GOVERNMENT OF INDIA
MINISTRY OF JAL SHAKTI,
DEPARTMENT OF WATER RESOURCES, RIVER DEVELOPMENT & GANGA REJUVENATION
LOK SABHA
UNSTARRED QUESTION NO. 1846
ANSWERED ON 22.09.2020

DYING RIVERS IN KERALA

1846. SHRI BENNY BEHANAN

Will the Minister of JAL SHAKT be pleased to state:

(a) whether it is a fact that many rivers are dying in Kerala due to various environmental factors and if so, the details thereof along with the name of the rivers and reasons for its death;
(b) whether the Union Government has conducted any survey of the rivers and made suggestions to State Government and if so, the details thereof; and
(c) whether the Union Government has conducted a study on devastating floods and dying rivers in Kerala, if so, the details thereof?

ANSWER

THE MINISTER OF STATE FOR JAL SHAKTI & SOCIAL JUSTICE AND EMPOWERMENT
(SHRI RATTAN LAL KATARIA)

(a) & (b) There are two types of rivers in the country; (1) perennial rivers and (2) Non-perennial rivers. In perennial rivers, water remains available throughout the year, while non-perennial rivers are rain fed rivers in which water flows only during the rainfall period. The flow in the rivers is dynamic and depends on many parameters such as rainfall, its distribution and intensity in the catchment, catchment characteristics and withdrawals / utilization of water in the basin.

Central Water Commission (CWC) monitors important rivers in the country. Considering annual average flow of last 20 years of terminal sites of important rivers, no appreciable increasing / decreasing trend in total water availability has been observed. Government has taken water conservation initiatives especially under Jal Shakti Abhiyan through the process of rain water harvesting and water conservation.

As per Central Pollution Control Board (CPCB) report of 2018 on polluted river stretches, 21 of them are found polluted in the state of Kerala based on BOD (Biochemical Oxygen Demand) levels. The detail of polluted river stretches is enclosed at **Annexure-I**

Discharge of untreated and partly treated sewage and industrial effluent along with dumping of solid waste are the major reasons for pollution in rivers in the State of Kerala. It is the primary responsibility of the State Government to provide necessary sewerage infrastructure, treat and thereafter discharge the sewage into water bodies & rivers. Similarly, the State Government / ULBs are to provide facilities for proper collection; transportation and management of solid waste and prevent it from polluting rivers & water bodies etc.

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River cleaning is a continuous process and the Central Government is supplementing the efforts of State Governments and Union Territories in river rejuvenation through programmes like ‘Namami Gange” and ‘National River Conservation Plan”.

Water being a State subject, its management including conservation, augmentation and efficient management of rivers and revival of water bodies including rivers/flood plain management in the Country is primarily State’s responsibility.

Central Water Commission (CWC) has formulated a Model Flood Plain Zoning Bill way back in 1975 which was circulated to all States for implementation. It aims at demarcating zones or areas likely to be affected by floods of different magnitudes or frequencies and probability levels, specifying the types of permissible developments in these zones, so that whenever floods actually occur, the damage can be minimized, if not avoided. Recently, Ministry of Jal Shakti vide DO letter No. 5/03/2016-FM/ dated 19.08.2020 has requested the State Governments that high priority may be accorded to the matter and urgent action be taken for enactment of suitable legislation regarding Flood Plain Zoning.

The key findings od CWC, based on analysis of rainfall data of IMD, discharge data of CWC G&D sites and inflow/outflow data of reservoir received from Government of Kerala, are placed at **Annexure-II.**

(c) Water Commission had constituted a Committee in September 2018 to carry out study on Central Kerala Flood- 2018. The Committee has submitted its Report titled “Kerala Floods and Solutions” in December 2018, which was sent to all concerned.

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ANNEXURE-I

Details of polluted stretches in Kerala as per CPCB report of 2018 as mentioned at part (a) & (b) of the Lok Sabha Unsatrred Question No. 1846 due for Answer on 22.09.2020.

