BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL

PRINCIPAL BENCH, NEW DELHI

Original Application No. 303 of 2023

Karnvir Thamman

.....Petitioner/Applicant

Versus

State of Punjab and Others

.....Respondents

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Submitted by :

Place: Chandigarh

Dated:

(Krishan Kumar)
Principal Secretary to the
Government of Punjab,
Department of Water Resources,
Chandigarh.

3145

BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL

PRINCIPAL BENCH, NEW DELHI

Original Application No. 303 of 2023

Karnvir Thamman (aged about 52 years) S/o Sh. Sham Lal Thamman, R/o Imli Wala Mohalla, Banur, Tehsil & District SAS Nagar, Mohali (Punjab), Mobile No. 9872305234, Email Address: shentythamman@gmail.com

.....Applicant

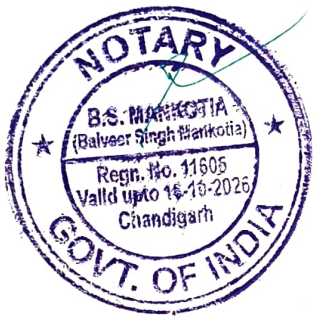
Versus

1. State of Punjab through its Chief Secretary, Punjab Civil Secretariat, Chandigarh, Contact No. 0172-2740156, Email Address:- cs@punjab.gov.in .
2. Department of Water Resources, Government of Punjab, through its Principal Secretary, Room no. 606, 6th floor, sector-9, Mini Secretariat, Chandigarh. 16009, Email- ps@punjab.gov.in Contact no-0172-2742307.
3. Director, Department of Rural Development and Panchayat, Government of Punjab, Vikas Bhawan, Sarovar Path, Phase 8, Sector 62, SAS Nagar (Mohali)- 160062, Contact No. 0172-5062522, Email Address:- dir.rdp@punjab.gov.in
4. Punjab Pollution Control Board, Punjab Zonal Office-1, Vatavaran Bhawan, Nabha Road, Patiala through its Secretary, Contact no. 0175-2215793, Email chairman.ptl.ppcb@punjab.gov.in
5. Deputy Commissioner cum District Magistrate Ferozepur, Deputy Commsioner Office 1st Floor, DC Office, District Administrative

Complex, Ferozpur Cantt 152001, Contact no. 01632-244054, email- dc.frz@punjab.gov.in

6. Deputy Commissioner, Tarn Taran, District Administrative Complex, Harike Road, Tarn Taran, Punjab. Pin Code- 143401, Contact no. 01852-2241101, email- dc.ttn@punjab.gov.in

.....Respondents



Status report by way of Affidavit of Krishan Kumar, Principal Secretary to Government of Punjab, Department of Water Resources, Chandigarh on behalf of Respondents No. 1 & 2.

RESPECTFULLY SHOWETH: -

I, the above named deponent do hereby solemnly affirm and declare as under: -

1. That the present Original Application is pending adjudication before this Hon'ble Tribunal and is listed for hearing on 15.01.2025.

2. That through the present Original Application, the applicant has inter-alia, sought directions from this Hon'ble Tribunal to the respondents to place on record all the relevant material justifying the issuance of the Notification and the material on the basis of which the flood plain zone has been notified.

3. That on previous date of hearing i.e. 11.09.2024, this Hon'ble Tribunal has directed that the compliance report disclosing the details of demarcated flood plain on the stretch in question be filed

in the first week of January, 2025. The order dated 11.09.2024 is being reproduced as under:-

1. *"The issue under consideration is about demarcation of flood plain zone of river Sutlej in 47 kilometre stretch of District Ferozpur and Tarn Taran.*
2. *Dr. Harinder Bedi, Chief Engineer, Mining Operation, State of Punjab appearing virtually has stated that, he has been authorized by the Chief Secretary, State of Punjab to appear on his behalf. On instructions from the Chief Secretary he has made a statement that the work of demarcation of the flood plain zone of River Sutlej in the stretch under consideration in district Ferozpur and Tarn Taran will be completed by 31.12.2024.*
3. *Let the compliance report disclosing the details of demarcated flood plain on the stretch in question be filed in the first week of January, 2025.*
4. *List on 15.01.2025."*

4. That in this regard, it is respectfully submitted that a project namely "Provision of services for acquisition, processing and delivery of Digital Elevation Model (DEM) and Digital Ortho-Image for Flood Risk Mitigation/Mapping of areas along the Sutlej, Beas and Ghaggar rivers" is in process of its approval under State Disaster Mitigation Fund. Copy of above Project is annexed herewith as Annexure R-1.

5. That the answering Respondent No.2 vide letter dated 16/09/2024, apprised the Special Chief Secretary, Department of Revenue, Rehabilitation and Disaster Management, Punjab that a

NOTARY B.S. MANKOTIA (Balveer Singh Mankotia) Regn. No. 11605 Valid upto 16-10-2026 Chandigarh GOVT. OF INDIA

joint committee of the members of Punjab, Himachal Pradesh and Uttrakhand was constituted by the Government of India on the subject i.e. Provision of services for acquisition, processing, and delivery of Digital Elevation Model (DEM) and Digital Ortho-Image for Flood Risk Mitigation/ Mapping of areas along the Sutlej, Beas, and Ghaggar rivers. It was also apprised that the committee had recommended that the DEM survey of river Sutlej is required to be carried out and is essential for protecting the human life, infrastructure and agricultural lands from floods caused by the floods. A proposal was accordingly sent to the Special Chief Secretary, Department of Revenue, Rehabilitation and Disaster Management, Punjab to consider the same under SDMF alongwith agenda for the meeting for approval, who made some observations/suggestions vide their letter dated 26/09/2024. Copies of letter dated 16.09.2024 and 26.09.2024 are annexed herewith as Annexure R-2 and R-3 respectively.

6. That the answering respondent No.2 vide letter dated 09/10/2024, again submitted this project to the Special Chief Secretary, Department of Revenue, Rehabilitation and Disaster Management, Punjab after rectifications and amendments as suggested vide their letter dated 26/09/2024. Copy of letter dated 09.10.2024 is annexed herewith as Annexure R-4.

7. That the 5th meeting of the Technical Advisory Committee of SDMF was held under the Chairmanship of SH. Hapreet Singh Sudan, IAS, Special Secretary (Revenue) and Director (Disaster Management), Department of Revenue, Rehabilitation and Disaster Management, Government of Punjab on 06/11/2024.

During this meeting the project was appraised by Technical Advisory Committee of State Disaster Mitigation Fund (SDMF). The technical members of the committee deliberated upon the submitted projects from the Water Resources Department & PAU, and after detailed discussions decisions were taken accordingly. A copy of proceedings of the 5th meeting of the Technical Advisory Committee of the State Disaster Mitigation Fund (SDMF) dated 12.11.2024 is annexed herewith as Annexure R-5.

8. That the answering respondent No.2 vide letter dated 23.12.2024 requested the Additional Chief Secretary Cum-Financial Commissioner, Revenue, Department of Revenue, Rehabilitation & Disaster Management, Government of Punjab to schedule the Project Appraisal Committee (PAC) Meeting for appraisal of (PFR) and Detailed Project Report (DPR) so that the Department of Water Resources can carry out the further necessary action regarding tendering/execution of the work. Copy of letter dated 23/12/2024 is annexed herewith as Annexure R-6.

9. That it is respectfully submitted that the demarcation of Flood Plain Zoning is a comprehensive exercise. The Central Water Commission (CWC) vide letter dated 08.08.2024 has denied to carry out the requisite work for the State and suggested that the State Government may hire a suitable agency which can do the above referred studies and provide the agency the required data required for the studies. The CWC further informed that it shall provide required inputs for the studies, and would also provide inputs on the draft report. Therefore, the State needs to carry out this work through a certified outsourced agency for which project

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has been prepared and is in various stages of its approval. Copy of letter dated 08.08.2024 is annexed herewith as Annexure R-7.

10. That it is further respectfully submitted that the Department has procured Drones for surveying but since it is a comprehensive exercise which will take long sufficient time for department to carry out on its own, so it has been decided to get it done through another agency.

11. That due to the above said reason, the work of demarcation of the flood plain zone of River Sutlej in the stretch under consideration in district Ferozepur and Tarn Taran is not yet completed and it would take some more time as explained above.

12. That it is humbly requested that State Government is taking this flood plain zoning work on priority and the department is making full endeavors to complete this flood plain zoning work in the shortest time possible.

In view of the submissions made herein above, it is respectfully prayed that the above status report/information may kindly be taken on record and sufficient long time may kindly be granted to the State of Punjab to complete the flood plain Zone work, in the interest of justice.

NOTARY B.S. MANKOTIA (Balveer Singh Mankotia) Regn. No. 11605 Valid upto 16-10-2026 Chandigarh GOVT. OF INDIA

Deponent

Place: Chandigarh

Dated: 13 JAN 2025

(Krishan Kumar)
Principal Secretary to the
Government of Punjab,
Department of Water Resources,
Chandigarh.

VERIFICATION:-

Verified that the contents of para No. 1 to 12 of the above affidavit are true and correct to my knowledge as per information derived from the official record. No part of it is false and nothing material has been kept concealed therein.

Deponent

Place: Chandigarh

Dated: 13 JAN 2025

(Krishan Kumar)
Principal Secretary to the
Government of Punjab,
Department of Water Resources,
Chandigarh.

NOTARY
B.S. MANKOTIA
(Balveer Singh Mankotia)
Regn. No. 11605
Valid upto 16-10-2026
Chandigarh
GOVT. OF INDIA

Certified that the Affidavit/SPA/GPA has been read over & Explained to the Deponent/Executant who seemed directly to understand the same at the time of making & signing the document.

ATTESTED AS IDENTIFIED

NOTARY, GOVT. OF INDIA
CHANDIGARH (U.T.)

13 JAN 2025

GOVERNMENT OF PUNJAB

WATER RESOURCES DEPARTMENT,

PUNJAB

DETAILED PROJECT REPORT (DPR)

FOR

PROVISION OF SERVICES FOR ACQUISITION, PROCESSING AND DELIVERY OF DIGITAL ELEVATION MODEL AND DIGITAL ORTHO-IMAGE FOR FLOOD RISK MITIGATION/MAPPING OF AREA ALONG RIVER SUTLEJ.

Submitted by: -

Executive Engineer, Ludhiana
Drainage -cum- Mining and Geology
Division Ludhiana, WRD, Punjab.

EXECUTIVE SUMMARY

Punjab, located in the northwest region of India, shares its borders with Pakistan on the West, the Indian States of Jammu and Kashmir on the North, Himachal Pradesh on its North-east and Haryana & Rajasthan to its South. The state spans an area of 50362 square kilometers and occupies 1.54% of India's total geographical area. Its capital city is Chandigarh. As of Census 2011, the total population of Punjab stands at 277.04 lacs, with the rural population accounting for around 173.05 lacs and the urban population at 103.99 lacs. Punjab is divided into twenty-three districts, each under the administrative control of a District Collector. The state also boasts 169 urban local bodies.

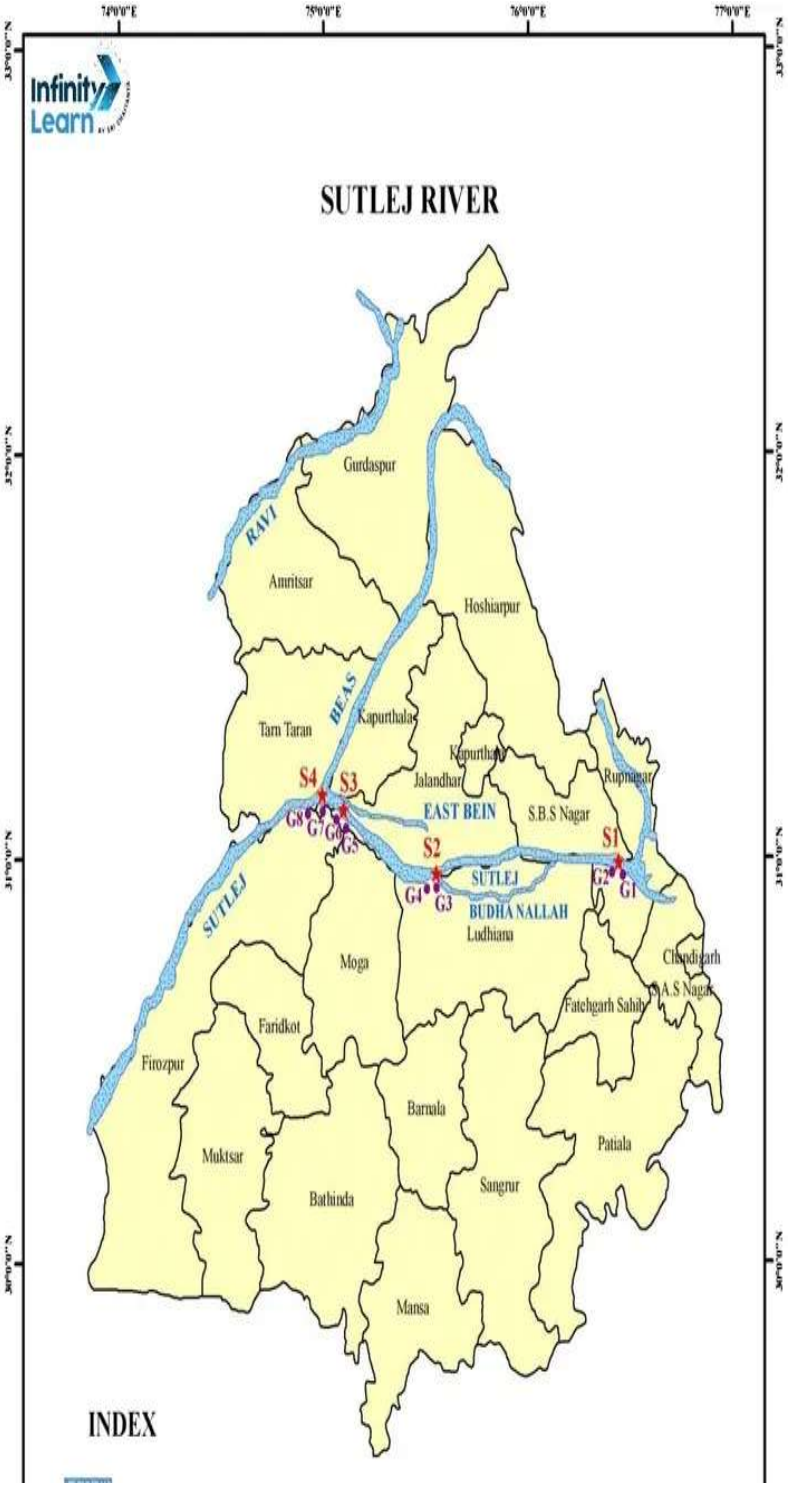
Punjab, known as the granary state of India, heavily relies on agriculture for its input-output system. Timely irrigation plays a vital role in sustaining agriculture, as most of it depends on monsoon. Unfortunately, global warming has already impacted monsoons, making it more important than ever to have proper irrigation systems in place. This is especially true for agriculture in the rain-fed, drought-prone, desert, and high-hill regions with scanty rains. Punjab's agriculture provides essential food security for the country, but the expansion of economic activities and high-yielding cash crops has led to an increasing demand for water, causing great stress on available water resources in the State.

