

The Netherlands – Kerala Digital Cooperation
**‘Strengthening Kerala’s IWRM and Building Resilience
to Disasters’**

Webinar Series

25th, 26th November 2021 & 1st December 2021

Jointly organised by

The Netherlands Enterprise Agency (RVO), Government of Netherlands

The Department of Water Resources, Government of Kerala

Kerala State Disaster Management Authority

Centre for Disaster Resilience, University of Twente, The Netherlands



1 Introduction

Kerala, located in the south-west coast of India is highly vulnerable to natural hazards, the occurrence of which is being exacerbated due to climate change. Bound by the Arabian sea in the west and the Western Ghats in the east, the state has 39 hazards categorized under natural hazards in the Kerala State Disaster Management Plan. Among the various natural hazards, floods are the most common in Kerala. Riverine flooding is a recurring event consequent to heavy or continuous rainfall exceeding the absorptive capacity of soil and flow capacity of streams and rivers. This causes a water course to overflow its banks onto flood plains; which by definition is a relatively flat land adjacent to a natural water course, composed primarily of unconsolidated depositional material derived from sediments transported by the related stream and subjected to periodic flooding. Hazard interactions between rainfall-runoff, and infiltration which cause slope stability and the loosening of materials also contribute to flash floods. Landslides may block river channels, and dam break floods can result in cascading disasters. Sediments from mass movements will fill up water reservoirs reducing their capacity. Flood plains are therefore 'flood prone' and are hazardous if the developmental activities in them exceed an acceptable level. Frequency of inundation depends essentially on rainfall, channel slope, relative height of the banks, materials that make up stream banks and land use in flood plain. Reclamation and settlement in floodplain areas is a major cause of flood damage in Kerala. Nearly 14.5% of the state's land area is prone to floods, and in the case of some districts the proportion is as high as 50%. Flood return probability of the State for varying return periods from 1 in 10 to 1 in 500 years (Eg. Figure 1) have been prepared by KSDMA with the technical assistance of United Nations Environment Programme.

Until 2018, the worst known flood event in Kerala in the last 100 years occurred when Periyar River breached its banks in 1924. However, between June 1 and August 18, 2018, Kerala experienced the worst ever floods in its history since 1924. During this period, the State received cumulative rainfall that was 42% in excess of the normal average. During 15-17 August, some areas received 3000 to 4000 mm of rain. The torrential rains triggered several landslides and forced the release of excess water from 37 dams across the State, adding to the impact of floods. According to the reports by the Government of Kerala, 1,259 out of 1,664 villages spread across its 14 districts were affected. Seven districts were worst hit severely they being Alappuzha, Ernakulam, Idukki, Kottayam, Pathanamthitta, Thrissur and Wayanad-where the whole district was notified as flood affected. The devastating floods and landslides have affected 5.4 million people, displaced 1.4 million people, and took 450 lives (22 May – 29 August 2018). The Post Disaster Needs Assessment Report estimated a total recovery need of 4400 million USD. The year 2019 also witnessed floods and landslides in the state wherein 1038 villages from 13 districts were notified as affected by floods & landslides and 151 lives were lost. Sectors like housing, power, agriculture were affected badly. The coastline of Kerala is equally hazard prone; 55% of the State's coastline is hazard prone (Figure 2).

