



Preparedness and Pre-planning for the Southwest Monsoon (SWM) 2025



**Hydrology and Disaster Management Division
Irrigation Department**

**Eng. (Ms) T.Yasotha
Chief Engineer (Hyd&DM)**



INTRODUCTION – IRRIGATION DEPARTMENT

- Irrigation Department was established in year 1900
- Planning and Design, Construction, Operation and maintenance of large water resources development projects in Sri Lanka
- Primary goal to ensure the food security through irrigation.
- Other key tasks are flooding related disaster risk reduction, dam safety operation, providing water for other sectors such as water supply, hydropower generation, domestic and industrial and riverine management activities.

Administrative set up



Range Director's Office - 14
Divisional Irrigation
Engineer's office- 52

Reservoirs – 258 nos

Major – 73 nos
(3,110,000 Acft-3,840 MCM)

Medium – 185 (380,000
Acft -380 MCM)

Capacity of total water storage
3,400,000 Acft (4200 MCM)
(47%)

➤ 103 Rivers

Irrigation Department, Sri Lanka

Schemes – 387 nos

Major/Medium – 241
nos

Anicut – 113 nos

Drainage – 25 nos

Lift – 8 nos

Total cultivation extent under ID
– 800, 200 Acres(323,840Ha)
(45%)

Hydrology and Disaster Management Division

- Hyg & DM is a specialized division of the Irrigation Department (ID)
- Responsible for maintaining the hydro-meteorological information system of the country.
- It was formed as a separate division in the year 1942, around 42 years after the formation of the Irrigation Department.
- However, the collection of hydro-meteorological data in major river basins started a few decades back. The river gauge at 'Nagalagam Street' on the Kelani River has been functioning since 1924.

Main Objectives

- Hydrological Data Collection and Management
- Hydrological Data Analysis
- Flood Forecasting and Early Warning
- Coordination with Disaster Management Authorities for better management of disasters.



OUR TASK

Hydrological Data Collection and Management

- The operation, maintenance, and data collection
- Establish new river gauging stations where necessary

Hydrological Data Analysis

- Processing hydro-meteorological data and converting them to useful information
- Archiving and dissemination of hydrological data and information

Flood Forecasting and Early Warning

- Modeling of river basins for flood forecasting.
- Issuing flood forecasting and early warning for major river basins of the country

Coordination with Disaster Management Authorities

- Coordinate with disaster management authorities for better management of disasters

Preparation of SWM , Flood Monitoring and operational activities

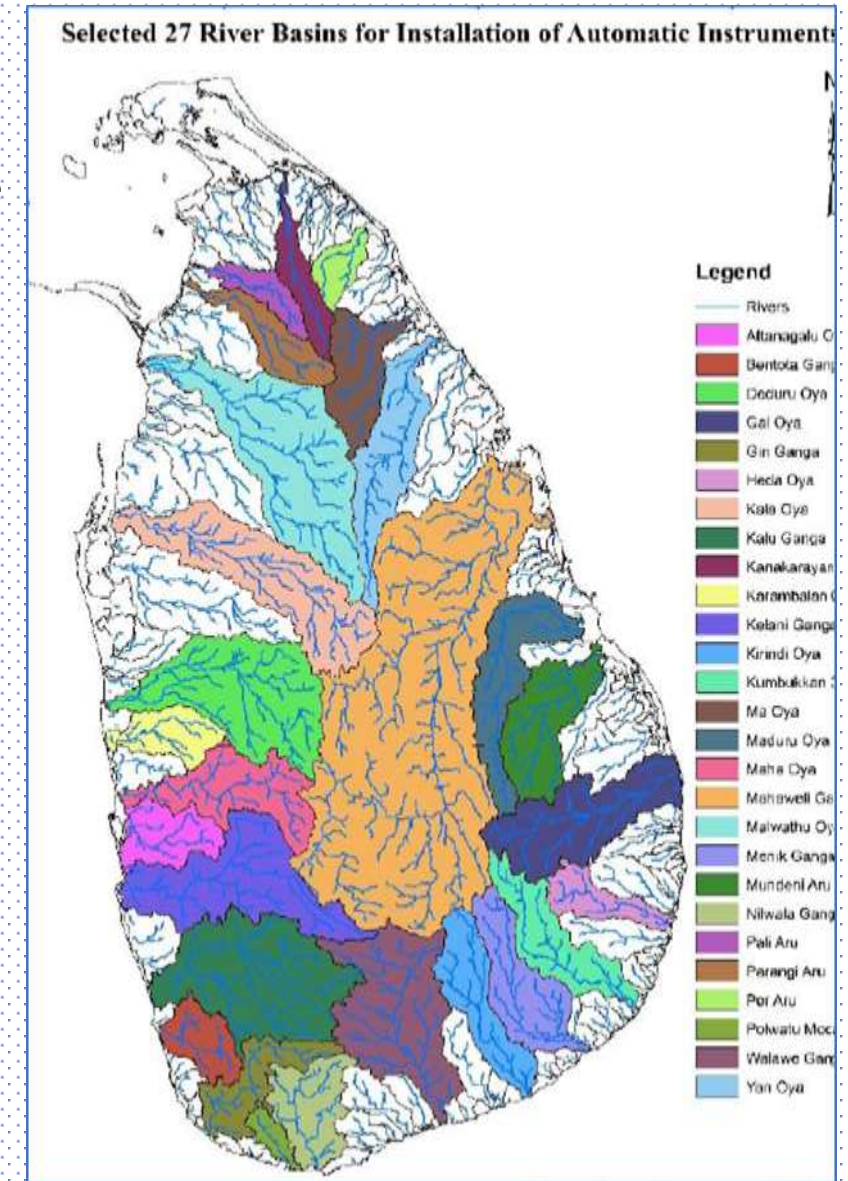
- **River flood - Upstream RF/River WL/WL trends**
- **Rainfall forecast –short-term forecast /long term forecast**
- **Monitoring Dam stability for pre and during monsoon period.**
- **Reservoir Operation –Flood accommodation/release mainly focus on forthcoming Water demands (Agriculture /drinking /hydropower/Industry etc.),safety of the dam and downstream people and their properties.**