In the circumstances when the temperature is rising globally and glaciers are melting, increasing the river levels and thereby may lead to devastating effects on the areas near these rivers; it becomes essential to make strategies for flood risk mitigation which may help in reducing the stress on the river infrastructure and the precious lives, livestock and livelihood is saved.

To relieve stress, there is a greater need for an efficient flood mitigation system with the help of the community awareness which can help for protection of the lives, livestock lives, livelihood, and infrastructure such as roads, bridges, etc. Given that water is a precious natural resource, every single drop must be utilized efficiently. As this project has been prepared for flood mitigation measures by doing Digital Elevation Modelling (DEM) using LiDAR and Remote sensing technique in River Sutlej by which flood routing and topography of river can be determine for better preparedness done by Department of Water Resources and local administration can conduct flood preparation works effectively.

Preparation of Proposal under SDMF:-

- The proposal has been prepared following the Guidelines issued by the National Disaster Management Authority, Government of India vide dated 14.01.2022, 28.02.2022 and 06.03.2023.
- It is hereby clarified that the funds requested under proposed DPR shall not be used for general environment improvement or landscape beautification and for funding the existing Government programmes/ongoing schemes etc.
- It is clarified that funds shall not be utilized for regular maintenance and upkeep of any structure or engineering measure aimed at mitigation.
- It is clarified that funds shall not be utilized towards the establishment expenditure such as salaries, office expenditures etc.
- Sutlej flows 306 Kms upto International Border in Punjab (India)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Rupnagar
S.B.S Nagar
EAST BEIN
SUTLEJ
BUDHA NALLAH
Ludhiana
Moga
Faridkot
Firozpur
Muktsar
Bathinda
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DECLARATION

It is certified that:

i) Funds available under SDMF shall not be used for general environmental improvement or landscape beautification and for funding the existing Government programmes/ongoing schemes etc.

ii) Mitigation Fund should generally not be used for maintenance and upkeep of any structure or engineering measure aimed at mitigation. This fund should be used for developing and implementing new projects. The mitigation measures that have been implemented, should be maintained through other sources of funding.

iii) Resources under Mitigation Fund cannot be used towards the establishment expenditure such as salaries, office expenditure etc. to be incurred by the Disaster Management Authorities or other entities, except for payment of remuneration to technical staff included in the project's costs. Such payments will be as per the GFR2017 and extant Government of India guidelines.

Sub Divisional Officer
Phillaur Bandh SubDivision
Ludhiana

Executive Engineer
Drainage-cum-Mining & Geology Division
Water Resources Department, Punjab

DECLARATION

1. Pursuant to the recommendation of the Technical Advisory Committee (TAC), it is hereby declared that the social auditing of the project will be conducted by forming committees consisting of key stakeholders at the village level, which may include Sarpanches, Namberdars, or other relevant stakeholder.
2. Furthermore, it is affirmed that all statutory regulations have been taken into account during the project's formulation, and the project proponent will strictly adhere to the statutory norms and guidelines throughout its implementation phase.

Sub Divisional Officer
Phillaur Bandh SubDivision
Ludhiana

Executive Engineer
Drainage-cum-Mining & Geology Division
Water Resources Department, Punjab

1.0	**Applicant Details**			
1.1	Name of Applicant Department / Organization	Executive Engineer, Ludhiana Drainage cum Mining & Geology Division, WRD, Ludhiana, Punjab.		
1.2	Type of Organization	State Government Department		
1.3	Address	Ludhiana Drainage cum Mining & Geology Division, WRD, Ludhiana, Punjab		
1.4	State/UT	Punjab		
1.5	District	Ludhiana		
1.6	City	Ludhiana		
1.7	Pin code	141013		
1.8	Project Point of Contact	Executive Engineer, Ludhiana Drainage cum Mining & Geology Division, WRD, Ludhiana, Punjab.		
1.9	Name	**Designation**	**Phone Number**	**E-mail**
1.9.1	Er. Manjeet Singh	Executive Engineer	+91 8146570372	xenldhdrg@gmail.com
2.0	**Project Details**			
2.1	Project Overview			
	Project Title	PROVISION OF SERVICES FOR ACQUISITION, PROCESSING AND DELIVERY OF DIGITAL ELEVATION MODEL AND DIGITAL ORTHO-IMAGE FOR FLOOD RISK MITIGATION/MAPPING OF AREA ALONG RIVER SUTLEJ.		
	Type of Project	Non-Infrastructure Project		
	Total Estimate Budget	Rs.58262750/-		
	Duration of Project	6 months		

2.2	Project Description				
	Summary of the Project	Since, the Punjab had faced heavy floods in the past, therefore during the monitoring of rainfall status & discharge in rivers, it is felt that a devastating situation may arise this year as well if timely action is not taken. As the project is more focused on the River Sutlej. So, if we study the course of the rivers and Population getting affected by these rivers the following data is derived: - The river Sutlej passes through the districts of Ropar, SBS Nagar, Ludhiana, Jalandhar, Moga, Ferozepur, Fazilka, Tarn Taran, Kapurthala and affects almost 129 Lakh population of these districts of Punjab. Also last year, in River Sutlej, flood water was flowing at its peak & situation was drastic in surrounding villages/Towns/urban & rural area and this flow of water in aforesaid rivers was not gradual & it kept fluctuating during the floods season. Thus, it was very difficult to monitor the discharge of floods in these systems and some part of manpower which can be used for flood preparations or remedial measures to the flood affected area, was struck only to monitor the periodic discharge in these systems. Therefore, it is necessity to establish a digital model to study the topography of area by DEM based on LiDAR in these rivers so the extend of endangerment can be accessed timely and data for the same can be provided to local authorities & local communities i.e it is required to make it withstand the floods in the forthcoming season. To further mitigate the risk of flood and to save human lives & livelihood of the community, it is very important to carry out flood mitigation work urgently. This Project comes under the ***Flood & Urban Flooding-Non-Structural Mitigation Measures.***			
	Goals	• To get the Digital representation of topography of adjoining villages to the river by which flood routing can be determined by the using 3D model of DEM applications by LiDAR (Remote sensing technique) so that prior to Floods, endangered areas can be identify and preventive flood measures can be adopted and Such areas can be vacant to safeguard the lives of local inhabitants if necessary. • The data accumulated by the DEM project with the help of LiDAR can be helpful in flood routing and evacuation plan can be prepared to safe guard the lives of local inhabitants.			
	Project Location				
Site No	**Village**	**Block**	**District**	**State**	**Geographical Coordinates**
	N/A				
	Objectives And Outcomes				
	Objective 1				

	Modernization Monitoring Network	**Outcome-1**	The generation of a digital elevation model plays a major role in Modernization of monitoring system by providing variety of technique such as digitizing contours from existing topographic maps, topographic leveling, EDM (Electronic Distance Measurement), differential GPS measurements, Digital photogrammetry, RADAR remote sensing (InSAR), Light Detection and Ranging (LiDAR)
		Outcome-2	The project will enable us to assess the impact of both natural and man-made features upon flood risk by identify the topography of river and adjoining areas.
		Outcome 3	The data availability to all concerned officials/community engaged in remedial tasks which would help the flood preparedness and awareness.
	Objective 2		
	Transformation Knowledge Access	**Outcome-1**	The project will build on the advances in cloud computing, internet, mobile devices, and other communication tools to modernize the access and visualization of topography information of river surfaces by different stakeholders.
		Outcome-2	The Digital computational data gathered by DEM project will be easily accessible and transformed by the administrative agency or the Stake holder on local scale.
		Outcome 3	The evacuation situation can be done before adverse situation which would safeguard the vulnerable areas.

	Objective 3		
	Strengthening Institutions	**Outcome-1**	Project will complement technology with investments in people and institutional capacity. Support will be provided for developing centers of expertise, innovative learning approaches, collaboration with academic and research institutes, and outreach programs. Office and equipment will be modernized to streamline work flows to effectively leverage the technology investments.
		Outcome-2	Project will modernized and enhance the ability of department and institution to understand the terrain significantly and topography of rivers to take preventive measure by the data accumulated by the DEM.
		Outcome 3	Project will provide the base precise data with characteristic behavior of floods in the region by which well prepared guideline and regulatory rules can be amended as per requirements.

	Assessments and Other Details	
	Hazard Assessment	**Type of Hazard: Flooding** **History of Hazard:** The region surrounding the Sutlej has a documented history of recurrent flooding events. Historical records indicate significant flood events in the years 1988, 1993, 1995, 2008, 2019, and 2023. These floods have been attributed to various factors including heavy rainfall, snowmelt, and fluctuations in river discharge. The floods have resulted in erosion, breaches in embankments, inundation of agricultural lands and communities, displacement of residents, and economic losses. **Methodology Followed for Assessment:** The hazard assessment was conducted using a combination of historical data analysis, hydrological modeling, and risk mapping techniques. Historical flood records were analyzed to identify patterns, trends, and magnitudes of past flood events. **Summary of Results:** • The hazard assessment identified flooding as a significant and recurring threat to the region surrounding the Sutlej . • Historical analysis revealed a pattern of frequent flood events, with notable occurrences in multiple years. • The assessment underscored the urgent need for comprehensive flood mitigation measures such as flood protection works, evacuation of local areas/effect communities from area/land under endangerment of floods or its effects and community resilience-building initiatives, to mitigate the impact of future flood events and safeguard lives, livelihoods, and critical infrastructure in the region such as houses, domestic animals, kettles etc.

	Vulnerability and Capacities Assessment:	**The assessment evaluated vulnerabilities and capacities across four key dimensions: physical, social, economic, and ecological.** **Physical Vulnerabilities:** Identified critical infrastructure Including embankments, roads, bridges, utilities as highly susceptible to flood damage. **Social Vulnerabilities:** Social survey revealed that 15 districts with population nearly 256 Lakhs vulnerable to flooding, with marginalized communities disproportionally affected. Focus group discussions highlighted concerns regarding limited access to resources, inadequate evacuation, routes, and insufficient community preparedness and response mechanisms. Examined the impact of flooding on communities, considering factors such as demographics, access to resources, social cohesion, and resilience networks. **Economic Vulnerabilities:** The assessment indicated significant economic loss due to flooding particularly in the agricultural sector. Floods in past had loss of livestock were reported in pas flood event occurred during previous floods impacting the lives and livelihood of farmers and rural households, income sources, agricultural productivity, local industries, and employment opportunities. **Ecological Vulnerabilities:** Field assessments identified vulnerable ecological zones including wetlands, riparian habitats and wildlife corridors. Flooding posed risk to Biodiversity, ecosystems, water quality threatening the ecological integrity of the region. **Community Interaction:** The assessment engaged with the community through a series of surveys, discussions, and interviews: **Household Surveys:** Households were surveyed to assess vulnerability levels, gather demographic data and identify specific needs and concerns related to flooding. In this survey it observed that due to lack of predetermination of approach of flood water & inundation period plays a major role in flood mitigation measures. **Focus Group Discussions:** Focus group discussions were conducted with community members, local authorities, and experts to explore social, economic, and ecological vulnerabilities and capacities. **Key Informant Interviews:** Key informant interviews were held with community leaders, government officials, and subject matter experts to gather insights into flood-related issues and potential mitigation strategies. **Result:** The community interaction revealed impacts of flooding on vulnerable populations, critical infrastructure and ecological systems. These findings informed the development of targeted interventions and strategies to enhance community resilience, improve flood preparedness and response, development in the region.

