പതിനാലാം കേരള നിയമസഭ

പതിനാറാം സമ്മേളനം

നക്ഷത്രചിഹ്നമിടാത്ത ചോദ്യം നമ്പർ .4932 — 14-11-2019 -ൽ മറുപടിക്ക്

പ്രളയത്തിൽ തകർന്ന റോഡുകളുടെ നവീകരണം

	ചോദ്യം		മറുപടി
	ശ്രീ.പുരുഷൻ കടലുണ്ടി		**ഇ.ചന്ദ്രശേഖരൻ (റവന്യൂവും ഭവന നിർമ്മാണവും വകുപ്പ് മന്ത്രി)**
എ)	കാലവർഷക്കെടുതിയിൽ തകർന്ന റോഡുകൾ നവീകരിക്കുന്നതിനുള്ള എന്തെല്ലാം നിബന്ധനകളാണ് നിലവിലുള്ളതെന്ന് അറിയിക്കുമോ; പ്രസ്തുത ഉത്തരവിന്റെ കോപ്പി ലഭ്യമാക്കാമോ;	എ)	കേന്ദ്ര ദുരന്ത പ്രതികരണ നിധിയുടെ മാനദണ്ഡപ്രകാരം അംഗീകൃത പ്രകൃതി ദുരന്തങ്ങളിൽ നാശം സംഭവിക്കുന്ന റോഡുകളുടെ പുനരുദ്ധാരണത്തിൽ ഗ്രാമീണ റോഡുകളുടെ അടിയന്തിര റിപ്പയറിനായി കിലോ മീറ്ററിന് 60,000/- രൂപയും മേജർ റോഡുകൾക്ക് കിലോ മീറ്ററിന് 1.00 ലക്ഷം രൂപയും (ഒരു ലക്ഷം രൂപാ) മാത്രമാണ് അനുവദനീയമായിട്ടുള്ളത്. എന്നിരുന്നാലും 10.10.2012-ലെ സ.ഉ(കൈ)നം.384/2012/ഡി.എം.ഡി ഉത്തരവ് പ്രകാരം 10 ലക്ഷം രൂപ വരെ റോഡുകളുടെ പുനരുദ്ധാരണത്തിനായി അനുവദിച്ചു വരുന്നു. പ്രസ്തുത ഉത്തരവിന്റെ പകർപ്പ് അനുബന്ധം I ആയി ചേർക്കുന്നു.
ബി)	പല ഗ്രാമീണ റോഡുകളും തകർന്നത് പുനർനിർമ്മിക്കുമ്പോൾ ആധുനിക രീതിയിൽ നിർമ്മാണം നടത്തുന്നതിന് ഈ ഉത്തരവ് തടസ്സമാണെന്നത് സർക്കാരിന്റെ ശ്രദ്ധയിൽപ്പെട്ടിട്ടുണ്ടോ;	ബി)	സംസ്ഥാന ദുരന്ത പ്രതികരണ നിധി വിനിയോഗിച്ചുകൊണ്ട് പുതിയ രീതിയിലുള്ള നിർമ്മാണ പ്രവൃത്തികൾ നടത്തുന്നതിന് അനുമതി നൽകാനാകില്ല. ഗതാഗതം പുന:സ്ഥാപിക്കുന്നതിനായി അടിയന്തിര സ്വഭാവത്തിലുള്ള റിപ്പയർ പ്രവൃത്തികൾ (immediate restoration) മാത്രമാണ് ദുരന്ത പ്രതികരണ നിധി മാനദണ്ഡപ്രകാരം അനുവദനീയമായിട്ടുള്ളത്.
സി)	കാലവർഷത്തിൽ തകർന്ന റോഡുകൾക്ക് ഡ്രയിനേജ് നിർമ്മിക്കുന്നതിനും മഴവെള്ളത്തിൽ നിന്ന് സംരക്ഷണത്തിനായി ഫില്ലിംഗ് നടത്തുന്നതിനും പുതിയ റോഡുകൾ കോൺക്രീറ്റ് ചെയ്യുന്നതിനുമായി കേന്ദ്ര സർക്കാരിൽ സമ്മർദം ചെലുത്താമോ;	സി) & ഡി)	ആധുനിക രീതിയിൽ റോഡുകൾ പുനരുദ്ധരിക്കുന്നതിന് കേന്ദ്ര മാനദണ്ഡപ്രകാരമുള്ള തുക മതിയാകില്ലെന്നും ആയതിനാൽ കൂടുതൽ തുക വിനിയോഗിക്കുന്നതിന് അനുവദിക്കണമെന്നും ആവശ്യപ്പെട്ടുകൊണ്ട് റവന്യൂ വകുപ്പുമന്ത്രി, കേന്ദ്ര ആഭ്യന്തര മന്ത്രാലയത്തിൽ നേരിട്ട് മെമ്മോറാണ്ടം നൽകിയിട്ടുണ്ട്. ആയതിന്റെ പകർപ്പ് അനുബന്ധം -II ആയി ചേർക്കുന്നു.
ഡി)	ആയത് സംബന്ധിച്ച് കേന്ദ്ര സർക്കാരിൽ സമർപ്പിച്ച അപേക്ഷയുടെ കോപ്പി ലഭ്യമാക്കുമോ?		

സെക്ഷൻ ഓഫീസർ

415
25/1/2013

GOVERNMENT OF KERALA

Abstract

Natural Calamity - Norms of relief assistance - Revised guidelines for issue of administrative/technical sanction and execution of works relating to repair/restoration of damaged roads caused due to natural calamities - Revised - orders issued.

DISASTER MANAGEMENT(REVENUE - K) DEPARTMENT

G.O.(MS) No.**384/2012 /DMD** Dated,Thiruvananthapuram, **10/10/2012**

Read: 1. G.O (MS) 272/2004/RD dated 1/09/04.
2. G.O(MS) 3483/2004/RD dated 16/09/04.
3. G.O (MS) 6466/2005/RD dated 13/12/05.
4 G.O(MS) 396/2009/DMD dated 08/10/2009.
5 G.O(MS) No.55/2010/DMD, dated 06/02/2010.
6 G.O(MS)No.251/2012/DMD, dated 22/06/2012

ORDER

Government are pleased to issue the following revised guidelines in the matter of issuing Administrative Sanctions and execution of works relating to repairs/restoration of damaged roads due to natural calamities by utilising funds from State Disaster Relief Fund. (formerly CRF)

1. Applications for sanction and execution of works relating to repairs and restoration of damaged roads to be considered by Government should be exclusively those which are recommended by, Members of Lok Sabha, Rajya Sabha, MLAs of the locality, Local Self Government Institutions, Voluntary Organizations, Residence Associations, Taluk Department Committees and Gramasabha

2. The road should be in Municipal or Panchayat area

3. It should not be a State road under Public Works Department except in very special cases.

4. Roads leading to S.T.Colonies/habitations are to be given priority.

5 After having issued Administrative Sanction, the list of such works will be forwarded to District Collectors immediately. The District Collectors concerned must cross-check the said Government Order with the Government Order already entered in the Kbase database for final verification www(210.212.239.21/search) and immediately forward it to Corporation/Municipality/Gramapanchayath concerned within two weeks from, the date of receipt of the Government Order. The Corporation/Muncipality/ Gramapanchayath will complete all formalities and forward the same to Disrict Collectors for Technical Sanction within two months on receipt of Government Order in their office. Administrative Sanction/Technical Sanction should not be issued from Collectorate for those Government Orders not entered in Kbase register.

The District Collectors will thereafter issue Execution Sanction for all such works which satisfy the above conditions within a maximum period of 2 months. All these items of work have to be completed and the final bill entered in the seniority register within a maximum period of 9 months. The District Collectors should ensure the same. If the work is not executed within two years from the date of issue of the Government Order, it will be deemed to be cancelled forthwith. District Collectors concerned need not report such cases, if any, to Government for immediate cancellation/modification. The District Collector concerned may report such cases to Government to consider it as fresh proposal with suitable explanation as to why the sanction lapsed in the past.

6. Maximum amount that can be sanctioned for a single work should not exceed ₹.10 Lakhs.

7. District Collectors concerned must also strictly ensure that amount utilised from SDRF should be utilized for the repair/ restoration of the damaged roads and not for the construction of new roads (original in nature).The District Collector should certify that the road was damaged due to floods,landslide or any other calamity. District Collectors will ensure that no violation of the said guidelines has occurred at any level which will be viewed seriously by Government.

8. No fund will be sanctioned for works for which financial assistance had already been sanctioned in the last 3 years.

9.In case where the road is divided into more than one reach, only the road work relating to one reach of the road will be sanctioned and executed in a year.

10. Repair/restoration of roads with a minimum width of 2 meters will alone be taken up. This will be applicable to pending works which have already been given administrative sanction.

11. The works upto and including 10 lakhs (Ten lakhs only) executed by the beneficiary agencies / committees will be exempted from tender system subject to the condition that eligible profit allotted to beneficiary committee convener in such works should be included in the total estimate of the work.

12. MLAs/MPs/DCs may encourage free labour contribution by beneficiaries through voluntary labour (Shramadanam)which will not be counted within₹.10 lakhs.

