Chapter - V

Flood and rain hazard

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Karnataka, although primarily a drought-prone state, has recently experienced severe flooding due to erratic climate conditions, resulting in significant losses. This chapter highlights deficiencies in flood risk management, particularly in KSNDMC projects, focusing on preparedness and compensation for damages.

The 2021 Karnataka State Action Plan for Flood Risk Management missed key elements such as community-level planning and flood-proofing measures. The lack of floodplain zoning regulations, despite available hazard maps, underscores a critical gap in risk mitigation. Additionally, non-compliance with NDMA guidelines revealed a lack of essential legal frameworks and documentation.

Structural mitigation efforts have largely been neglected, and non-structural measures suffered from insufficient institutional support and law enforcement, as illustrated by cases in Belagavi and Shivamogga. Authorities did not conduct safety audits and retrofit buildings, prioritizing financial compensation for damages over disaster resilience, which also lacked comprehensive guidelines and validation measures.

Floods and rain hazards are closely related, as floods are a consequence of rain hazards. Flooding can also be caused by the overflowing of rivers, lakes, or seas, based on which, can be differentiated as flash flooding, riverine flooding, coastal flooding, urban flooding, groundwater flooding, *etc*.

Frequent floods from rivers and lands getting covered with water due to heavy rain are common disasters in the State of Karnataka causing damage to public structures and private properties.

5.1 Karnataka State Flood Profile

Karnataka has encountered severe flooding mainly in the Krishna and Cauvery River basins during the monsoon season, resulting in substantial loss and damage to human life, property, crops, and essential infrastructure. This phenomenon has been primarily attributed to the occurrence of intense to very heavy rainfall, leading to substantial inflows into the rivers and its upstream tributaries. Consequently, these augmented water volumes have exerted considerable pressure on the reservoirs within the State, culminating in the inundation of low-lying regions and the extensive submergence of agricultural land situated along river and canal courses.

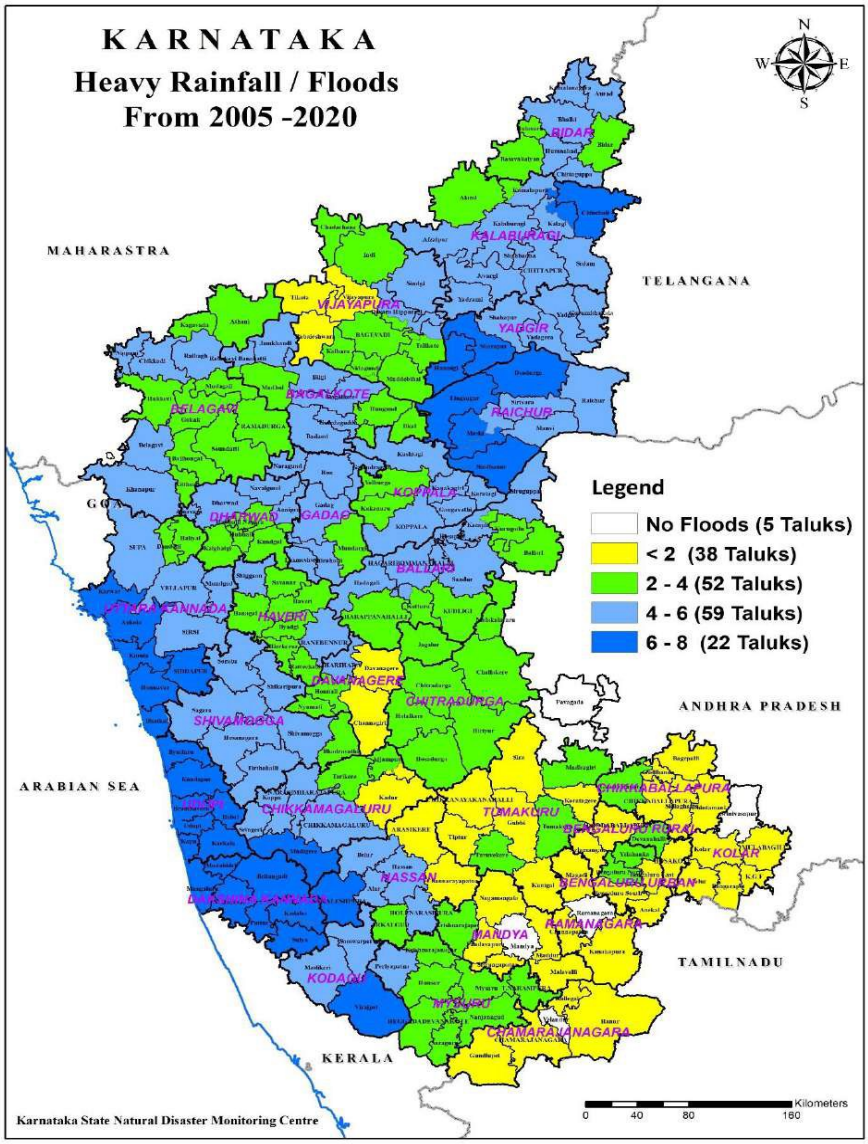
5.1.1 Regional distribution of rainfall in the State

The rainfall in Karnataka has been distributed into three seasons *viz.*, pre-monsoon (January to May), south-west monsoon (June to September) and north-east monsoon (October to December).The south-west monsoon plays a dominant role contributing more than 70 *per cen*t of the annual rainfall. The annual rainfall ranges from less than 500 mm (North Interior Karnataka) to more than 4000 mm (Western Ghats and coastal Karnataka), averaging to about 1,150 mm distributed over 40 to 100 rainy days in a year.

Because of the varying rainfall distribution, many a time, areas which were not traditionally prone to floods also experienced severe inundation. Areas with poor drainage facilities get flooded by accumulation of water from even moderate

rainfall. The flood frequency of the State during the period 2005-2020 is shown in **Exhibit 5.1** below.

Exhibit 5.1: Map showing the flood frequency of the State during the period 2005-2020



Source: KSNDMC

Karnataka has experienced eight years[26] of flood hazards including consecutive floods from 2018 to 2022 in the last ten years. The year-wise details of flood/heavy rain incidents under the test-checked districts during the period 2018-2022[27] are shown in **Table 5.1.**

Table 5.1: Year-wise details of flood/heavy rain incidents under the test-checked districts

District	Calendar year of flood impact
Belagavi	2019, 2020, 2021 and 2022
Chikkaballapura	2021 and 2022
Dakshina Kannada	2018, 2019, 2020, 2021 and 2022
Davanagere	2019, 2020, 2021 and 2022

[26] State experienced both drought and floods during 2018 and 2019.

[27] Year 2022 was not declared as calamity affected by the State Government, though encountered flood hazard.

District	Calendar year of flood impact
Haveri	2019, 2020, 2021 and 2022
Kalaburagi	2019, 2020, 2021 and 2022
Kodagu	2018, 2019, 2020, 2021 and 2022
Ramanagara	2021 and 2022
Shivamogga	2018, 2019, 2020, 2021 and 2022

Source: Data furnished by the Revenue Department (Disaster Management)

5.1.2 Impact and estimated loss

Apart from enormous damage to agriculture/horticulture sector and infrastructure, the floods also lead to loss of human and cattle life. The assessment of potential losses resulting from floods constitutes a significant aspect of risk evaluation and disaster preparedness. The total estimated loss under the test-checked districts due to floods during the audit period is shown in **Table 5.2**.