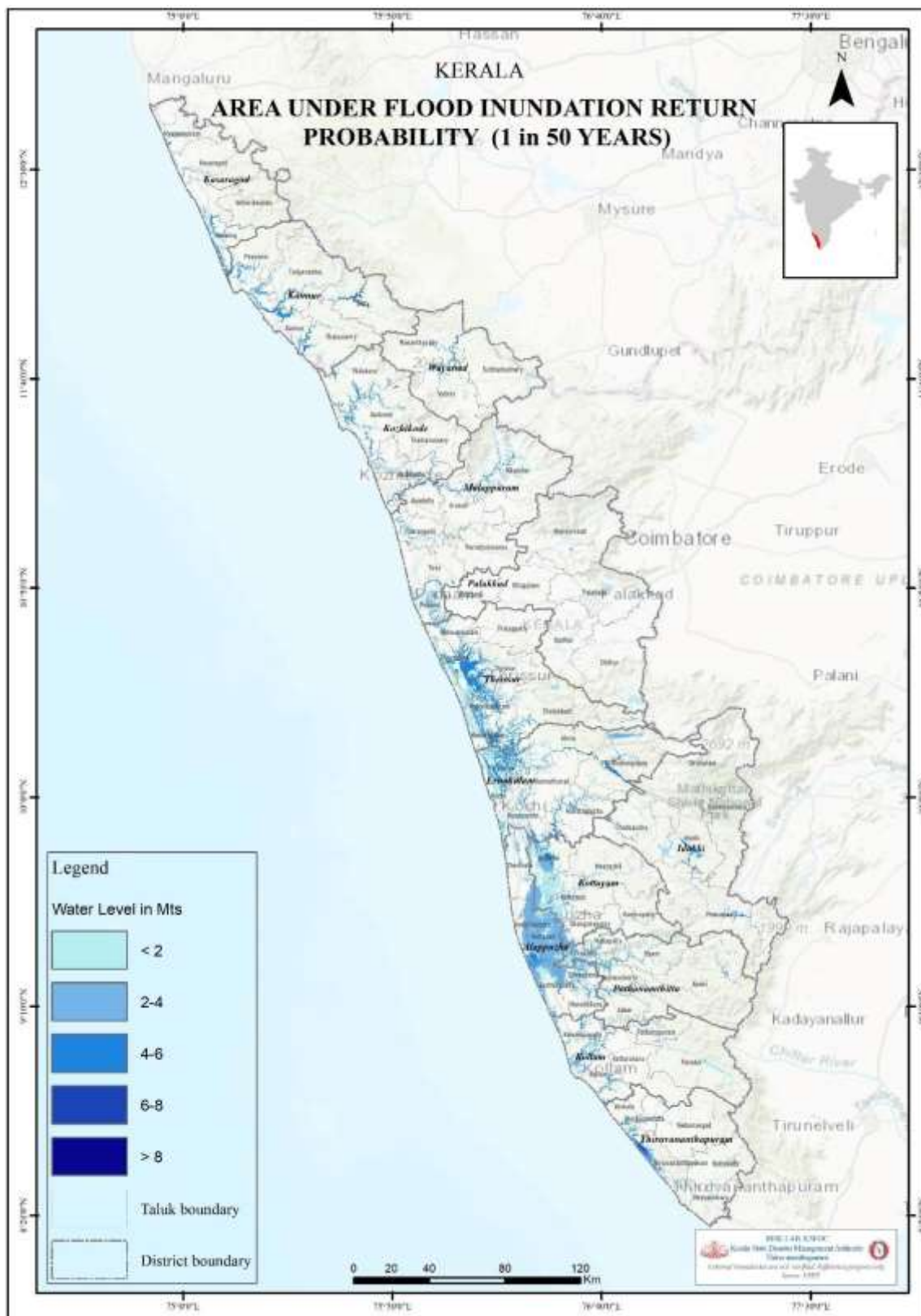


Figure 1: Flood probability – Area and depth of inundation (1 in 50 years)