13. Payment of works which doesn't satisfy the above said conditions and time limit shall not be effected at any cost.

14. No payment shall be effected for any incomplete work.

15. The works will be executed by Local Bodies viz, Gramapanchayath, Muncipality, Zila Panchayath and Corporation with the help of their Engineers. The Local bodies shall entrust the work to the Assistant Executive Engineer, PWD (Spl. Buildgs) Division within the locality, in the absence of their own Engineers or Engineers deployed in such local bodies. For the purpose of execution of work Local bodies may entrust the work to PWD (Roads & Bridges) Division also, in the absence of their own Engineers and PWD (Spl.Building) Division Engineers. In case where the road is passing through more than one Grama Panchayat, the work will be undertaken by concerned Block Panchayath and Technical Sanction shall be issued by the District Collector on the basis of verification of estimates by the Assistant Executive Engineer concerned , PWD (Spl Bldgs) Division. Besides, the work shall also be entrusted to PWD (Spl. Blds/Roads & Bridges) Division.

16. Government had instructed the District Collectors that the payment should be made based on a seniority list prepared for the purpose, in the order of furnishing final bills, in the collectorate after completion of the work. It is

reiterated that the priority order should strictly be abided by all concerned while making payments.

17. The details of all works done with SDRF Assistance shall be maintained electronically in each District and Taluk.

18. Utilization Certificate shall be submitted by the District Collector to Government within two months of completion of works. In cases, where utilization certificate is not received in time, sanction for the work will stand withdrawn and responsibility will be fixed by District Collector for the delay.

19. The Disaster Management (Revenue-K)Department will maintain a database of all works for which Administrative Sanction have been issued and moniter the progress of work through the District Collectors concerned. The above guidelines should be complied with in letter and spirit while sanctioning and executing works relating to Calamity Relief. District Collectors will ensure that no violation of guidelines occurr at any level. As SDRF is meant for immediate and timely relief for the affected, completion of work on schedule is of paramount importance.

Any violation of the above guidelines will be viewed seriously.

These guidelines will take effect from the date of order.

(BY ORDER OF THE GOVERNOR)
Dr. K.B.Valsalakumari
Principal Secretary to Govt.

To

All District Collectors,
The Commissioner of Land Revenue, Thiruvananthapuram
The Principal Accountant General (Audit) , Kerala, Thiruvananthapuram
The Accountant General (A&E),Kerala, Thiruvananthapuram.
The Accountant General , Branch office,
Kottayam/Thrissur/Ernakulam/Kozhikode
Stock file / Office Copy

Copy to:-

Finance Department
Special Secretary to Hon'ble Chief Minister
PS to Minister (Revenue)
PA to Principal Secretary (Revenue)
Revenue (K2, K3 & K4) Seats

Forwarded/By Order

Section Officer

S.O.

അനുബന്ധം-II

MEMORANDUM

Kerala Floods – 2018

1st August to 30th August 2018

EXEMPTION FROM THE NORMS OF ASSISTANCE FROM NATIONAL DISASTER RESPONSE FUND FOR RURAL ROAD REPAIR, AS A SPECIAL CASE

Submitted by
Government of Kerala

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1. Introduction

Kerala is a land of rains and rivers. The State has mainly two rainy seasons viz. the Southwest monsoon that arrives towards the end of May or early June, which is known as *edavapathi* and Northeast season which hits the State during mid-October which is known as *thulam*. The swirling, jostling, billowing monsoon rains was a part of the State every year, however, the Southwest season of 2018 had a different impact as the monsoon resulted in a disastrous flood.

In a span of 30 days, 339 human lives were lost, thousands of houses damaged, over a million and half people were moved to relief camps, large stretches of major roads got washed away and many bridges got damaged. Cochin International Airport which is one of the busiest International airports of the country got flooded and suspended its operations from 15th to 29th of August 2018. Uninterrupted rains lashed most areas of the State from 8th to 18th of August 2018 which resulted in wide spread destruction in all the major sectors of the state.

The floods of Southwest season can be comprehended as an evident example of global climate change impact with very heavy rainfall in a short span of time as indicated and predicted by the Fifth Assessment Report published by the Intergovernmental Panel for Climate Change (IPCC) in 2014.

1.1. Forecast and preparations

The 1st long range forecast (LRF) by India Meteorological Department (IMD) issued on 16th April 2018 predicted that the monsoon seasonal rainfall will be 97% of the Long Period Average (LPA) with a model error of ± 5%. Forecast also suggests maximum probability for normal monsoon rainfall (96-104% of LPA) and low probability for deficient rainfall during the season. Based on this forecast, the State Relief Commissioner convened a meeting of all the departmental heads, district collectors, scientific organizations, IMD, Geological Survey of India, National Centre for Earth Science Studies and representatives of defence forces on 16th May 2018[1] in which all the stakeholders were assigned specific tasks for better preparedness during the monsoon season. Preparedness at the district level was reviewed by Chief Minister and Minister for Revenue and Disaster Management via video conference on regular intervals and specific instructions were issued regarding the implementation of the decisions of the monsoon preparedness meeting. All districts conducted District Disaster Management Authority meetings to ensure that the decisions of the monsoon preparedness meeting were taken forward for implementation by the respective departments.

[1] Minutes and circular issued vide Government Letter DM1/217/2018/DMD; dated 28th May 2018

Subsequently, IMD issued the 2nd stage LRF for the southwest monsoon season on 30th May 2018 in which they predicted that the monsoon rainfall will be 95% of LPA over South Peninsula with a model error of ±8%. It was also predicted that the monthly rainfall over the country as a whole is likely to be 94% of LPA during August both with a model error of ± 9%. It is also indicated in the 2nd stage LRF that the forecast probability for 'above normal' rainfall was 13% and 'excess' was only 3%.

It may be noted that in the second stage LRF, predicted value of the total rainfall for the southwest monsoon season was only 95% as against the 97% predicted value in the first stage forecast. So also, the prediction uncertainty band increased from 5% in the first stage to 8% in the second stage. Probability of excess rainfall and above normal rainfall was also predicted to be as low as 3% and 13% respectively. Hence, given the large uncertainty in predictions, the thumb rule to practice is to **'conserve water'**.

1.2. Monsoon rainfall assessment – 1st to 30th August 2018

The State received an excess of 96% during the period from 1st to 30th August 2018, and 33% during the entire monsoon period till the end of August. Table 1 below shows the rainfall excess that the state has received during this period. Note that in the 2nd stage forecast issued on 30th May 2018, the prediction was only of 95% of LPA (5% less than long period average) during the month of August, while the state received 96% excess rainfall. This unpredicted excess intense rainfall spell have caused significant damage to life and property, the details of which is given in the subsequent chapters.

Table 1: Monsoon Rainfall Assessment from 1st to 30th August 2018 (Source: IMD)

District	Actual Rainfall (mm)	Normal Rainfall (mm)	Percentage Departure (%)	
Thiruvananthapuram	373.8	142	163	Large Excess
Kollam	644.1	258.7	149	Large Excess
Pathanamthitta	764.9	352.7	117	Large Excess
Alappuzha	608.2	343.1	77	Large Excess
Kottayam	619.2	386	60	Large Excess
Idukki	1478.9	527.3	180	Large Excess
Ernakulam	648.3	401.3	62	Large Excess
Thrissur	734.7	440.1	67	Large Excess
Palakkad	848.8	333.8	154	Large Excess
Malappuram	913.7	395.3	131	Large Excess
Kozhikode	836	500.9	67	Large Excess
Wayanad	1053.5	592.9	78	Large Excess
Kannur	665.3	540.9	23	Excess
Kasaragode	636.9	636.3	0	Normal
TOTAL	821	419.3	96	Large Excess

Bureau of Indian Standards IS 4987:1994 prescribes the requirement of 256 rain gauges in the state to be deployed by the nodal agency recognised for the purpose in the country. The State is in receipt of daily rainfall data from 68 rain gauges every 24 hours, which impede the ability of the State to concurrently monitor the spatial distribution and

intensity of rainfall. The station wise monthly rainfall aggregates are given in Table 2. Figure 1, Figure 2 and Figure 3 shows the departure of monthly rainfall in Kerala as compared to the long period average.

1.3. Monsoon rainfall assessment – 8th to 17th August 2018

The peak spell of rains that created the extreme floods in Kerala occurred between 8th to 17th of August 2018. The comparison of rainfall prediction and qualitative alerts from IMD as against the realised actual rainfall is given in Table 3. The table clearly indicates that Kerala received rainfall which was completely unprecedented. It may be seen that, while on 8th August, the expectation was to receive heavy to very heavy rainfall in most districts of the state, but it exceeded and the state received extremely heavy rainfall in Idukki and Wayand.

On 09-08-18, while there was no significant alert requiring actions the actual daily rainfall received in the district was heavy to very heavy rainfall in 7 districts (Idukki, Wayanad, Kozhikkode, Malappuram, Palakkad, Kottayam and Pathanamthitta). Similarly on 10th, 11th and 12th of August, while red alert was issued for 5 to 8 districts, the actual rainfall there was only very light to light.

On the next more crucial day, August 15th, the prediction was mostly for yellow in the State with four districts to be receiving red and one receiving orange, the entire state received extremely heavy rainfall. On 16th August, 7 districts were predicted to be receiving orange and 7 to be receiving red, the actual rainfall received was yellow in three, one green, one orange and 9 red. Thus the actual rainfall received in the state exceeded predicted rainfall in most crucial days on which the state was flooded. Graphical representations and maps that indicate spatial comparison between predicted rainfall and actual rainfall can be found in the Annexures. While comparing the available district wise daily rainfall forecast with actual realised rainfall, it can be ascertained that there is a wide disparity between the predicted amount of rainfall and the actual received. Thus, it is evident that the actual rainfall received significantly exceeded the expectation. This unforeseen exceedance and high intensity of rainfall resulted in tremendous overland flow leading to complete saturation of top soil, caused deep seated landslides, debris flows and substantial sheet erosion resulting in the rivers exceeding the levee areas and causing destruction to life and property.