	RISK ASSESSMENT	**Rationale for Choosing the Project:** The decision to pursue the flood protection project stems from the urgent need to mitigate the risks posed by recurrent flooding in areas affected by floods. The floods of 2023 resulted in significant erosion along the embankment of the River Sutlej resulting in several breaches in their embankments and erosion of cultivated lands threatening the safety and livelihoods of the community. Without intervention, the potential for embankment breaches and catastrophic damage to property and infrastructure is high. Therefore, digitalization of related data like discharge in rivers, flood plain zoning of area adjourn to the rivers and limits of damage for different intensity of floods plays a major role in flood mitigation measures. **Project Costs:** The estimated project costs : **Total Project Costs:** 58262750/- **Project Benefits:** **Qualitative Benefits:** 1. **Risk Reduction:** The project will reduce the risk of embankment erosion and breaches, enhancing the safety and security of the community during flood events. 2. **Environmental Protection:** The DEM of the rivers will help preserve the natural environment by preventing erosion and protecting riparian habitats along the River Sutlej. **Quantitative Benefits:** 1. **Economic Savings:** Avoidance of flood-related damages property, agricultural losses and infrastructure damage will be saved over the project's lifespan. 2. **Infrastructure Protection:** The project will safeguard critical infrastructure like schools, community halls/buildings & roads, bridges, and utilities.

	Stakeholder Analysis:	**1. Local Community:** **Role:** The primary beneficiaries and recipients of flood protection measures. They are directly impacted by flooding events and will benefit from the project's implementation; therefore, it is also purposed to form a social audit committee comprising of local community comprising Sarpanch, Nambardar and farmers for social audit of the project and role of this committee is to be regular checking of project. **2. Local Authorities (District Administration, Gram Panchayats):** **Role:** Responsible for governance, policymaking, and decision-making at the local level. They have jurisdiction over public infrastructure and resources. **3. Government Agencies (Water Resources Department, SDMF):** **Role:** Responsible for managing water resources, disaster preparedness, and emergency response at the state or regional level. **4. Private Sector (Contractors, Engineers, Suppliers):** **Role:** Provide goods and services related to project implementation, such as construction, engineering, and materials supply. **5. Environmental Groups and Conservationists:** **Role:** Advocate for environmental protection and conservation of natural resources, including rivers, wetlands, and wildlife habitats.

	Mitigation Strategy:	**Mitigation Measures:** • **Surveying of River topography for preparation of DEM using LiDAR:** The primary mitigation measure involves surveying of rivers and adjoining areas to prepare DEM using LiDAR for River Sutlej to avail the topography and terrain surfaces which will be helpful for predetermination of floods routing. • **Rationale for Mitigation Measures:** i) **Effectiveness**. Preparation of DEM has been identified as effective measure to frame a database of vulnerable areas around these rivers. ii) **Cost-Effectiveness**. Focusing solely on DEM preparation allows efficient allocation of resources, maximizing the cost effectiveness within the available budget. iii) **Feasibility:** The scope of the project aligns with the available resources and technical capabilities, ensuring that the mitigation measures can be implemented effectively within the project timeline. **Achievement of Objectives and Outcomes:** **Objectives:** Enhance flood resilience and protect vulnerable communities and infrastructure. **Outcomes:** Reduced risk of embankment erosion and breaches, resulting in enhanced safety for residents

	Cost Benefit Analysis:	• **Introduction:** This cost-benefit analysis evaluates the social costs and benefits associated with the proposed flood mitigation project, focusing on study of topography of river and adjoining areas. The analysis considers both qualitative and quantitative impacts of the project on the community and environment. • **Social Costs:** The estimated project costs: **Total Project Costs:** ₹ 58262750**/-** • **Social Benefits:** • **Qualitative Benefits:** • **Risk Reduction:** The project will reduce the risk of Floods as predetermination of floods, its effects will enhance the flood preparation tasks efficiency of the communities/ Departmental agencies during flood events. • **Quantitative Benefits:** • **Economic Savings:** Avoidance of flood-related damage, including property destruction, agricultural losses, and infrastructure damage will be saved over the project's lifespan.

Planned Activities:

Project Objective: Surveying of flood plains of the River Sutlej to mitigate the risk of flood-related damages and enhance community resilience.

Planned activity Timeline:

1. The contract for 'Provision of services for Acquisition, Processing and Delivery of DEM and Digital Orthoimagery data' in the flood plains of Sutlej river basins covering the river bed (with or without water) upto its bank and a buffer zone of 5(five) km on either side of the river banks. The total area will be approximately 1450 square kms. For the purpose of this RFB the area of flood plains has been divided into 3 Lots as given below:

Table :1

Sr. no.	Lot	Description	Approx area (in sq km)	Period of completion
1	I	Sutlej River	1450	6 months

2) Services are to be provided for generation and delivery of following key-deliverables.

(i) Processed bare earth ground elevation data of 0.4 m accuracy (on ellipsoidal heights) at regular spacing of 1(one) metre – called DEM in GEOTIFF and ASCII format.

(ii) DEM (on MSL heights) after integration with SOI developed the Geoid model.

(iii) Digital Ortho-imagery of 25 cm GSD or better in GEOTIFF format.

In addition, following raw/intermediate products/reports shall also be delivered:

(iv) Raw data captured by various sensors and instruments.

(v) All Ground control points (GCPs) provided/used for Data Acquisition & Processing.

(vi) Processed Digital Surface Model (DSM).

(vii) Processed bare earth ground elevation data of 0.4 m accuracy (on ellipsoidal heights) at irregular spacing with mass points and break lines – called DTM.

(viii) Contours at 1 metre vertical interval

(ix) Combined hard copy plot of ortho-imagery with

		contours at 1 metre vertical interval on 1:10000 scale. (x) All salient reports generated as part of processing, QA/QC . Two copies of all softcopy deliverables will be provided in USB hard-disks/ NAS Boxes 3. Brief Scope of Activities for this contract shall include (i) Provision of Ground controls as per requirements of the project. This shall include planning, observations, computation, monumentation and signaling as necessary. Sub-contracting shall be permitted for this activity. (ii) Raw Data Acquisition & Pre-processing : Acquisition of Raw Digital Data by Aerial Platform for generating Digital Elevation Model(DEM) of 0.4 m accuracy (on ellipsoidal heights) and Digital Orthoimagery of 25 cm GSD. This shall also include Flight Planning, Sensor Calibration, Flight Execution as per plan, QA/QC for review of flight line alignment, raw data validation for completeness, no data voids, strip matching, pre-processing of onboard GNSS/IMU data for trajectory file and other pre-processing steps needed for point cloud extraction/preparing data for post-processing stage. Scope of this activity shall also include performing responsibilities of Non-Scheduled Operator for performing Aerial Work as required for performing the services. Valid Non-Scheduled Operator's Permit (NSOP) should be held by the firm (as single entity or JV) or its subcontractor, granted by the Central Government under sub-rule (2) of rule 134A of Aircraft (2nd Amendment) Rules, 2010, published in the Gazette of India vide Ministry of Civil Aviation Notification No. 423 dated 29th July 2010. The bidder may perform the duties of NSOP by itself or may sub-contract it to a firm which is an NSOP holder. The Contractor shall also obtain necessary clearances from the Ministry of Defence, Government of India, and other agencies as needed, for flying over the survey area and to acquire and deliver raw data and processed products. Contractor shall mobilize all necessary equipment, software and hardware at Survey of India Camp/Office required for carrying out this activity. (iii) Post Processing for generation of DSM, DTM, DEM & Digital Ortho-imagery:

This activity shall include:

• Planning

• Setting up of Production: This would include setting up LAN and mobilization of adequate storage systems, servers, workstations, software, peripherals etc to handle/store raw data, intermediate data, data under process and processed data/deliverables. The use-rate of equipment and other costs associated with Preparation of site at the Production Centre shall be deemed to be included as part of post-processing cost. Pl. refer footnote at Form-1(Priced Activity Schedule).

• Generation of Digital Surface Model (DSM) from raw/pre-processed data.

• Necessary editing/filtering of non-ground points (vegetation, built-up areas, bridges, elevated structures etc) to generate bare-earth DEM of of 0.4 m accuracy (on ellipsoidal heights)

• QA/QC at various stages of Project including validating horizontal and vertical accuracy as per specifications laid down in RFB. Proper versioning and management of data in various Production Cycles. This shall include carrying out corrections as per Quality Audit Report and security vetting report provided by SOI

• Facilitating quality audit, stage approvals , security vetting and final acceptance tests by SOI

• Integration of Geoid model supplied by SOI with the DEM on ellipsoidal heights, generated by contractor, to yield DEM on MSL heights

• Generation of Digital Ortho-Imagery

• Carrying out corrections after security vetting as pointed out by concerned agencies

Specifications of deliverables are given below: Digital Elevation Model (DEM)

TABLE-2

S.No.	Description	Specification

		1	Fundamental Spatial Accuracy Requirements	Fundamental spatial accuracy of the survey must conform to the following: a. Fundamental Vertical Accuracy (FVA)* i) <= +/- 40 cm. 95% confidence interval (1.96 x RMSE) for terrain with open vegetation, sparse or dense man-made structures. b. Fundamental Horizontal Accuracy (FHA) i. <= +/- 25 cm. 95% confidence interval (1.96 x RMSE)
		2	Supplemental Spatial Accuracy Requirements	Supplemental spatial accuracy of the survey must conform to the following: Supplemental Vertical Accuracy (SVA)* i. <= +/- 50 cm. 95% confidence interval (1.96 x RMSE) for terrain with low crop/low weeds ii. <= +/- 60 cm. 95% confidence interval (1.96 x RMSE) for terrain with tall crop/tall weeds/tall scrub/ dense forest/thick vegetation
		3	Supplemental Spatial Accuracy Requirements	On average • there shall be 4(four) or more directly measured points per sq. m in open area • there shall be 1 (one) or more directly measured points in forest area.
		4	Maximum Data Void in Shadow/Shady Areas**	The maximum size of data void in bare-earth DTM shall not exceed 1(one) sq metre
		5	Projection	UTM
		6	Datum	Vertical:

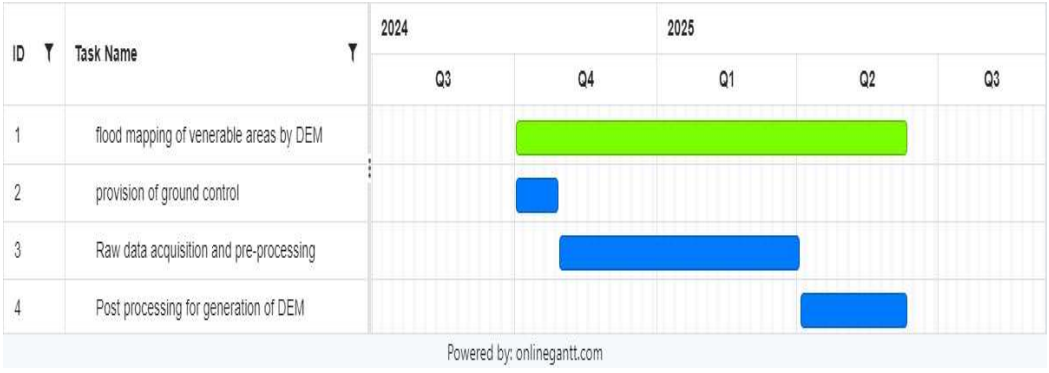
				(i)WGS-84 (before integration with Geoid Model) (ii) MSL (after integration with Geoid Model)Horizontal: WGS-84

DIGITAL ORTHO- IMAGERY:

- Ortho Imagery of Pan- sharpened, R, G, B
- Spatial Accuracy: 25 cm in Plain Area
- Spatial Resolution: 25 cm GSD .
- Projection: UTM
- Datum: WGS 84
- A Gaussian-like histogram with grey levels spreading at least 85% of (0, 255)

- Seam lines should not run along linear features and should be edited in a manner so as not to introduce visible flaws
- No visible geometric flaws, graphic imperfections and colour unbalancing at viewing scale of 1:2,000
- The imagery closest to the nadir view should be used for ortho mosaic to minimize the effects of relief displacement
- Ortho-image format: GeoTIFF.