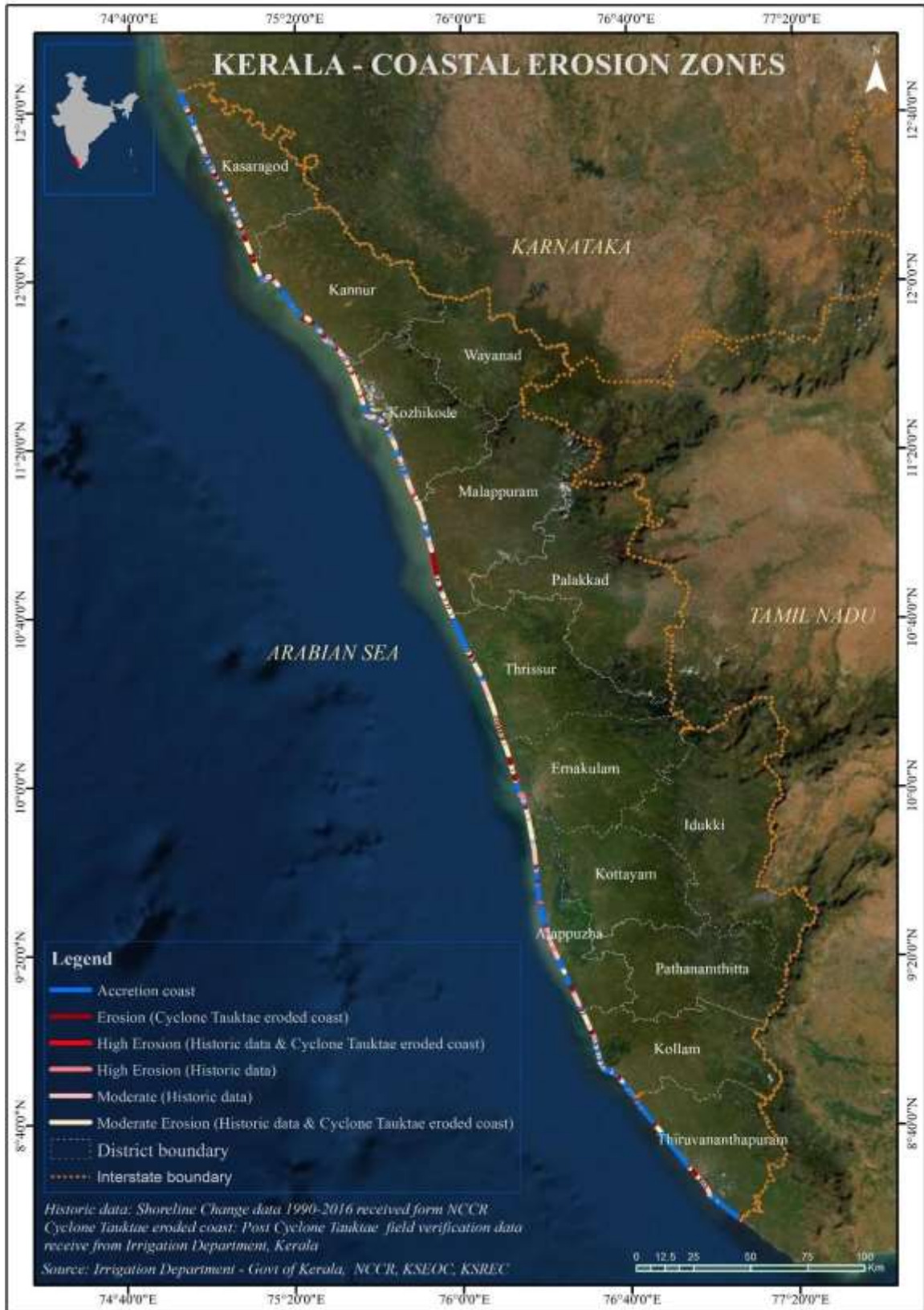


Figure 2: Coastal erosion zones

2 Need for consultation

The hazards happening in one part of the world can no longer be dealt in isolation. A systemic approach is the need of the hour especially when climate change-triggered events are on the rise. Assessing the systemic vulnerability of Kerala with respect to hydro-meteorological hazards is essential. Considering the extreme weather scenarios, Kerala, with its long coastline and 44 rivers, must learn to live with water. In a state where land is a scarce commodity and the density of population is 860 persons per square kilometer, challenges like “Making Room for the River” seem to be a tall order task. Such water challenges call for international cooperation, exchange of knowledge and expertise. Lessons from international best practices when adapted to suit the local context could pave the way to solutions that are not only successful but also sustainable.

The Netherlands, despite its long coastline, two-thirds of its area being vulnerable to flooding and the majority of its population living below sea level, is a country which has tamed its water to a great extent. The country is celebrated for its expertise in flood control, water management and its efforts in international capacity building in resilience building. The Netherlands works with other nations to tackle water related issues and thereby promote resilience and this inter-boundary cooperation is a role model. Expertise of the Netherlands is sought to help Kerala in addressing the problems pertaining to building long term resilience to hydro-meteorological hazards.

It is often misunderstood that there are quick fixes for combating the vagaries of climate extremes. The resurgence story of The Netherlands from a severely flood affected country to being one of the most disaster resilient country is underscored by the collective acceptance of the fact that there are no quick fixes to combating climate extremes. Every step, whether policy or execution of projects, are data and science driven and involves careful planning. Solutions are arrived at after careful data analysis; spatial planning is undertaken and implementation is carried out in a mission mode with medium to long term focus by multi-disciplinary teams. These vast experiences of the Netherlands in evolving as resilient country provides lessons for building a disaster and climate change adaptive Nava Kerala as envisaged by the Government.