The Central Water Commission, in its report on Kerala Floods 2018 states that "it can be seen that the 2-day and 3-day rainfall depths of 15-17, August 2018 rainfall in Pamba, Periyar and Bharathapuzha sub-basins are most comparable to the Devikulam storm of 16-18, July 1924. For the entire Kerala the depth of rainfall realised during 15-17, August 2018 is 414 mm, while the same during 16-18, July 1924 was 443 mm".

Table 2: Station wise monthly rainfall for the months of June, July and August 2018 (Source: IMD)

Sl.No	District	Station Name	Jun-18				Jul-18				Aug-18			
			Actual Rainfall (mm)	Normal Rainfall (mm)	Departure (%)		Actual Rainfall (mm)	Normal Rainfall (mm)	Departure (%)		Actual Rainfall (mm)	Normal Rainfall (mm)	Departure (%)	
1	Thiruvananthapuram	Trv City	397.6	338.7	17.39	Normal	218.4	228.9	-4.59	Normal	322.8	142	127.3	Large Excess
2		Trv AP	420.5	338.7	24.15	Excess	234.21	228.9	2.32	Normal	255	142	79.58	Large Excess
3		Nedumangad	362	338.7	6.88	Normal	250.2	228.9	9.31	Normal	259.4	142	82.68	Large Excess
4		Neyyattinkara	280	338.7	-17.33	Normal	239.8	228.9	4.76	Normal	242	142	70.42	Large Excess
5		Varkala	308.8	338.7	-8.83	Normal	193.6	228.9	-15.42	Normal	266.1	142	87.39	Large Excess
6	Kollam	Kollam	277.6	457.7	-39.35	Deficient	372.8	398	-6.33	Normal	372	258.7	43.8	Excess
7		Aryankavu	404.2	457.7	-11.69	Normal	335	398	-15.83	Normal	509	258.7	96.75	Large Excess
8		Punalur	414.8	457.7	-9.37	Normal	511.5	398	28.52	Excess	526.4	258.7	103.5	Large Excess
9	Pathanamthitta	Konni	565.5	556.9	1.54	Normal	679.4	539.9	25.84	Excess	689	352.7	95.35	Large Excess
10		Kurudamannil	453.5	556.9	-18.57	Normal	490.2	539.9	-9.21	Normal	612.4	352.7	73.63	Large Excess
11	Alappuzha	Alappuzha	757.8	593	27.79	Excess	695.9	533	30.56	Excess	477.6	343.1	39.2	Excess
12		Kayamkulam	578.2	593	-2.5	Normal	542.4	533	1.76	Normal	346.2	343.1	0.9	Normal
13		Mavelikkara	511.7	593	-13.71	Normal	625.6	533	17.37	Normal	614	343.1	78.96	Large Excess
14		Cherthala	729.6	593	23.04	Excess	782.2	533	46.75	Excess	353.6	343.1	3.06	Normal
15		Mancompu	464.2	593	-21.72	Deficient	789.3	533	48.09	Excess	337.8	343.1	-1.54	Normal
16		Haripad	419.2	593	-29.31	Deficient	596.2	533	11.86	Normal	346.8	343.1	1.08	Normal
17		Chengannur	429.8	593	-27.52	Deficient	672	533	26.08	Excess	358	343.1	4.34	Normal
18		CPCRI Kayamkulam	378.8	593	-36.12	Deficient	325.1	533	-39.01	Deficient	211.3	343.1	-38.41	Deficient
19	Kottayam	Kottayam	656.3	649.1	1.11	Normal	803.2	591.4	35.81	Excess	504.4	386	30.67	Excess
20		Vaikom	1274.7	649.1	96.38	Large Excess	1017	591.4	71.96	Large Excess	484.3	386	25.47	Excess
21		Kumarakom	331.8	649.1	-48.88	Deficient	622.1	591.4	5.19	Normal	270.7	386	-29.87	Deficient
22		Kozha	368.9	649.1	-43.17	Deficient	499.6	591.4	-15.52	Normal	390.2	386	1.09	Normal
23	Idukki	Peermade	1207	651.6	85.24	Large Excess	1419.3	788.9	79.91	Large Excess	1522.7	527.3	188.8	Large Excess
24		Thodupuzha	760.8	651.6	16.76	Normal	1180.1	788.9	49.59	Excess	785.7	527.3	49	Excess
25		Munnar	700.3	651.6	7.47	Normal	1437.6	788.9	82.23	Large Excess	1489.7	527.3	182.5	Large Excess
26		Idukki	815.3	651.6	25.12	Excess	1460.2	788.9	85.09	Large Excess	1159.6	527.3	119.9	Large Excess
27		Myladumpara	504	651.6	-22.65	Deficient	775.6	788.9	-1.69	Normal	911.6	527.3	72.88	Large Excess
28	Ernakulam	Kochi AP	727.6	696.4	4.48	Normal	956.51	670.2	42.72	Excess	410.8	401.3	2.37	Normal
29		Aluva	680.7	696.4	-2.25	Normal	803.4	670.2	19.87	Normal	374.4	401.3	-6.7	Normal
30		Piravom	1178.1	696.4	69.17	Large Excess	1601	670.2	138.88	Large Excess	720.2	401.3	79.47	Large Excess

31	Ernakulam	Perumbavur	831.2	696.4	19.36	Normal	968.7	670.2	44.54	Excess	664.4	401.3	65.56	Large Excess
32		CIAL Kochi	764	696.4	9.71	Normal	956.8	670.2	42.76	Excess	146.4	401.3	-63.52	Large Deficient
33		Ernakulam South	NA	696.4	NA	NA	44	670.2	-93.43	Large Deficient	377	401.3	-6.06	Normal
34	Thrissur	Kodungallur	636.1	707.4	-10.08	Normal	825.6	772.9	6.82	Normal	298.2	440.1	-32.24	Deficient
35		Irinjalakuda	619.1	707.4	-12.48	Normal	657.1	772.9	-14.98	Normal	552.6	440.1	25.56	Excess
36		Vadakkancherry	635.8	707.4	-10.12	Normal	677.2	772.9	-12.38	Normal	620.8	440.1	41.06	Excess
37		Kunnamkulam	370.4	707.4	-47.64	Deficient	389.4	772.9	-49.62	Deficient	549.6	440.1	24.88	Excess
38		Chalakudy	591	707.4	-16.45	Normal	716.6	772.9	-7.28	Normal	492.6	440.1	11.93	Normal
39		Enamackel	351.6	707.4	-50.3	Deficient	584	772.9	-24.44	Deficient	324.2	440.1	-26.33	Deficient
40		Vellanikkara	729.8	707.4	3.17	Normal	829.21	772.9	7.29	Normal	773.3	440.1	75.71	Large Excess
41	Palakkad	Palakkad	620.8	464.3	33.71	Excess	926.9	595.4	55.68	Excess	949.32	333.8	184.4	Large Excess
42		Mannarkad	761.8	464.3	64.07	Large Excess	861.6	595.4	44.71	Excess	824.2	333.8	146.9	Large Excess
43		Ottappalam	999.8	464.3	115.33	Large Excess	1064	595.4	78.7	Large Excess	809.6	333.8	142.5	Large Excess
44		Alathur	558.4	464.3	20.27	Excess	638.3	595.4	7.21	Normal	814.4	333.8	144	Large Excess
45		Chittur	400.1	464.3	-13.83	Normal	844	595.4	41.75	Excess	571.5	333.8	71.21	Large Excess
46		Kollengode	443.6	464.3	-4.46	Normal	611.8	595.4	2.75	Normal	675.4	333.8	102.3	Large Excess
47		Pattambi	783.6	464.3	68.77	Large Excess	693.9	595.4	16.54	Normal	538.8	333.8	61.41	Large Excess
48		Thrithala	601.6	464.3	29.57	Excess	591.9	595.4	-0.59	Normal	499.6	333.8	49.67	Excess
49		Parambikulam	581	464.3	25.13	Excess	563	595.4	-5.44	Normal	484	333.8	45	Excess
50	Malappuram	Nilambur	757.6	660.9	14.63	Normal	900.8	792.9	13.61	Normal	1080	395.3	173.2	Large Excess
51		Manjeri	735.3	660.9	11.26	Normal	934.8	792.9	17.9	Normal	628.3	395.3	58.94	Excess
52		Perinthalmanna	849.8	660.9	28.58	Excess	947.9	792.9	19.55	Normal	674.4	395.3	70.6	Large Excess
53		Ponnani	824.9	660.9	24.81	Excess	608.8	792.9	-23.22	Deficient	593	395.3	50.01	Excess
54		Angadippuram	574.3	660.9	-13.1	Normal	775.6	792.9	-2.18	Normal	518.6	395.3	31.19	Excess
55		Karipur AP	872.51	660.9	32.02	Excess	855.01	792.9	7.83	Normal	552.5	395.3	39.77	Excess
56	Wayanad	Mananthavady	825.8	698.1	18.29	Normal	1113.5	1110.4	0.28	Normal	1194.6	592.9	101.5	Large Excess
57		Vythiri	1380.5	698.1	97.75	Large Excess	1377.7	1110.4	24.07	Excess	732.4	592.9	23.53	Excess
58		Ambalavayal	343.7	698.1	-50.77	Deficient	786	1110.4	-29.21	Deficient	624.6	592.9	5.35	Normal
59		Kuppady	441.6	698.1	-36.74	Deficient	694.8	1110.4	-37.43	Deficient	658.5	592.9	11.06	Normal
60	Kozhikode	Kozhikode	781.1	895.8	-12.8	Normal	806	955.2	-15.62	Normal	517.2	500.9	3.25	Normal
61		Vadakara	1514.1	895.8	69.02	Large Excess	1392.9	955.2	45.82	Excess	873.4	500.9	74.37	Large Excess
62		Quilandy	891	895.8	-0.54	Normal	494	955.2	-48.28	Deficient	552	500.9	10.2	Normal
63	Kannur	Kannur	878.8	852.4	3.1	Normal	816.1	1055	-22.64	Deficient	428.3	540.9	-20.82	Deficient
64		Taliparamba	857.7	852.4	0.62	Normal	897.4	1055	-14.94	Normal	542	540.9	0.2	Normal
65		Thalassery	895.3	852.4	5.03	Normal	780.2	1055	-26.05	Deficient	402.8	540.9	-25.53	Deficient
66		Irikkur	1171	852.4	37.38	Excess	1117	1055	5.88	Normal	677	540.9	25.16	Excess
67	Kasargod	Hosdurg	875.4	999.6	-12.42	Normal	826.7	1108.5	-25.42	Deficient	592.7	636.3	-6.85	Normal
68		Kudulu	1039	999.6	3.94	Normal	713.4	1108.5	-35.64	Deficient	441.6	636.3	-30.6	Deficient