Table 5.2: Estimated loss under the test-checked districts due to flood between the years 2019-2022

(₹ in crore)

Name of the district	2019	2020	2021	2022
Belagavi	17,835.50	2,283.73	2,182.84	952.30
Chikkaballapura	0	0	748.33	542.43
Dakshina Kannada	1,088.28	209.65	102.11	431.80
Davanagere	18.80	31.99	309.93	427.93
Haveri	2,720.64	602.27	1,222.02	208.51
Kalburgi	328.80	4,981.10	626.42	285.96
Kodagu	312.43	1,128.82	1,072.83	228.55
Ramanagara	0	0	372.90	287.51
Shivamogga	1,091.65	208.49	646.74	45.70
Total	**23,396.1**	**9,446.05**	**7,284.12**	**3,410.69**

Source: Data furnished by the nodal department

Data pertaining to the year 2018 was not furnished by the nodal department.

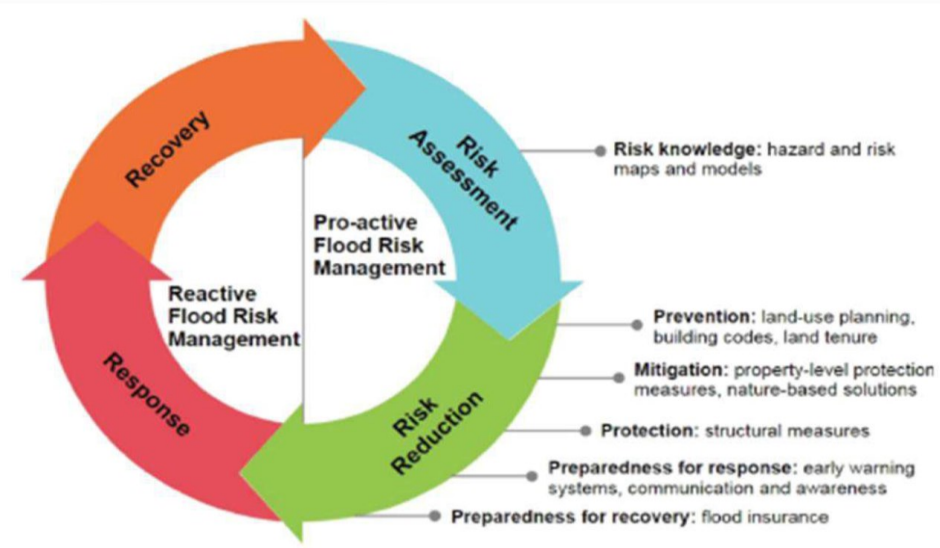
The total estimated loss of infrastructure and crops in the State due to floods during the audit period was to the tune of ₹97,814.77 crore. The component-wise details are shown in **Appendix 5.1**.

5.2 Flood Risk Management

Flood Risk Management (FRM) necessitates an ongoing process of adaptation, aiming to manage flood risk, reduce community vulnerability, and expedite post-flood recovery consistently and effectively. Flood risk reduction is a systematic approach to identify, assess and reduce the risks of disasters.

A pragmatic flood risk management cycle is shown in **Chart 5.1**.

Chart 5.1: Flood risk management cycle



Source: Karnataka State Action Plan for Flood Risk Management

5.3 Preparedness towards Flood Risk Reduction

5.3.1 Flood management framework – deficient State Action Plan

The NDMA brought out (January 2008) the guidelines for Management of Floods. In accordance with Section 9.3 of the guidelines, all State Governments/SDMAs were to prepare the Flood Management Plans (FMPs) in accordance with these guidelines. The State Government, however, inordinately delayed the preparation of FMP for the State and brought out the 'Karnataka State Action Plan for Flood Risk Management' only during the year 2021.

The salient activities to be covered in the FMPs were to include identification of flood prone areas, preparation of flood vulnerability/flood risk/ flood hazard maps, and improvement of drainage, developing guidelines for flood-proofing measures for all existing critical lifeline structures and major public buildings in a phased manner.

Besides, NDMA provided for preparation of FMPs by schools, hospitals, industries, entertainment houses, major shopping complexes *etc*., in flood prone areas and carrying out mock drills for enhancing preparedness. The State Plan, however, did not provide for preparation of FMPs by any of these agencies/institutions. Guidelines for flood proofing measures were not prepared. The State Plan did not stipulate the important milestones for implementation of various activities spelt out in the plan and thus the implementation of the Action plan was not time-bound. Thus, the State Plan did not comply with the provisions of the national guidelines and did not adequately address the issues relating to flood management.

The Government replied (August 2024) that the FRM action plan had been formulated by KSNDMC. However, supporting documentation was not furnished to Audit.

5.3.2 Absence of institutional initiatives

As per the NDMA guidelines, the Government of India has taken a number of initiatives in the field of flood management and appointed many committees/ working groups/task forces from time to time to look into the problem of floods

and suggest remedial measures for their management. It has also issued a number of policy statements in this regard.

Though it is mentioned in the State Flood Action Plan as 'State Government had appointed many committees/working groups/task forces', the details of the said institutional support for flood management were either not mentioned in the Action Plan or not furnished to audit. Audit hence is unable to assess the efficacy of implementation of initiatives proposed, if any.

5.3.3 Deficient weather forecast mechanism

Flood forecasting and warning mechanisms are the primary and crucial non-structural measures in flood management. A robust early warning system was to comprise installation of field monitoring sensors – for weather, geological, hydrological parameters; collection/analysis of data in real-time; simulation through appropriate mathematical models; customized report generation; and dissemination of the alerts/reports/advisories to the users.

Audit observed that the forecast and early warning alert mechanism for flood, though established in the State by incurring substantial expenditure towards installation of TRGs and TWSs through KSNDMC, was marred by inaccurate reporting due to non-/malfunctioning of the equipment (commented under Paragraph 4.3.2.1 previously).

Audit also observed serious omissions in implementation of various projects taken up by KSNDMC towards flood warning/management activities which facilitated lapses in flood management in the State. Details of the projects and deficiencies thereon are discussed in successive paragraphs.

5.3.3.1 Non-implementation of Real-time Decision Support System for Flood Early Warning and consequent non-preparation of hydrological flood model

As large parts of the State were recurrently affected by floods, the KSNDMC proposed (January 2021) to implement 'Realtime Decision Support System for Flood Early Warning' in Krishna River basin under the component of preparedness and capacity building. The project involved:

- Installation of radar stream gauges and reservoir level sensors;
- Data collection and analysis;
- Dissemination of early warning and advisories to all the stakeholders; and
- Developing state-of-the-art modelling tools for flood forecasting and inundation mapping compatible with GIS environment.

KSNDMC entrusted (July 2021) the work to a firm[28] at a project cost of ₹2.57 crore. The work comprised installation and commissioning of six water level sensors (at reservoirs) and stream gauge sensors with velocity meter sensors (nine numbers) at different locations, within a period of 120 days, including comprehensive annual maintenance contract (CAMC) for a period of four years. As of December 2023, a total payment of ₹2.45 crore was made to the agency.