Preparation of SWM

- Normally SWM rainfall received South western part of Sri Lanka which falls under wet zone. especially Kalani,Kalu,Gin ,Nilwala,Attanagala Mahaweli and Maha oya basins are vulnerable for flood.
- Based on DOM, 3 month forecast we have expected more RF in dry and intermediate zones and currently almost full of reservoir capacity. So, continuous monitoring are in progress of WL in river & reservoirs and upstream Rainfall.
- Standing order for monitoring of Reservoir/dams for pre monsoon period.
- Reservoir operation and monitoring are in progress(it changes 3/6/12/24 hours based on Inflow ,Water requirements, Safety of the dam and safety of downstream people and their properties)
- Coordination of other reservoir operating Agencies(Mahaweli/CEB)
- DOM Forecasted RF disseminates

Field Level PM to Farmers to minimize Paddy harvesting losses(Yala season is in progress, expected harvesting starts on mid of July)

Divisional Irrigation office to Irrigation field level operators to minimize water losses and Irrigation infrastructure damages.



Water Availability in Major Reservoirs

Range	No of Major Reservoirs	Gross Capacity (Acft)	Percentage of current Reservoir storage	Percentage of Overall Long term average
Ampara	9	1,052,221	89.6%	58%
Anuradhapura	10	556,390	88.4%	66%
Badulla	7	78,388	97.5%	77%
Batticaloa	4	140,133	95.6%	73%
Colombo		-		
Galle	2	3,081	87.3%	63%
Hambantota	10	377,738	91.8%	71%
Kandy	3	28,450	96.6%	78%
Kurunegala	10	142,145	93.2%	67%
Monaragala	3	46,684	99.3%	70%
Polonnaruwa	4	352,010	91.1%	78%
Puttalam	2	74,261	80.0%	60%
Trincomalee	5	191,288	93.4%	65%
Mannar	4	67,370	87.1%	63%
Total	73	3,110,160	90.6%	66%

Major Reservoirs

- Above 90% storage = 53/73
- Above 70% storage = 72/73
- Spilling reservoirs= 24/73
- Water Availability in major reservoirs=90.6%(2,831,325 Acft- 3450 MCM)

Medium Reservoirs

- Total storage in medium tanks=270,245 Acft
- Water availability in medium tanks=93.5% total storage(252,700 Acft -310 MCM)

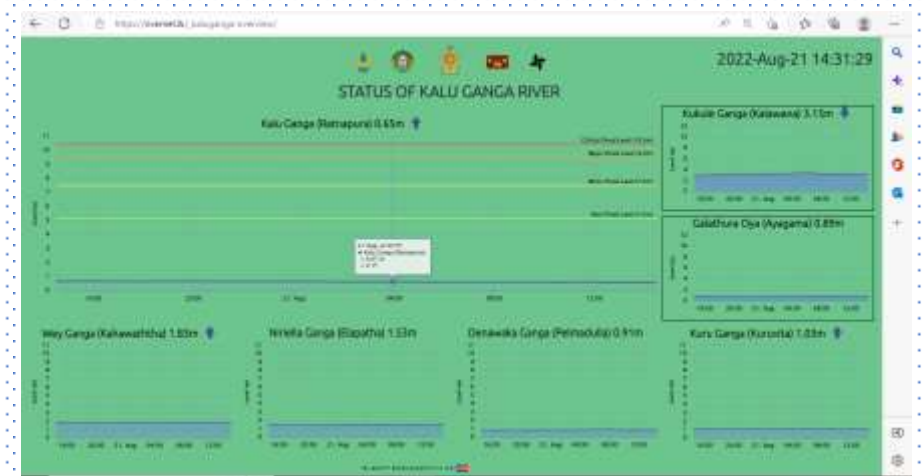
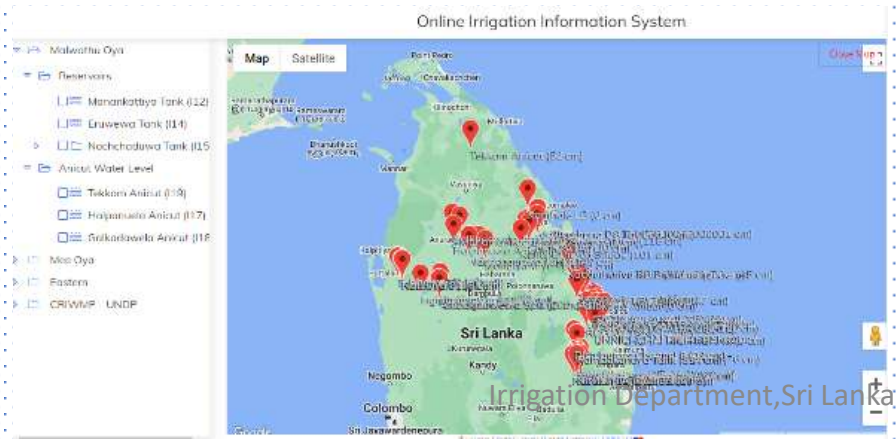
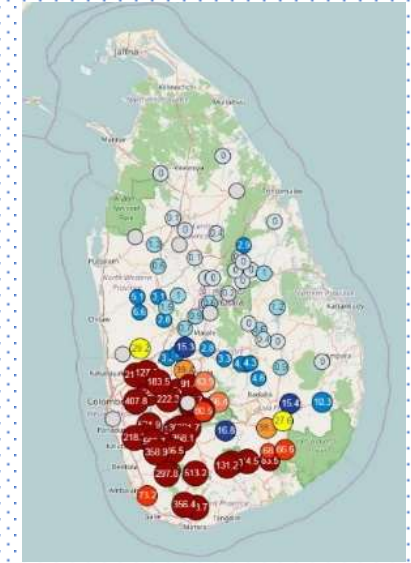
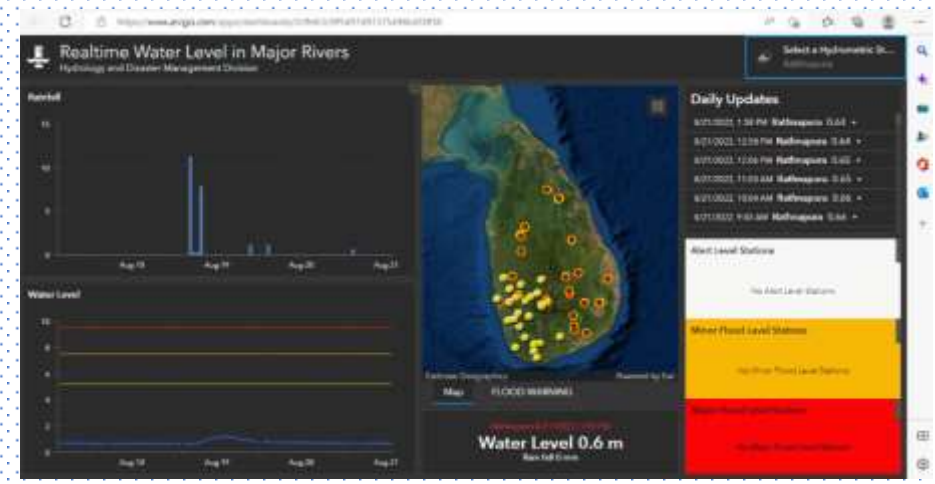
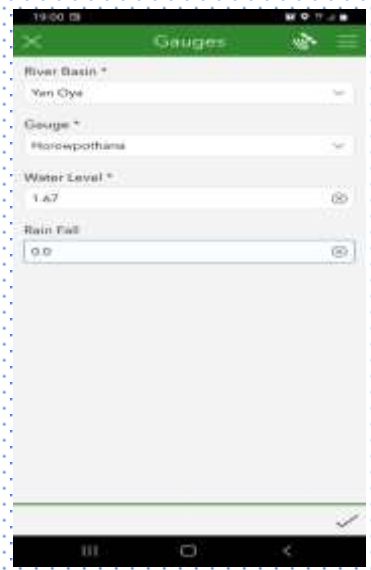
Details of major reservoirs spilling

