Inundation Monitoring Technology and Application

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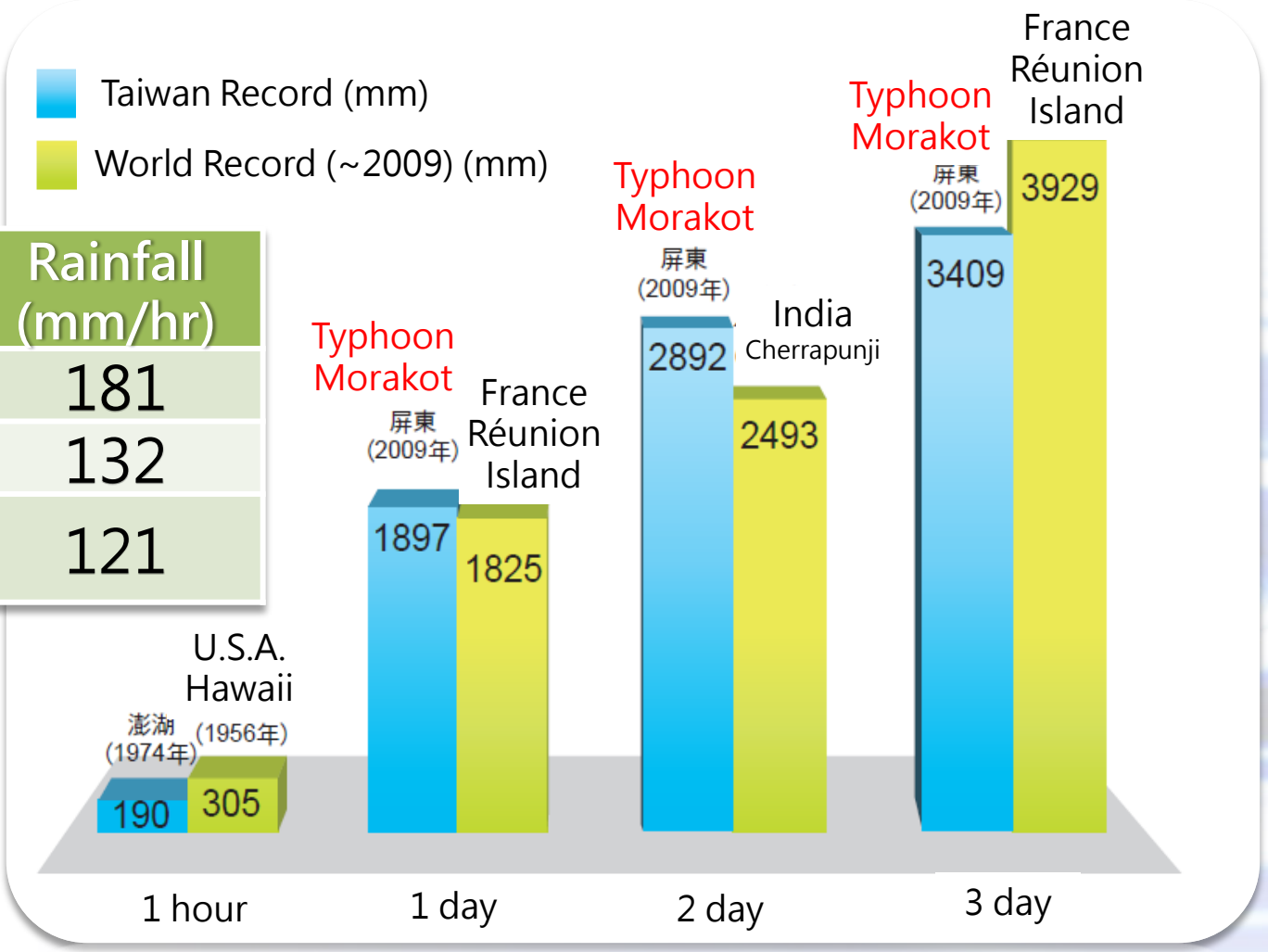
Taiwan faces the challenge of climate change