River Name	River Stretch	BOD (mg/l)	Priority
1. Karamana	Malekkdu to Thiruvallam	56.0	I
2. Bharathapuzha	Along Patambi	6.6	VI
3. Kadambayar	Manckakadavu to Brahmapuram	5.9 – 6.4	VI
4. Keecheri	Puliyannor to Kechery	6.4	VI
5. Manimala	Kalloopara to Thondra	6.3 – 6.4	VI
6. Pamba	Mannar to Thakazhy	3.3 – 7.8	VI
7. Bhavani	Along Elachivazhy	5.4	V
8. Chitrapuzha	Irumpanam to Karingachira	4.6	V
9. Kadalundy	Along Hajirappally/Hajiyarpally	3.6	V
10. Kallai	Thekepuram to Arakkinar	4.5	V
11. Karuvannur	Along Karuvannur	3.5	V
12. Kavvai	Along Kavvai	3.9	V
13. Kuppam	Thaliparamba to Velichangool	3.1 – 3.8	V
14. Kuttiyady	Along Kuttiyady	5.0	V
15. Mogral	Along Mogral	3.1	V
16. Periyar	Alwaye-Eloor to Kalamassery	3.2 – 5.1	V
17. Peruvamba	Along Peruvamba	3.9	V
18. Puzhackal	Olarikkara to Puzhackal	3.8	V
19. Ramapuram	Along Ramapuram	3.3	V
20. Thirur	Naduvilangadi to Thalakkadathur	3.6	V
21. Uppala	Poyya to Mulinja	3.2	V

ANNEXURE -II

Findings of CWC study as mentioned at part (a) & (b) of the Lok Sabha Unsatrred Question No. 1846 due for Answer on 22.09.2020.

i. Kerala terrain is a linear one with elevation varying from about -2 m to 1500 m in a stretch of about 80 to 100 km across the State. The Western Ghats terrain has steep slopes, while the rest of terrain is rolling/plains. The time of concentration (the time required to travel the water from farthest point of project catchment to the project catchment outlet) of most of the reservoirs in the region is about 2 to 3 hours only. ii. During the August 2018 flood 13 out of 14 districts of the State were severely affected from flood due to heavy rainfall. As per IMD, Kerala received about 2346.6 mm of rainfall during 1 June 2018 to 19 August 2018 against the normal rainfall of 1649.5 mm, which was 42% above the normal. During 1 August 2018 to 19 August 2018 total rainfall occurred in Kerala was about 758.6 mm against the normal of 287.6 mm, which was 164% above normal. iii. A one day rainfall of 398 mm, 305 mm, 255 mm, 254 mm, 211 mm and 214mm respectively was recorded at Nilambur in Mallapuram district, Mananthavady in Wayanad district, Peermade, Munnar and Myladumpara in Idukki district and at Pallakad district respectively on 9 August 2018. The severe rainfall in Wayanad district resulted in heavy flooding at Mananthavadi and Vythiri during 8-10, August 2018. iv. As per analysis carried out by CWC, the rainfall of 15-17, August 2018 having eye of storm near Peermade between Pamba and Periyar sub-basins, was almost of the same order as that of rainfall of Devikulam, Kerala which occurred during 16-18, July 1924. As per the historical records severe most flooding had occurred in Kerala during the year 1924. The average cumulative rainfall of 15-17, August 2018 is about 414 mm for entire Kerala. The consequent cumulative runoff of three days for the entire Kerala (area about 38,800 sq.km) is about 12 BCM (12,000 MCM) for a runoff coefficient of 0.75. v. Further, total catchment area tapped by dams in Kerala excluding barrages is about 6610 sq.km. Taking a runoff coefficient of 0.8 the runoff generated from the catchment tapped by the dams during the 3 days rainfall of 15-17, August 2018 has been estimated about 2.19 BCM, out of total runoff of 12 BCM for entire Kerala. The total live storage of Kerala is about 5.8 BCM. Even with 20% of the live storage availability on 14 August 2018, the available flood moderation extent would have been only 1.16 BCM against the estimated inflow of 2.19 BCM. It shows that in any case, it was essential to make releases from reservoirs. vi. Out of 758.6 mm rainfall from 1 August 2018 to 19 August 2018, about 414 mm rainfall occurred in just three days viz 15-17, August 2018, which created severe flooding in the State. Due to severe rainfall from 15-17, August 2018, the gates of about 35 dams were also opened due to extremely large inflow of water in the reservoirs. During August 2018, the reservoirs were either at FRL or only few feet below the FRL. vii. During 15-17, August 2018, the 3-day rainfall depths realised in Periyar, Pamba, Chalakudi and Bharathapuzha sub-basins were 588 mm, 538 mm, 421 mm and 373 mm respectively and these depths are of the same order as that of 1924 rainfall. viii. As per CWC's Neeleswaram G&D site (Periyar sub-basin) records, the maximum discharge passed in Periyar river was 8800 cumec on 16 August 2018 at 15:00 hrs and maximum water level attained was at EL 12.4 m. The earlier HFL was recorded on 27 July 1974 at EL 11.105 m. The major storages in Periyar basin are Idukki (live storage 1.4 BCM) and Idamalayar (LS 1.1 BCM). The peak release on 16 August 2018 from Idukki was 1500 cumec against a peak inflow of 2532 cumec achieving a flood moderation of 1032 cumec. The release from Idamalayar on 16 August 2018 was 963 cumec against an inflow of 1164 cumec. The discharge in Periyar river at Neeleswaram G&D site on 17 August 2018 was recorded as 8600 cumec and release from Idukki and Idamalayar were 1500 cumec (inflow 1610 cumec) and 1272 cumec (inflow 1007 cumec). On analysis of data it has been found that the releases from these dams were the controlled releases, as the discharging capacity of these dams are 5013 cumec (Idukki) and 3012 cumec (Idamalyar). ix. The maximum discharge in Pamba river at CWC, G&D site (Malakkara) was 2900 cumec on 16 August 2018 with corresponding water level at EL 9.58 m. The earlier recorded HFL was 8.2 m. The major reservoir in Pamba sub-basin is Kakki and release from this