Table 3: District wise qualitative prediction and comparison with realisation (Source: IMD)

DISTRICTS	DISTRICT WISE DAILY RAINFALL FORECAST (24 HR PRIOR FORECAST FOR EACH DAY) FROM 08.08.18 TO 22.08.18 (SOURCE: IMD)														
	08.08.18	09.08.18	10.08.18	11.08.18	12.08.18	13.08.18	14.08.18	15.08.18	16.08.18	17.08.18	18.08.18	19.08.18	20.08.18	21.08.18	22.08.18
[illegible]	Yellow	Green	Yellow	Green	Green	Green	Green	Yellow	Orange	Yellow	Green	Green	Green	Green	Green
Kollam	Yellow	Green	Yellow	Yellow	Yellow	Green	Green	Yellow	Orange	Orange	Yellow	Green	Green	Green	Green
[illegible]	Yellow	Yellow	Yellow	Orange	Yellow	Orange	Yellow	Yellow	Orange	[illegible]	Yellow	Yellow	Green	Green	Green
[illegible]	Orange	Yellow	Yellow	[illegible]	[illegible]	Orange	Orange	Orange	Orange	Orange	Yellow	Yellow	Green	Green	Green
[illegible]	Orange	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Orange	Orange	Yellow	Yellow	Green	Green	Green
[illegible]	Orange	Yellow	Yellow	[illegible]	[illegible]	Orange	Orange	Orange	[illegible]	[illegible]	[illegible]	Yellow	Green	Green	Green
[illegible]	Orange	Yellow	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Yellow	Green	Green	Green
[illegible]	Orange	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Orange	[illegible]	Yellow	Yellow	Green	Green	Green
[illegible]	Orange	Yellow	[illegible]	[illegible]	[illegible]	Orange	Yellow	Yellow	[illegible]	[illegible]	Yellow	Yellow	Green	Green	Green
Malappuram	Orange	Yellow	Orange	[illegible]	[illegible]	Orange	Yellow	Yellow	[illegible]	[illegible]	Yellow	Yellow	Green	Green	Green
[illegible]	Orange	Yellow	[illegible]	[illegible]	[illegible]	Orange	Yellow	Yellow	[illegible]	[illegible]	Yellow	Yellow	Green	Green	Green
[illegible]	Orange	Yellow	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Yellow	Yellow	Green	Green	Green
[illegible]	Orange	Yellow	[illegible]	[illegible]	[illegible]	Orange	Yellow	[illegible]	[illegible]	[illegible]	Yellow	Green	Green	Green	Green
[illegible]	Orange	Yellow	Yellow	Yellow	Orange	Yellow	Yellow	[illegible]	Orange	Yellow	Green	Green	Green	Green	Green

DISTRICTS	ACTUAL REALISED RAINFALL FROM 08.08.18 TO 22.08.18 (SOURCE: IMD DAILY RAINFALL ARCHIVE MAPS)														
	08.08.18	09.08.18	10.08.18	11.08.18	12.08.18	13.08.18	14.08.18	15.08.18	16.08.18	17.08.18	18.08.18	19.08.18	20.08.18	21.08.18	22.08.18
[illegible]	Green	Green	Green	Green	[illegible]	[illegible]	[illegible]	[illegible]	Yellow	Green	Green	Green	Green	Green	Green
Thiruvananthapuram	Yellow	Yellow	Yellow	Green	[illegible]	[illegible]	[illegible]	[illegible]	Yellow	Yellow	Yellow	Green	Green	Green	Green
[illegible]	Yellow	[illegible]	Yellow	Green	[illegible]	Yellow	Orange	[illegible]	[illegible]	[illegible]	Orange	Green	Green	Green	Green
[illegible]	Yellow	Yellow	Green	Green	[illegible]	[illegible]	Green	[illegible]	[illegible]	Yellow	Green	Green	Green	Green	Green
[illegible]	Orange	[illegible]	Orange	Green	Green	Green	Yellow	[illegible]	[illegible]	[illegible]	Orange	Green	Green	Green	Green
[illegible]	Yellow	Yellow	Green	Green	[illegible]	Yellow	Green	[illegible]	[illegible]	Orange	Green	Green	Green	Green	Green
[illegible]	[illegible]	[illegible]	[illegible]	Yellow	Green	Orange	Orange	[illegible]	[illegible]	[illegible]	[illegible]	Orange	Green	Green	Green
[illegible]	Orange	Green	Green	Green	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Green	Green	Green	Green	Green
[illegible]	Yellow	[illegible]	Yellow	Green	[illegible]	Yellow	Orange	[illegible]	[illegible]	Orange	Yellow	Green	Green	Green	Green
[illegible]	Orange	[illegible]	Yellow	Green	Green	Yellow	Orange	[illegible]	[illegible]	Yellow	Orange	Green	Green	Green	Green
[illegible]	Orange	[illegible]	Green	Green	[illegible]	Yellow	Orange	[illegible]	[illegible]	Yellow	Green	Green	Green	Green	Green
[illegible]	[illegible]	[illegible]	Yellow	Green	Green	Yellow	Orange	[illegible]	Orange	Orange	Yellow	Green	Green	Green	Green
[illegible]	Orange	Orange	Green	Green	Green	Yellow	Yellow	[illegible]	Yellow	Yellow	Green	Green	Green	Green	Green
[illegible]	Green	[illegible]	Green	Green	[illegible]	Yellow	Orange	[illegible]	Green	[illegible]	[illegible]	Green	Green	Green	Green

COLOUR CODE		RAINFALL INTENSITY (MM)	
Green	[illegible]	[illegible]	Light (2.5-15.5mm)
Yellow	WATCH (Be Updated	Heavy Rainfall at Isolated Places	Moderate (15.6-64.4mm)
Orange	ALERT (Be Prepared)	Heavy to Very Heavy Rainfall at Isolated Places	Heavy (64.5-115.5mm)
[illegible]	[illegible]	[illegible]	Very Heavy (115.6-204.4mm)
			Extremely Heavy (> 204.5mm)

Note: Daily Rainfall Forecast issued at 13:00 hrs of each day was considered as the rainfall prediction for the next day (On 13-08-18 modified rainfall forecast received at 2000hrs was considered as the prediction for 14-08-18)

1.4. Flooding – 8th to 22nd August 2018

The intense unprecedented spell of rainfall began on 8th August 2018. The rainfall initially was active in the northern districts of Kerala causing widespread flooding in Wayanad, Kannur and Mallappuram. Rainfall of 398 mm which is equivalent to one day Standard Project Storm was experienced in Nilambur of Malappuram district on 9-08-2018. The rainfall was intense in these districts on 8th and 9th August. On contrary to the predictions, after a relatively low spell of rainfall from 10th to 13th August, the precipitation increased substantially over the entire state attaining its peak on 15th, 16th and 17th August. This rain spell was wide spread and affected the entire state as it is evident from Table 3.

The Hydrological Studies Organisation of Central Water Commission of Government of India submitted a detailed report titled 'Study report – Kerala Floods of August 2018' on September 2018. This report states that, the actual rainfall from 15th to 17th August in the State was 414 mm as compared to the extreme rainfall from 16th to 18th July 1924 during which it was 443 mm. This generated around 12 Billion Cubic Meter runoff within these three days, which is just about 3% lesser runoff than in 1924.

The severity of flood was increased by high tide due to perigean spring tides for the period of 11th to 15th, August 2018. The Spring Tides raised the low tide water levels substantially and thus, outflow of flood water into sea was substantially impeded.

According to the satellite image analysis based flood affected area maps provided by National Remote Sensing Centre (NRSC), between 16-07-2018 to 28th August 2018, 65,188 hectares of land area was inundated. Many areas were under water for more than 2 weeks. Densely populated Kuttanad backwater belt of Alappuzha was under water since July 2018 as polder walls (bund) breeched. Figure 4 shows the flood affected areas between 16th July and 28th August, plotted against the flood prone areas of Kerala. The flood prone area map was prepared as a worst case scenario by National Centre for Earth Science Studies (NCESS) and legalised in the Kerala State Disaster Management Plan 2016.