Climate change has led to the alternation of drought and flood in Taiwan

More Severe and Frequent Drought and Flood

Extreme Storm Rainfall reaches World Record

Storm Events	Rainfall (mm/hr)
2016/ 尼莎	181
2017/ 0601	132
2018/ 0823	121



資料來源：中央氣象局, 2017

Before

Insufficient Information of Disaster

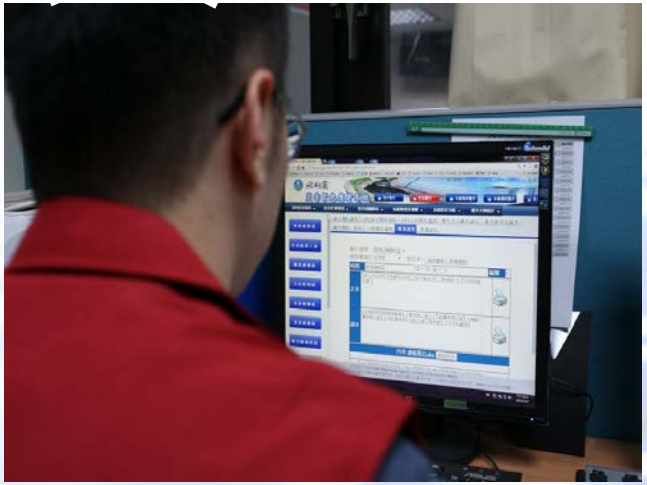
Highest inundation level of Typhoon Morakot

Crest Gage

Before

Inaccurate Disaster Reports

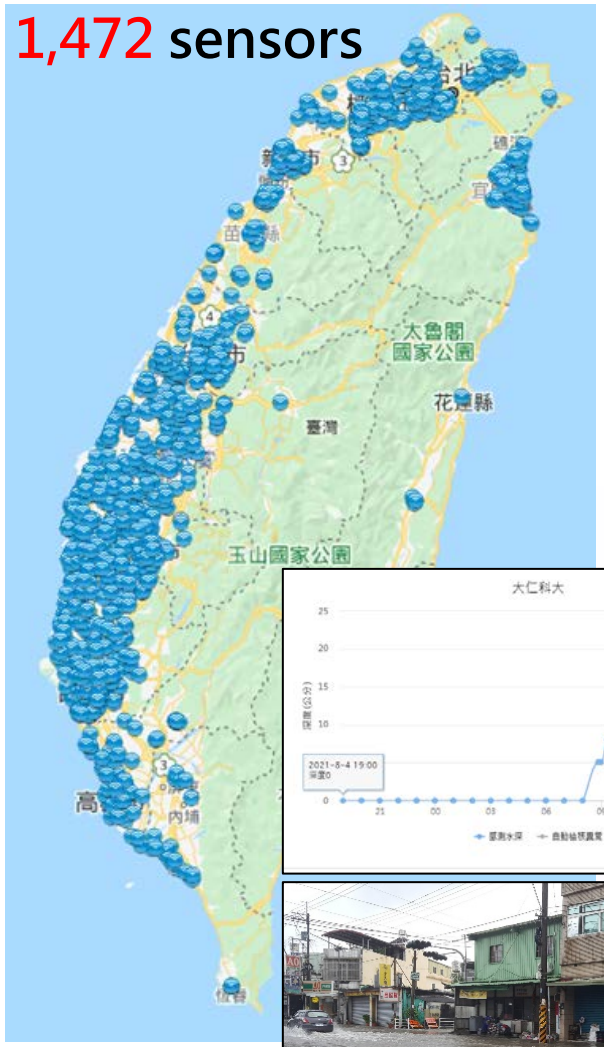
? ?