No	Range/ Division	Reservoir	River/ Stream	District	No. of gates opened or Ungated spilling height (inch)	Spill Discharge (cusec)	Status of Downstream
1	Ampara/Ampara	Ekgal Oya	Gal Oya	Ampara	Spill= 1"	21	Normal
2	Ampara/Ampara	Pannalgama	Gal Oya	Ampara	Spill= 5"	82	Normal
3	Ampara/Ampara	Namal Oya	Gal Oya	Ampara	Spill= 3"	163	Normal
4	Ampara/Maha Oya	Rambukkan oya	Mundeni Aru	Ampara	RG=(2"@2)	203	Normal
5	Ampara/Pottuvil	Rottikulam	Karanda Oya	Ampara	Spill= 1"	134.0	Normal
6	Ampara/Ampara	Senanayaka Samudra	Gal Oya	Ampara	GO=(0.25"@5)		Normal
7	Anuradhapura/Anuradhapura	Mahakanadarawa	Malwathu oya	Anuradhapura	Spill= 3"	406	Normal
8	Anuradhapura/Anuradhapura	Nuwarawewa	Malwathu oya	Anuradhapura	Spill= 6"	132	Normal
9	Anuradhapura/Anuradhapura	Rajanganaya	Kala Oya	Anuradhapura	Spill= (1"@2)	630	Normal
10	Anuradhapura/ Padaviya	Yan Oya	Yan Oya	Anuradhapura	GO= (0.65"@3)	200	Normal
11	Badulla/Badulla	Ambewela	Mahaweli Ganga	Badulla	Spill=1"		Normal
12	Badulla/Badulla	Kande Ela	Mahaweli Ganga	Badulla	Spill= 1"		Normal
13	KANDY/ Dambulla	Nalanda	Dambulu Oya	Kandy	Spill	20	Normal
14	KANDY/ Dambulla	Wemedilla	Dambulu Oya	Kandy	Spill	11	Normal
15	HAMBANTOTA/ Tissamaharama	Lunugamwehera	Kirindi Oya	Hambantota	Spill=(0.3'x 2 ,0.6'x 4)	2966	Normal
16	HAMBANTOTA/ Tissamaharama	Tissawewa	Kirindi Oya	Hambantota	Spill=(1"@1)	19	Normal
17	HAMBANTOTA/ Tissamaharama	Weheragala	Menik Ganga	Hambantota	Spill=(3"@6)	720	Normal
18	HAMBANTOTA/ Tissamaharama	Yodawewa	Kirindi Oya	Hambantota	Spill=(24"@2)	200	Normal
19	HAMBANTOTA/ Tissamaharama	Bandagiriya	Malala Ara	Hambantota	Spill=(41"@7, 5"@5)	1713	Normal
20	HAMBANTOTA/ Tissamaharama	Weerawila	Kirindi Oya	Hambantota	Spill=(23"@3)	348	Normal
21	HAMBANTOTA/ Hambanthota	Mau Ara	Mau Ara	Hambantota	RG=Spill	785	Normal
22	MONARAGALA/ Monaragala	Muthukandiya	Heda Oya	Monaragala	Spill= 3"	330	Normal
23	MONARAGALA/ Monaragala	Ethimale	Wila Oya	Monaragala	Spill=(8")	235	Normal
24	Mannar/Murunkan	Gaints tank	Malwathu oya	Mannar	CO Spill	28.84	Normal