Three seminars are planned under the programme, they being:

1. 25-11-2021: Risk informed spatial planning
2. 26-11-2021: Integrated water resource management
3. 1-12-2021: Risk Informed Spatial Planning and way forward in the Netherlands-Kerala collaboration for resilience building

3 Domains of consultation

3.1 Risk informed spatial planning

Risk is an ever-evolving dynamic situation of a society requiring continuous assessment with disaggregated data of underlying hazards and vulnerabilities in an integrated decision-making platform. Such an integrated platform is the key to developing a prudent decision support system for not only concurrent response planning, but also medium to long term climate change adaption planning and all aspects of good governance. A database that can cater to

comprehensive decision making essentially should have geographic variables, socio-economic variables, environmental fluxes and impact data. Through this session of the seminar, best practices for the management of such databases and their use in the assessment of risks for adaptive spatial planning is to be presented to the audience.

Inauguration			
Date and Time: 25 th November 2021, 14.30 IST to 17.00 IST 10:00 CET to 12:30 CET			
General Link for webinar 25 November https://utwente-nl.zoom.us/j/87344350095			
Personal panelist links have been sent to the speakers			
Time	Speaker	Title	Remarks
14.30 IST to 14.50 IST 10:00 CET to 10:20 CET	Inauguration: 1. Hon'ble Minister for Revenue 2. Hon'ble Minister for Water Resources 3. Mr. Gert Heijkoop, Consular General of the Netherlands, Bangaluru 4. Dr. V.P Joy IAS, Chief Secretary, Kerala 5. Representative of Indian Embassy in the Netherlands 6. Mr. Guus Schutjes, Program Manager RVO Partners for Water		
14:50 IST to 15:00 IST 10:20 CET to 10:30 CET	Introduction to the three days seminar and expectations – drs. Fernanda Van der Velde, RVO Moderator: Dr. Sekhar L. Kuriakose		
Technical Session 1: Risk informed spatial planning			
15:00 IST to 15:10 IST 10:30 CET to 10:40 CET	Dr. Sekhar L. Kuriakose, Visiting Scientist, ITC-CDR, Univ. of Twente	Data Management for Risk Assessment – expectations from the experts	The slides will focus on data capturing gaps, analytical gaps, capacity building needs, need for a dynamic DSS & expectations from the experts
15:10 IST to 15:25 IST 10:40 CET to 10:55 CET	Ir. Tjitte Nauta, Regional Manager, Asia, Deltares	Integrated near real-time data gathering and analytical tools for risk management	Expectation from the talk is the experience of Deltares in data gathering and analytics from environmental monitoring instruments for planning and concurrent management. The various Asian experiences of Deltares in risk reduction projects may be highlighted
15:25 IST to 15:40 IST 10:55 CET to 11:10 CET	Prof. Dr. Victor Jetten, ITC, Univ. of Twente	Catchment scale modelling of cascading hazards for scenario based spatial planning -	The expectation from this talk is to share examples of catchment scale modelling of cascading hazards (flash floods, debris flows,

		OpenLISEM	landslides, floods) and introduction to such modelling tools which would be helpful for scenario based spatial planning
15:40 IST to 15:55 IST 11:10 CET to 11:25 CET	Mr. Bas Kolen, HKV consultants	Practical tools for integrated water resources management for daily use	The expectation from this talk is to understand the various models available across the globe and specific models developed by Netherlands that can be used on a daily basis
15:55 IST to 16:10 IST 11:25 CET to 11:40 CET	Prof. Dr. C.J van Westen, ITC-CDR, Univ. of Twente	Risk Changes – The integrated risk assessment tool	The expectation from this talk is to showcase the experience of Risk Changes and how such an assessment tool could enable local risk reduction planning.
16:10 IST to 16:25 IST 11:40 CET to 11:55 CET	Prof. Dr. Richard Sliuzas, ITC, Univ. of Twente	Risk informed spatial planning – data requirements and best practices	Expectation from the talk is the experience sharing of the Netherlands on developing and maintaining detailed cadastral information and utilization of such information along with hazard information for spatial planning. Examples from global south on risk informed planning may also be highlighted
16:25 IST to 16:45 IST 11:55 CET to 12:15 CET	Interactive session		
16:45 IST to 17:00 IST 12:15 CET to 12:30 CET	Report: Dr. Sekhar L. Kuriakose/Dr. Dinand Alkema, ITC-CDR University of Twente - Recommendations for future collaboration based on the session Rapporteurs of session: Ir. Manu R and Mr. MSc. Pascal Weidema		