	Implementation Plan:	**Project Objective:** Surveying of flood plains of the River Sutlej to mitigate the risk of flood-related damages and enhance community resilience. **Implementation Timeline:** **Week 1-4: Provision of Ground Controls.** Planning, Observations, Computation, Monumentation and Signaling. **Week 5-20: Raw Data Acquisition and & Pre-processing.** Acquisition of Raw digital Data by Aerial platform for generating DEM of 0.4m accuracy and Digital Orthoimagery of 25cm GSD. Flight Planning, Sensor Calibration, Flight Execution, QA/QC for review of flight line alignment, raw data validation, Strip Matching, Pre-Processing of onboard GNSS/IMU data for trajectory file. **Week 21-26: Post Processing for generation of DEM & Digital Ortho-imagery.** Planning & Setting up a production centre at SOI at Dehradun. Generation of DEM from pre-procesed data. Facilitating quality audit, stage approvals, security vetting. Integration of Geoid model with DEM. Generation of Digital Ortho-Imagery. Carrying out corrections after security vetting. **GANTT CHART:**



	Budget for Project Activities:	Rs. 58262750/-

	Reporting and Monitoring Arrangements:	1. **Objectives:** Surveying in the geographical data of river section and adjoining areas to determine the flood routing in respective rivers and preparation of dashboard for data bank & real time evaluation of topography in rivers. **Monitoring Plan:** • **Objective:** Surveying the geographical data of rivers by means of DEM applications. • **Indicator:** Progress of work in terms of surveying, data processing and compilation.(% completion). • **Timeline:** Weekly progress reports submitted by the firm during work. • **Evaluation:** Compare actual progress against planned milestones to ensure timely completion. **2. Objective:** Ensure compliance with PWD specifications and engineering standards. • **Indicator:** Adherence to PWD specifications and safety protocols. • **Timeline:** Daily on-site inspections by field staff. • **Evaluation:** Document any deviations from design specifications or safety standards and take corrective actions as necessary. **3. Objective:** Enhance community resilience and preparedness. • **Indicator:** Community engagement activities conducted. • **Timeline:** Monthly community engagement reports submitted by project coordinator. • **Evaluation:** Assess community participation and feedback to gauge effectiveness of awareness-raising efforts. **Timeline for Evaluation:** • **Daily:** Conduct inspections to ensure compliance with specifications and safety standards. • **Weekly:** Review progress reports of DEM application and address any issues or delays. • **Monthly:** Analyze reports and adjust outreach strategies as needed. **Reporting Arrangements:** 1. **Weekly Progress Reports:** • Firm/Agency submits weekly progress reports on installation of equipment, including photos and updates on milestones achieved. • Executive Engineer reviews reports and addresses any concerns or delays. **2. Daily Inspection Reports:** • Field staff team submit inspection reports, documenting adherence to PWD specifications. • Any deviations or non-compliance issues are reported immediately for corrective action.

	Detail cost estimate	Tender Quotations	Benchmark Rates	Other
	Yes			NA

	MONITORING AND EVALUATION (M&E)		
	INDICATOR	**DESCRIPTION**	**OUTPUT**
	Progress of installation process (%)	Measure the completion status of the installation process activities.	Percentage of completion of installation process.
	Adherence to Design Specifications	Assess whether construction activities adhere to the PWD and design specifications.	Compliance with design specifications documented through daily inspection reports.

	ATTACHED DOCUMENTS CHECKLIST		
Section	Document	Attached	
3.1	Hazard Assessment Report	Yes	
3.2	Vulnerability Assessment Report	Yes	
	Community Interaction Report	N/A	
	Sample Questionnaire	N/A	
3.3	Risk Assessment Report	Yes	
	Option Analysis	Yes	
	Cost-Benefit Analysis	Yes	
3.5	Preliminary Design for Infrastructure Projects	N/A	
3.6	Project/River Plan	Yes	
4.2	Cost Determination Report	Yes	
	List of all references used for research data	Yes	

S.No	Activity	Cost in Rs/Sq km	Amount in RS
1	Provision for GCP and vertical control	1700	2465000
2	Data Acquisition	16000	23200000
3	Data Processing	1250	1812500
4	ORI & DEM Generation	1450	2102500
5	Post processing (DEM editing, DTM & contour generation etc	2750	3987500
6	QA/QC of ORI/DEM	1000	1450000
7	Total 1-6	24150	35017500
8	Feature extraction including QA/QC	4000	5800000
9	Total 7+8	28150	40817500
10	Storage with smart rack	@500TB	4000000
11	Total 9+10		44817500
12	@10% of SI No 11 for unforseen expanses		4481750
13	@20% of S.I No. 11, to cover expenses incurred toward usage of SOI equipment and other expenses on travel etc. Of SOI personnel- For control provisioning, Leveling, Workstations etc to be used for QA/QC/Audit for deliverable etc		8963500
14	Grand total 11-13		58262750

Sub Divisional Officer
Phillaur Bandh SubDivision
Ludhiana

Executive Engineer
Drainage-cum-Mining & Geology Division
Water Resources Department, Punjab

Hazard Assessment Report:

1. Introduction: This hazard assessment report focuses on evaluating the risks associated with flooding in the Nearby villages of River Sutlej , located in State of Punjab. The region surrounding the Sutlej River has a documented history of recurrent flooding events. Historical records indicate significant flood events in the years 1988, 1993, 1995, 2008, 2019, and 2023. These floods have been attributed to various factors including heavy rainfall, snowmelt, and fluctuations in river discharge. The floods have resulted in erosion, breaches in embankments, inundation of agricultural lands and communities, displacement of residents, and economic losses.

2. Methodology: The hazard assessment was conducted using a combination of historical data analysis, hydrological modeling, and risk mapping techniques. Historical flood records were analyzed to identify patterns, trends, and magnitudes of past flood events.

3. Hazard Identification: Analysis of historical data revealed a pattern of recurrent flood events in the region, affecting villages along the Rivers Sutlej. These flood events were primarily attributed to heavy rainfall, snow melt, and fluctuations in river discharge. Hazards associated with flooding include erosion, breaches in embankments, inundation of agricultural lands and communities, displacement of residents, and economic losses.

4. Vulnerability Assessment:

The assessment evaluated vulnerabilities and capacities across four key dimensions: physical, social, economic, and ecological.

Physical Vulnerabilities: Included analysis of infrastructure susceptibility to flood damage, such as embankments, roads, bridges, and utilities.

Social Vulnerabilities: Examined the impact of flooding on communities, considering factors such as demographics, access to resources, social cohesion, and resilience networks.

Economic Vulnerabilities: Assessed the economic consequences of flooding on livelihoods, income sources, agricultural productivity, local industries, and employment opportunities.

Ecological Vulnerabilities: Biodiversity, ecosystems, water quality will not get disturbed due to this work.

5. Summary of Results:

- The hazard assessment identified flooding as a significant and recurring threat to nearby villages of River Sutlej, with a history of frequent flood events.
- Vulnerability assessments revealed vulnerabilities across multiple dimensions, including physical, social, economic, and ecological.

6. Conclusion: The hazard assessment underscores the urgent need for comprehensive flood mitigation measures tailored to the specific vulnerabilities and hazards faced by nearby villages of River Sutlej. These measures should include infrastructure reinforcement, early warning systems, community preparedness and response mechanisms, and ecosystem-based approaches to enhance resilience and reduce vulnerability to future flood events.

7. Recommendations: Based on the findings of the hazard assessment, the following recommendations are proposed for nearby villages of River Sutlej:

By using applications of DEM we can:

- Implement infrastructure upgrades to reinforce critical assets such as embankments and bridges.
- Develop and implement early warning systems tailored to the local context to alert communities to impending flood risks.
- Enhance community preparedness and response mechanisms through education, training, and capacity-building initiatives tailored to the specific needs of nearby villages of River Sutlej· Promote ecosystem-based approaches to flood mitigation, including wetland restoration and floodplain management, to enhance resilience and reduce vulnerability to future flood events

8. Acknowledgement: We acknowledge the contributions of all stakeholders involved in the hazard assessment process, including community members, local authorities, and subject matter experts from nearby villages of River Sutlej.

This hazard assessment report provides valuable insights into the risks associated with flooding in nearby villages of River Sutlej and serves as a foundation for developing strategies to enhance resilience and reduce vulnerability to future flood events in the region.

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Executive Engineer
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Water Resources Department, Punjab

Vulnerability Assessment Report:

1. Introduction: This Vulnerability and Capacities Assessment (VCA) report aims to assess the vulnerabilities and capacities of nearby villages of River Sutlej in State of Punjab, particularly in relation to flood events. The assessment seeks to identify key vulnerabilities across physical, social, economic, and ecological dimensions, as well as to evaluate the existing capacities that contribute to resilience in the face of flood hazards.

2. Methodology: The VCA utilized a participatory approach, combining quantitative and qualitative methods:

- **Household Surveys:** Conducted structured surveys with randomly selected households to gather demographic data, assess vulnerability levels, and identify specific needs and concerns related to flooding.
- **Focus Group Discussions:** Organized focus group discussions with community members, local authorities, and experts to explore social, economic, and ecological vulnerabilities and capacities, and to solicit inputs for resilience-building strategies.
- **Key Informant Interviews:** Held key informant interviews with community leaders, government officials, and subject matter experts to gather insights into flood-related issues and potential mitigation strategies.
- **Field Assessments:** Conducted on-site inspections and field observations to assess the physical vulnerability of infrastructure and ecological zones to flooding.
- **Data Analysis:** Utilized both qualitative and quantitative data analysis techniques to identify patterns, trends, and relationships, and to derive actionable recommendations.

3. Vulnerabilities and Capacities Assessment: The assessment focused on four key dimensions:

- **Physical Vulnerabilities:** Identified critical infrastructure, such as embankments, roads, and utilities, as highly susceptible to flood damage.
- **Social Vulnerabilities:** Highlighted concerns regarding vulnerable populations, limited access to resources, inadequate evacuation routes, and insufficient community preparedness and response mechanisms.
- **Economic Vulnerabilities:** Identified significant economic losses in the agricultural sector, impacting livelihoods, income sources, and local industries.
- **Ecological Vulnerabilities:** Assessed the impact of flooding on biodiversity, water quality, and ecosystem services, identifying vulnerable ecological zones and habitats.

4. Summary of Findings:

- The VCA revealed vulnerabilities across multiple dimensions, including physical, social, economic, and ecological, in nearby villages of River Sutlej.
- Critical infrastructure, vulnerable populations, agricultural livelihoods, and ecological systems were identified as at risk from flooding.
- Existing capacities, such as community networks, local knowledge, and informal coping mechanisms, were found to contribute to resilience in the face of flood hazards.

5. Recommendations: Based on the findings of the VCA, the following recommendations are proposed:

- Implement infrastructure upgrades to reinforce critical assets and improve flood resilience.

- Enhance community preparedness and response mechanisms through education, training, and capacity-building initiatives.
- Promote ecosystem-based approaches to flood mitigation, including floodplain management, to enhance resilience and reduce vulnerability to future flood events.

6. Conclusion: The VCA underscores the urgent need for comprehensive flood mitigation measures tailored to the specific vulnerabilities and capacities of nearby villages of River Satluj. These measures should be informed by the findings of the assessment and developed in collaboration with local stakeholders to ensure effectiveness and sustainability.

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Risk Assessment for Flood Protection Project

Project Rationale: The proposed flood protection project aims to establish a dashboard to analyse, building capacities for flood remedial tasks by creating a DEM of Rivers Sutlej to observe the topography and ortho imagery for analysing flood routing regarding the discharge in rivers of Punjab State and to monitor the flow in rivers and prediction of evacuation situations in different zones of Flood-Plain-Zone of these rivers. Without immediate intervention, the potential loss of life, property, and infrastructure would have been catastrophic. Therefore, preparing a DEM, such as the proposed, is essential to safeguard the embankments and adjoining villages of rivers and protecting the community from future flood events.

Options Analysis

Several options were considered for flood mitigation/protection measures in vicinity of the rivers, including:

i. Stereo Photogrammetry.
ii. GIS Mapping.
iii. Contour Surveying.

After careful evaluation, the preparation of DEM was selected as the most viable option due to its effectiveness in evaluating and plotting a complete topographical representation of the surrounding areas of rivers, minimizing the risk of embankment breaches.

Cost and Benefit Analysis: The cost and benefit analysis of the proposed flood mitigation measure project are outlined below:

Costs:

The estimated cost of preparation of DEM including advertisement, and contingency charges, is approximately Rs. 58262750/-

Benefits:

1. Risk Reduction: The primary benefit of the project is the reduction of flood risk.
2. Economic Savings: The avoidance of flood-related damages, including property destruction, agricultural losses, and infrastructure damage, will result in significant economic savings for the community and government.
3. Environmental Protection: The project will help preserve the natural environment by protecting riparian habitats, and maintaining water quality in the Rivers.

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Cost Benefit Analysis

Computation of Annual cost of the Project:

A. Total PROJECTED cost of this Project = Rs.58262750/-

B. Total Benefited Area = 394133 Acre (Approx.)

Assuming cultivated area @ 70% of 394133 Acre = 275893 Acre (Approx.)

Assuming DEM benefits @ 10% of 394133 Acre = 39413 Acre (Approx.)

Assuming the flood occurs 1 times in 10 years, then benefited area = 27589 acres

Value of Crop (Rice) Area x Yield x Rate

= 27589 x 28 x 2180

= Rs 1684051482 Crore

Hence, Benefit Cost Ratio (B.C. Ratio) = 168.40 : 5.83

= 28.88:1

- The Paddy crop has been taken because the paddy crop is sown during the flood period (01.07 to 30.09) in Punjab.
- Rate of Rice crop taken from F.C.I. Department
- Average yield of crop in year 2023 also taken from F.C.I. Department 28 qtl/acre and (28 x 2.47)= 69.16 qtl/hectare

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Executive Engineer
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Water Resources Department, Punjab

List of References:

- Guideline for NDMF & SDMF 2023
- www.nhp.mowr.gov.in
- www.surveyofindia.gov.in

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GOVERNMENT OF PUNJAB
DEPARTMENT OF WATER RESOURCES

To

Special Chief Secretary,
Department of Revenue, Rehabilitation
and Disaster Management, Punjab

Memo No. 1469 /CE/DRG/2024/E-754256
Dated: 16/09/2024

Subject: **Provision of services for acquisition, processing, and delivery of Digital Elevation Model (DEM) and Digital Ortho-Image for Flood Risk Mitigation/ Mapping of areas along the Sutlej, Beas, and Ghaggar rivers.**

1.0 Please refer to the above subject matter.

2.0 It is apprised that a joint committee of the members of Punjab, Himachal Pradesh and Uttrakhand was constituted by the Government of India on the above subject matter. The committee had recommended that the DEM survey of river Sutlej is required to be carried out. This is essential for protecting the human life, infrastructure and agricultural lands from floods caused by the floods. A proposal is accordingly sent to you to kindly consider the same under SDMF. The agenda for the meeting is attached herewith.