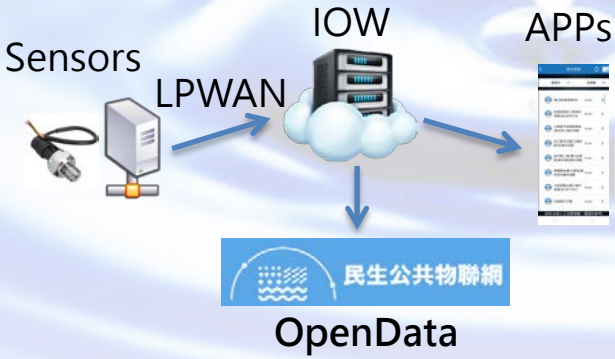
20cm？ 50cm？

Widespread flood sensors

Now



APP



Data interval:
1 hour normally,
5~10 mins. during inundation

Now

Widespread CCTV

Image Recognition of Inundation depth

Integrated Inundation Information

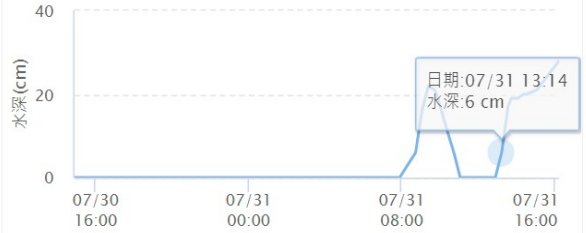
縣市: 高雄市 行政區: 永安區 淹水感測器: 新港里(北溝排水旁) 查詢

查詢時間:2021/07/31 16:44:14

Real-time inundation depth

建置單位:高雄市政府
資料時間:2021/07/31 16:14 水 深:28 cm

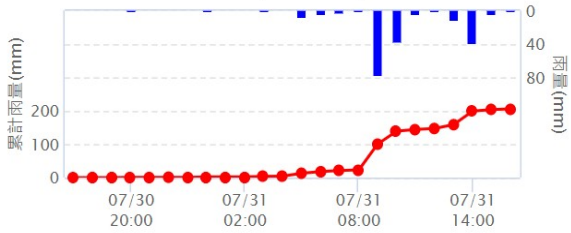
過去24小時水深歷線圖



Adjacent rainfall station

最近: 24小時 間隔:1小時
距離:2,875m

永安(C0V620)

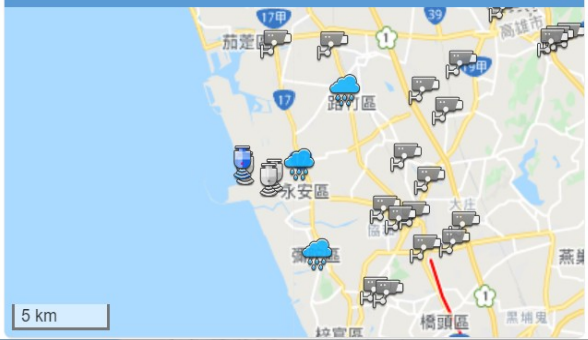


Data verification

- 資料即時性(3小時內)
- 突波檢核(與前一筆絕對差值小於50cm)
- 鄰近雨量站雨量值檢核

永安(C0V620)	雨量值 資料時間:07/31 16:30	檢核值	結果
10M	0	10	✖
1H	0.5	20	✖
3H	14	50	✖
6H	64	70	✖
12H	196	90	✔

