

# **Kerala's Worst Deluge in a Century : Displacement of People and Magnitude of Loss**

**B.A.Prakash**

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The catastrophic flood experienced in Kerala is considered as the worst flood in the history of a century. This is the worst deluge witnessed in Kerala since 1924. The deluge has created unprecedented damage to eight districts in Kerala and resulted in the loss of 488 human lives. The magnitude of damage to houses was too large forcing 14.51 lakh people from 3.91 lakh families to move away from their houses to relief camps provided by the state government. Thousands of houses, shops, commercial buildings, public buildings were either completely destroyed or partially destroyed due to the devastating flood. The Cochin International Airport, one of the major airports in the country, which was constructed in low lying paddy land, was completely flooded and forced to close down the entire operations for 14 days between August 15<sup>th</sup> and 29<sup>th</sup>, 2018. We do not have detailed data on the magnitude of the loss of the deluge as enumeration of loss has not been completed. Based on the scanty information, an attempt is made in the article to examine the nature and causes of flood, displacement of people and magnitude of loss.

## **Nature and Causes of Deluge**

The Central government has treated the flood situation as a disaster of serious nature and categorised it as L3-level disaster, under national disaster management guidelines. According to it, the disaster corresponds to a nearly catastrophic situation or a very large-scale disaster that overwhelms the state and district authorities. The Disaster Management Department in Kerala notified that all the villages of seven districts are severely affected with excessive rainfall, flooding, landslides and consequent disaster which cost damage to property and disruption to normal life. They are Alappuzha, Kottayam, Pathanamthitta, Ernakulam, Thrissur, Wayanad and Idukki (Table 1).

**Table 1**  
**Number of Villages notified as flood/landslides affected till August 29, 2018**

Sl. No.	Number of Districts	Number of Taluks Affected	Number of villages Affected	Total Number of Villages	Percentage of Villages Affected
1	Alappuzha	6	93	93	100.00
2	Kottayam	5	100	100	100.00
3	Pathanamthitta	6	70	70	100.00
4	Ernakulam	7	127	127	100.00
5	Thrissur	7	255	255	100.00
6	Wayanad	3	49	49	100.00
7	Idukki	4	67	67	100.00
8	Kollam	6	37	105	35.24
9	Malappuram	8	53	138	38.41
10	Palakkad	6	86	157	54.78
11	Kannur	4	24	132	18.18
12	Kozhikode	1	20	118	16.95
<b>Total</b>		<b>63</b>	<b>981</b>	<b>1411</b>	<b>69.53</b>

*Source:* Government of Kerala (2018), Kerala Gazette dt August 29, 2018

Besides the above, majority of the villages in Palakkad district is also declared as flood affected areas in the notification of the department issued on 29 August, 2018 (Kerala Gazette notification, August 30, 2018). A notable aspect is that severe flood damage occurred in districts having hilly regions and forest areas due to heavy rains and landslides such as Idukki, Pathanamthitta, Wayanad and Palakkad.

Though a number of factors can be attributed to deluge, the most important factors are incessant rain received during the period of south-west monsoon, unscientific and poor management of dams and unsustainable development approach perused. Large excess rain (60% or more from normal), excess rain (20% to 59% more from normal) received during the first 12 weeks (between 1 June to 23 August, 2018) of south west monsoon is the most important cause of the deluge. The rainfall data of India Meteorological Department (IMD), Kerala indicate that large excess rains from the normal received in four districts namely

Idukki, Malappuram, Palakkad and Wayanad during the second and third week of June, 2018. The other districts which received excessive rainfall are Ernakulam and Kottayam.