3.0 You are requested to kindly consider to approve the proposal under **SDMF.**

Encls as above

Principal Secretary, Water Resources

AGENDA

Revision of Project: Provision of Services for Acquisition, Processing, and Delivery of Digital Elevation Model (DEM) and Digital Ortho-Image for Flood Risk Mitigation/Mapping of Areas along the Sutlej, Beas, and Ghaggar Rivers

1. **Project Approval**

The proposed project was approved during the 2nd SEC meeting on 26.06.2024, under Item No. 18, for a total cost of Rs. 583.75 Lakhs under the State Disaster Management Fund (SDMF). The project is scheduled for execution in the FY 2024-25. (**SEC Minutes attached**)

2. **Scope of Work**

The project aims to undertake Digital Elevation Modeling (DEM) of the Sutlej, Beas, and Ghaggar rivers within the state of Punjab, covering a total area of 7350 sq. km.

3. **Joint Committee Recommendations**

In response to the floods of 2023, a joint committee was formed with members from Punjab, Himachal Pradesh, and Uttarakhand. The committee's report recommended the DEM survey of the Sutlej River downstream of the Bhakra Dam. This is critical for protecting communities, infrastructure, and agricultural lands from flooding caused by heavy rainfall and dam operations. (**Committee Report Attached**)

4. **Survey of India Proposal**

To conduct the DEM of the Sutlej, Beas, and Ghaggar rivers, the Survey of India (SOI) was approached, and a proposal was submitted by SOI. The anticipated cost of the DEM for all three rivers is Rs. 27.87 crores, with an estimated completion time of one year. (**Proposal Attached**)

5. **Phased Execution Proposal**

Due to the high cost and extended timeline of the proposal submitted by the SOI compared to the administrative approval by the SEC under SDMF, it is proposed that the project be executed in phases. The DEM for the Sutlej, Beas, and Ghaggar rivers will be carried out in stages.

6. **Phase-1: Sutlej River Digital Elevation Modeling (DEM)**

It is proposed to execute Phase-1 of the DEM for the Sutlej River during the current fiscal year (2024-25), considering its significance in connection with NGT Case OA 303 of 2023 (Next date of hearing 15.01.25) from Harike Head Works to till River Sutlej entering international Border (47 Km) and as per recommendations of Joint committee from Nangal to Machiwara- Rahon Bridge (98 Km).

7. **Cost Estimate for Phase-1**

The estimated cost for the Total Sutlej River DEM is Rs. 8.92 crores (excluding unforeseen charges), with a total estimated cost of Rs. 11.53 crores (including unforeseen charges). As per the rates given by SOI in their proposal submitted to WRD for Rs. 5.84 crores approximate length of 145 Km of Sutlej can be cover in Phase-1. The final cost will be determined by the rates quoted by bidders during the tender process.

8. **Budget Considerations**

It is important to note that while total projects worth Rs. 70.81 crores (Rs. 64.97 Cr for Structural & Rs. 5.84 Cr for Non-Structural Measures) have been approved under SDMF 2024-25 by the SEC.

According to the Limitation for the utilization of SDMF as per the Ministry of Home Affairs guidelines indicated at para 10.(ii) is that not more than 50% of SDMF allocation may be utilized for measures/projects to mitigate risks from a single hazard in a year. Therefore, a total of Rs.76.40 Crores (Rs.64.94 Cr for Structural Mitigation and Rs. 7.64 crores for Non-Structural mitigation) is available for this financial year for flood mitigation as per para 10.(i) and 10.(ii) of the MHA's guidelines.

9. **Request for Approval**

In light of the above, approval is requested for the revision of the project, with a change in scope to execute the DEM for the Sutlej River from Nangal to Machiwara- Rahon Bridge (98 km) & Harike D/S to upto Sutlej enters International Border (47km) i.e. Total length of 145 km as Phase-1 in the current FY 2024-25 at an estimated cost of Rs. 5.84 Crores.

Proceedings of the State Executive Committee (SEC) held on 26th June, 2024 under the chairmanship of Sh. Anurag Verma IAS, Chief Secretary-cum-Chairman, SEC for proposals under the State Disaster Mitigation Fund (SDMF).

Following Officers were present in the meeting: -

1. Sh. KAP Sinha, IAS,Special Chief Secretary-cum-Financial Commissioner.
2. Sh. Ajoy Kumar Sinha, IAS,Principal Secretary, Finance
3. Sh. Ajoy Sharma, IAS,Principal Secretary, Local Government
4. Sh. Gurkirat Kirpal Singh, IAS,Administrative Secretary, Home
5. Sh. Krishan Kumar, IAS, Principal Secretary, Water Resources (Special Invitee)

1.0 SCS-cum-FC Revenue (Member Secretary SEC) informed the members that the Government of India has introduced the State Disaster Mitigation Fund in the 15th Finance Commission as 20% of the total allocation every financial year of State Disaster Risk Management Fund. He also shared the guidelines issued by Ministry of Home Affairs and National Disaster Management Authority to regulate the mitigation funds.

2.0 The SEC members were briefed about the 15th Finance Commission allocations to the State under the State Disaster Mitigation Fund (SDMF) and its further bifurcations as per the guidelines: -

Financial Year	2021-22	2022-23	2023-24	2024-25	2025-26
TOTAL Annual Allocations (in Cr)	**132.00**	**138.60**	**145.60**	**152.80**	**160.60**
Structural Mitigation 85%	*112.20*	*117.81*	*123.76*	*129.88*	*136.51*
Non-Structural Mitigation 10%	*13.20*	*13.86*	*14.56*	*15.28*	*16.06*
Small Grants Window 5%	*6.60*	*6.93*	*7.28*	*7.64*	*8.03*
Limitation to use only 50% for mitigation of a single hazard in a year	**66.00**	**69.30**	**72.80**	**76.40**	**80.30**

3.0 According to the Limitation for the utilization of SDMF as per the Ministry of Home Affairs guidelines indicated at para 10.(ii) is that not more than 50% of SDMF allocation may be utilized for measures/projects to mitigate risks from a single hazard in a year. Therefore, a total of Rs.76.40 Crores (Rs.64.94 Cr for Structural Mitigation and Rs.7.64 crores for Non-Structural mitigation) is available for this financial year for flood mitigation as per para 10.(i) and 10.(ii) of the MHA's guidelines.

4.0 FCR further informed that Principal Secretary, Water Resources has sent 18project proposals(17 Structural and 1 Non-Structural) for flood risk mitigation amounting to Rs.29.30 Crores. List of these projects is given below:

Sr. No.	Area	Name of Work	Amount (lacs)
1.	Ferozepur	Flood Risk Mitigation by strengthening of 5L advance bandh of river Sutlej from RD 100000-112500 near villages Rampur, Chak Bahmniya, Rame taharpur, etc Tehsil Dharmkot and Dist Moga.	85.00
2.	Ferozepur	Flood risk mitigation by construction of reclamation of spur on l/s of river Sutlej to save the abadies,c/land, BOP at village Raja rai, Gajniwala and Dona matter, etc Tehsil Guruharsahai, Dist Ferozepur.	210.00
3.	Ferozepur	Flood risk mitigation by constructing armoured spur at RD 8450 of flood protection bandh 0-110920 d/s Harike Headworks on river Sutlej in Villages Dineke/ Gatta badshah, Nizamdinwala, Fatehgarhsabran, Padhri, Wattu Bhatti, etc Tehsil Makhu, Dist Ferozepur.	60.88
4.	Ferozepur	Flood risk mitigation by strengthening of Gidderpindi Bandh of River Sutlej from RD 28500-55000 near villages Daulewala Kalan, Paraliwala, Mehruwala, KanniaKhaas, Bhaini, Kambo Khurd,etc Tehsil Dharmkot, Dist Moga.	295.00
5.	Jalandhar	Flood risk mitigation of area near East bein in villages Mandala, Gidderpindi, Nasirpur, Nahal, etc Tehsil Shahkot, District Jalandhar.	260.50
6.	Ferozepur	Flood risk mitigation by strengthening of budha creek bundh from RD 0-6000 connecting at RD 7900G of flood protecting bundh Muthiawala Complex in villages Basti Ram Lal, Pachrayian, Palla Mega, Maste Ke, etc Tehsil and District Ferozepur.	20.52
7.	Ferozepur	Flood Risk mitigation by strengthening of flood Protection Rd 30000-45000 and 45000-55000 in Muthianwala complex in Villages Fatte Wala, Daula Singh Wala, Kutabdin Wala, Masheke, Aseke, etc Tehsil and District Ferozepur	397.78
8.	SAS Nagar	Flood Risk Mitigation in Tangri Nadi by strengthening and level raising of left and right bandhs of Tangri in villages Sarangpur, Jodhpur, Rajapur, khelan, etc Tehsil Dera Bassi and Dist SAS Nagar.	147.00
9.	Fazilka	Flood Risk Mitigation for River Sutlej Creek near Hastan Kalan, Mahatam Nagar, Kawanwali, etc Tehsil and District Fazilka.	196.80
10.	Ludhiana	Flood Risk Mitigation of area of river Sutlej by constructing a/spur at RD 64900/4-L by providing Boulder stones in wire creates along river Sutlej (Mannewal Complex) in village Talwandi Naubad, etc Tehsil Jagraon, Dist Ludhiana.	100.71
11.	Ludhiana	Flood Risk Mitigation of area of river Sutlej by raising of DhussiBhandh in between RD 70000 to 90000 of 5L Bandh (SherewalBaghian Complex) near villages Sherewal&Baghian, etc Tehsil Jagraon, Dist Ludhiana.	27.18
12.	Hoshiarpur	Project to reduce Disaster risk and its impact by providing protection on L/S of Chabbewal Choe for the protection of agriculture land of villages Dhirowal& Bassi Jamal Khan, etc in Tehsil & District Hoshiarpur.	22.68

13.	Hoshiarpur	Project to reduce disaster risk and its impact by providing protection along L/S and R/S of Nasrala Choe to save C-Land and abadies of village SherpurBahtian&Thathal, etc in Tehsil and District Hoshiarpur.	85.00
14.	Hoshiarpur	Project to Reduce disaster risk and its impact by strengthening of L/S Bandh of Mehangrowalchoe and providing protection along L/S to save C-Land and Abadies of Village Bassi Wahid & Chak Gujran, etc in Tehsil and District Hoshiarpur	24.00
15.	Hoshiarpur	Project to Reduce disaster risk and its impact by constructing Boulder Stone T-Stud/Revetment to save abadies and agricultural land of village Salempur, Tahli, Rarra, Gandowal, Kotli, Abdullapur, etc along left side of River Beas in tehsil Tanda, Distt Hoshiarpur.	102.00
16.	Hoshiarpur	Project to Reduce Disaster Risk and its impact by Constructing Boulder Stone T-Stud/Revetment to Save abadies and agricultural land of village Tahli, etc along left side of River Beas in Tehsil Tanda, Distt Hoshiarpur	97.00
17.	Tarn Taran	Flood Risk Mitigation of River Beas by restoring Goindwal Embankment on R/s of River Beas from Rd (0-12500) to design section on R/s of River Beas in Village Goindwal sahib, etc Tehsil Khadoor Sahib, Dist Tarn Taran.	214.50
18.	Ludhiana	Provision of services for acquisition, processing and delivery of digital elevation model and digital ortho-image for flood risk mitigation/mapping of area along river Sutlej, Beas and Ghaggar. – NON-STRUCTURAL MITIGATION	583.75
		TOTAL	**2930.30**

4.1 FCR further informed that Director (Research), Punjab Agriculture University has submitted 03 non-structural mitigation (R&D) project proposals for Drought, Heat Wave and Frost mitigation, list of the project is given below:

S.No.	Name of the Project	Type of Project	Hazard	Amount (Lacs)
1	Targeted breeding for disaster risk mitigation in wheat (drought and pre-harvest sprouting) and rice (submergence and drought)	Research	Drought	195.82
2	Managing Heat Wave Stress in Citrus Orchards: A Focus on Irrigation Management and Straw Mulching in South-Western Punjab	Research	Drought & Heat Wave Stress	145.00
3	Mitigating Abiotic Stresses in Potato and Onion Through Crop Improvement Approaches	Research	Frost and Drought	187.00
	TOTAL			**527.82**

4.2 FCR also informed that Dean (Research &Development),Indian Institute of Technology, Ropar has submitted 03 non-structural mitigation (R&D) project proposals for earthquake risk mitigation, list of the project is given below:

S.No.	Name of the Project	Type of Project	Amount (Lacs)
1	Assessment of Local Site Effects Specific to State of Punjab: A Pre-requisite for Seismic Risk Reduction	Research	98.24
2	Earthquake Risk and Engineering towards Seismic Safety of Building Stock in Punjab	Research	92.59

3	Development of Indigenous Seismic Vulnerability and Risk Assessment (SeisVARA) Tool Tailored for the State of Punjab	Research	80.61
	TOTAL		**271.44**

5.0 FCR further said that these DPRs have been appraised from technical and social perspective and recommended by the Technical Advisory Committee (TAC) in its 3rd meeting held on 20.05.2024 which was further appraised by the Project Appraisal Committee (PAC) from technical, administrative, and financial perspectives in its 2nd meeting held on 07.06.2024.After due deliberation in the Project Appraisal Committee, all the 24 pre-feasibility reports/concept notes and their subsequent Detailed Project Reports were recommended for consideration and approval of the State Executive Committee.