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reservoir was 488 cumec (15th of August), 899 cumec (16th of August), 443 cumec (17th of August), 356 cumec (18th of August), 309 cumec (19th of August) against the spillway capacity of 1788 cumec. The reservoir was at EL 980.91 m on 14 August 2018, against the FRL at EL 981.46 m. The maximum reservoir level attained on 19 August 2018 was 981.4 m. x. From the analysis it has been found that the dams in Kerala neither added to the flood nor helped in reduction of flood, as most of the dams were already at FRL or very close to FRL on 14 August 2018, due to more than normal rainfall in the months of June to July 2018. It may be noted that, had the reservoir been a few feet below FRL, the flooding conditions would have not changed much, as the severe storm continued for 3 days and even for 4 days at majority of the places, and in any case it would have been necessary to release from the reservoirs after 1st day of the extreme rainfall. xi. Nevertheless, it is essential to review the rule curves of all the reservoirs in Kerala. The rule curves need to be meticulously drawn particularly for the reservoirs having the live storage capacity, of more than 200 MCM in order to create some dynamic flood cushion for moderating the floods of lower return periods particularly in the early period of monsoon. xii. The runoff generated from Pamba, Manimala Achenkovil and Meenachil rivers during 15-17, August 2018 rainfall was about 1.63 BCM against the 0.6 BCM carrying capacity of Vembanad lake. Further, the discharging capacity of 630 cumec of Thottappally spillway was the other major constraint for the disposal of runoff. Considering the lake carrying capacity of about 600 MCM and discharging capacity of 630 cumec of Thottappally spillway and about 1706 cumec present discharging capacity of Thaneermukkom barrage, it can be concluded that out of 1.63 BCM the runoff generated during the 15-17, August 2018 rainfall, only about 0.605 BCM runoff was possible to drain out of the Vembanad lake. The remaining runoff volume of about 1 BCM created the rise of the water level in the lake and nearby areas. This continuous rising of lake water may be one of the reason of overall change in the river hydrodynamics of Pamba, Manimala, Meenachil and Achenkovil river systems resulting higher water level for a particular discharge in these rivers. Considering the high rainfall during 15-17, August 2018, the absence of appreciable storage reservoirs in the upstream in the above rivers along with the shrinkage of carrying capacity of Vembanad Lake and reduction of the capacity of Thottappally spillway worsened the flooding in the Kuttanad region and the backwaters flows to the low lying areas in the upper reaches of the lake. xiii. The worst affected districts noticed were Wayanad (Kabini sub-basin), Idukki (Periyar sub-basin), Ernakulam (Periyar and Chalakudi) sub-basins, Alleppey and Pathanamthitta (both in Pamba sub-basin). xiv. In a nutshell, it can be concluded that August 2018 flood in Kerala was due to severe storm occurrences during 8-9, August 2018 and 15-17, August 2018. The storm of 15- 17, August 2018 resulted in heavy flooding in Periyar, Pamba, Chalakudi and Bharatpuzha sub-basins of Kerala. The rainfall during 15-17, August 2018 was almost comparable to the historical 16-18, July 1924 rainfall of Kerala, particularly in Periyar, Pamba, Chalakudi and Bharatpuzha sub-basins. xv. The release from reservoirs had only minor role in flood augmentation as released volume from the reservoirs were almost similar to inflow volumes. In fact Idukki reservoir absorbed a flood volume of about 60 MCM during 15-17, August 2018. Even, with the 75 percent-filled reservoir conditions, the current flood could have not been mitigated as 1-day rainfall in majority of the area was more than 200 mm and severe rainfall continued for 3 to 4 days.

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