Verification of records disclosed that :

- Technical specifications of the installed equipment had not been checked, verified and certified by any of the technical personnel of KSNDMC, prior to commissioning;

[28] M/s. MOSERP Technologies India Private Limited, Bengaluru.

- As per the work order, the KSNDMC was required to provide the server, static IP to the server for receiving data from these instruments. Details on KSNDMC providing the Server or the Static IP are not on record. Further, KSNDMC was not in possession of date-wise data of the water levels/velocity captured by any of these sensors;

  This is an impediment for monitoring water levels and the objective of the system installed was not achieved;
- Each radar stream gauge was to be calibrated by the vendor once every six months, duly submitting the calibration certificate to KSNDMC. However, neither details of calibration nor the certificates thereon were on record;
- As per the Service Level Conditions, the vendor was responsible for keeping the equipment in good condition during the warranty/CAMC period of four years.
- Audit verified the online functioning of these sensors and noticed (December 2023) that, six out of the installed 15 sensors were non-functional and hence, data was not being captured from these equipment.

  Director, KSNDMC admitted (December 2023) that 8 out of the 24 equipment (gauges/sensors) installed under the project were non-functional.

Thus, in the absence of basic data, the State Government/KSNDMC could not create the envisaged hydrological models for flood forecasting in the State/region. Thus, the investment of ₹2.45 crore on the sensors and stream gauge monitors was rendered largely unfruitful.

Further, KSNDMC was not in possession of documents like original invoice of procurement, warranty card and user guide/manual of these installed equipment. Thus, absence of original documents coupled with the gauges/sensors becoming non-functional within the maintenance period, raises doubts on the genuineness of equipment installed under the project.

The Director, KSNDMC stated (December 2023) that penalty would be levied as per the tender clause in respect of non-functioning equipment. Thus, it is evident that data on water levels was not available for creation of an envisaged model for flood forecasting.

5.3.3.2 Centralised Wireless public broadcasting at vulnerable GPs– Unfruitful expenditure of ₹1.09 crore due to under performance

The project of 'Centralised Wireless public broadcasting at vulnerable GPs' was proposed by KSNDMC, as a pilot project, in January 2021 and the same was approved by SEC in February 2021 at a cost of ₹1.14 crore.

The project envisaged covering 104 GPs under the districts of Belagavi, Bagalkot and Raichur districts, wherein it was planned to disseminate flood alert early warning messages centrally from the control room at KSNDMC. The contract for installation of required equipment and commissioning was entrusted (June 2021) to two firms[29] with a stipulation to complete the work within three months. As of December 2023, a total payment of ₹1.09 crore was paid to the firms.

Test-check of alert message-log *vis-à-vis* success/published data disclosed that the project was under-performing as sent messages had not reached all the intended GPs in many instances due to non-availability of system/network. Hence, the purpose of installing the equipment at grassroots level for alerting endangered

[29] M/s. Protronics Technologies – 89 GPs and M/s. Sumukha Technologies and Software Pvt Ltd – 15 GPs.

population from flood early warning through a wireless broadcasting system at a cost of ₹1.09 crore was not achieved.

The Director, KSNDMC replied (July 2024) that to curtail the failure of the announcements due to non-availability of network, new sim cards were being provided free of cost to the service provider for replacement based on the ISP with better signal strength in the Grama Panchayat. It further stated that as Grama Panchayat building construction is underway at some places, the instruments would be relocated/reinstalled on completion of the construction activity and at some places power failure issues were reported for which the Grama Panchayat officials have been informed not to turn off the power supply provided to the system. However, the details of success rate of messages sent subsequently after replacement of sim cards were not furnished to audit. Hence, audit could not ensure the status of functioning of the project. The project lagged due to failure in ensuring suitable network connectivity which should have been checked at the initial stage itself.

5.3.3.3 Wasteful expenditure on preparation of urban flood model for Bengaluru

Department of Science and Technology funded the work 'Preparation of urban flood model for Bengaluru'. KSNDMC was entrusted (March 2019) with implementation of the project. The total project outlay was ₹2.30 crore. A total sum of ₹1.74 crore was released during the years 2018-19 and 2019-20. The scope of the work *inter alia* included installation of 25 TWSs and 04 ultrasonic water level sensors in BBMP limits at a cost of ₹16.69 lakh. As of December 2023, audit observed that a total expenditure of ₹1.61 crore had been incurred (90 *per cent* of the expenditure towards salaries) on the project.

Audit observed that KSNDMC, despite being the implementing and monitoring agency, did not possess either the details of location of installation of equipment or the data obtained through the equipment since installation. Thus, while ₹1.61 crore has been expended on salaries, the preparation of the flood forecast alert model is absent. The reasons for this lapse are to be investigated.

5.3.3.4 Non-functional water level sensors installed on stormwater drains in Bengaluru

(a) KSNDMC took up (March 2021) the project "Strengthening the flood early warning system of BBMP through installing water level sensors (WLS)" at an outlay of ₹2.36 crore out of SDRF grants. The project included installation of 105 water level sensors (100 on storm water drains and five in flood vulnerable streets) at different locations at a cost of ₹1.03 crore.

Audit scrutiny of records showed that the work order was issued during July 2021 and the firm completed (January 2022) the installation and was paid ₹0.98 crore (annual maintenance charges to be paid accordingly for five years). Audit verification (December 2023) revealed that 49 out of 100 WLS installed on storm water drains were non-functional and no information/data was available in respect of five WLS reportedly installed at flood vulnerable streets. This affected the objective of strengthening the flood early warning system besides rendering the expenditure (incurred out of SDRF grants) on non-functional WLS unfruitful.

The Director, KSNDMC replied (December 2023) that in the absence of watch and ward, some of the installed WLS were removed by BBMP and a few were stolen.

Audit further observed that KSNDMC had procured a total of 25 large display (65 inches) television sets (TVs) at a cost of ₹32.66 lakh under this project for displaying the water level status of storm water drains. Audit verification revealed that three TVs were given to corporations of smart cities[30], six to DCs of smart cities[31], two were installed in the chamber of Commissioner, KSDMA and four TVs were being used at KSNDMC and the remaining 10 TV units were lying idle rendering the expenditure of ₹13.06 lakh unfruitful. Reasons for supplying the display units to other smart cities while the project was meant for Bengaluru/BBMP were not forthcoming from the records.

Director, KSNDMC stated (December 2023) that eight display units would be installed in BBMP after development of a new web portal for Bengaluru smart city and a letter has been addressed to BBMP for provision of space and other required infrastructure.

(b) Audit observed that KSNDMC had implemented (February 2022) the work of Supply, installation, commissioning and maintenance of Telemetric Rain Gauge (75), Telemetric Weather Stations (29), Telemetric Water Level sensors (50) and IP cameras (30) under smart cities of Mangaluru, Belagavi and Hubballi-Dharwad at a total cost of ₹1.45 crore. Scrutiny of records revealed that 69 out of these 184 equipment were non-functional (December 2023).

Director, KSNDMC accepted (December 2023) that the equipment was not functioning but did not spell out action taken for rectification of defects and making them functional to achieve the intended objective of creation of disaster resilient smart cities.