Inundation area estimation



Adjacent CCTV

Sensor photo

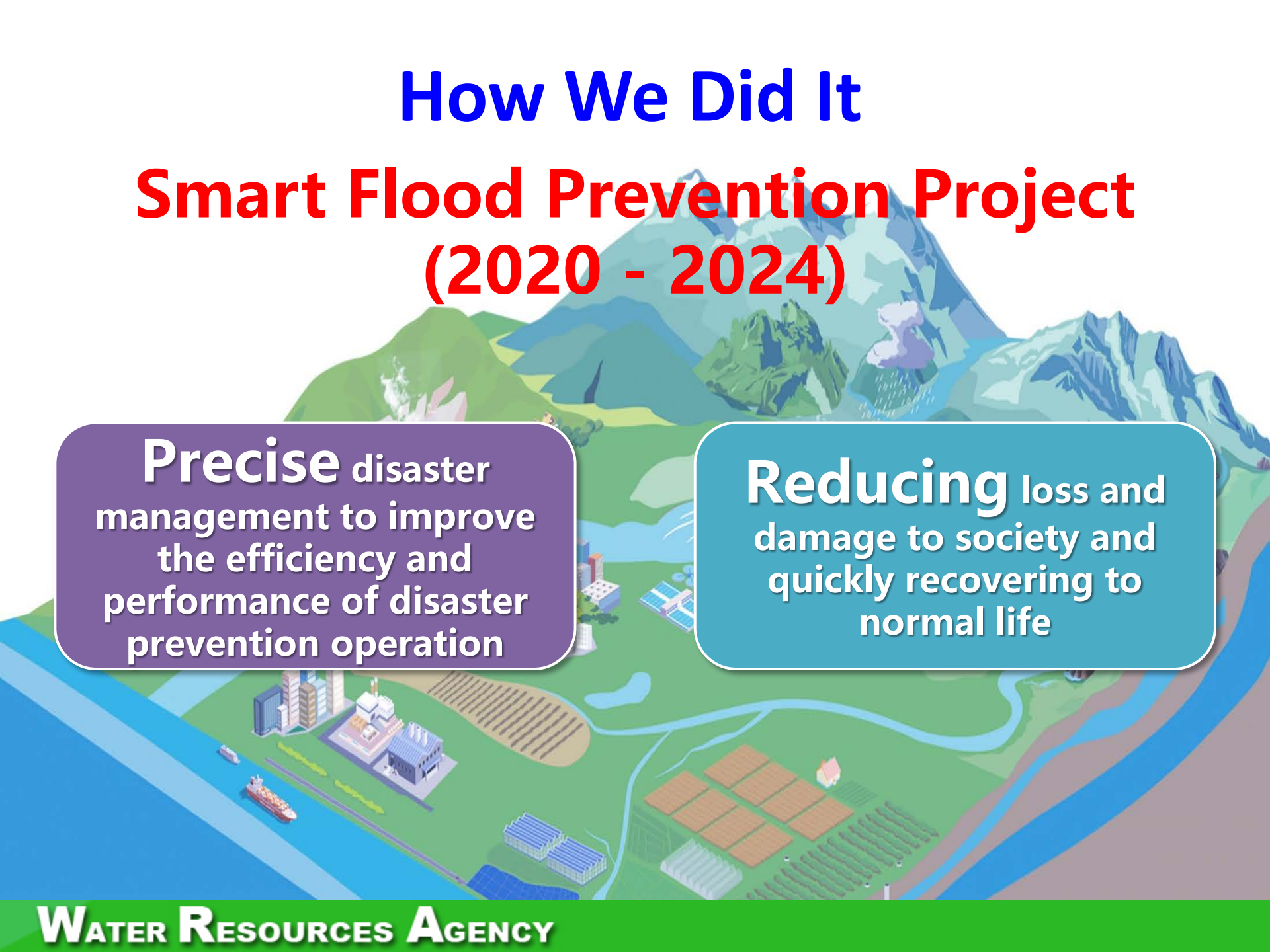
Depth (m)

