

ANNEXURE-I**ANNEXURE REFERRED TO IN REPLY TO PART (a) OF UNSTARRED QUESTION NO. 1707 TO BE ANSWERED IN LOK SABHA ON 20.12.2018 REGARDING "USE OF GEOGRAPHIC INFORMATION SYSTEMS FOR FLOOD FORECASTING"**

STATEMENT SHOWING STATE-WISE FLOOD DAMAGE DURING 2017*

* Tentative

Sl.No	Name of State	Area Affected (Mha)	Population Affected (Million)	Damages to Crops		Damage to Houses		Cattle Lost Nos.	Human Lives Lost Nos.	Damage to Public Utilities (Rs. Crore)	Total Damages Crops, Houses & Public Utilities (Rs. Crore)
				Area (Mha)	Value (Rs. Crore)	Nos.	Value (Rs. Crore)				
1	2	3	4	5	6	7	8	9	10	11	12
1	ANDHRA PRADESH	0.000	0.000	0.000	0.000	25	0.000	0	1	0.000	0.000
2	ARUNACHAL PRADESH	0.106	0.199	0.041	97.540	1463	5.550	1177	60	1471.590	1574.680
3	ASSAM	0.398	5.602	0.398	0.000	78287	0.000	0	160	0.000	0.000
4	BIHAR	0.810	17.164	0.810	0.000	118410	0.000	373	514	0.000	0.000
5	CHATTISGARH	0.000	0.000	0.000	0.000	929	0.000	0	52	0.000	0.000
6	GOA	0	0	0	0	64	0	0	1	0	0
7	GUJARAT	0.891	0.520	0.891	0.000	38796	0.000	0	284	0.000	0.000
8	HARYANA	0.001	0.000	0.001	17.960	8	0.047	0	0	0.000	18.007
9	HIMACHAL PRADESH	0.006	6.865	0.003	34.607	2195	13.300	199	75	3.460	51.367
10	JAMMU & KASHMIR	0.000	0.000	0.000	0.000	92	0.000	0	7	0.000	0.000
11	JHARKHAND	0.000	0.010	0.000	0.000	2668	0.000	0	12	0.000	0.000
12	KARNATAKA	0.000	0.000	0.000	0.000	1910	0.000	0	84	0.000	0.000
13	KERALA	0.000	0.000	0.000	0.000	3836		0	66	0.000	0.000
14	MADHYA PRADESH	0.000	0.000	0.000	0.000	0	0.000	0	0	0.000	0.000
15	MAHARASHTRA	0.000	0.000	0.000	0.000	0	0.000	0	148	0.000	0.000
16	MANIPUR	0.089	0.000	0.089	0.000	18989	0.000	0	21	0.000	0.000
17	MEGHALAYA	0.000	0.000	0.000	0.000	148	0.000	0	3	0.000	0.000
18	MIZORAM	0.046	0.000	0.046	0.000	5437	0.000	0	11	0.000	0.000
19	NAGALAND	0.568	0.667	0.568	9.300	4200	18.200	2515	29	524.090	551.590
20	ODISHA	0.658	0.697	0.021	0.000	5610	0.000	1316	3	334.315	334.315
21	PUNJAB	0.006	0.000	0.006	18.230	130	0.410	6	5	0.000	18.640
22	RAJASTHAN	1.087	3.586	0.739	1333.221	57290	30.450	5536	101	513.186	1876.857
23	SIKKIM	0.002	0.033	0.001	5.000	810	9.270	110	10	231.170	245.440
24	TAMILNADU	0.000	0.000	0.000	0.000	9	0.000	0	1	0.000	0.000
25	TRIPURA	0.004	0.000	0.004	0.000	4091	0.000	0	17	0.000	0.000
26	UTTAR PRADESH	0.437	2.923	0.396	308.053	26834	0.000	93	121	0.000	308.053
27	UTTARAKHAND	0.000	0.000	0.000	0.000	1410	0.000	0	59	0.000	0.000
28	WEST BENGAL	1.033	8.723	1.033	6914.500	826982	9158.280	2857	217	1655.160	17727.940
29	ANDAMAN & NICOBAR ISLAND	0.000	0.000	0.000	0.000	0	0.000	0	0	0.000	0.000
30	CHANDIGARH	0.000	0.000	0.000	0.000	0	0.000	0	0	0.000	0.000
31	DADAR & NAGAR HAVELI	0.000	0.000	0.000	0.000	0	0.000	0	0	0.100	0.100
32	DAMAN & DIU	0.000	0.000	0.000	0.000	0	0.000	0	0	0.000	0.000
33	DELHI	0.000	0.000	0.000	0.000	0	0.000	0	0	0.000	0.000
34	LAKSHADWEEP	0.000	0.000	0.000	0.000	0	0.000	0	0	0.000	0.000
35	PUDUCHERRY	0.000	0.000	0.000	0.000	0	0.000	0	0	0.000	0.000
	Total	6.140	46.988	5.046	8738.411	1200623	9235.507	14182	2062	4733.071	22706.989

ANNEXURE REFERRED TO IN REPLY TO PART (c) OF UNSTARRED QUESTION NO. 1707 TO BE ANSWERED IN LOK SABHA ON 20.12.2018 REGARDING “USE OF GEOGRAPHIC INFORMATION SYSTEMS FOR FLOOD FORECASTING”

Status of Operation & Maintenance Manual

Sl. No.	State	Number of O&M Manuals	Status of O&M manual
1	Andhra Pradesh	1	O&M manual completed and rest are under progress.
2	Bihar	20	O&M manual of 2 large dams under preparation.
3	Chhatisgarh	1	Preparation of other dams O&M manuals has been requested.
4	Gujarat	1	Field offices have been requested for preparation of O&M manuals.
5.	Himachal Pradesh	16	16 O&M manuals have been received.
6.	Jharkhand	1	Preparation of other dams O&M manuals has been requested.
7	Karnataka	-	Chairman, NCDS requested WRD Karnataka to prepare O&M manuals.
8	Kerala (Irrg.)	-	Chairman, NCDS requested WRD Kerala irrigation to prepare O&M manuals.
9	Madhya Pradesh	25	Other dams O&M manuals preparation under process.
10	Maharashtra	111	Rest O&M manuals preparation under process.
11	Odisha	7	6 more O&M manuals under progress.
12	Punjab	12	Chairman, NCDS requested Punjab Irrigation Deptt to prepare O&M manuals.
13	Rajasthan	O&M of important dams are under preparation.	
14	Tamil Nadu	89	O&M rules for flood regulation of all 89 dams of TNWRD have been prepared.
15	Telangana	-	Telangana WRD informed that field authorities have been requested for preparation of O&M manuals.
16	Uttar Pradesh	-	U P Irrigation & WRD informed that field authorities have been requested for preparation of O&M manuals.
17	Uttarakhand	-	Chairman, NCDS has requested WRD Utarakhand to prepare O&M manuals.
18	West Bengal	-	Chairman, NCDS has requested WRD West Bengal to prepare O&M manuals.
19	Bhakra Beas Management Board(BBMB)	3	Completed and Digitization of Drawings is under process.
20	Damodar Valley Corp. (DVC)	4	Completed.
21	Kerala State Electricity Board (KSEB)	-	Chairman, NCDS requested KSEB to prepare O&M manuals.
22	Meghalaya Power Generation Corporation limited(MePGL)	-	Chairman, NCDS requested MePGL to prepare O&M manuals.
23	National Hydro Power Corp.(NHPC)	18	Data Book & O&M Manuals for 18 dams completed and Teesta low Dam -IV is under preparation.

Note: Status as per information received from State Govts.