This highlights the negligence of KSNDMC authorities in (i) execution of projects, (ii) maintenance of equipment installed, and (iii) non-obtaining envisaged data from this equipment. Besides, sanctioning/release of funds under SDRF by SEC/Revenue Department for disaster management activities without monitoring the implementation of these projects and achieving anticipated results is a pointer to indifference and apathy towards the project. The objective of better disaster management and disaster risk reduction stood affected on this account. Resultantly, the population of the State continued to suffer year after year without a comprehensive forecast alert mechanism against flooding.

On the above omissions in functioning of KSNDMC, the State Government did not offer issue-wise remarks but replied (August 2024) that some of the equipment were non-functional due to expiry of AMC, for which action is being taken to invite tenders and all the omissions would be rectified.

However, the Government had not taken timely action though the AMC of the equipment had expired commencing from 2022 and water level sensors were defunct even within the AMC period. Reply of the Government is silent on the issues of physical absence of large number of sensors installed under BBMP jurisdiction despite incurring expenditure under SDRF grants.

Recommendation 11: The State Government should ensure proper functioning of weather forecasting mechanisms/equipment and fix responsibility for improper project/scheme implementation.

[30] Belagavi, Hubballi-Dharwad, Mangaluru.
[31] Belagavi, Davanagere, Hubballi-Dharwad, Mangaluru, Shivamogga, Tumakuru.

5.3.4 Deficient floodplain zone mapping

Disaster risk reduction frameworks envisage key themes encompassing risk reduction strategies such as early warning systems, community education, enhanced building codes, land use planning, and public participation in DRR. The DM Act and DM Policy similarly stressed a transformative shift towards proactive disaster management, with a focus on long-term DRR initiatives.

Assessment of flood hazard is the basic requirement in management of the disaster. Flood zonation maps were to be created by considering various relevant factors like rainfall and climate, size of basin, land slope and aspect ratio, gradient of stream networks, drainage density, land use and land cover, soil type, infrastructure, *etc*., along with their significance. These hazard zonation maps will facilitate decision-makers to formulate an efficient flood zonation plan for mitigating disaster risk reduction.

Audit observed from records made available that the State had prepared flood hazard zoning maps for each of the river basins (as part action plan for flood risk management) and identified villages prone to floods. However, such vulnerability mapping was not done for the plain areas which were not covered under river flow paths but were affected by water inundation due to heavy rainfall.

The Government replied (August 2024) that flood zonation maps were formulated in consultation with the Water Resources Department and the Central Water Commission and the same would be strengthened.

5.3.5 Absence of floodplain zoning regulations

Floodplain zoning further requires laying down limitations on development of both the unprotected as well as protected areas. The State Action Plan envisaged enactment and enforcement of appropriate laws for implementing floodplain zoning regulations like eviction of encroachment into the waterways and natural drainage lines, restriction of unplanned growth, incorporation of specific provisions[32] to the building by-laws, *etc*. The Ministry of Water Resources and Central Water Commission had circulated a draft bill on floodplain zoning way back in the year 1975 and various committees/task forces/working groups *etc.*, have also recommended the same.

However, the State was yet to frame and enact the Floodplain Zoning Regulations and thus, encroached inhabitation, unplanned growth, *etc*., along waterways were not regulated in the State despite people being affected repeatedly by floods and compensations being paid.

Recommendation 12: The State Government should take immediate measures to prepare floodplain zoning of all vulnerable locations and should enact regulations thereon. It also should contemplate shifting of villages persistently affected by floods to safer elevations to avoid recurrent damage as well as recurrent expenditure towards compensation.

[32] Plinth levels of all buildings to be 0.6 m above the drainage/flood submersion lines, all the buildings to be preferably double and multiple storeys in the areas liable to floods, *etc*.

5.4 Mitigation Measures Against Flood Hazard

5.4.1 Non-compliance to the provisions of NDMA guidelines

As per constitutional provisions, flood management is a State subject and as such the primary responsibility for flood management lies with the States. The role of the Central Government is advisory, catalytic and promotional in nature. The States have to investigate, plan, construct, maintain and operate all flood management works. In this direction, NDMA guidelines stipulated certain provisions to be complied with by the State Government. However, the authorities at State Government did not comply with such provisions, which resulted in flawed management against flood hazard in the State. Omissions to NDMA provisions and their impact are illustratively discussed below.

❖ **Legal framework for making infrastructure flood resilient**

It is stipulated that infrastructural activities by different organisations such as the National Highway Authority of India (NHAI), the State Public Works Department, other departments, *etc*., in the flood prone areas need to be carried out duly considering the requirements for making them flood resilient. While constructing highway lines and roads, due care has to be taken in aligning, locating and designing with respect to height and width of embankments and providing adequate waterways i.e., bridges, culverts, vents and causeways for passage of storm water.

Despite mentioning the requirement of legal framework in its Flood Action Plan, the State did not establish a legal framework for obtaining mandatory clearances by agencies for construction of public infrastructure in flood-prone areas which resulted in National/State highways, railways and other roads getting flooded/ inundated repeatedly without arrangement for passage of storm water.

Photographs of public infrastructure flooded with rainwater in different parts of the State are shown as **Exhibit 5.2.**

Exhibit 5.2 Photos of public spaces inundated with floods

Bengaluru-Mysuru Express Way

Belagavi-Kolhapur Highway

School building in Ramanagara district

Railway track in Dakshina Kannada

Source: Media Reports.

❖ Regulation of inhabitations in low-lying areas

As a preventive measure, the inhabitations in the low-lying areas along the rivers, canals and drains were to be regulated by the State Government/SDMA/DDMAs. However, none of the authorities regulated such inhabitations as evidenced in audit in the test-checked districts of Belagavi, Dakshina Kannada, Davanagere, Shivamogga, *etc*., where the authorities operated '*Kalaji Kendras (*Relief Centres*)*' to accommodate population living along the banks of river/canal (passing through the towns) affected due to increase in the water level till it receded and also financially compensated for inundation of houses as per norms.

Illustration: Non-relocation of flood prone families in Belagavi district

The villages in Belagavi district were prone to riverine floods due to their location on the banks of various rivers such as Krishna, Doodhganga, Ghataprabha, Malaprabha, Hiranyakesi and Markandeya. Due to release of excess water from dams upstream, the number of villages as indicated in ***Table 5.3*** *were recurrently affected by floods and the district/taluk authorities were providing temporary rescue and relief measures by shifting the victims to Kalaji kendras (relief centres) till the flood recedes and providing compensation for house damages.*

Table 5.3: Details of villages prone to recurrent floods

Sl.No	Name of the taluk	Number of villages	No of families	Population at risk	Livestock at risk
1	Athani	24	21,858	1,11,888	67,283
2	Khagwada	13	24,019	43,597	51,730
3	Chikkodi	11	34,910	1,15,461	42,939
4	Nippani	23	26,890	1,25,219	1,10,320
5	Raibagh	15	15,050	1,28,296	65,213
6	Khanapur	05	808	3,028	541
7	Hukkeri	26	1,758	8,020	2,744
8	Belagavi	06	2,768	41,187	2,779
9	Gokak	29	31,393	1,62,714	34,875
10	Mudalagi	14	12,692	71,395	68,719
11	Ramadurg	32	24,107	1,09,228	63,565
12	Savadatti	11	11,990	83,229	21,091
	Total	**209**	**2,08,243**	**10,03,262**	**5,31,799**

Source: Information furnished by the department

Despite the fact that more than 10 lakh people and 5.32 lakh livestock were at risk, the State Government/district administration did not take necessary action to relocate recurrently affected families to safer places. This resulted in regular periodical flooding affecting villages enroute, with regular compensation given towards damages.