2
1.5
1
0.5
0.3

WGS84: 120.21382, 22.82696
TWD97: 169303, 2525337
比例尺:1/4514

How We Did It

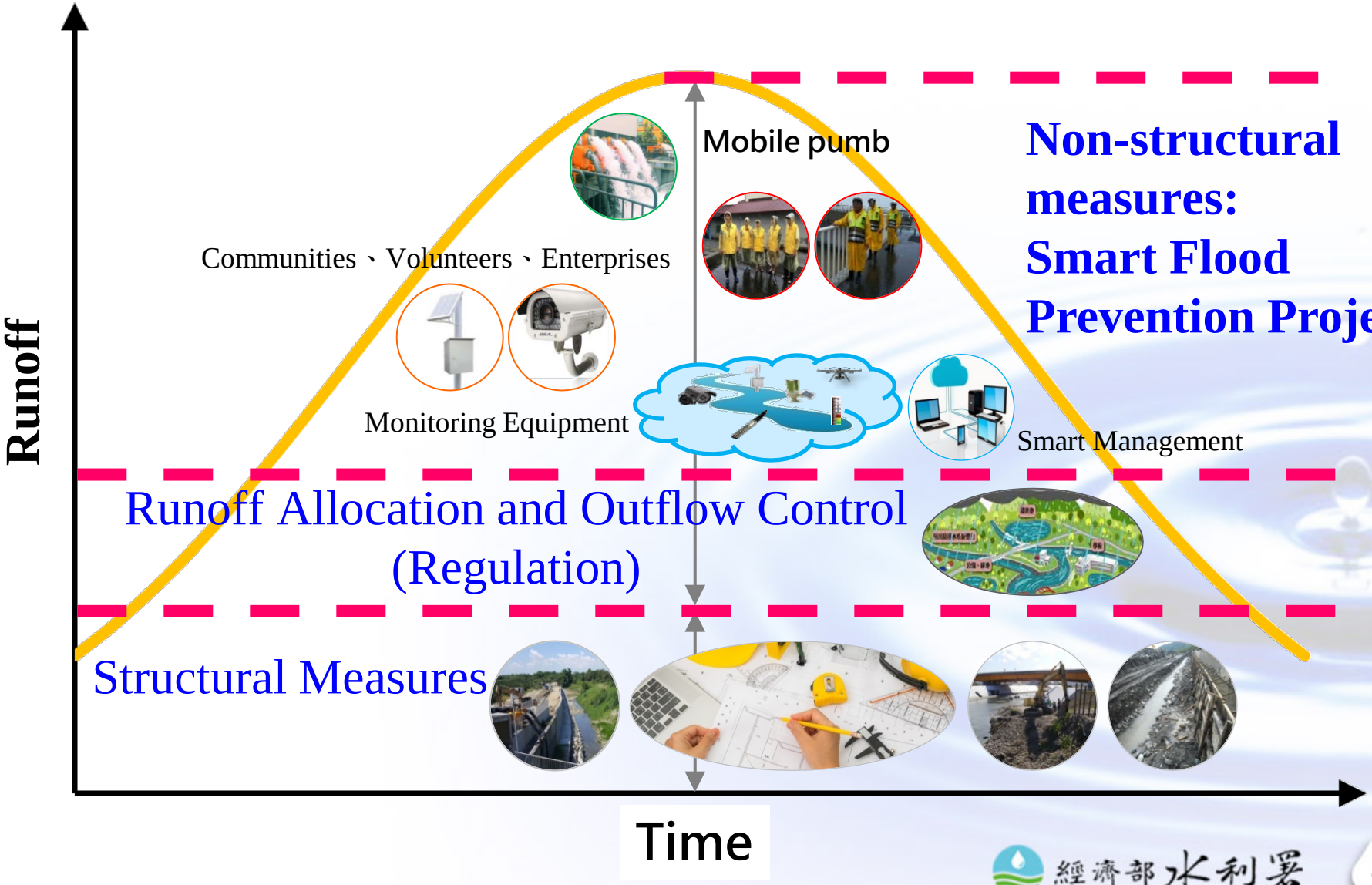
Smart Flood Prevention Project (2020 - 2024)