6.0 In light of above, the State Executive Committee approved above mentioned 24 projects for funding under the State Disaster Management Fund.

The meeting ended with a vote of thanks.

Principal Secretary
Finance

Principal Secretary
Local Government

Administrative Secretary
Home

Principal Secretary
Water Resources
(Special Invitee)

Special Chief Secretary-
cum-
Financial Commissioner
Revenue

Chief Secretary-cum-
Chairman, SEC

भारतीय सर्वेक्षण विभाग
SURVEY OF INDIA

सर्व शिक्षा अभियान
सब पढ़ें सब बढ़ें

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भारत के महासर्वेक्षक का कार्यालय
Office of the Surveyor General of India
हाथीबड़कला एस्टेट, डाक बक्स सं. 37
Hathibarkala Estate, Post Box No. 37
देहरादून - 248 001 (उत्तराखण्ड), भारत
DEHRADUN - 248 001 (UTTARAKHAND), INDIA

NO. T- 1152 /1147-Project (PHHC GD)/16636 **Date: 25 July, 2024**

To,

The Chief Engineer,
Drainage-cum-Mining and Geology,
Department of Water Resources,
Chandigarh.

SUB: Work of provision of services for acquisition, processing and delivery of Digital Elevation Modelling and Digital Ortho-Image for flood risk mitigation / mapping of area along river Sutlej, Beas and Ghaggar. - Reg.

Ref: Your office letter no. 923/PA/CE/D.g./2024 dated 17-06-2024.

With reference to the letter cited above, a Detailed Proposal prepared by SOI and approved by the Surveyor General of India is enclosed herewith.

Also, following may be noted:

1. It is to be noted that the proposal is prepared considering the area as provided in the project report submitted through referenced letter.
2. The cost as submitted are estimates only. The final cost of the project will be discovered after open tendering and subsequent price discovery.

In case of any queries, please feel free to contact this office.

This is for your information and further necessary action, please.

(Misal Roshan Srivastava)
Superintending Surveyor,
for Surveyor General of India
e-mail :misal.srivastava.soi@gov.in
sgo.technical.soi@gov.in
Tel No. : 0135 - 2747058

Copy to : Sr. PS to SGI, for kind information please.

PROJECT PROPOSAL

for

PROVISION OF SERVICES

for

ACQUISITION, PROCESSING AND DELIVERY

of

DIGITALELEVATION MODEL [DEM]

&

DIGITAL ORTHO RECTIFIED IMAGE[ORI]

for FLOOD RISK MITIGATIONMAPPING OF

AREA ALONG RIVERS: SUTLEJ, BEAS & GHAGGAR

Prepared by	Prepared on request of
SURVEY OF INDIA **DEPARTMENT OF SCIENCE & TECHNOLOGY** **GOVERNMENT OF INDIA**	**WATER RESOURCES DEPARTMENT,** **GOVERNMENT OF PUNJAB**

1. Introduction:

The extensive flooding in the state of Himachal Pradesh, Punjab and Uttarakhand in 2023 necessitated a review of issues related to flood management in these States. A Committee was thus constituted by Department of Water Resources, RD&GR(Flood Management Wing),under the Chairmanship of the Chairman of Central Water Commission (CWC), through their orderno. I/87733/2023 dated 04-09-2023. The mandate of the committee is to conduct a joint flood management study in wake of the extensive floods in the state of Himachal Pradesh, Punjab and Uttarakhand. In its 2nd meeting dated 29-02-2024, the committee decided that the State Governments of these three states shall prepare DEM of area covering Satluj, Ghaggar and Beas rivers, in their own territorial extent, as per the standards & specifications of SoI.

Consequently, O/o Chief Engineer/ Drainage-Cum - Mining & Geology, Water Resources Department, Chandigarh, Punjab has requested Survey of India to get this work done for the state of Punjab. A detailed proposal for preparing Orthometric Height (~MSL) based Digital Elevation Model and Digital Ortho Rectified Imageof river basinsup to 5km from each bank for flood risk mitigation/mapping of area along river Sutlej, Beas and Ghaggar. (Attached as Annexure as received from WRD, Got of Punjab)

The Project is prepared with following advantages in mind

1. The generation of a digital elevation model plays a major role in Modernization of flood monitoring system.
2. The project has been prepared for flood mitigation measures by means of Digital Elevation Model (DEM) [i.e. both Digital Surface Model (DSM) and Digital Terrain Model (DTM)] using Remote sensing techniques i.e both LiDAR and Optical Sensorsfor area covering River Sutlej, River Beas &River Ghaggar.By using DEM, flood routing and topography of river basins up to 5km from each bank of the rivers can be determined and used for better preparedness of Department of Water Resources and local administration, so that they can conduct flood preparation works effectively.
3. The Digital computational data gathered by DEM project will be easily accessible and usable to the administrative agency or the Stake holder on local scale.
4. Project will modernized and enhance the ability of the concerned department and institution to understand the terrain significantly and topography of rivers, to take preventive measure by the data accumulated by the DEM.
5. Digital Ortho rectified Imagery [ORI] will also be generated for understanding the topographical features in the project area. This will aid in better understanding of the project area and in turn will result in more efficient decision making. Also, it will be used as reference with future surveys for change detection in the river basin area.
6. The project will enable the authorities to assess the impact of both natural and man-made features upon flood risk by identify the topography of river basin up to 5km from each bank.

2. Project Area:

The area for which the 'Provision of services for Acquisition, Processing and Delivery of DEM and Digital Ortho Rectified Imagery data', in the flood plains of Sutlej, Beas and Ghaggar river basins is required, covers the river bed (with or without water),up totheir banks and a buffer zone of 5(five) km on

either side of the river banks. The total area is approximately 7350 square km as provided by Water Resource Department, Govt of Punjab.

Project area for tendering purpose will be as per the 1:50,000 Toposheet published by Survey of India. The actual area of the project will be as per the ground reality. The same will be determined by ORI generated in the Subject Project. A maximum 25% variation between planned project area and actual project area will be permissible. In case, there is variation of more than 25%, then the same will be considered under this project's scope only after the approval of the project sanctioning authority/approving authority.

The river Sutlej passes through the districts of Ropar, SBS Nagar, Ludhiana, Jalandhar, Moga, Ferozepur, Fazilka, Tarn Taran and Kapurthala. The river Beas passes through the districts of Gurdaspur, Hoshiarpur, Amritsar, Tarn Taran and Kapurthala. The river Ghaggar passes through the districts of Patiala, Sangrur and Mansa.

Sl. No.	Description	Approximate Area (sq km)#
1	River Sutlej	3060
2	River Beas	1200
3	River Ghaggar	3090

#provided by Govt of Punjab.

3. Scope of Work:

1) Provision of Ground control/Check Points:
   a. This part includes planning, creation, observation, computation, of Ground Control/Check Points.
   b. Existing CORS (Continuously Operating Reference Station) of Survey of India and Control points established under various mapping work shall be utilized for provisioning the Horizontal Control/Check points for the project.
   c. Provision of Vertical Control/Check Points will be based on the Geoid Model developed by SoI based on Indian Vertical Datum.
   d. High Precision levelling/ DT Levelling would be carried out if necessary for achieving the objectives of the Project.
   e. About 75 Control Points per 1000 sq km and about 100 check points per 1000 sq km will be provisioned in the project.

2) Aerial Data Acquisition [LiDAR+ Optical]{including planning and other preparatory works}:
   a. Flight planning, sensor calibration, Flight execution as per plan, QA/QC for review of flight line alignment, raw data validation for completeness, avoiding data voids, strip matching, pre-processing of on-board GNSS/IMU data for trajectory file and other pre-processing steps needed for point cloud extraction/ preparing data for post-processing stage.
   b. Obtaining necessary clearances from relevant ministries as per the extant rules of GoI and other agencies for flying over the survey area and to acquire data.
   c. Mobilization of all necessary equipment, software and hardware for carrying out the activity.

d. Assistance from Govt. of Punjab will be required wherever necessary for getting necessary administrative approvals and smooth execution of survey and mapping related activities such as data acquisition, field validation, etc.
e. Acquisition of Raw Digital data by Aerial Platform for generating Digital Elevation Model (DEM) of 0.25mvertical accuracy (RMSE) and Digital Ortho Rectified Imagery of 10cm GSD (Ground Sampling Distance) with 0.20m Horizontal Accuracy. LiDAR survey and Digital photogrammetry of the area shall be carried out by the SOI through outsourcing using Aerial platform with onboard LiDAR and Optical Sensors integrated with on-board GNSS and IMU to generate Digital Elevation model (DEM) of 0.25m accuracy (RMSE) and Ortho rectified image of 10cm GSD with 0.20m Horizontal Accuracy.
f. If the case arises in which Aircraft flying is not permissible in any particular area pocket as per the extant rules, UAVs with Optical &LiDAR Sensors will be the platform for data acquisition in such area pockets. This will ensure continuity of Data (DEM/ORI, Contours) in such area pockets.

3) Post Processing for generation of DEM [DSM and DTM] and Digital Ortho Rectified Imagery:
   a. This part includes generating Digital Surface Model (DSM) from raw/ pre-processed data and performing necessary editing/ filtering of non- ground points (vegetation, built-up areas, bridges, elevated structures etc.) for generating bare-earth DEM [DTM] of 0.25m accuracy (RMSE).
   b. Conversion of Ellipsoidal Height Based DEMs to Orthometric height DEMs usingGeoid model developed by SoI.
   c. Generationof Ortho-imagery of 10 cm GSDwith 0.20m Horizontal Accuracy (RMSE).
   d. QA/QC at various stages of project including horizontal and vertical accuracy validation as per specifications.
   e. Proper Cataloguing of all data.

4) Feature Extraction: Topographical features shall be derived from Ortho-rectified image using suitable GIS software. The base map shall comprise of various layers in GIS format as per the requirements of the project.Geospatial Data Model used in NHP project by SOI will be deployed for better consistency of data.

5) Generation of Final Deliverables: Map template on 1:25k scale in .pdf and Geo package (open source). Contour at 0.5 m interval in vector format (.shp). Geospatial Data Model used in NHP project by SOI will be deployed for better consistency of data.

6) Final Deliverables: QA/QC of the final deliverables and proper cataloguing of raw data, project files and documents, map templates, etc. before delivery.

7) Storage and Management of Data acquired/Generated:
   a. Several Terra Bytes (TB) of Data will be acquired and generated during the course of the project. Hence, to store and maintain a copy of all the data generated in the

project, a robust storage will be provisioned compatible with Geo-ICT Infrastructure of SOI.

b. A similar storage will required to be provisioned in Government of Punjab also for maintaining a copy of all the data for records and further utilization by Govt of Punjab.

8) Training: Training of Govt of Punjab Officers and Staff as per the requirement at National Institute of Geo-informatics Science and Technology (NIGST), Hyderabad, the training institute of SOI. The Training related costs will be borne by Govt of Punjab.

4. Roles and Responsibilities:

a. Survey of India:

i. SOI will plan, execute including outsourcing and deliver the project. This will result in generation of SOI mandated fundamental theme as per NGP-2022 i.e ORI and DEM. Procurement of goods and services will be done as per the extant Public Procurement Rules and Guidelines of Government of India.

ii. SOI will hand hold and provide training as per the requirement of Govt of Punjab at NIGST, Hyderabad for geospatial skill development of its officers and staffs..

iii. One copy of the data and maps will be maintained by SOI as per the mandate of NGP-2022 as a part of National Digital Spatial Framework.

b. Govt. of Punjab (GoP):

i. Assistance from Govt. of Punjab will be required wherever necessary for getting necessary administrative approvals and smooth execution of survey and mapping related activities such as data acquisition, field validation, etc.

ii. GoP will provide funds to SoI through Government approved channel.

5. Deliverables:

1) Ellipsoidal height (WGS-84) based Digital Elevation Model (DSM & DTM) with 0.15 m vertical accuracy (RMSE).
2) Orthometric Height Based Digital Elevation Model (DSM & DTM) with 0.25 m vertical accuracy (RMSE). Orthometric height DEM will be generated using Geoid Model developed by SOI.
3) Ortho-Rectified Imagery at 10cm GSD with horizontal accuracy of 0.20 m accuracy or better (RMSE) in Geo-Tiff format.
4) Contour at 0.5 m interval in vector format (.shp).
5) Topographical maps on 1:25k scale in '.pdf' and 'Geo-package' (open source). Geospatial Data Model will be as per NHP project.

6. **Fund Provision and Cost Estimate*** **(Total Area of 7350 sq km):**
   1) Funds for the project will be provisioned by Govt of Punjab.
   2) Cost Estimate:

Sl No.	Activity	Cost (in Rs per sq km)	Amount (Rs)
1	Provision of GCP and vertical control	1700	1,24,95,000
2	Data Acquisition	16,000	11,76,00,000
3	Data processing	1,250	91,87,500
4	ORI & DEM Generation	1,450	1,06,57,500
5	Post processing (DEM editing, DTM & contour generation, etc.)	2750	2,02,12,500
6	QA/QC of ORI/DEM	1000	73,50,000
7	**Total (1 to 6)**	**24,150**	**17,75,02,500**
8	Feature Extraction including QA/QC	4000	2,94,00,000
9	**Total (7+8)**	**28,150**	**20,69,02,500**
10	Storage with Smart Rack	@500TB [usable]	75,00,000
11	**Total(9+10)**		**21,44,02,500**
12	@10% of Sl.No. 11, for unforeseen expenses.		**2,14,40,250**
13	@20% of Sl.No. 11, to cover expenses incurred towards usage of SOI equipments and other expense on travel etc. of SOI personnel - For control provisioning, Levelling, WorkStations etc. to be used for QA/QC/Audit of Deliverables etc.		**4,28,80,500**
14	**Grand Total (11 to 13)**		**27,87,23,250**

*These are estimates only. The final cost of the project will be discovered after open tendering and subsequent the price discovery.