Present practices of Flood Monitoring and Forecasting

Flood Monitoring Systems

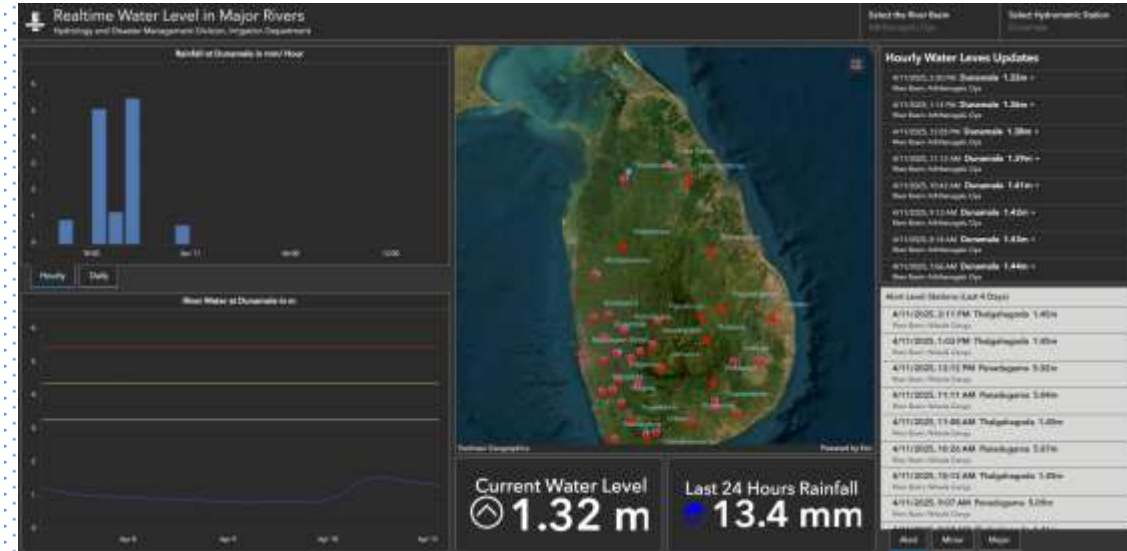
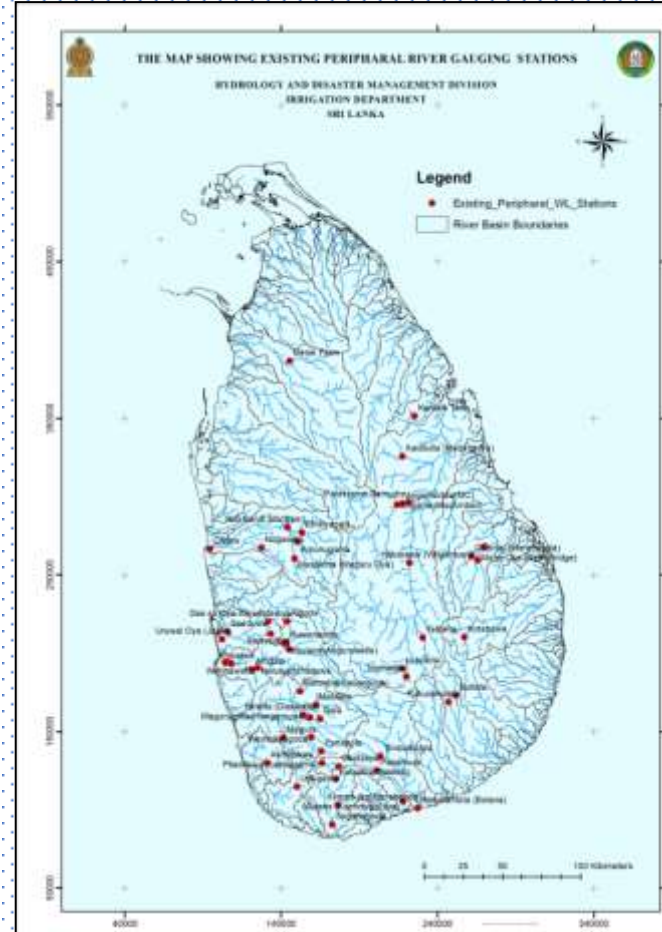
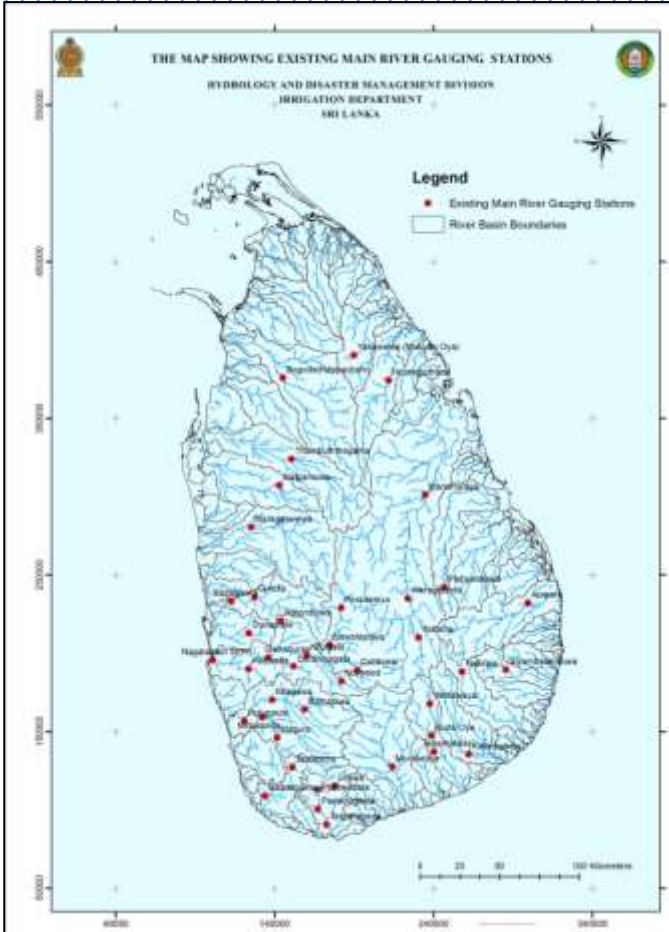
- 1. Manual System
- 2. Semi Automated System (www.irrigation.gov.lk – Realtime water level in major rivers)
- 3. Hydro-Meteorological Information System (Not open for public)
- 4. Rivernet (www.rivernet.lk)
- 5. Wari Soba System