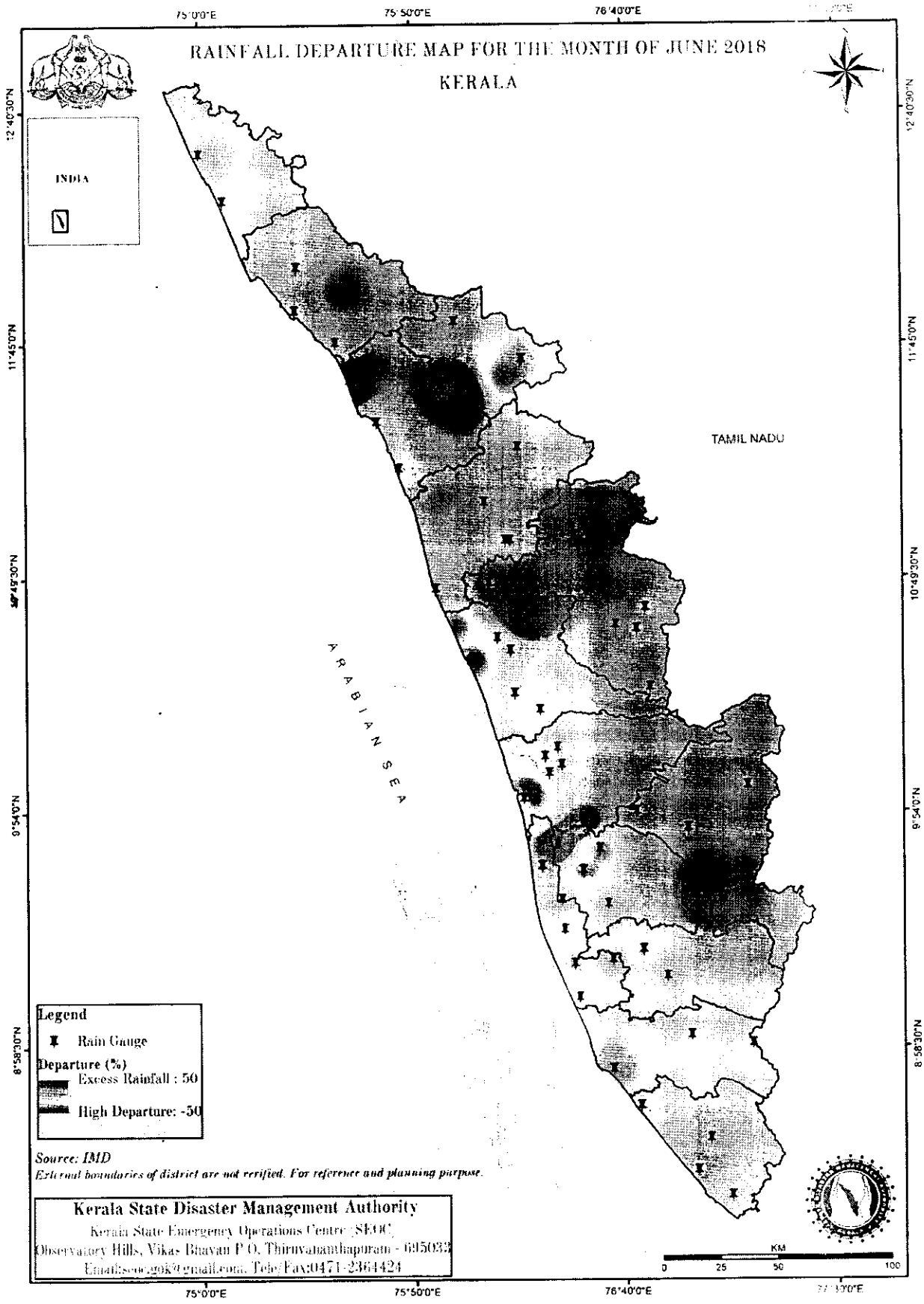


Figure 1. Rainfall departure for the month of June 2018 (Data source: IMD)

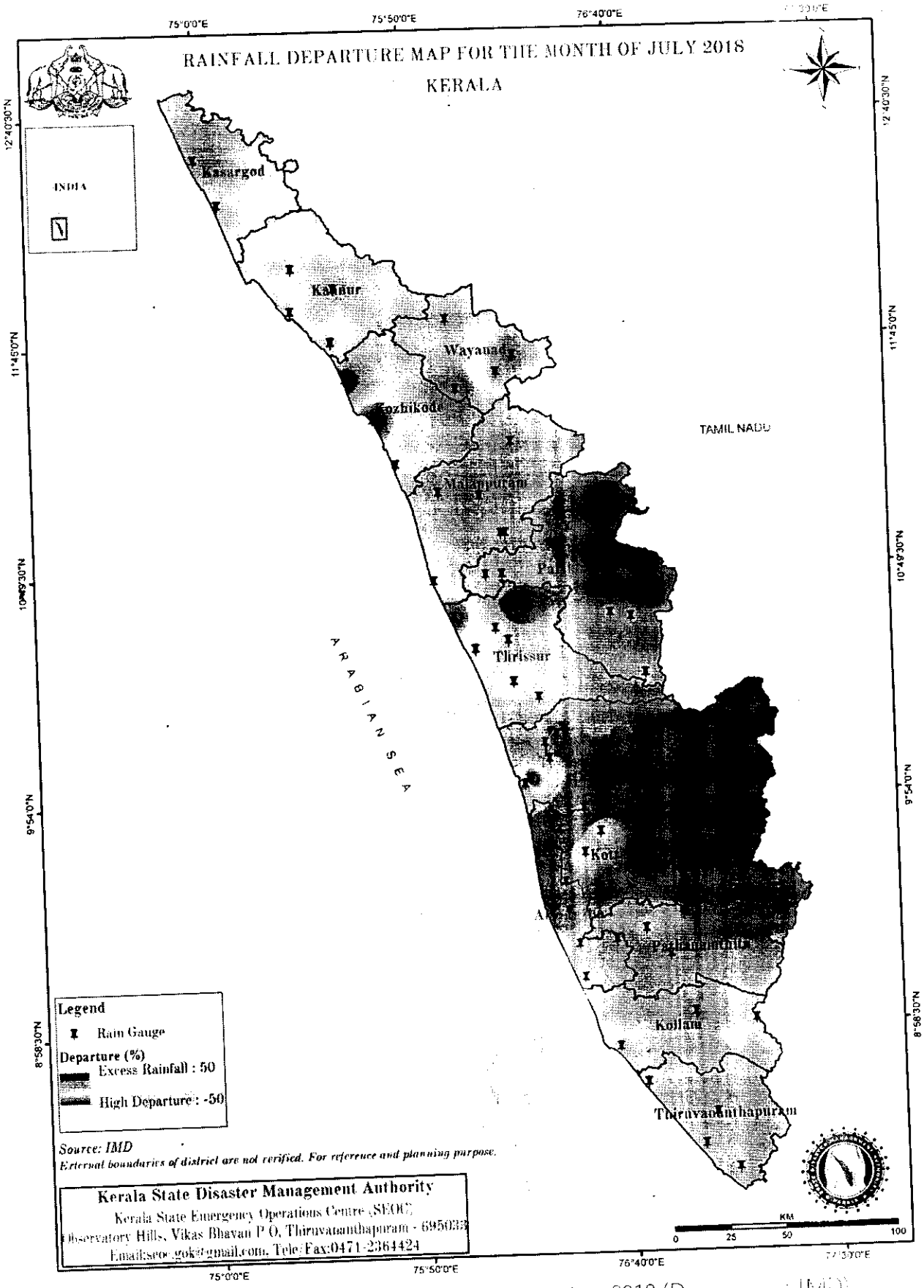


Figure 2: Rainfall departure for the month of July 2018 (Data source: IMD)