32 Integrated water resource management

The experience of the Netherlands in Integrated Water Management is world renowned based on their expertise in forming policies and plans with a combination of both hard and soft solutions. In this session Kerala will share their experiences/constraints in managing water resources in an integrated and holistic manner. Experts from the Netherlands will share their

experience in planning and implementing More Room for the River project, Meuse Works which has been developed as a part of IWRM. The positive impact of the same was evident in the 2021 Limburg floods. The experience sharing will enable to identify common grounds for fostering further long-term collaborations for project design, planning, implementation and mitigation of extreme events.

Technical Session 2: Integrated water resource management			
Date and Time: 26 th November 2021, 14.30 IST to 17.00 IST 10:00 CET to 12:30 CET			
Link for webinar 26 November https://utwente-nl.zoom.us/j/89826000947			
Personal panelist links have been sent to the speakers			
Time	Speaker	Title	Remarks
14.30 IST to 14.40 IST 10:00 CET to 10:10 CET	Introduction to the seminar – Dr. Sekhar L. Kuriakose Moderator: Ir. Pieter-Paul van Meel MSc (CE)		
14:40 IST to 14:55 IST 10:10 CET to 10:25 CET	Ir. Alex Varghese, Chief Engineer, Irrigation and Administration, Dept. of Water Resources	<ul style="list-style-type: none"> Urban flooding Coastal erosion in Kerala – Challenges and solutions Issues in Kuttanad 	Focus on Kerala's extreme natural/climatic events and its impacts Explanation on constraints on wetland management. It is expected to identify the needs through knowledge/experience from Netherlands to mitigate recurring floods.
14:55 IST to 15:05 IST 10:25 CET to 10:35 CET	Ir. Priyesh R, Director, Irrigation Design & Research Board, Dept. of Water Resources	Capacity requirements for integrated water management & flood resilience building in Kerala	The slides will focus on data capturing gaps, analytical gaps, need for a dynamic DSS & expectations from the experts. Expectations may include: <ul style="list-style-type: none"> Designing of flood abatement structures Watershed based modelling for flood resilience Flood impact assessment models for deriving design inputs

			<ul style="list-style-type: none"> • Bioengineering/NbS methods for flood risk reduction • Financial and institutional frameworks for maintenance and management of flood defence systems
<p>15:05 IST to 15:25 IST 10:35 CET to 10:55 CET</p>	<p>MSc. Nanco Dolman, Leading Professional in Water Resilient Cities, RHDHV</p>	<p>Urban Flood Management;</p> <p>Dike designs, management and automated systems for river flood management</p>	<p>The expectation from this talk is to share the experience of Arcadis in Urban Flood Management designs and automation of urban flood risk reduction systems. Example of use of Duck Bill valves for unidirectional flow control, flow monitored automated diversion systems etc. may be of interest;</p> <p>Expectation from the talk is the experience of RHDV in dike designs, continued health monitoring of dikes, their management and automated systems for river flood management.</p>
<p>15:25 IST to 15:40 IST 10:55 CET to 11:10 CET</p>	<p>Prof. Job Dronkers</p>	<p>Best practices - hard engineering solutions for coastal protection</p>	<p>The expectation from this talk is to highlight the need to carefully plan with observational data before arriving at hard engineering solutions and how the Netherlands does it. What are the different hard engineering solutions adopted to protect the coast of the Netherlands and what are the</p>