Permanent Hydro-meteorological Station Network (41 Stations)

Peripheral Hydro-meteorological Station Network (66 Stations)

Dissemination of data to the public Real time monitoring-Rivers



Real time monitoring-Reservoirs



- Most of the Hydro-metrological stations are in wet zone area.
- Expanding Hydro-metrological stations in intermediate and dry zone area under CResMPA ,WB funded project.

Flood Warning

General flood warning

Common Prior Flood Warning Messages are issued based on;

1. Short Range Forecasts issued by DOM
2. Soil moisture situation of catchment
2. Water level situation of rivers and upstream reservoirs

Basin wise flood warning

Thereafter, river basin wise flood warnings are issued based on, Observed Rainfall, Observed River Water Level, River Trend, reservoir operation and flood model results.

Flood warnings are issued as

- Amber Warning
- Red Warning

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IRRIIGATION DEPARTMENT
 (HYDROLOGY AND DISASTER MANAGEMENT DIVISION)

දිනය: 2025.01.19
 වේලාව: 7:30 AM

Flood Warning Message : Number - 01
 වර්ණය - රතු
 Colour - Red

2025.01.20 දින පෙ.ව. 7:30 දක්වා වලංගු.
 Valid till 7:30 AM on 20th of January 2025

වැවිලි කිරීමේ දෙපාර්තමේන්තුව විසින් නිකුත් කළ
Flood Warning Message : Number - 01
 වර්ණය - රතු
 Colour - Red

වැවිලි කිරීමේ දෙපාර්තමේන්තුව - Malwathu Oya Basin

වැවිලි කිරීමේ දෙපාර්තමේන්තුව විසින් නිකුත් කළ බව පෙනී යන්නේ මෙහිදී 3.00 මීටර් වන වැසි වර්ෂාවක් වැටී ඇති බවයි. මෙහිදී වැවිලි කිරීමේ දෙපාර්තමේන්තුව විසින් නිකුත් කළ බව පෙනී යන්නේ මෙහිදී 3.00 මීටර් වන වැසි වර්ෂාවක් වැටී ඇති බවයි. මෙහිදී වැවිලි කිරීමේ දෙපාර්තමේන්තුව විසින් නිකුත් කළ බව පෙනී යන්නේ මෙහිදී 3.00 මීටර් වන වැසි වර්ෂාවක් වැටී ඇති බවයි. මෙහිදී වැවිලි කිරීමේ දෙපාර්තමේන්තුව විසින් නිකුත් කළ බව පෙනී යන්නේ මෙහිදී 3.00 මීටර් වන වැසි වර්ෂාවක් වැටී ඇති බවයි.

A considerable rainfall has been occurred in Up and mid-stream areas of Malwathu Oya as of 3.00 pm today. In addition, Nachachadawa reservoir is now spilling at a rate of 2873 meter cube per second. By analyzing that situation and river water levels of hydrological stations in Malwathu Oya, it is warned that there is a possibility of occurring a Major flood situation in lowline areas of Malwathu Oya valley situated in Vengalacherdikulam, Mada, Muzsalai and Namadahan DS Divisions. As a result, already inundated made may become highly vulnerable and dangerous for crossing. The residents and vertical drivers running through those areas are requested to take adequate attention in this regard. **Disaster Management. Authorities are requested to take adequate actions in this regards.**

Eng. L.S. Sooriyasilandara
 Director of Irrigation
 (Hydrology & Disaster Management)
 Irrigation Department
 Colombo 10

වැවිලි කිරීමේ දෙපාර්තමේන්තුව
IRRIIGATION DEPARTMENT
 (HYDROLOGY AND DISASTER MANAGEMENT DIVISION)