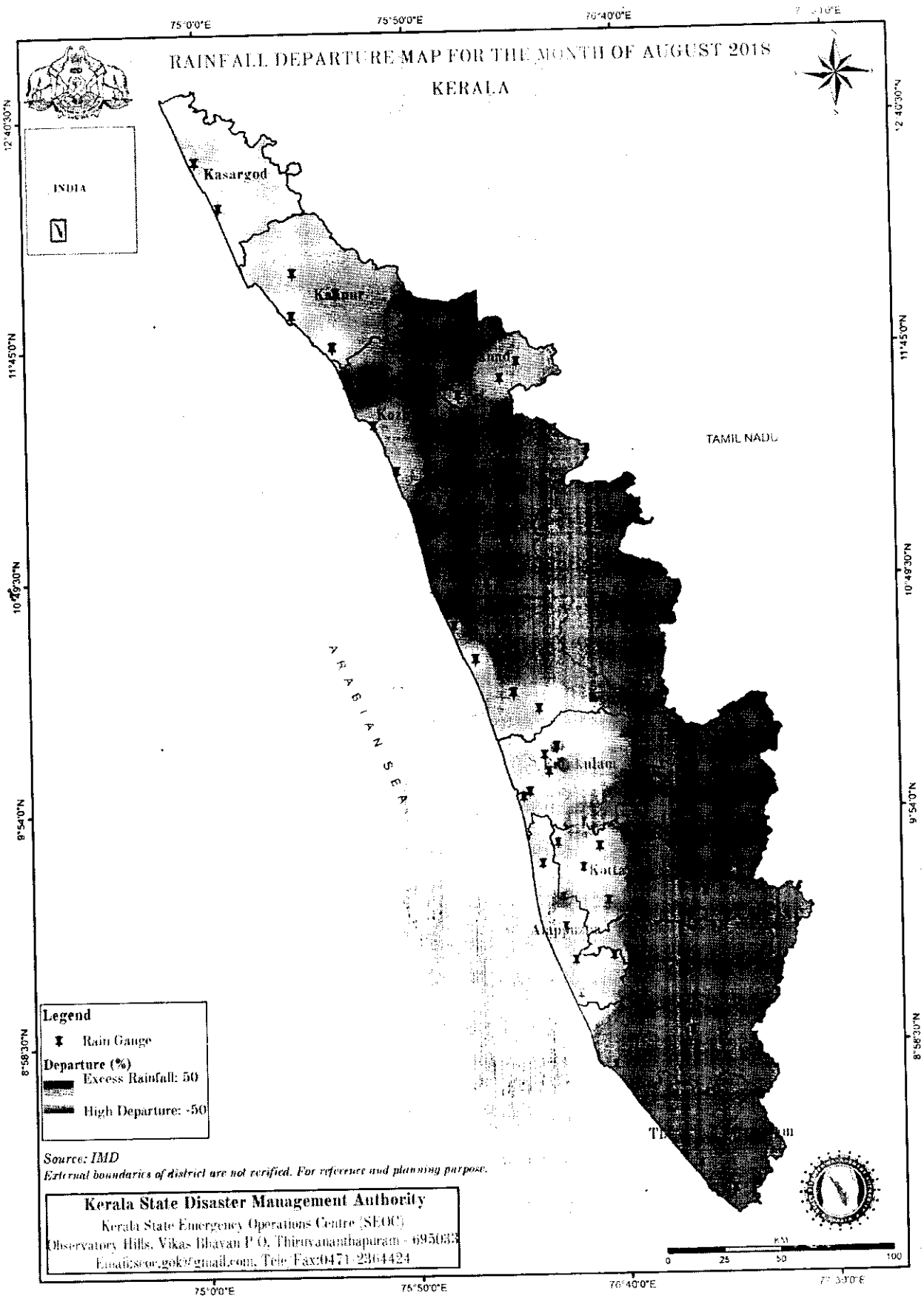


Figure 3: Rainfall departure for the month of August 2018 (Data source: IMD)

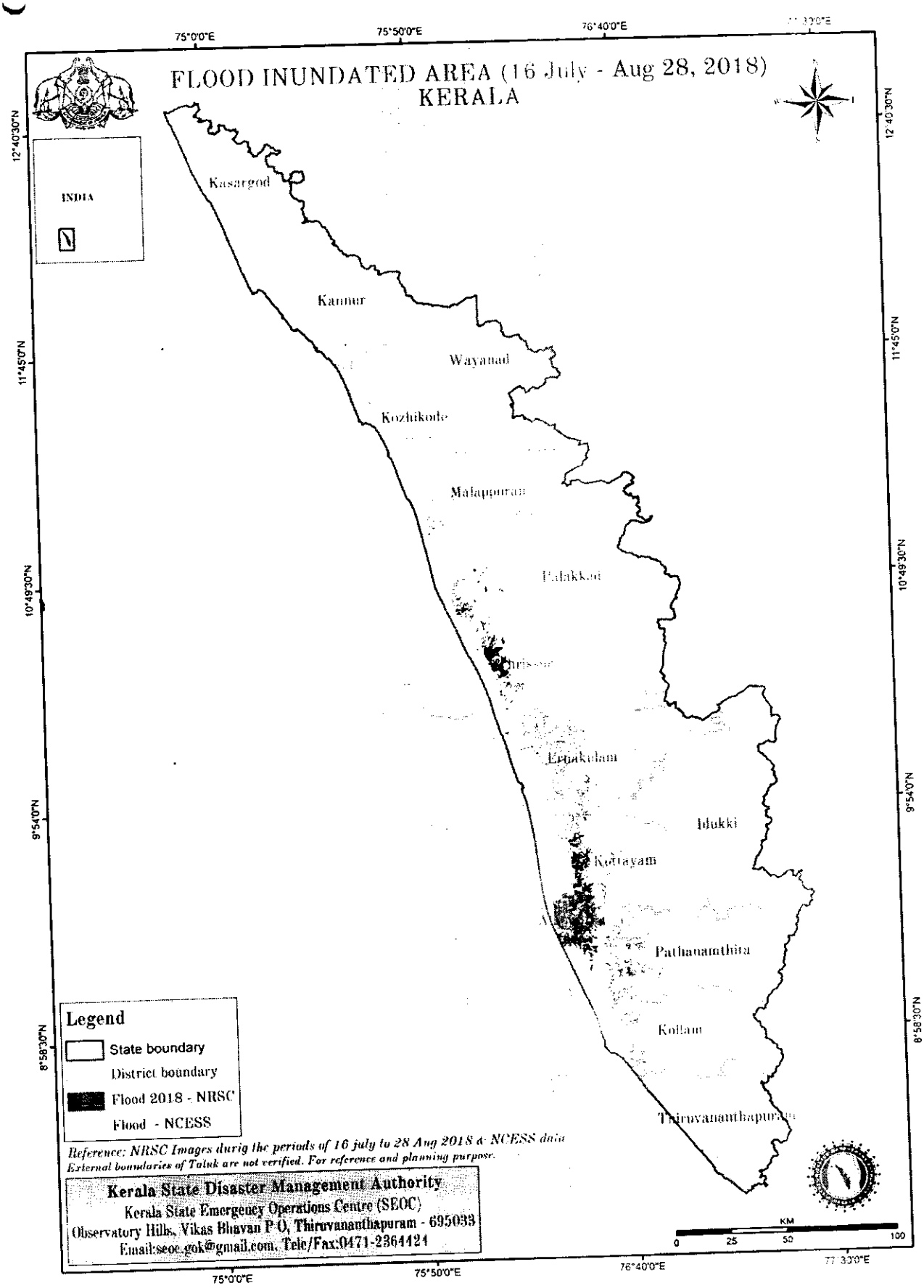


Figure 4 Flood affected areas as derived from Radar Images plotted against the flood prone areas of Kerala

1.5. Landslides – August 2018

Kerala is prone to landslides. The Kerala State Disaster Management Plan identifies 14.4% of the State as landslide prone. The National Remote Sensing Centre reported over 5000 landslides. In the month of August, 104 individuals have lost their lives in landslides in the State.

Historically, landslides of Kerala are of debris flow type and confined to certain catchments. However, in this unpredicted and unprecedented rainfall, there were numerous deep seated landslides, rock slides and landslips. Figure 5 shows the locations of 5000 landslides that occurred in Revenue land in the state.