7. **Time Schedule**: 12 months [subject to the natural constraints and administrative clearances or any other unforeseen exigencies].

8. **Relationship** between SOI, GoI and WRD, Govt of Punjab shall be Principle-to-Principle. Any dispute will be settled mutually by both the Departments, if necessary.

3197

Government of Punjab

Revenue, Rehabilitation, and Disaster Management Department

(Disaster Management – 1 Branch)

To

The Principal Secretary,
Department of Water Resources,
Government of Punjab.

Memo No. 2/1/2022-2 DM-1/ 16404
Chandigarh, Dated: 26/9/24

Subject: **Regarding – Provision of services for Acquisition, Processing and Delivery of Digital Elevation Model and Digital Ortho-Image for Flood Risk Mitigation/Mapping of areas along the Sutlej, Beas and Ghaggar rivers.**

Sir,

This is with reference to your letter no. 1469/CE/DRG/2024/E-754256 dated 16.04.2024 regarding the subject cited above.

2. As per the proposal submitted by the Water Resources Department, Phase-1 of the Digital Elevation Modelling (DEM) for the Sutlej River is proposed, covering a stretch from Nangal to Machiwara-Rahon Bridge (98 km) and from Harike D/S to the point where the Sutlej enters the international border (47 km), totalling 145 km. This phase is planned for the current fiscal year 2024-25, with an estimated cost of Rs 5.84 Crores, which was originally the total project cost for all three rivers in the previously approved project by the State Executive Committee.

3. It is submitted that following the State's SDMF administrative procedures, projects are appraised by the Technical Advisory Committee and the Project Appraisal Committee before receiving final approval from the State Executive Committee. In this case, the revised PFR and DPR will need to be submitted by WRD and appraised by the committees due to the significant changes in both the project's scope and cost. After technical and administrative appraisal of the projects, the project will again be placed before the State Executive Committee (SEC) for final approval. This is as per the approval of the competent authority.

Deputy Secretary Revenue

3198

GOVERNMENT OF PUNJAB
Department of Water Resources

To

Special Chief Secretary-
Cum-Financial Commissioner, Revenue,
Department of Revenue, Rehabilitation & Disaster Management,
Govt. of Punjab.

Memo No.: - 1666/CE/DRG/2024
Date: - 09/10/2024

Subject: Submission of Revised Pre-Feasibility Report (PFR) and Detailed Project Report (DPR) for Approval under State Disaster Mitigation Fund FY 2024-25.

1.0 Please refer to the subject cited above and your office Memo No. 2/1/2022-2 DM-1/ 16404 dated 26.09.2024.

2.0 As per the instructions vide the referenced letter above, the Revised PFR and DPR for the project *"Provision of services for acquisition, processing, and delivery of Digital Elevation Model (DEM) and Digital Ortho-Image for Flood Risk Mitigation/ Mapping of areas along the Sutlej, Beas, and Ghaggar rivers* " amounting to Rs. 582.62 lakhs are submitted herewith.

3.0 It is requested that the enclosed Pre-feasibility Report (PFR) and Detailed Project Report (DPR) may be forwarded to the Appraisal Committee for due consideration and approval so that the Department of Water Resources can carry out the further necessary action regarding tendering/execution of the work.

Encl/As Above

Principal Secretary,
Water Resources Department

Endst No. 1667/CE/DRG/2024 Dated: 09/10/2024

Chief Engineer/Drainage-cum-Mining and Geology, Water Resources Department, Punjab, Chandigarh to coordinate with the concerned Department and provide all relevant information.

Principal Secretary,
Water Resources Department

Government of Punjab
Revenue, Rehabilitation, and Disaster Management Department
(Disaster Management – 1 Branch)

To

1. The Director, Indian Meteorological Department,
   Meteorological Centre, Sector 39, Chandigarh, 160036
2. The Head of the Department,
   Earthquake Engineering Division, Department of Civil Engineering
   Indian Institute of Technology Ropar,
   Nangal Road, Rupnagar – 140001.
3. The Director (Research),
   Punjab Agriculture University, Ludhiana.
4. The Director, Punjab Remote Sensing Center,
   PAU Campus, Near Kitchlu Nagar block 'F' end,
   Ludhiana 141004
5. Officer In charge, Punjab Climate Change Knowledge Centre (PSCCKC)
   Punjab State Council for Science & Technology
   MGSIPA Complex, Sector-26, Chandigarh-160001
6. The Director, Department of Local Government
   Municipal Bhawan, Plot No. 3, Dakshin Marg,
   Sector 35-A, Chandigarh-160022
7. The Chief Administrator,
   Punjab Urban Development Authority,
   Room No. 101, 1st Floor PUDA Bhawan,
   Sector-62, SAS Nagar (Mohali)
8. The Chief Conservator of Soils,
   Department of Soil & Water Conservation,
   First Floor SCO 50-51, Sector 17-E Chandigarh
9. The Chief Engineer (Drainage),
   Department of Water Resources,
   Sector 18, Chandigarh.

Memo No. 2/1/2022-2 DM-1/ 18848-57
Chandigarh, Dated: 12/11/2024

Subject: **Proceedings of the 5th Meeting of the Technical Advisory Committee of the State Disaster Mitigation Fund (SDMF)**

Sir,

Kindly refer to the subject cited above.

2. This is with reference to the fifth meeting of the Technical Advisory Committee of SDMF held under the Chairmanship of Sh. Harpreet Singh Sudan IAS, Special Secretary (Revenue) and Director (Disaster Management), Department of Revenue, Rehabilitation and Disaster Management, Government of Punjab on 06.11.2024. The proceedings of the meeting are enclosed for your information and necessary action.

Deputy Secretary Revenue

Proceedings of the 5th Meeting of the Technical Advisory Committee (TAC) held on 06.11.2024 at 10:30 a.m. under the chairmanship of Sh. Harpreet Singh Sudan IAS, Special Secretary Revenue -cum- Director (Disaster Management) for the appraisal of project proposals under the State Disaster Mitigation Fund (SDMF).

The list of participants has been attached in Annexure 'A'

1.0 At the outset of the meeting, the Chairman welcomed all the committee members for attending the 5th meeting of the Technical Advisory Committee.

2.0 **Agenda 1**: The committee was informed that the Disaster Management Department had sought clarification from the Ministry of Home Affairs (MHA), Government of India, regarding the application of the 50% limitation on funds for single-hazard mitigation as the MHA's guidelines for SDMF. Specifically, the query concerned whether this 50 % limitation should be calculated based on the entire opening balance (including accumulated funds) or only the annual allocation for the corresponding financial year. The clarification was necessary to prevent the potential underutilization of accumulated funds for mitigation activities if the limitation was applied solely to the annual allocation. In response, the MHA clarified, in a letter dated September 17, 2024, that the opening unspent balance should be included when calculating the 50% limitation for single-hazard mitigation within a given year. The Technical Advisory Committee (TAC) was informed of this clarification, and committee members took note of the clarification issued by MHA.

3.0 **Agenda 2**: A project from the Water Resource Department was originally approved & sanctioned during the 2nd State Executive Committee (SEC) meeting held on 26.06.2024 for a total cost of Rs. 583.75 lakhs under the State Disaster Mitigation Fund (SDMF) which was originally the total project cost for all three rivers in the previously approved plan. The duration of the project was 6 months as per the DPR. Now vide the revised proposal, the Department of Water Resources has requested approval for the revision of the project, with a change in scope to execute the DEM for the Sutlej River from Nangal to Machiwara-Rahon Bridge (98 km) & Harike D/S to up to Sutlej enters International Border (47km) i.e. Total length of 145 km as Phase-1 in the current FY 2024-25 at an estimated cost of Rs. 5.82 Crores. This change has been proposed to comply with the Hon'ble NGT's directives for flood zonation based on Survey of India standards. The adoption of advanced technologies, such as LiDAR, has increased the overall project cost.

4.0 **Agenda 3**: A project proposal was presented by Regional Research Station (PAU), Ballowal Saunkhri, SBS Nagar titled "To study the Impact of Land Use and Land Cover Changes on Soil Erosion under Changing Climatic Scenarios in Kandi Region of Punjab" amounting Rs. 109.16 lakhs.

5.0 The technical members of the committee deliberated upon the submitted projects from the Water Resources Department & PAU, and after detailed discussions following decisions were taken:

S.No.	Title	Amount	Decision by TAC
1	Provision of services for acquisition, processing and delivery of Digital Elevation Model and Digital Ortho-Image for Flood Risk Mitigation/Mapping of area along River Sutlej" from Nangal to Machiwara- Rahon Bridge (98 km) & Harike D/S to up to Sutlej enters International Border (47km) i.e. Total length of 145 km as Phase-1 **Submitted by: Water Resources Department**	Rs.582.62 Lakhs	Given the project's importance for flood risk assessment and the inclusion of additional technological interventions, the revised proposal submitted by the Water Resources Department under Agenda No. 2 was recommended for further appraisal by the Project Appraisal Committee.
2	To study the Impact of Land Use and Land Cover Changes on Soil Erosion under Changing Climatic Scenarios in Kandi Region of Punjab **Submitted by: Regional Research Station (PAU)**	Rs.109.16 Lakhs	It has been recommended that this project by PAU be incorporated as a non-structural component with increased scope including the water, mining, and geomorphological studies for the *Kandi* area into a similar project submitted by the Soil & Water Conservation Department, valued at Rs. 88.92 crores (as the activities proposed are linked to the structural activities). The Soil & Water Conservation project has already been endorsed by the TAC and PAC to the State Executive Committee for submission to the NDMA for funding under the National Disaster Mitigation Fund (NDMF).

6.0 **Agenda 4:** With the Chair's permission, some additional agenda items were also discussed during the meeting, and after due deliberations following decisions were made:

a. The Committee members recommended organizing exposure visits to states that are recognized leaders in disaster response, operations, research and development, early warning systems, and mitigation efforts. States such as Odisha, Bihar, Haryana, and Himachal Pradesh etc have developed robust frameworks and innovative practices in these areas. By

visiting these regions, Punjab's teams could observe successful models, learn about cutting-edge technologies, and gain insights into efficient operational strategies. The knowledge gathered from these visits would serve as valuable input for designing and establishing the proposed Center for Excellence in Punjab, ensuring that it incorporates best practices and aligns with national standards for disaster management and resilience. This initiative aims to equip Punjab's disaster management efforts with proven strategies and tailored solutions that address the state's specific challenges. The Chair approved the agenda in principle and directed that the DM Department should form teams of officers who volunteer from PRSC, IIT Ropar, Water Resources Department, other member departments and districts to be nominated for these peer learning visits subject to approval by the competent authority.

b. The Water Resources Department requested training on digital modeling software and capacity building for their engineers. In response, IIT Ropar and the Punjab Remote Sensing Center, Ludhiana, have expressed their willingness to support this initiative. It was decided that proposals from both institutions, through the WRD, for two batches of 25 engineers each, should be submitted to the committee for consideration.

c. The Chair directed the Disaster Management Department to request relevant departments to share the challenges they are facing related to various hazards in the state such as industrial & chemical fires in Industrial areas, and fires in crowded areas where the movement of fire tenders becomes restricted. These issues will be considered for the design and implementation of mitigation activities under the State Disaster Mitigation Fund.

The meeting ended with a vote of thanks.

Harpreet Singh Sudan, IAS

Director (DM)-cum-Chairperson,

Technical Advisory Committee

Annexure A

List of Participants:

1. Sh. Surender Paul, Director India Meteorological Department (IMD) Chandigarh
2. Dr. Manmohan Singh, Deen & Director RRS PAU
3. Dr. Abrar Yousf, Scientist Soil & Water Engg, RRS PAU
4. Dr. A. S. Brar, Principal Agronomist, PAU Ludhiana
5. Dr. Sukhpreet Singh, Agronomist, PAU Ludhiana
6. Er. Maganbir Singh, Principal Scientific Office, Punjab State Council for Science & Technology
7. Er. Anuj Sehgal, SEC (HQ), PUDA
8. Smt. Avneet Kaur, Xen Local Government
9. Dr. R. K. Setia, Scientist-SE, PRSC Ludhiana
10. Sh. Gurbinder Singh Dhillon, DSCO(H.Q), Soil Water Conservation, Punjab
11. Sh. Rajat Grover, XEN/DRAINAGE WRD
12. Dr. Putul Haldar, Assistant Professor, Civil Engg. IIT Ropar
13. Dr. Rupali Bal, Scientist-C, Punjab State Council for Science & Technology
14. Sh. Sashikanta Sahoo, Scientist SD, PRSC Ludhiana
15. Smt. Manjeet Kaur Sahotra, Deputy Secretary Deptt. of Revenue, Rehabilitation and Disaster Management.
16. Smt. Prabhjot Kaur, ACFA, Deptt. of Revenue, Rehabilitation and Disaster Management.
17. Sh. Vivek Sharma, Senior Consultant (DM), Deptt. of Revenue, Rehabilitation and Disaster Management.
18. Sh. Vipin Kakkar, Superintendent -I, DM-1 Branch
19. Sh. Swarn Singh, Senior Assistant, DM-1 Branch

3204

Government of Punjab

Department of Water Resources, Punjab,

To

Additional Chief Secretary-
Cum-Financial Commissioner, Revenue,
Department of Revenue, Rehabilitation & Disaster Management,
Govt. of Punjab.