දිනය: 2024.11.29
 වේලාව: 10:30 AM

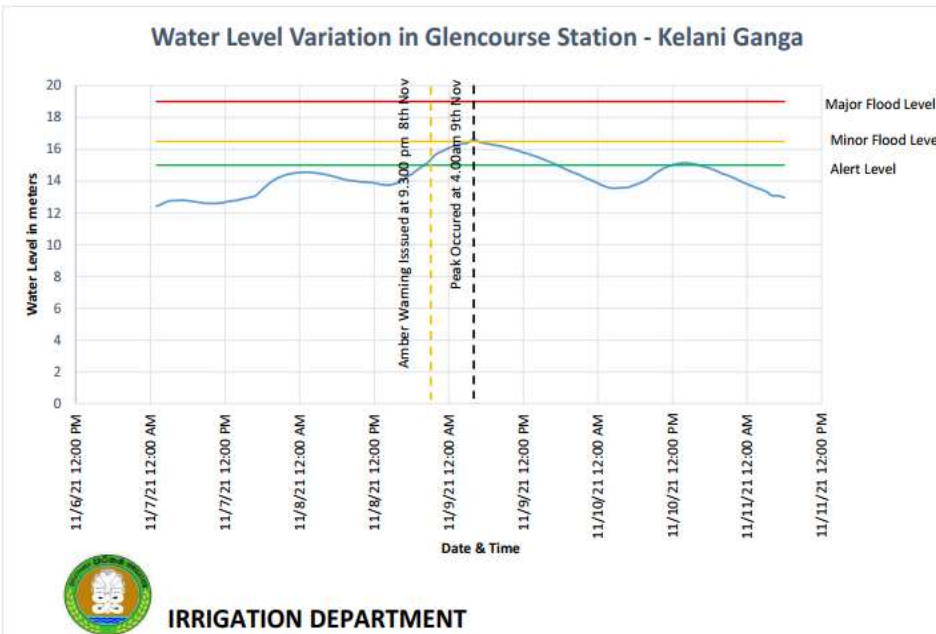
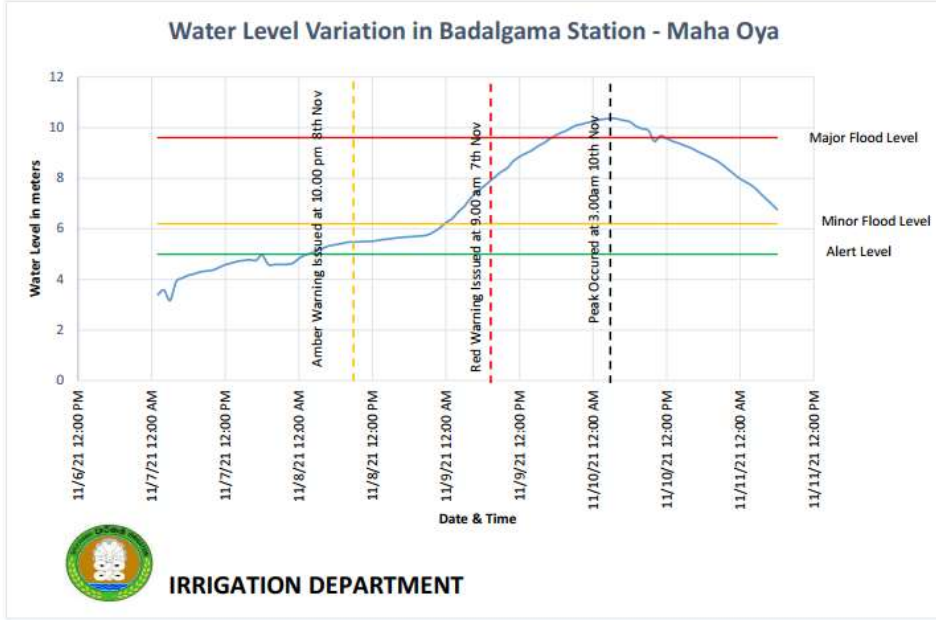
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 වර්ණය - ඇමර්
 Colour - Amber

2024.11.29 දින පෙ.ව. 10:30 දක්වා වලංගු.
 Valid till 10:30 AM on 29th of November 2024

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Flood Warning Message : Number 01
 වර්ණය - ඇමර්
 Colour - Amber

වැවිලි කිරීමේ දෙපාර්තමේන්තුව - Kelani River Basin

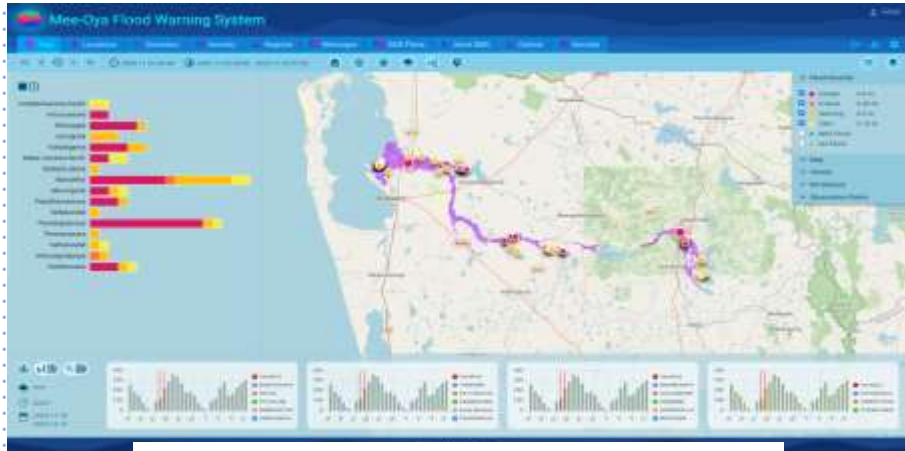
මෙහිදී වැවිලි කිරීමේ දෙපාර්තමේන්තුව විසින් නිකුත් කළ බව පෙනී යන්නේ මෙහිදී 10.00 මීටර් වන වැසි වර්ෂාවක් වැටී ඇති බවයි. මෙහිදී වැවිලි කිරීමේ දෙපාර්තමේන්තුව විසින් නිකුත් කළ බව පෙනී යන්නේ මෙහිදී 10.00 මීටර් වන වැසි වර්ෂාවක් වැටී ඇති බවයි. මෙහිදී වැවිලි කිරීමේ දෙපාර්තමේන්තුව විසින් නිකුත් කළ බව පෙනී යන්නේ මෙහිදී 10.00 මීටර් වන වැසි වර්ෂාවක් වැටී ඇති බවයි.