❖ Absence of timelines and priorities

The State Governments/SDMAs were to evolve datelines and priorities for carrying out detailed hydrological and morphological studies regarding the circumstances, in which embankments/flood walls/flood levees will be constructed for prevention of flooding.

However, neither the SDM Policy nor the annual DMPs of the State and Districts had prioritised and fixed definite timeframe for taking up/completion of works towards construction of embankments/flood walls/flood levees towards ensuring prevention of flood hazards, resulting in instances of same localities being affected with recurrent floods causing significant damage.

❖ **Non-creation of temporary storage of floodwaters**

The State Government/SDMA was to study the availability of natural depressions, swamps and lakes in the vicinity of the rivers and wherever required and feasible, utilise them for temporary storage of floodwaters.

As audit observed, all the districts including the test-checked districts were invariably affected by heavy rainfall and consequent flooding causing substantial damage to houses/infrastructure. However, the annual DMPs of the State and Districts did not contain any proposal ensuring availability of natural depressions along the overspreading rivers/canals in the State to initiate action to utilise available space for temporary storage of water during floods. The absence of detention basins, which if available could have been preventive measures, facilitated spreading of water/inundation of agricultural fields and consequent loss of grown crops in the fields, which are financially compensated.

❖ **Absence of State Flood Control Board**

Taking a serious note of flooding in the country, the GoI established the Central Flood Control Board in the year 1954 which is responsible to lay down general principles and policies in connection with flood control measures, to consider and approve master plans for flood control submitted by the states/river commission, and to arrange for necessary assistance in connection with planning and execution of flood control works.

However, despite the State being affected with recurrent floods causing damage to human life and infrastructure, the State Government had not put in place the State Flood Control Board/Technical Advisory Committee, in line with the Central Government.

As regards non-compliance with NDMA norms discussed above, the Government replied (August 2024) that the departments concerned would be urged to strictly implement the regulations in flood prone areas. This is indicative of the lack of effective cooperation among stakeholder departments besides laxity in regulation and monitoring by KSDMA/the nodal department towards disaster management activities, resulting in non-compliance to NDMA stipulations.

5.4.2 Absence of structural and non-structural measures

Protecting flood-prone areas against all return probabilities of floods is neither economically viable nor practically possible. However, in order to provide a reasonable degree of protection against flood damages, a pragmatic approach was needed through a combination of structural[33] and non-structural[34] measures.

The State Government/KSDMA did not comply with the provisions of NDMA guidelines towards prioritisation of Structures which specified that defence installations, industries, public utilities like hospitals, electricity installations, water supply, telephone exchanges, aerodromes, railway stations, commercial centres, *etc*., were to be in such a manner that they are above the levels corresponding to a 100-year frequency or the maximum observed flood levels. As a result, flooding/inundation of public/private properties was a common feature

[33] Building storages/reservoirs across the rivers, protective embankments along the riverbanks, channelisation of rivers, drainage improvement, diversion of flood waters, watershed management *etc*.

[34] Bioengineering based bank protection measures, vulnerability linked relocation, flood forecasting, floodplain zoning, restrictive land use legislations and policies in floodplains, creating awareness, *etc*.

every time. Photographs of public utilities drowned in flood waters due to absence of prioritisation of structures are shown in **Exhibit 5.3** below.

Exhibit 5.3: Photographs showing inundated public utility structures

Mangaluru floods - 2019

A commercial complex in Belagavi - 2019

Source: Media Reports.

Thus, due to the absence of adequate protective measures, all of the nine test-checked districts were affected by the flood hazard, either riverine or by heavy rain, including Chikkaballapura and Ramanagara which are generally not flood vulnerable districts as shown in **Table 5.1**.

Illustration: Improper drainage system leading to flooding of houses in Shivamogga district

The DDMP of Shivamogga district had identified a list of colonies in Shivamogga town that were prone to inundation. These colonies were situated on the banks of Tunga River. The Audit team conducted (18 January 2023) a joint physical inspection of the Upper Tunga Dam in Gajanur and noticed that the inundation of these colonies was not due to release of excess water from the dam but was due to reverse influx of drainage water that was being released to the left bank canal of the dam. The Assistant Executive Engineer who was part of the inspection stated that during the rainy season whenever there is an increase in water levels, the drainage water flows back to the houses and nearby fields due to non-availability of outflow path.

Scrutiny of records showed that the Karnataka Neeravari Nigam Limited had addressed several letters to the Commissioner of Shivamogga City Corporation and also to the Principal Secretary, Director of Municipal Administration, DC, Shivamogga, Chief Executive Officer, Zilla Panchayat, Shivamogga since 2016 onwards. However, no action was taken to set right the lacuna in the drainage system. The correspondence also highlighted the extreme need for creating an alternate arrangement for drainage flow to avoid not only the inundation but also to safeguard the inhabitants from water contamination and related health hazards.

The above illustration indicates the inability of the district administration to take corrective structural measures and make the district better disaster resilient.

Undertaking necessary structural measures, which consist of various physical infrastructure and facilities required to help communities cope with disasters, was one of the components of FRM aimed at enhancing resilience to flood hazards. Audit observed that though the State was recurrently affected by floods either riverine or by rainwater inundation, the State Government and the district administration had not initiated necessary permanent structural measures to mitigate the impact of the flood menace. Photographs showing the damage caused by floods are shown in **Exhibit 5.4**.

Exhibit 5.4: Photographs showing the damage caused by the floods in test-checked districts due to the absence of structural measures

Belagavi – 2019

Kalaburagi – 2020

Chikkaballapura – 2019

Dakshina Kannada – 2022

Source: Media reports.

The Deputy Commissioners of Dakshina Kannada, Davanagere and Kodagu districts replied that structural measures were not taken up and affected population/communities were financially compensated towards the damages caused. The reply is indicative of the fact that the authorities were not adequately inclined towards disaster risk reduction measures to avoid/mitigate the ill-effects of hazards.

The Government replied (August 2024) that the departments concerned would be urged to undertake suitable structural and non-structural mitigation measures.

Recommendation 13: The State Government should implement structural and non-structural measures by involving all line departments to mitigate recurrent floods and reduce damage to public infrastructure.

5.4.2.1 Non-involvement of line departments

Audit observed that both the SDMP as well as the State Action Plan for Flood Risk Management 2021 assigned certain additional responsibilities (under various themes) to the departments like Public Works Department, Rural Development and Panchayat Raj, Housing, Urban Development, Water Resources Department, *etc*., for taking up structural and non-structural measures as mitigative action against flood in the State. The structural measures included works like assessing vulnerability and taking up necessary action for strengthening roads/ highways/expressways by implementing DRR measures, construction of multi-purpose shelters, identification of sites for flood resistant constructions, designing critical infrastructure duly assessing the high flood levels/flood frequency, strengthening the existing critical infrastructure through retrofitting, *etc*. The non-structural measures involved measures like regulation and enforcement of

laws/norms, wetland conservation and restoration, catchment area treatment, promoting private participation in disaster management projects, *etc*.