			suggestions of the speaker for coastal protection in high energy coasts like that of Kerala
15:40 IST to 15:50 IST 11:10 CET to 11:20 CET	MSc Jaap Flikweert, Leading Professional Flood Resilience RHDV	Sand Engine, Building with Nature	Progress Partner for Water project Bacton Sand Engine, Digital Twin, Virtual Coast.
15:50 IST to 16:05 IST 11:20 CET to 11:35 CET	Ms. Monique Berendsen Representative, Netherlands Delta Commission	Planning Delta Commission	Planning for Netherlands Water Resilience & Security for medium and long term. Planning process, financing and public, political stakeholders' acceptance
16:05 IST to 16:20 IST 11:35 CET to 11:50 CET	Mr. Bas Jonkman	The Limburg Floods of 2021	The expectation from this talk is to share the experience of the recent floods in Limburg and how Meuse works reduced the overall flood impact
16:20 IST to 16:35 IST 11:50 CET to 12:05 CET	Ir. Pieter-Paul van Meel MSc (CE), Advisor, Integrated Water Resources Management, RVO	Planning and Implementation of More Room for the River & Meuse Works	Expectation from the talk is the experience of the Netherlands in the implementation of More Room for the River with stress on comprehensive medium to long term planning based on observation and modelling data and the benefits of the project
16:35 IST to 16:45 IST 12:05 CET to 12:15 CET	Interactive session		
16:45 IST to 17:00 IST 12:15 CET to 12:30 CET	Report: Alex Varghese/Priyesh R – Recommendations for future collaboration based on the session Rapporteurs of session: Ir. Manu R and Mr. MSc. Pascal Weidema		

33 Risk informed spatial planning and future collaborations

Risk informed spatial planning is a key to medium to long term resilience building. A key to the success to the resilience building. Risk informed early actions have kept Netherlands relatively more resilient to various risks as compared to even many other European states. Availability of disaggregated quality cadastral and socio-economic data with focus on risk informed planning is essential. Development of appropriate capacities for risk informed planning is crucial. This session will focus on needs for risk informed planning and the future collaboration potential between the professionals and academia of the Netherlands with that of Kerala.

Theme: Risk informed spatial planning and future collaborations			
Date and Time: 1 st December 2021, 14.30 IST to 17.00 IST 10:00 CET to 12:30 CET			
Specialized link will be shared to the speakers as this is a closed event			
Time	Speaker	Title	Remarks
14.30 IST to 14.45 IST 10:00 CET to 10:15 CET	Introduction to the session – Mr. Pranab Jyothi Nath IAS, Gert Heijkoop		
14:45 IST to 15:30 IST 10:15 CET to 11:00 CET	<p>Recommendations of Technical Session 1 (25-11-2021): Risk informed planning – Dr. Sekhar L. Kuriakose</p> <p>Discussion <i>Kerala side</i> – Principal Secretary, Science & Technology & EVP, KSCSTE, Commissioner Disaster Management, Chief Town Planner, Director General KILA, Chief (Agri) and Chief of Perspective Planning, Planning Board <i>Netherlands side</i> – Prof. Dr. Maarten van Aalst, Director, International Red Cross Climate Centre and University of Twente, Prof. Dr. C.J van Westen, Univ. of Twente, Ir. Pieter-Paul van Meel, Drs. Fernanda van der Velde RVO, Ir. Luit-Jan Dijkhuis, Ministry of Infrastructure and Water, MSc. Pascal Weidema</p> <p>Moderator: Ir Pieter-Paul van Meel</p>		
15:30 IST to 16:15 IST 11:00 CET to 11:45 CET	<p>Recommendations of Technical Session 2 (26-11-2021): Integrated water resource management – Ir. Alex Varghese</p> <p>Discussion: Integrated water resource management <i>Kerala side</i> – Vice Chairman, Planning Board, Additional Chief Secretary, Water Resources, Additional Chief Secretary, Environment and Climate Change, Additional Chief Secretary, Local Self Government Department, Additional Chief Secretary, Disaster Management, Chairman KSEBL, Principal Secretary, Science and Technology and EVP, Kerala State</p>		

	<p>Council for Science, Technology and Environment</p> <p><i>Netherlands side</i> – Consular General, Mr. Gert Heijkoop, Drs. Fernanda van der Velde, Ir. Pieter-Paul van Meel, Ir. Luit-Jan Dijkhuis, Ministry of Infrastructure and Water; Prof. J. Dronkers.</p> <p>Moderator: Dr. Sekhar L. Kuriakose</p>
P.M.	<p>Proceedings will be compiled by Ir. Manu R and Mr. MSc. Pascal Weidema and edited by Alex Varghese/Priyesh R and Sekhar L. Kuriakose, Pieter-Paul van Meel and Fernanda van der Velde</p>
<p>16:15 IST to 16:45 IST 11:45 CET to 12:15 CET</p>	<p>Concluding remarks – Consular General, Mr. Gert Heijkoop and Mr. Pranab Jyothi Nath IAS, Secretary, Water Resources</p> <p>Rapporteurs of session: Ir. Manu R and Mr. MSc. Pascal Weidema</p>