Pilot study :Real-Time Flood Forecasting Model – Mee Oya

Real-Time Forecast

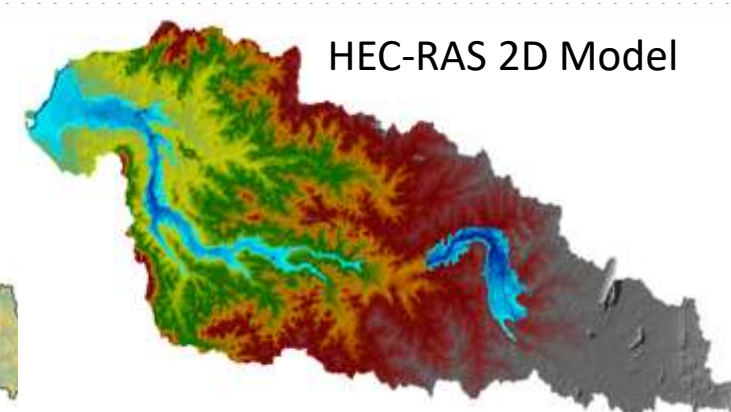
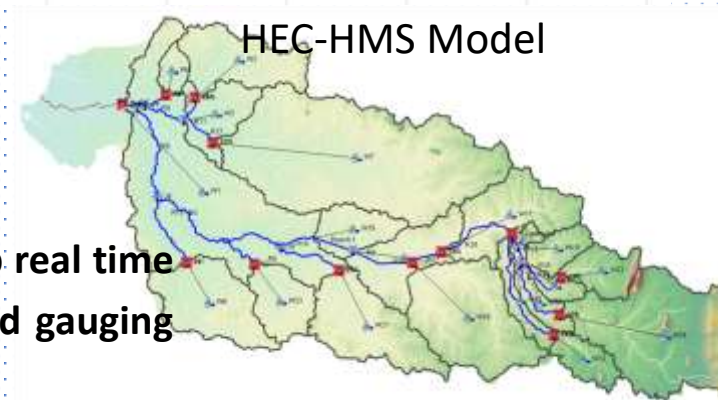
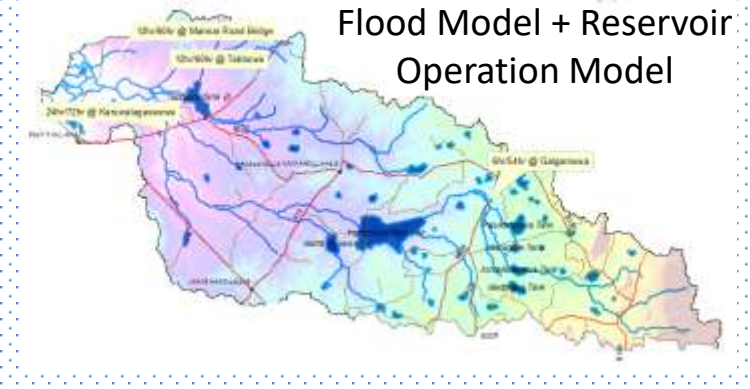
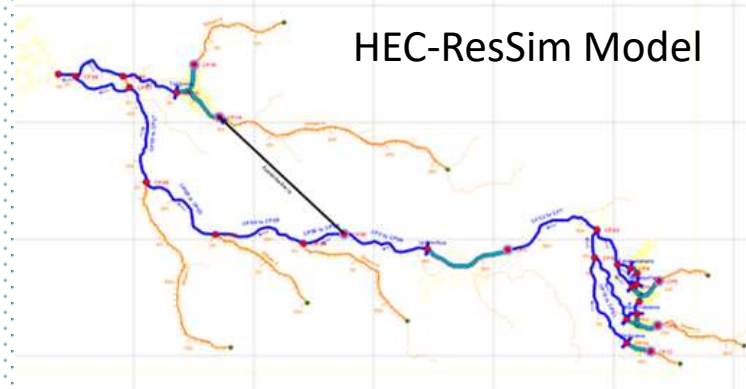
- Gauging station data are automatically fed into the model through an API.
- Forecasts are retrieved from a weather forecast service.
- Authority was given for decision makers to make relevant changes.
- Suite of Models runs automatically as scheduled (e.g., daily, every 6 hours, etc) and results are updated.
- Flood Warnings are disseminated among the institutes related with the public policy and safety.



<https://ceyrex.com/mee-oya/forecast>

Inundation Map Library

- Includes Pre-processed maps for PMR, 2, 5, 10, 25, 50, 100 Year RP rainfall combinations.
- Flood Risk Zones are identified