During the course of audit, documentation was not available to indicate the involvement of the Revenue Department (Disaster Management) with the line departments regarding preparation of Flood Action Plan or SDMPs. Besides, the nodal department had not communicated the Flood Action Plan to any of the departments for initiating required action on assigned responsibilities. Consequently, neither the State Government/departments nor the district administrations had initiated proper measures towards any sort of structural/non-structural flood mitigative measures, and thus, exposed the State to unceasing distress.

The Government, during the exit conference, acknowledged the observations and stated that issues would be looked into, and action would be taken to comply with the NDMA guidelines and replied (August 2024) that the departments concerned would be urged to strictly implement regulations in flood prone area. However, the need for structural and non-structural measures in sync with the line departments need to be prioritized.

5.4.3 Absence of Safety Audit

Damage to houses and infrastructure is one of the major destructions caused by the floods invariably across the State and the State Government was compensating towards damage of houses after the hazard had occurred. Despite compensating for damages due to disasters, the authorities did not insist on/ensure construction of disaster resilient houses by the beneficiaries.

Audit observed that the SDMPs mentioned about the safety audit of infrastructure only against the hazards of earthquake and tsunami. However, a large number of houses and infrastructure in the State were being affected by floods and consequent landslides. Thus, safety audit of houses and infrastructure in districts vulnerable to flood would lead to taking up disaster resilient retrofitting and rectification actions timely besides avoiding loss and risk to property. Safety audit would also minimise substantial financial burden towards payment of compensation.

The Government accepted (January 2024) during exit conference the concept of a safety audit of houses which can avoid/minimise damage to houses as well as expenditure towards payment of compensation.

5.5 Relief towards Flood/Rain Damage

The global and national frameworks advocated drifting towards disaster risk reduction from the earlier relief-centric concept, which benefits the Government by not only reducing continued financial burden but also by leaping towards building disaster resilience while minimising damage to infrastructure and human lives.

Audit observed that instead of initiating/exploring measures towards efficient DRR, the Government persisted in compensating the flood-affected population financially as per NDRF/SDRF norms and extending additional assistance from State funds. Compensation towards damage to houses and crop loss (input subsidy) *inter alia,* comprised the major fraction of financial assistance extended to flood/rain-affected population.

Lacunae noticed in the provision of relief assistance to the flood/rain affected population in the State and test-checked districts are discussed in subsequent paragraphs.

5.5.1 Non-maintenance of incident-wise data of expenditure

For better management of disasters and to mitigate the related issues, Government was required to implement robust data management practices, ensuring that incidence-wise expenditure data is maintained, regularly updated and reviewed. This would also benefit the Government/decision makers to assess the magnitude of the disaster *vis-à-vis* expenditure booked by the ground authorities besides planning better management.

However, the State Government/nodal department was not in possession of the details of either incident-wise or disaster-wise expenditure. Hence, audit could not assess and vouch for component-wise expenditure towards flood compensation.

5.5.2 Compensation towards house damage

SDRF norms prescribed (April 2015) compensation to be paid under two categories for damage caused to the building *i.e.*, (i) fully damaged/ destroyed and severely damaged houses and (ii) partially damaged houses. The beneficiary was eligible for compensation only if the damage was at least 15 *per cent*. The State Government, however, categorised damage into four types as shown in **Table 5.4.**

Table 5.4: Categorisation of damage and compensation thereon

(Amount in ₹)

Category		Categorization based on the extent of damage	Compensation as per SDRF/NDRF norms	Additional assistance by State Government	Total compensation paid
A		Fully damaged – more than 75 *per cent*	95,100	4,04,900	5,00,000
B	B2	Severe damage - (reconstruction) 25 to 75 *per cent*	95,100	4,04,900	5,00,000
	B1	Severe damage - (repair) 25 to 75 *per cent*	95,100	2,04,900	3,00,000
C		Partial damage – 15 to 25 *per cent*	5,200	44,800	50,000

Source: State Government orders.

The State Government has not prescribed any specific mechanism for inspection of damaged houses. As per the prevailing procedure, on reporting an incidence of house damage/collapse, the revenue authorities at the village level inspect the spot and prepare a report assessing the damage by visual means. Subsequently, the Engineer of concerned local body certifies the extent of damage for payment of compensation to the affected family.

In this regard audit observed the following:

- The State Government issued orders/instructions imposing/withdrawing conditions time and again for payment of compensation, which resulted in the district authorities not having a definite set of guidelines and formats for obtaining information and thus, payments were made arbitrarily. (For *e.g.,* order instructing payment of damage compensation based on the percentage of damage and its withdrawal, frequent changes in categorisation of damage, *etc*.);
- The higher compensation announced annually by the State Government based on the severity of the rainfall was limited 'only for a specific period in a year (monsoon)'. The houses damaged due to rainfall/other hazards during the other period/months of the year were not eligible for higher compensation. Random verification of a few individual payment files showed that photographs which

neither had GPS coordinates nor the signs of rain/wetness on the damaged portion/collapsed buildings formed the basis for payment. The records in support of having rained on the date of damage as per the claim, press clippings *etc.*, were also not available. Thus, the possibility of claiming/payment of compensation at a higher rate, even for the houses damaged during the period outside the duration of the calamity, cannot be ruled out.

- It can be seen from **Table 5.4** that 25 *per cent* damage overlapped between two categories – B (B1, B2) and C with significant differences in compensation prescribed. Audit noticed ten instances where damage recorded as 25 *per cent* was paid lower compensation under the 'C category' in certain cases while it was considered as 'B category' in certain other cases and paid higher compensation. This ambiguity allowed Engineers to manipulate (increase/decrease) the percentage of damage initially assessed by the local authorities, to fit the case into a higher or lower category **(Appendix 5.2a)**.

- The absence of definite guidelines on the classification of damage and the huge difference in payment of compensation between categories allowed for arbitrary classification by the authorities. Damages assessed between 70-75 *per cent* (13 instances) were categorised as B1/C while damages of 26-40 *per cent* (29 instances) were categorised as B2/C (**Appendix 5.2b**).

Illustration

In Haveri district, 696 house damages initially categorised as C were subsequently categorised (reportedly on re-verification) as B1/B2 with an increase in financial assistance from ₹50,500 to ₹3.00/5.00 lakh per unit. The district authorities did not explain the reasons for the huge upward variation in assessment of damage from the minor repair level to reconstruction level. In view of the significant difference in the quantum of compensation between the two categories (B1 and B2), audit could not rule out the possibility of fraudulent practices in certifying the extent of damage (**Appendix 5.2c)**.

Audit also noticed that a total of 2,503 houses in eight taluks of Haveri district were identified as damaged under various categories during the year 2020-21 even when the rainfall received was less than normal (the departure from normal rainfall ranged between -13 and +8). A total compensation of ₹64.00 crore[35] *was paid in these cases. Hence, there was no relation between scientific evidence and hazard data.*

- The compensation amount of ₹95,100 prescribed as per SDRF norms for A and B categories was to be paid to the affected persons by the taluk authorities immediately on approval of the case, through bank transfers. However, the additional financing by the State Government was to be obtained through Rajiv Gandhi Rural Housing Corporation Limited[36] (RGRHCL) in four instalments based on the progress of repair/reconstruction. The details of compensation cases sanctioned for A and B categories in the State during the period from 2019-20 to 2022-23 and the status of construction is shown in **Table 5.5**.