A major cause for the deluge is the unscientific and poor management of the dams during the period of heavy rain. According to ENVIS (Environment Information System) Kerala has 53 major reservoirs. The dams are managed by Kerala State Electricity Board (KSEB) and Irrigation Department. Of the dams, 14 are located in Idukki, 9 are in Palakkad, 8 are in Thrissur, 4 are in Pathanamthitta and 2 are in Wayanad district. Due to heavy rain, water level of most of the dams reached near the maximum storage level by the end of July 2018. Due to this, shutters of 18 dams located in different districts of Kerala were opened on 31<sup>st</sup> July 2018. Subsequently all the major dams were opened at the peak of the flood on 9<sup>th</sup> and 10<sup>th</sup> August 2018. All the five shutters of the Idukki reservoir, Asia's highest arch dam (Cheruthoni dam) was opened on 10<sup>th</sup> August 2018, resulting in an unprecedented overflow of Periyar, the longest river in Kerala having a length of 244 km, flowing through Idukki and Ernakulam districts and flooded almost all places in two sides of the river and its distributaries. Similarly the opening of all shutters of the two dams of Sabarigiri hydro-electric project in Pampa river located in Ranni taluk of Pathanamthitta district has practically flooded major parts of two districts viz. Pathanamthitta and Alappuzha. The overflow of Pampa river, having a distance of 176 km has created unprecedented flood damage to vast areas in regions such as Ranni, Kozhencheri, Aranmula, Chengannur and Kuttanad, belonging to two districts.

Another major cause of the deluge is unsustainable development approach perused in Kerala during the last six decades. Those are construction of a large number of dams for generation of hydro-electric power and irrigation, destroying river ecology due to dams, constructing houses, roads and other structures in the banks of the rivers and its branches, wide spread conversion of low lying paddy land for construction, encroachment on forest land for farming and construction, ecological destruction due to undesirable construction in hilly terrains, conversion of wet lands, paddy lands, ponds, streams for construction in urban areas, opening up of a large number of stone quarries without considering ecological consequences, widespread sand mining from rivers, streams, lakes etc. All the political parties in Kerala opposed the recommendations of Gadgil Committee and Kasturirangan Committee for ecological protection of Western Ghats. All these factors have contributed to the devastating flood. The development slogan has been 'destroy ecology, environment and

natural resources for rapid development'. The lesson learned from the catastrophic flood is that Kerala cannot survive unless the state give up the unsustainable development approach.

### **Displacement of People**

Army, navy and national disaster response force (NDRF) started evacuation of families from water surged houses and houses destroyed due to landslides. The number of people in the 513 relief camps comprising persons who are forced to shift to the camps and rescued was 60,622 in August 11, 2018. The flood situation became grave and within 24 hours the number of relief camps increased to 1026 and people in the camps rose to more than one lakh.

The Pathanamthitta district administration appeared to have failed to gauge the gravity of the situation on 15<sup>th</sup> August 2018. The rise in water level was so swift that many found themselves without any option but to wait for rescuers in roof tops and first floor of the houses. The rescuers could not reach many of the stranded owing to shortage of dinghies and boats. The stranded people were rescued after two to three days, when the fishermen were brought to the places with their big size traditional fishing boats used in sea. Similar is the situation that prevailed in Chengannur Municipality and low lying upper Kuttanad in Alappuzha district. Army, navy and coast guard teams were pressed into rescue operations as families clambered on roofs to escaping rising Pampa river. Ranni, Kozhencheri, Aranmula and Thiruvalla in Pathanamthitta district were isolated, as its river breached its banks. The navy airlifted stranded citizens in Aluva, Perumbavoor, Thrissur and Pathanamthitta after the social media was flooded with distressed messages. Many of the marooned families including senior citizens and infants have been forced to live without food and water for two to four days in roof tops. It is reported that of the total population of two lakhs in Kuttanad region, 90 percent of were forced to abandon their houses and move to relief camps and houses of their relatives and friends. It is estimated that the number of people moved to relief camps was 1.2 lakh in Kuttanad.

The devastating landslides and flooding caused by the rain in various places in Kozhikode district forced about 20,000 persons to abandoned their houses and move to relief camps. As all the rivers breaching the banks following the incessant rain, Kottayam district also faced a grim flood situation and more than 17,000 persons are displaced and relocated in relief camps. The Malappuram district also experienced severe flooding due to the overflow of the rivers and thousands of people were evacuated from river side to safe places in 79

relief camps. According to the state government, the different agencies engaged in rescue operations have rescued more than 82,000 citizens from flooded locations in 4 districts on 17<sup>th</sup> August 2018. According to the press release of the State government, the total number of persons in the 3930 relief camps was 10.58 lakhs on August 19, 2018 (Table 2).