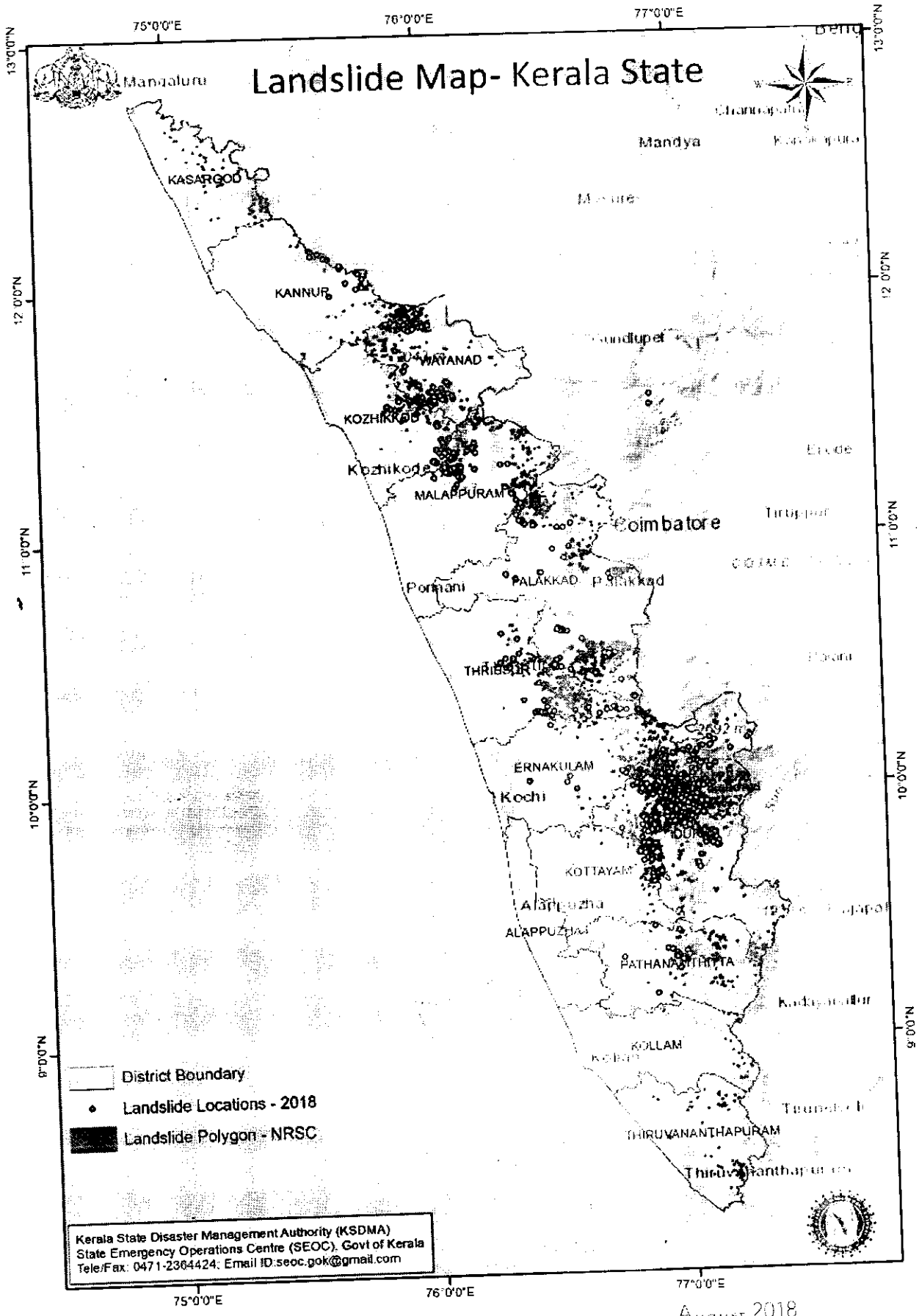


Figure 5: Locations of landslides that occurred in August 2018

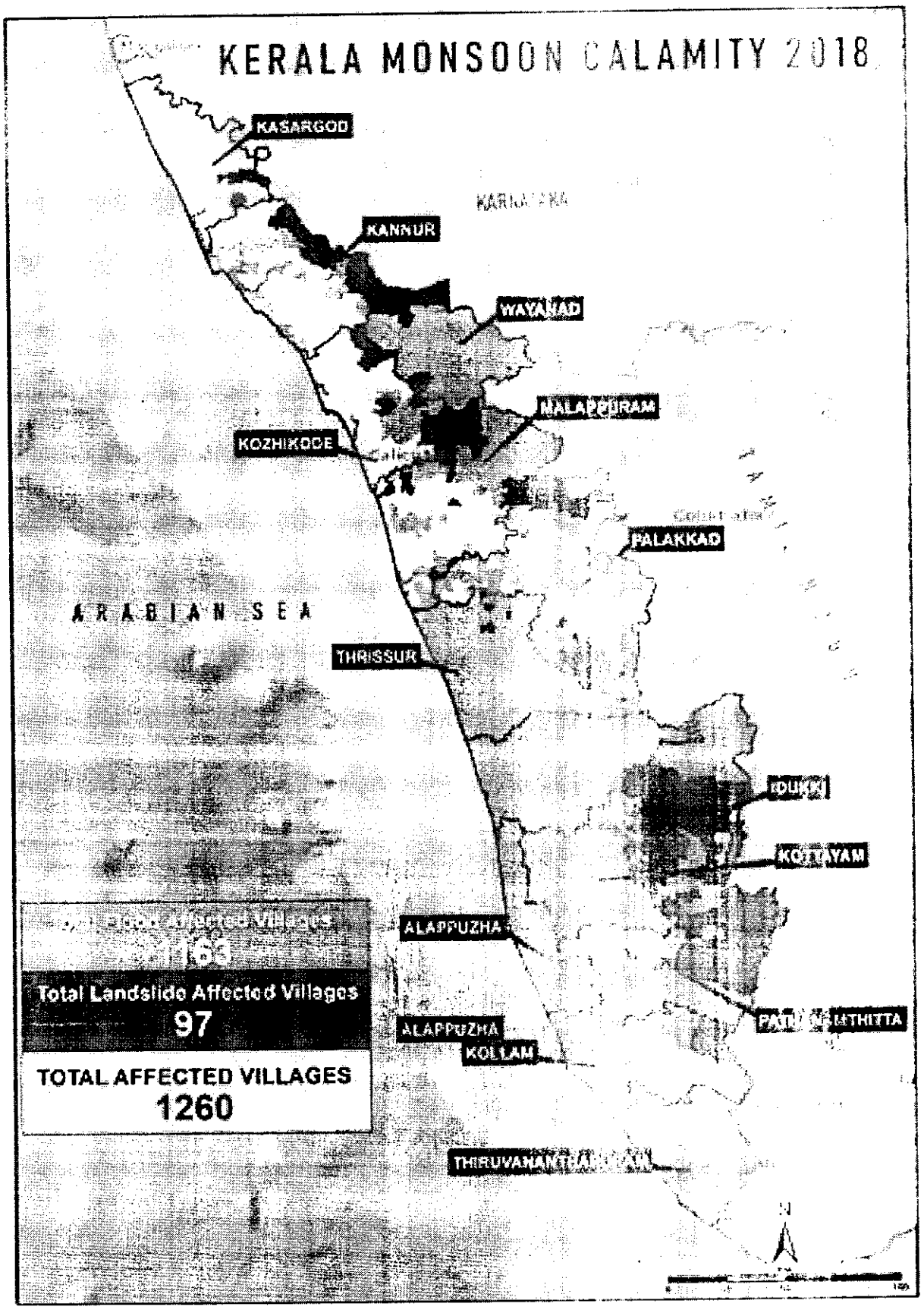


Figure 6: Flood and landslide affected villages in Kerala

2. Assessment of losses to roads

The Government had submitted two memoranda to Government of India. The Government of India released Rs. 2904.85 crores as additional assistance to Government of Kerala from National Disaster Response Fund. However, the State is facing difficulty in restoring roads owned by panchayaths and municipalities given the SDRF/NDRF norms whereby a maximum of only Rs. 60,000/kilometre is permissible for repair and restoration of rural roads. The permissible maximum for district and major roads is Rs. 1,00,000/kilometre.

Due to the extremely devastating monsoon calamities in the form floods and landslides, Public Works Department (PWD) has suffered unprecedented losses as evidenced by damage to physical infrastructure especially roads and bridges. All types of roads and bridges have been negatively affected. Some roads and bridges have even been completely washed away due to floods. Culverts have also been severely damaged. As long as 77,762.35 kilometres of rural roads and 17,927.68 kilometres of district/major roads were damaged in Kerala Floods 2018. During the period from 29th May to 31st July 2018, the rural roads under the Local Self Governments suffered Rs. 376.5 crores worth of losses. During the period from 1st August to 31st August 2018, additionally, Rs. 92.31 crores worth of losses were suffered by the rural roads.

The district/major roads in Kerala suffered a loss worth Rs. 179.27 crores. These estimates are as per the SDRF/NDRF norms, whereby a maximum of Rs. 60,000/kilometre is permissible for repair and restoration of rural roads. The permissible maximum for district and major roads is Rs. 1,00,000/kilometre. As many as 510 bridges have been damaged due to the calamity. Around 5,10,00,000 rupees would be required for rectifying the damages to bridges. The highest number of bridges damaged has been in Alappuzha, as 121 bridges have been damaged in the district.

Heavy losses were incurred to the roads and bridges of those under local self governments. The flood waters gushed through the roads, making them severely unfit for passage. The roads need to be built better to be used with immediate effect. At many places the rivers breached the banks depositing huge amounts of silt. The tables below show the loss incurred to the community owned roads.

Table 4: Damage to roads

District	Major Roads	Panchayath	Municipality	Corporation
Thiruvananthapuram	677	1995.49	3144.62	5.00
Kollam	694.57	1337.33	2576.5	1021.2
Pathanamthitta	1394.65	4757.68	331.72	-
Alappuzha	621.63	8717.166	649.91	-
Kottayam	1224.57	8385.96	1377.015	-
Idukki	2632.56	1469.3	278.28	-
Ernakulam	3063.57	5652.53	1119.3	1061.46
Thrissur	1155.87	3904.47	583.527	1396.25

Palakad	1327.42	2499.18	1273.79	-
Malapuram	1991	3970	636.333	-
Kozhikode	998.3	1362.33	505.815	2213
Wayanad	1001.44	910	740.365	-
Kannur	681.95	6080	1126.8	306.09
Kasargoade	463.15	1817.1	261.7	-
TOTAL	17927.68	52858.54	14,605.68	10,298.14

3. Request

The State Government through its Public Works Department and the Local Self Government Engineering Department prepared standard estimates for restoration of roads in Kerala. The estimates are as follows:

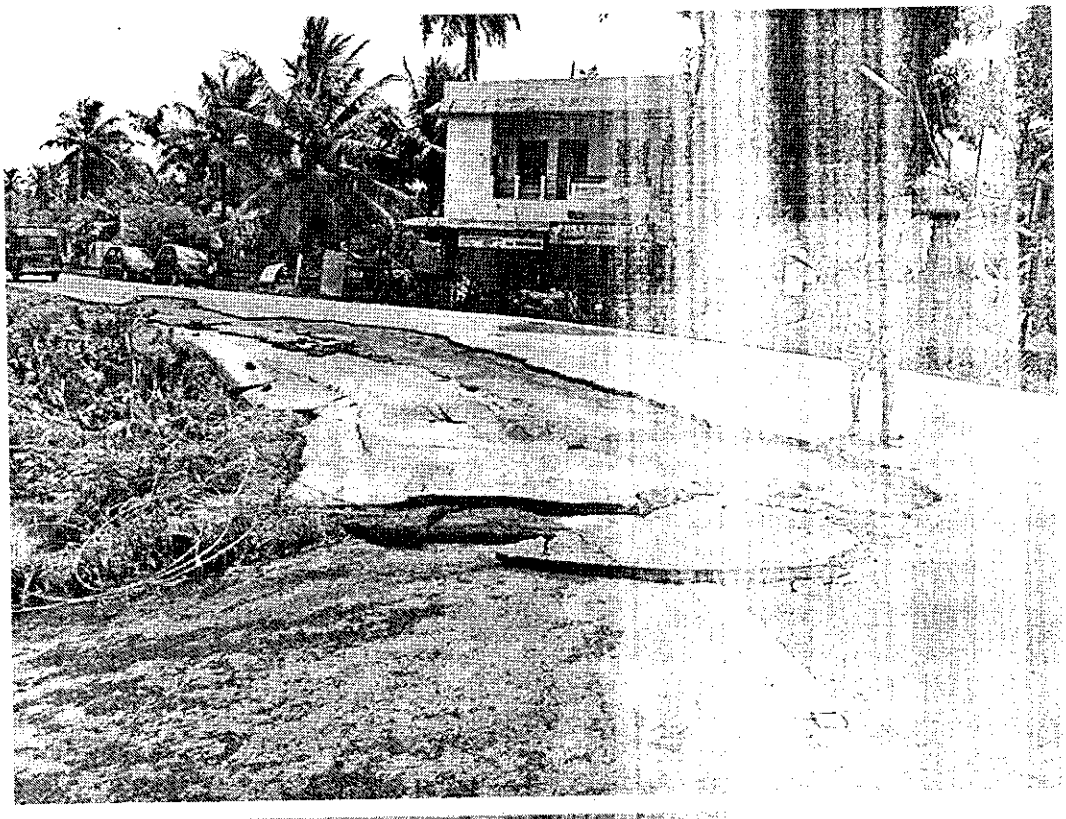
1. Restoration of District/Major Roads (PWD) - Rs. 25 lakh/Kilometer
2. Road re-tarring of rural road (3.75 m wide) - Rs. 13 lakhs/Kilometer
3. Road re-tarring of rural road (3 m wide) - Rs. 10 lakhs/Kilometer