[35] Category A - ₹91,00,000; Category B1 - ₹33,50,000; Category B2 - ₹60,13,00,000; Category C - ₹2,62,75,000.

[36] The nodal agency for implementation of rural housing schemes in the State.

Table 5.5 Statement [37] showing the status of construction in respect of compensation cases sanctioned

(number)

Year	Compensation cases sanctioned	Completed houses	Houses in progress	Construction not started
2019-20	43,397	27,691	8,756	6,950
2020-21	8,911	4,876	3,005	1,030
2021-22	27,039	9,819	12,002	5,218
2022-23	31,060	2,804	18,958	9,298
Total	**1,10,407**	**45,190**	**42,721**	**22,496**

Source: Compiled by audit from online data available on RGRHCL portal.

A damaged house for which a compensation of ₹ 95,100 (as per norms) as first instalment was paid was required to commence the reconstruction of house immediately and complete it as early as possible. However, it could be observed from the table above that 22,496 houses for which a total compensation of ₹213.94 crore had been paid, did not commence the construction even after two-three years of damage/payment of compensation. Apparently, these beneficiaries either had alternative dwelling arrangements and were not in need of the additional compensation or the assessments made were not correct.

As a result, ₹213.94 crore[38] paid towards compensation remained unfruitful as the very objective of providing proper accommodation to the affected beneficiaries remained defeated. It could also be seen that in 23,763 cases where compensation was paid prior to 2022-23, construction was at various stages of completion and remained incomplete.

The State Government instructed (October 2022) the DCs of the districts to cancel the compensation sanctioned in respect of houses where construction had not commenced and to issue notices for speedy completion in respect of lingering houses. However, records showed that no action had been taken in this regard by the concerned officers.

- On a house being damaged by flood/rain, it is stipulated that the local revenue authorities were to inspect the spot for assessing the damage and obtain a certificate from the Engineer concerned which was to be approved by the Tahsildar for initial payment and then by the DC for forwarding the case to RGRHCL for further monitoring and payment. RGRHCL was not required to inspect the damaged house or certify the damage but was only to monitor further progress and make payments thereon. However, audit observed discrepancies between categorisation as per taluk authorities and that exhibited in the RGRHCL portal. Cases assessed as category A / B2 were revised to B1 (32 instances) and vice-versa (18 instances) and also A / B1 / B2 was categorised as C (22 instances) (**Appendix 5.2d**). It was not forthcoming as to how RGRHCL authorities revised/modified the category without physical inspection of the house. Inappropriate change of categorisation by RGRHCL, without physically verifying the damaged house, points towards the possibility of depriving the actually damaged house/beneficiary from getting the correct compensation and benefitting an ineligible beneficiary with higher amount of compensation. Matter needs to be investigated.
- One-time financial assistance of ₹50,000 under category C was being paid to the affected families for immediate repair. There was, however, no system in

[37] The figures shown for these cases are year specific and are not progressive.
[38] Construction not started (22,496) * Initial payment (₹95,100) = ₹213.94 crore.

place to check whether the beneficiary had utilised the compensation for carrying out the repairs.

- Once a house was compensated for damage due to a calamity, the State Government should have ensured disaster resilient construction/repair. However, the State Government permitted (2022) to extend house damage compensation though the same house was provided compensation under the "C" category during the previous years. This showed that the State Government was more intent on providing assistance rather than ensuring that the constructions/repairs taken up were disaster resilient.
- The State Government also permitted (2022) damage compensation payments to houses constructed under various government schemes which again indicates that the houses constructed earlier were not disaster-resilient.
- There were 41 instances (**Appendix 5.2e),** where the compensation was paid based only on the assessment done by local authorities and without certification by the Engineer concerned.
- No timelines were prescribed for completion of the construction of houses.

Audit could not ascertain as to how one could assess and decide the extent of physical damage upto a particular percentage just through visual means without any scientific or engineering basis. Audit observed instances of payments though the damage was not clearly visible from the photographs placed on record. Thus, the compensation payments were being made without comprehensive guidelines for damage assessment and proper validation measures and hence, extension of undue benefits cannot be ruled out.

At the instance of audit, the State Government revised (August 2024) the percentage of damage as well as quantum of compensation towards house damages due to rain/flood caused only during the monsoon period[39]. On verification of the revised order, audit observed that the Government had not acted upon other findings in the process of payment of compensation like visual assessment of damage, precautionary measures towards the possibility of claiming/payment of compensation at higher rates, ensuring actual execution of repair work, insisting on disaster resilience to avoid repetition of damage/claims, *etc*.

The Government replied (August 2024) that the compensation towards house damage due to rain has been revised for the year 2024-25. However, no action has been taken by the State Government to investigate omissions pointed out by Audit and to fix responsibility on the erring officials.

5.5.3 Input subsidy for crop loss

The loss of crops had been catastrophic in the State due to various types of hazards, predominantly flood and drought and compensation was paid (including both SDRF and State grants) by the State Government through the *Parihara* portal, as shown in **Table 5.6**.

Table 5.6: Details of crop compensation as per *Parihara* portal

Category	Type of crop	Maximum eligible amount for prescribed two hectares	
		Rainfed	Irrigation
A	Agriculture/horticulture/annual plantation crops	₹27,200	₹50,000
B	Perennial crops	₹56,000	₹56,000
C	Loss of land due to silt	₹24,400	
D	Loss of substantial portion of land	₹75,000	

[39] Off-monsoon period damages to be paid as per SDRF norms.

Audit obtained and analysed the data dump of *Parihara* covering the period 2017-18 to 2022-23. As per the information available on *Parihara* portal, a total of ₹6,752.28 crore had been paid in respect of 5,91,302 number of cases during the period 2018-19 to 2022-23 through *Parihara* portal.

Random verification of the data (through input of data like individual Aadhaar number, year, season, calamity, *etc*.,) showed instances of compensation having been paid in violation of the guidelines (**Appendix 5.3)** and thus, were ineligible as listed below:

i) Farmers were given compensation more than the eligible amount in one season under category A and category B.
ii) Farmers having more than two hectares of land were given compensation under categories C and D.
iii) Farmers receiving compensation under categories of both A/B and D for the same survey numbers and in the same season.

The above instances are only illustrative but not exhaustive. The Government needs to verify and initiate action to ensure payments to only genuine beneficiaries.

5.5.3.1 Irregularities noticed in distribution of crop loss compensation during the year 2019-20

In Haveri district, audit observed that the DC/ADC had booked (February 2020) complaints with the police authorities on the Tahsildars of all the eight taluks under the district alleging fraudulent payments of input subsidy towards loss of crops due to flood during the year 2019-20 and in turn, the police authorities had submitted the first information reports to the concerned jurisdictional magistrate courts.

As per the procedure, the data entry operator at the taluk level was to enter all the details of the beneficiary into the different modules of the portal for submission to the next higher level. In case of any difference in name and aadhaar number of the beneficiary between the e-file submitted by the operator and the RTC[40] data, the Village Accountant concerned should send back the file to the operator for correction and the corrected file was to be approved by the Tahsildar. The consolidated file of all the beneficiaries (in the form of XML file) would be further submitted to DC for approval and payment.