**Table 2**  
**Number of Persons in Flood Relief Camps on August 19, 2018**

<b>Sl. No</b>	<b>District</b>	<b>Number of camps</b>	<b>Number of Persons in camps</b>	<b>Percent</b>
<b>1</b>	Alappuzha	601	2,77,706	<b>26.23</b>
<b>2</b>	Ernakulam	733	2,61,634	<b>24.71</b>
<b>3</b>	Thrissur	721	2,04,181	<b>19.29</b>
<b>4</b>	Kottayam	411	98,175	<b>9.27</b>
<b>5</b>	Pathanamthitta	528	69,505	<b>6.57</b>
<b>6</b>	Idukki	211	33,636	<b>3.18</b>
<b>7</b>	Malappuram	155	32,743	<b>3.09</b>
<b>8</b>	Wayanad	202	28,861	<b>2.73</b>
<b>9</b>	Kozhikode	150	23,060	<b>2.18</b>
<b>10</b>	Kollam	89	16,811	<b>1.59</b>
<b>11</b>	Other four districts	129	12,328	<b>1.16</b>
	<b>Total</b>	<b>3930</b>	<b>10,58,640</b>	<b>100</b>

Source : Malayala Manorama daily, dated August 20, 2018

### **Magnitude of Loss**

The deluge has created unprecedented damage to property and destroyed the livelihood of lakhs of people engaged in primary, secondary and tertiary activities in eight districts of

Kerala. The damage and destruction may be classified in to two categories namely public and private. Damage to public property consists of damage to roads, bridges, irrigation canals, dams, water supply network, electricity network, Cochin International Airport, public buildings, schools, hospitals, offices, banks and other buildings and assets of local governments (LGs). In hilly areas large portion of roads were completely destroyed, due to the landslides and mud slides in a large number of places in Idukki, Pathanamthitta, Wayanad and Malappuram districts.

The local self-government department (LSGD) in Kerala has collected some data about the flood damage in rural areas which comes under the Grama Panchayats (GPs) in six districts namely, Pathanamthitta, Alappuzha, Kottayam, Thrissur, Ernakulam and Wayanad. The flood damage reported is given in table 3.

**Table 3**  
**Details of flood Damage of Rural Areas in Six Districts \***  
**(as on August 26, 2018)**

<b>Sl.No</b>	<b>Item</b>	<b>Total Six Districts</b>
1	Total Number of Grama Panchayaths (GPs)	<b>387</b>
2	Number of Flood Affected GPs	<b>344</b>
3	No of Flood Affected Houses	<b>3,44,047</b>
4	No of Flood Affected Public Buildings	<b>5,263</b>
5	No of Flood Affected Wells	<b>1,43,303</b>
6	No. of Schools Affected	<b>285</b>
7	No. of Carcass buried (Large Animals)	<b>2,242</b>
8	No. of Carcass buried (Small Animals)	<b>2,150</b>
9	No. of Carcass buried (Birds)	<b>2,99,859</b>

\*Pathanamthitta, Alappuzha, Kottayam, Thrissur, Ernakulam, Wayanad

Source: Local Self Government Department, Government of Kerala.

Of the total 387 GPs covered in the six districts, 89 percent GPs are affected by the flood. The number of houses affected by the flood is estimated as 3.44 lakh. Nearly 5263 public buildings and 285 schools as reported as damaged. About 1.43 lakhs wells, the main source of drinking water in the above districts are badly affected due to filling of mud, contamination of water and damage to wells. It is also reported that large number of livestock and poultry are dead due to the flood.

### **Loss Estimate of Post Disaster Needs Assessment (PDNA)**

The PDNA was initiated on September 18, 2018 for a period of three weeks with the engagement of over 100 people from government, international agencies and civil society. It made an analysis of the damage, loss, impact and recovery needs. It has covered the 11 thematic areas such as housing, land and settlement; health and nutrition; education; cultural heritage; agriculture, fisheries and livestock; water, sanitation and hygiene; disaster risk reduction; environment and climate change; employment and livelihoods; gender and social inclusion; and governance. Damages are defined as the partial or total destruction of physical infrastructure, assets, stocks, and capital, built or natural and measured in physical terms (units, meters or km, tons, hectares, etc). These assets may be public, private or community assets and can be further distinguished by the characteristics of ownership. Losses are defined as the alteration of economic flows and speak to the gap between the pre-event performance and the post-event conditions. Losses are expressed in monetary terms for production, income, expenditure etc.