Memo No.: 2137-40 /CE/ DRG/ 2024 /E-754256
Date: 23/12/2024

Subject: Scheduling of Project Appraisal Committee (PAC) meeting for revised Digital Elevation Modelling (DEM) Project.

1.0 Please refer to your office Memo No. 2/1/2022-2 DM-1/ 16404 dated 26.09.2024

2.0 As per the instructions vide the referenced letter above, the Revised PFR and DPR for the project *"Provision of services for acquisition, processing, and delivery of Digital Elevation Model (DEM) and Digital Ortho-Image for Flood Risk Mitigation/ Mapping of areas along the Sutlej, Beas, and Ghaggar rivers* " amounting to Rs. 582.62 lakh was submitted vide this office Memo No. 1666/CE/DRG/2024 dated 09-10-2024.

3.0 It is submitted that PFR of the said project was apprised by the Technical Advisory Committee (TAC) vide Minutes of Meeting dated 06-11-2024 (copy enclosed).

4.0 You are requested to kindly schedule the Project Appraisal Committee (PAC) Meeting for appraisal of (PFR) and Detailed Project Report (DPR) so that the Department of Water Resources can carry out the further necessary action regarding tendering/execution of the work.

Encl/As Above

Principal Secretary
Water Resources Department

C.C

1. Chief Engineer/Drainage cum Mining and Geology Water Resources Department, Punjab.
2. Superintending Engineer/Jalandhar, Drainage cum Mining & Geology Circle, WRD, Punjab.
3. Executive Engineer/Ludhiana, Drainage cum Mining & Geology Circle, WRD, Punjab.

Government of Punjab
Revenue, Rehabilitation, and Disaster Management Department
(Disaster Management – 1 Branch)

To

1. The Director, Indian Meteorological Department,
   Meteorological Centre, Sector 39, Chandigarh, 160036
2. The Head of the Department,
   Earthquake Engineering Division, Department of Civil Engineering
   Indian Institute of Technology Ropar,
   Nangal Road, Rupnagar – 140001.
3. The Director (Research),
   Punjab Agriculture University, Ludhiana.
4. The Director, Punjab Remote Sensing Center,
   PAU Campus, Near Kitchlu Nagar block 'F' end,
   Ludhiana 141004
5. Officer In charge, Punjab Climate Change Knowledge Centre (PSCCKC)
   Punjab State Council for Science & Technology
   MGSIPA Complex, Sector-26, Chandigarh-160001
6. The Director, Department of Local Government
   Municipal Bhawan, Plot No. 3, Dakshin Marg,
   Sector 35-A, Chandigarh-160022
7. The Chief Administrator,
   Punjab Urban Development Authority,
   Room No. 101, 1st Floor PUDA Bhawan,
   Sector-62, SAS Nagar (Mohali)
8. The Chief Conservator of Soils,
   Department of Soil & Water Conservation,
   First Floor SCO 50-51, Sector 17-E Chandigarh
9. The Chief Engineer (Drainage),
   Department of Water Resources,
   Sector 18, Chandigarh.

Memo No. 2/1/2022-2 DM-1/ 18848-57
Chandigarh, Dated: 12/11/2024

Subject: **Proceedings of the 5th Meeting of the Technical Advisory Committee of the State Disaster Mitigation Fund (SDMF)**

Sir,

Kindly refer to the subject cited above.

2. This is with reference to the fifth meeting of the Technical Advisory Committee of SDMF held under the Chairmanship of Sh. Harpreet Singh Sudan IAS, Special Secretary (Revenue) and Director (Disaster Management), Department of Revenue, Rehabilitation and Disaster Management, Government of Punjab on 06.11.2024. The proceedings of the meeting are enclosed for your information and necessary action.

Deputy Secretary Revenue

Proceedings of the 5th Meeting of the Technical Advisory Committee (TAC) held on 06.11.2024 at 10:30 a.m. under the chairmanship of Sh. Harpreet Singh Sudan IAS, Special Secretary Revenue -cum- Director (Disaster Management) for the appraisal of project proposals under the State Disaster Mitigation Fund (SDMF).

The list of participants has been attached in Annexure 'A'

1.0 At the outset of the meeting, the Chairman welcomed all the committee members for attending the 5th meeting of the Technical Advisory Committee.

2.0 **Agenda 1**: The committee was informed that the Disaster Management Department had sought clarification from the Ministry of Home Affairs (MHA), Government of India, regarding the application of the 50% limitation on funds for single-hazard mitigation as the MHA's guidelines for SDMF. Specifically, the query concerned whether this 50 % limitation should be calculated based on the entire opening balance (including accumulated funds) or only the annual allocation for the corresponding financial year. The clarification was necessary to prevent the potential underutilization of accumulated funds for mitigation activities if the limitation was applied solely to the annual allocation. In response, the MHA clarified, in a letter dated September 17, 2024, that the opening unspent balance should be included when calculating the 50% limitation for single-hazard mitigation within a given year. The Technical Advisory Committee (TAC) was informed of this clarification, and committee members took note of the clarification issued by MHA.

3.0 **Agenda 2**: A project from the Water Resource Department was originally approved & sanctioned during the 2nd State Executive Committee (SEC) meeting held on 26.06.2024 for a total cost of Rs. 583.75 lakhs under the State Disaster Mitigation Fund (SDMF) which was originally the total project cost for all three rivers in the previously approved plan. The duration of the project was 6 months as per the DPR. Now vide the revised proposal, the Department of Water Resources has requested approval for the revision of the project, with a change in scope to execute the DEM for the Sutlej River from Nangal to Machiwara-Rahon Bridge (98 km) & Harike D/S to up to Sutlej enters International Border (47km) i.e. Total length of 145 km as Phase-1 in the current FY 2024-25 at an estimated cost of Rs. 5.82 Crores. This change has been proposed to comply with the Hon'ble NGT's directives for flood zonation based on Survey of India standards. The adoption of advanced technologies, such as LiDAR, has increased the overall project cost.

4.0 **Agenda 3**: A project proposal was presented by Regional Research Station (PAU), Ballowal Saunkhri, SBS Nagar titled "To study the Impact of Land Use and Land Cover Changes on Soil Erosion under Changing Climatic Scenarios in Kandi Region of Punjab" amounting Rs. 109.16 lakhs.

5.0 The technical members of the committee deliberated upon the submitted projects from the Water Resources Department & PAU, and after detailed discussions following decisions were taken:

S.No.	Title	Amount	Decision by TAC
1	Provision of services for acquisition, processing and delivery of Digital Elevation Model and Digital Ortho-Image for Flood Risk Mitigation/Mapping of area along River Sutlej" from Nangal to Machiwara- Rahon Bridge (98 km) & Harike D/S to up to Sutlej enters International Border (47km) i.e. Total length of 145 km as Phase-1 **Submitted by: Water Resources Department**	Rs.582.62 Lakhs	Given the project's importance for flood risk assessment and the inclusion of additional technological interventions, the revised proposal submitted by the Water Resources Department under Agenda No. 2 was recommended for further appraisal by the Project Appraisal Committee.
2	To study the Impact of Land Use and Land Cover Changes on Soil Erosion under Changing Climatic Scenarios in Kandi Region of Punjab **Submitted by: Regional Research Station (PAU)**	Rs.109.16 Lakhs	It has been recommended that this project by PAU be incorporated as a non-structural component with increased scope including the water, mining, and geomorphological studies for the *Kandi* area into a similar project submitted by the Soil & Water Conservation Department, valued at Rs. 88.92 crores (as the activities proposed are linked to the structural activities). The Soil & Water Conservation project has already been endorsed by the TAC and PAC to the State Executive Committee for submission to the NDMA for funding under the National Disaster Mitigation Fund (NDMF).

6.0 **Agenda 4:** With the Chair's permission, some additional agenda items were also discussed during the meeting, and after due deliberations following decisions were made:

a. The Committee members recommended organizing exposure visits to states that are recognized leaders in disaster response, operations, research and development, early warning systems, and mitigation efforts. States such as Odisha, Bihar, Haryana, and Himachal Pradesh etc have developed robust frameworks and innovative practices in these areas. By

visiting these regions, Punjab's teams could observe successful models, learn about cutting-edge technologies, and gain insights into efficient operational strategies. The knowledge gathered from these visits would serve as valuable input for designing and establishing the proposed Center for Excellence in Punjab, ensuring that it incorporates best practices and aligns with national standards for disaster management and resilience. This initiative aims to equip Punjab's disaster management efforts with proven strategies and tailored solutions that address the state's specific challenges. The Chair approved the agenda in principle and directed that the DM Department should form teams of officers who volunteer from PRSC, IIT Ropar, Water Resources Department, other member departments and districts to be nominated for these peer learning visits subject to approval by the competent authority.

b. The Water Resources Department requested training on digital modeling software and capacity building for their engineers. In response, IIT Ropar and the Punjab Remote Sensing Center, Ludhiana, have expressed their willingness to support this initiative. It was decided that proposals from both institutions, through the WRD, for two batches of 25 engineers each, should be submitted to the committee for consideration.

c. The Chair directed the Disaster Management Department to request relevant departments to share the challenges they are facing related to various hazards in the state such as industrial & chemical fires in Industrial areas, and fires in crowded areas where the movement of fire tenders becomes restricted. These issues will be considered for the design and implementation of mitigation activities under the State Disaster Mitigation Fund.

The meeting ended with a vote of thanks.

Harpreet Singh Sudan, IAS

Director (DM)-cum-Chairperson,

Technical Advisory Committee

Annexure A

List of Participants:

1. Sh. Surender Paul, Director India Meteorological Department (IMD) Chandigarh
2. Dr. Manmohan Singh, Deen & Director RRS PAU
3. Dr. Abrar Yousf, Scientist Soil & Water Engg, RRS PAU
4. Dr. A. S. Brar, Principal Agronomist, PAU Ludhiana
5. Dr. Sukhpreet Singh, Agronomist, PAU Ludhiana
6. Er. Maganbir Singh, Principal Scientific Office, Punjab State Council for Science & Technology
7. Er. Anuj Sehgal, SEC (HQ), PUDA
8. Smt. Avneet Kaur, Xen Local Government
9. Dr. R. K. Setia, Scientist-SE, PRSC Ludhiana
10. Sh. Gurbinder Singh Dhillon, DSCO(H.Q), Soil Water Conservation, Punjab
11. Sh. Rajat Grover, XEN/DRAINAGE WRD
12. Dr. Putul Haldar, Assistant Professor, Civil Engg. IIT Ropar
13. Dr. Rupali Bal, Scientist-C, Punjab State Council for Science & Technology
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16. Smt. Prabhjot Kaur, ACFA, Deptt. of Revenue, Rehabilitation and Disaster Management.
17. Sh. Vivek Sharma, Senior Consultant (DM), Deptt. of Revenue, Rehabilitation and Disaster Management.
18. Sh. Vipin Kakkar, Superintendent -I, DM-1 Branch
19. Sh. Swarn Singh, Senior Assistant, DM-1 Branch

भारत सरकार /Government of India
केंद्रीय जल आयोग/ Central Water Commission
नदी संरक्षण निदेशालय/ River Conservation Directorate

विंग-1, प्रथम तल,पश्चिम खंड -2,
आर. के. पुरम, नई दिल्ली-110606
Email: rcddte-cwc@nic.in

DATE: 08-08-2024

To,

The Principal Secretary (WR),
Water Resources Department,
Punjab, Chandigarh

Sub : Flood Plain Zoning of river Satluj in the state of Punjab-reg

Ref : Memo No. 1226/CE/DRG/2024 dated 01.08.2024

Sir,

Please refer to your letter cited under reference on the subject cited above, vide which status of technical and logistic support requested by CWC from your department to carry out the work of Flood Plain Zoning in river Satluj has been conveyed. It has been informed by you that requisite hydrological data is being collected at your end and shall be shared with CWC subsequently. However, there are budget constraint towards procurement of HPCs at your end and HPC procurement may therefore not be possible.

2. CWC vide letter dated 10.07.2024 has earlier informed to your office that a view on the request of State Government towards study work of Flood Plain Zoning in river Satluj will be taken by competent authority in CWC only after obtaining confirmation about availability of logistic and technical requirements indicated in the letter from your end.

3. In view of above, I am directed to inform that Central Water Commission endeavour to technically hand-hold State Government towards studies for scientific assessment of flood plain zones of river to enable its notification by State Government. However, the work of Flood Plain Zoning involves a number of activities to be completed including data collection & processing, satellite image processing, creation of 2D inundation model, demarcation of flood extent on GIS etc., testing and analysis of a 2-D hydrodynamic model.

It is therefore suggested that the State Government may hire a suitable agency which can do the above referred studies, and provide the agency the required data required for the studies. On its part, CWC shall provide required inputs for the studies, and would also provide inputs on the draft report.

Yours faithfully,

Mayank Suhirid
Director

Copy for kind information to:

1. PPS to Chairman, CWC, New Delhi.
2. Chief Engineer, Drainage cum Mining, WRD Punjab