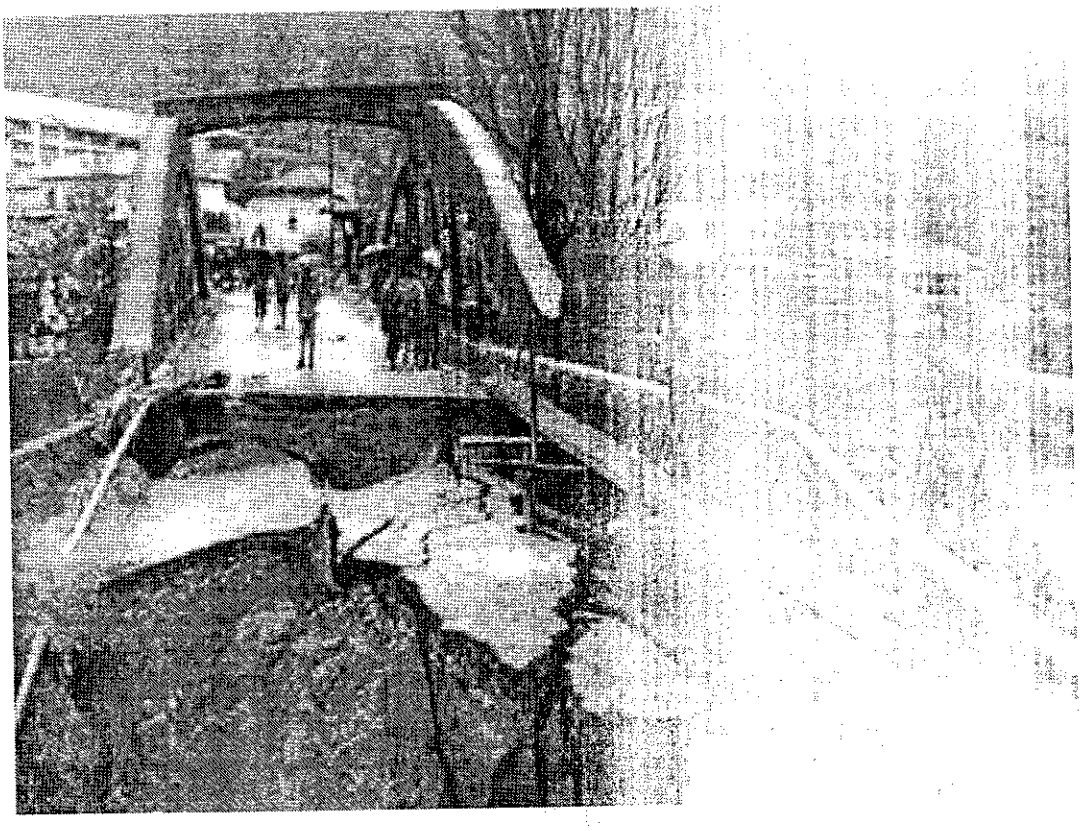
The above figures indicate the difference between the permissible norms and the cost that is needed for any meaningful restoration. As you are aware the State Government is not in a financial position to restore all the damaged roads at this cost with the own funds of State Government.

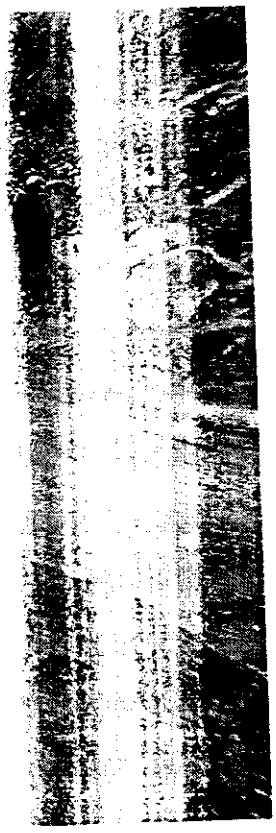
Considering the above, the State is requesting permission to utilise upto Rs. 10 lakhs/Km for restoring rural roads from the National Disaster Response Fund (NDRF) additional grant provided to the State by Government of India.

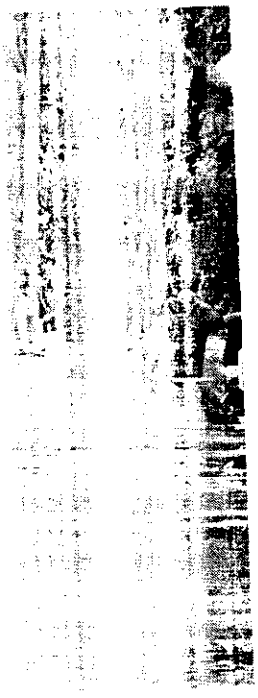
Through this, the State will be able to restore atleast some of the significant rural roads to disaster resilient standards. By restoring the roads to only motorable conditions, the vulnerability of the roads to any impending disaster will be several folds and will again lead to requesting devolution of funds from NDRF to State Disaster Response Fund (SDRF), in the event of a major calamity.

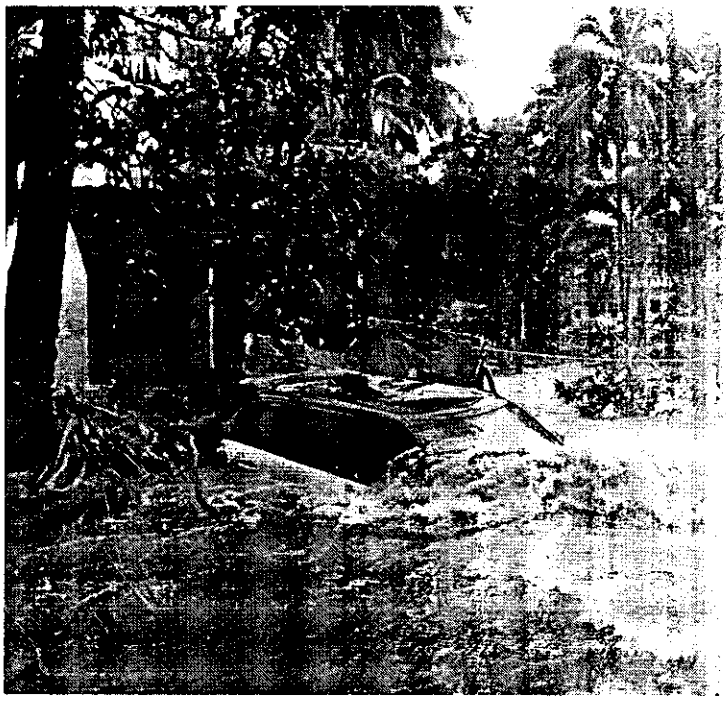
4. Pictures

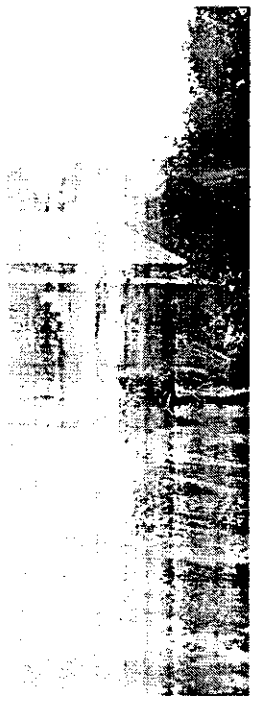


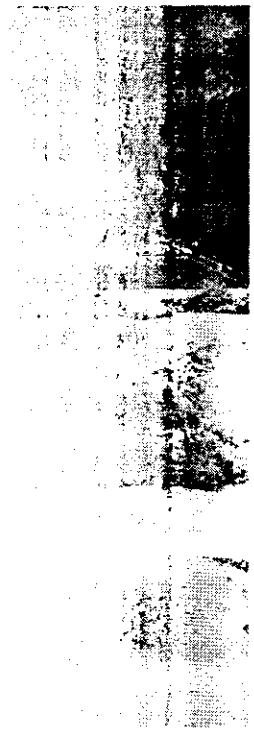












S-D.