The post disaster needs assessment estimated the total damage and loss as around ₹ 26,996 crore. It comprises of damage of ₹ 10,842 crore and loss of ₹ 16,154 crore (Table 4). The PDNA estimated the total recovery needs as ₹ 26,985 crore. In case of the possibility of extension of working days under MGNREGA, the recovery needs for employment and livelihoods would amount to ₹ 22,214 crore. If we add this amount the total recovery needs would be ₹ 45,027 crore.

**Table 4**  
**Estimate on total damage; loss and recovery cost (₹ in crore)**

SI No	Sector	Damage	Loss	Total Damage & Loss	Recovery Cost			Total
					Short-term	Medium-term	Long-term	
1	Housing, Land & Settlements	5,296.30	1,383.29	6,679.59	NA	NA	NA	5,390.54
2	Health & Nutrition	498.80	27.80	526.60	NA	NA	NA	566.76
3	Education	179.22	0.00	179.22	186.07	25.27	2.19	213.53
4	Cultural Heritage	52.55	18.80	71.34	47.55	18.84	6.80	73.19
5	Water, Sanitation & Hygiene	889.95	471.41	1,361.36	NA	NA	NA	1,331.15
6	Agriculture, Fisheries & Livestock	2,975.40	4,179.19	7,154.59	NA	NA	NA	4,498.60
7	Environment and Climate Change	26.00	0.04	26.04	111.19	36.16	0.50	147.85
8	Disaster Risk Reduction	16.50	584.16	600.66	33.81	43.66	32.24	109.71
9	Local Governance	28.00	0.00	28.00	0.00	0.00	0.00	32.20
10	Gender and Social Inclusion	0.90	0.00	0.90	0.00	0.00	0.00	35.03
11	Employment and livelihoods including tourism	878.42	9,489.37	10,367.79	1141.06	2362.34	400.00	3903.40
12	Integrated Water Resource Management	0.00	0.00	0.00	0.00	0.00	0.00	23.66
<b>Grand Total</b>		<b>10,842.04</b>	<b>16,154.06</b>	<b>26,996.09</b>				<b>16,325.62</b>
13	Transportation							8,554.00
14	Power							353.00
15	Irrigation							1,484.00
<b>Grand Total (With WB Data)</b>								<b>26,716.62</b>



## **The Way Forward**

A few suggestions are proposed to address the flood disaster. (1) Kerala will have to redefine development strategy and policies in all fronts based on the lessons from the deluge. (2) The state should adopt a sustainable development approach and strict measures are to be taken to preserve ecology, environment and natural resources. (3) Instead of crude bureaucratic approach, the disaster prediction, management and relief should be done based on scientific and modern disaster management principles. Scientific principles should be used to assess climate change, forecasting rain, flood induced by dams, drought, earthquake, etc and prompt action to face it. (4) Introduce scientific management of dams and appropriate steps to decommission, structurally weak and old dams. (5) State government cannot address the rehabilitation and reconstruction unless it takes steps to improve state finances by cutting non-plan revenue expenditure, especially salary and pension. For this, government may implement pay and pension revision once in ten years instead of once in five years. Dearness Allowance increase may also be deferred for one or two years. (6) By following the present bureaucratic practices and rules used for implementing major development projects, it is not possible to implement flood related projects efficiently and quickly. Framing new rules or relaxation of existing rules are required. (7) The state government should approach all sections of people in Kerala, non-residents Keralites, social and religious organisations to donate cash, land, gold and other items in kind for rehabilitation and reconstruction. (8) In rehabilitation top priority should be given for those flood victims, whose houses were fully destroyed, partially destroyed, lost entire household items, livelihood assets, livestock and poultry, stock in shops, small scale industrial units etc. (9) For reconstruction of infrastructure top priority should be given to roads and other modes of transport, electricity, water supply, communications, damaged public offices, hospitals, educational institutions, banks etc. (10) There is considerable scope to use central and state government agencies, centrally sponsored schemes for rehabilitation and reconstruction activities. (11) The policy of pumping more credit through banks and other financial institutions to the flood victims to recover their loss of property and livelihood may also be resorted.