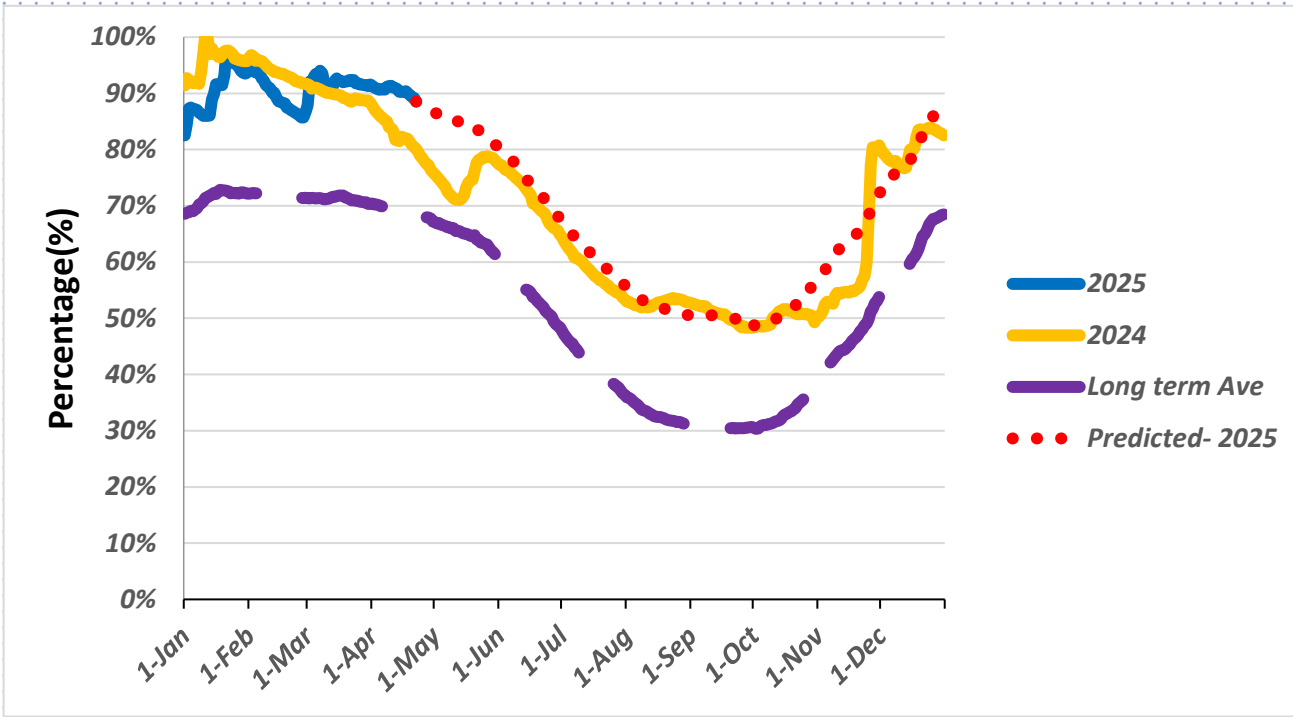


➤ 27 river basins are identified vulnerable for flood, develop real time flood forecasting models and installation of new automated gauging stations are on going project under CResMPA funded by WB.

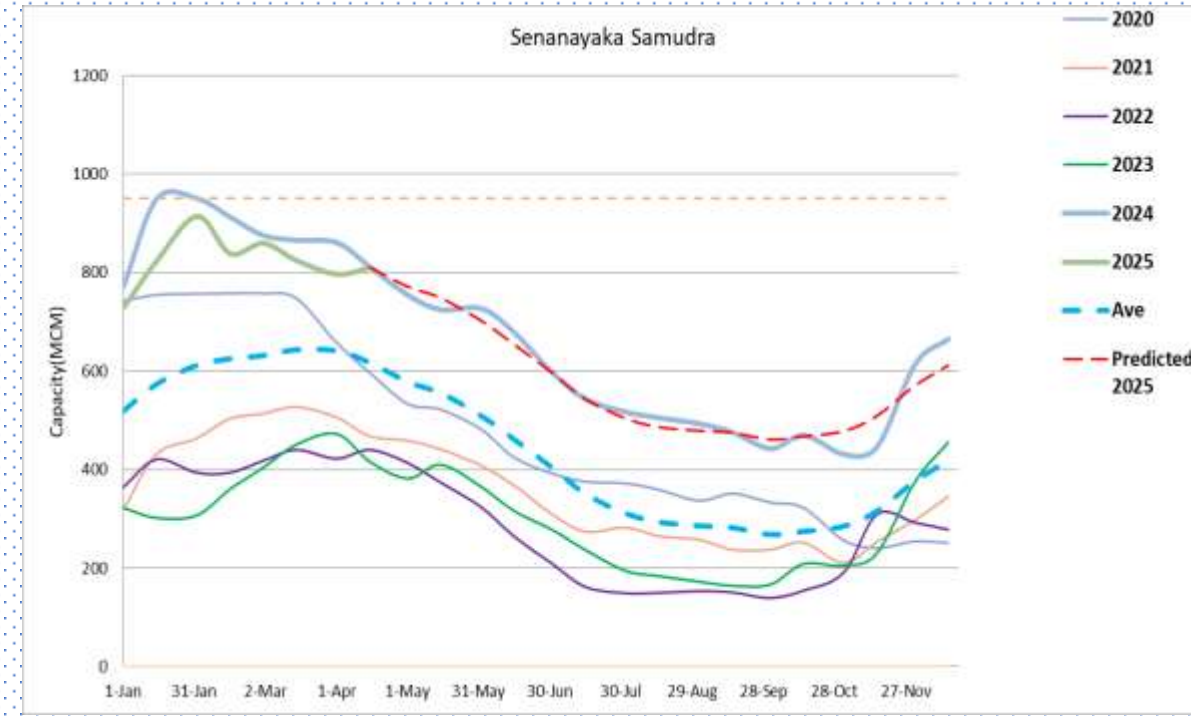
Thank You

Water Management:

Overall percentage of Reservoir Behavior



Individual Reservoir Behavior



- **Short term forecast-** Reservoir operation updated based on forecast, Irrigation sluice/Operation- adjust water issue schedule based on forecasted RF.
- **Seasonal forecast –Seasonal Plan for** cultivation (Crop type: Paddy/OFC-flood and drought tolerance crop, Start date of water issue, decision on start with onset RF)Irrigation schedule of water issue, Hydropower generation(reduce import of fuel),schedule for other water users.
- During initial stage of paddy and harvesting stage of paddy were affected during last Maha season (Oct 2024 to March 2025)-unexpected continuous rainfall- Short and seasonal forecast is very important

Maha 2024/25 Performance

- Starts on mid Oct - end Feb
- Total Cultivated Extent = **757,350 Acres(95%)**
- Paddy= **725,350 Acres**
- OFC= **32,000 Acres**
- Available water at the end of Maha season=3,200,000 Acft at end of Feb.
- Some of the initial stage's paddy was damaged due to Fungal cyclone and unexpected continuous rainfall; and harvesting also affected continuous rainfall during month of Feb and March.

Yala 2025 in progress

- Starts on mid March end July
- Cultivated Extent=685,460 Acres(85%)
- Paddy= 618,260 Acres
- OFC= 67,200 Acres

Water requirement for season=3,084,570 Acft(3810 MCM)

Water availability at start season=3,264,000 Acft(4030 MCM)

Surplus at end of the season = more than 200,000Acft

- 3rd Season will start on end of July which decides based on available water in the reservoirs and forecasted rainfall(green gram cultivation).

- **Normally Yala season starts with about 70% of Reservoir storage. But this year we have enough water with started Yala 96 %.**
- **So seasonal forecast is very important to monitor/decide the ongoing and forthcoming seasonal cultivation in dry period in dry and intermediate zones.**