As audit observed that the *Parihara* portal permits an option to the Village Accountant and the Tahsildar to approve the case, even when the details of beneficiaries differ from the RTC records in specific cases like death of the original landholder, sale of land, donated land, *etc*. Exploiting this option, the Village Accountant and the Tahsildars of these taluks had irregularly approved payments towards input subsidy in cases where there were differences in the name of the landholder, survey number belonging to Government land/religious places, *etc*., and made payments to fictitious bank accounts.

However, despite passage of three years after filing of FIRs, no action had been taken by the DC, Haveri to expedite inquiry and take action on the delinquent officials. The DC, Haveri not only did not follow up the case expeditiously but also did not conduct an internal departmental inquiry against the subordinate officials.

The Government replied (August 2024) that the DC, Haveri had been directed to expedite inquiries and take legal action against the erring officials.

[40] Record of Rights, Tenancy and Crop Information.

5.5.4 Omissions in compensation towards water flooding into houses

Habitations/houses constructed in low-lying areas are more prone to inundation during heavy rainfall. Non-enforcement of building bye-law regulations and lack of preparedness results in houses getting flooded during heavy rainfall being a common and regular phenomenon.

As per SDRF norms, houses affected due to water flooding/inundation for more than two days (causing damage to household articles and foodgrains) were to be paid a compensation of ₹10,000 (which included a State additional grant of ₹6,200). The norms did not prescribe any spot verification/inspection by authorities for payment of compensation. An application with a photograph would make a beneficiary eligible for payment. The compensation towards this component was invariably paid in all the test-checked districts. Verification of records showed the following omissions.

- Though water flooding was a regular feature for dwelling units constructed along river/water courses, the State/district authorities did not take action to rehabilitate inhabitants of such houses to safer locations or avoid flooding through structural measures.
- There was no documentary evidence on record in support of the claim that houses were inundated for more than 48 hours which had caused damage to household articles and food grains.
- In certain cases, the photographs showed water stagnation only in the outer premises of the house, without a photograph of water flooding into the house.

The payment of compensation without initiating preventive measures and proper verification facilitated such people to continue residing at places exposed to danger. The compensation payment, therefore, had become a source of regular income for the families living in such houses.

Recommendation 14: The State Government should streamline the procedure for payment of compensation towards damages preventing ineligible payments and fixing accountability on concerned officials for any irregularities.

5.6 Rehabilitation

Rehabilitation and reconstruction are important components of disaster management. In accordance with Section 39(f)(iii) of DM Act, the State Government is responsible for carrying out rehabilitation and reconstruction. Rehabilitation refers to the restoration of basic services and facilities for the functioning of a community or a society affected by a disaster.

Among the test-checked districts, the rehabilitation activities for flood hazard were initiated only in Haveri district. Audit observations noticed thereon are discussed in subsequent paragraphs.

5.6.1 Delay in providing rehabilitation to flood-affected Mustur village

The Mustur village in Ranebennur taluk of Haveri district consists of nearly 350 families and is located on the banks of both Tungabhadra and Kumudavathi rivers and hence was recurrently affected by flood. The then Member of the Legislative Assembly submitted (1992) a proposal to shift the village to a safer location but the same was not done. The distressed village people subsequently represented (July 2014) to the Tahsildar, Ranebennur taluk for shifting the families and providing flood-safe houses.

On verification of records and joint physical inspection (June 2023) of the work site, audit observed that construction of a total of 232 houses was approved by the State Government (May 2016) at a total outlay of ₹17.14 crore. However, only a sum of ₹3.30 crore was released (October 2016) to the contractor (Nirmithi Kendra) through DC, Haveri. Hence, contractor could only ensure partial completion of 116 houses (May 2019) without any basic infrastructure and work remained incomplete since then. However, many families had already occupied the houses though they were not handed over to the department by the agency.

The fact that families occupied the houses that were partially constructed and were without any infrastructure shows the urgent circumstances under which they continued to live earlier. The other families who were either not allotted houses or the construction had not commenced/completed were forced to continue to live in the village with danger of floods.

The fact clearly exhibits incomplete action by the Government/district administration towards providing safer living standards to the flood distressed population even after 30 years of the proposal. Further measures initiated towards achieving envisioned disaster risk reduction, were ineffective.

The Government did not furnish any specific reply to the observation.

5.6.2 Safer residential sites not provided to flood affected families

The villages of Kudala, Allapura, Haravi and Haranagiri in Hanagal taluk of Haveri district were recurrently affected by the flooding of Varada River water. Hence, the Grama Panchayat, Kudala submitted (August 2019) a proposal to the Tahsildar, Hanagal for shifting the affected families to a nearby safer location. The Tahsildar, Hanagal in turn forwarded a proposal (March 2020) to the DC, Haveri for providing residential sites to the affected families of these villages in Maranabeeda village and the DC ordered (September 2020) to reserve the required land for the said purpose.

Audit observed that no action was taken in this regard even as of June 2023. In the meantime, 52 houses in these villages were damaged due to flood/rain and were paid compensation (April 2020) as per SDRF norms. The Additional Deputy Commissioner, Haveri replied (June 2023) that the villages were affected only during 2019-20 and were not affected during subsequent years and thus, there was no proposal for shifting these villages.

Since the proposal was made by the rural population and accepted by the DC on grounds that the villages were being affected by recurrent floods, inaction by the authorities either to provide safer sites or initiate adequate structural measures to avoid flooding is fraught with the risk of exposing the rural population to recurrent danger.

The Government did not furnish any specific reply to the observation.

5.7 Reconstruction of Infrastructure Damaged by Flood Hazard

Reconstruction is the restoration or replacement of severely damaged physical structures, utilities and local infrastructure to its original status. Reconstruction must be fully integrated into ongoing long-term development plans, taking account of future disaster risks. The responsibility of taking up permanent restoration/ reconstruction vests with the respective departments through financing from their regular budgetary grants.

While the nodal department was compiling the data on damages to different types of infrastructure by natural calamities, it was not in possession of the details regarding reconstruction/restoration of damages by the line departments, indicating ineffective monitoring towards providing basic connectivity/services to the affected population.

Though restoration works were taken up and completed, the expenditure incurred for the works was in excess of the SDRF norms in many cases as pointed out in Paragraph 3.1.8. Audit also observed that there were delays in taking up reconstruction/restoration works. Audit conducted a joint physical inspection (October 2022) of three bridges and two roads (State highway) damaged due to flood during the year 2022-23 in Ramanagara district and noticed that the bridges/roads had not been restored and as a result, the public were forced to take alternate longer routes.

Illustrative photographs taken during the JPV of damaged bridges are shown in **Exhibit 5.5** below:

Exhibit 5.5: Photographs showing the damaged major bridges

Source: Photographs taken during the JPV.

Scrutiny of the proposals showed that the individual restoration works were estimated to cost between ₹5 lakh and ₹15 crore. With respect to the above two bridge works (Harisandra and Manchenabele), DPRs were under preparation and the restoration works were in progress for one bridge (Suggenahalli).