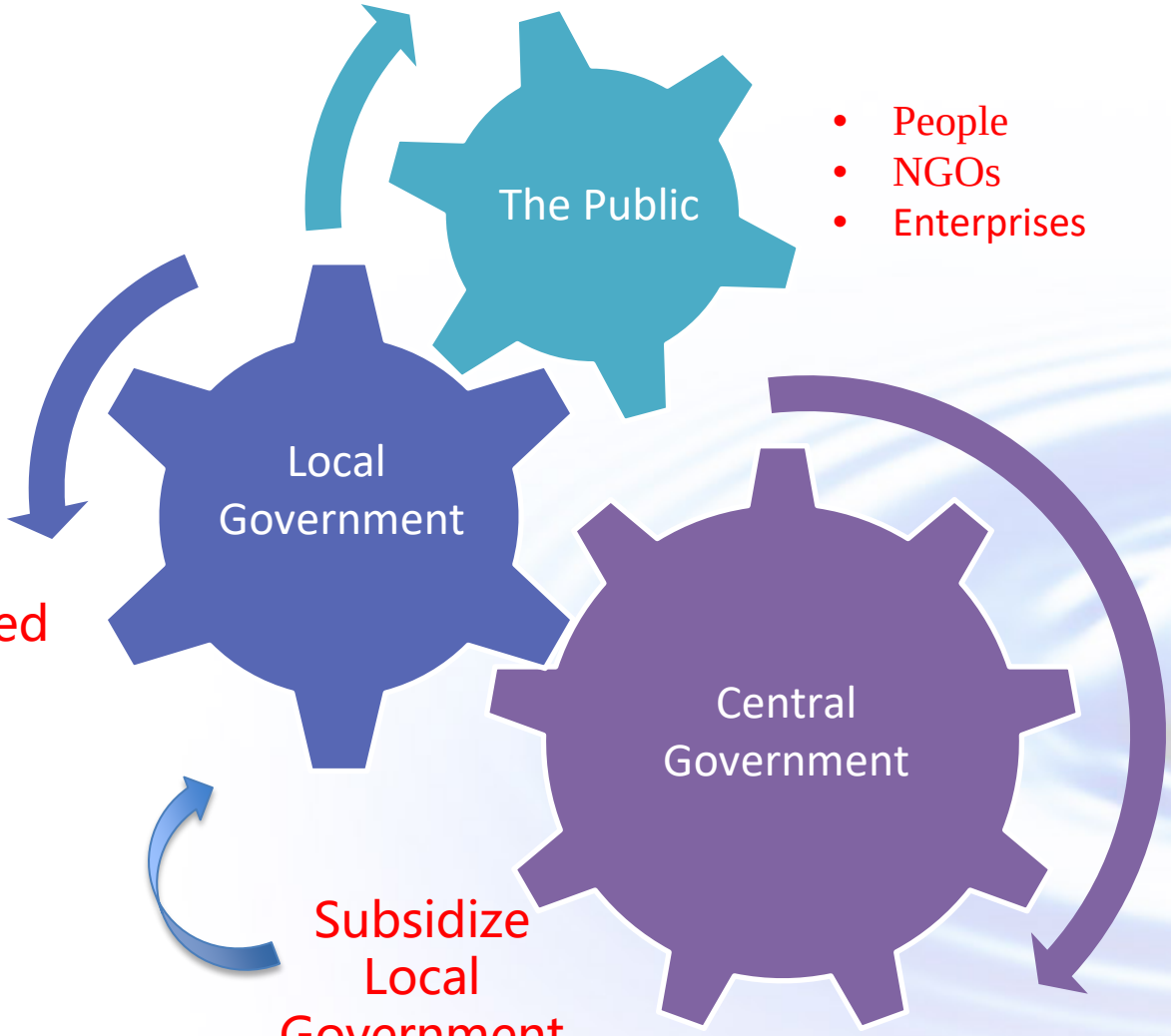
Precise disaster management to improve the efficiency and performance of disaster prevention operation

Reducing loss and damage to society and quickly recovering to normal life

Impact Mitigation of Extreme Events



Public-Private Collaboration



- People
- NGOs
- Enterprises

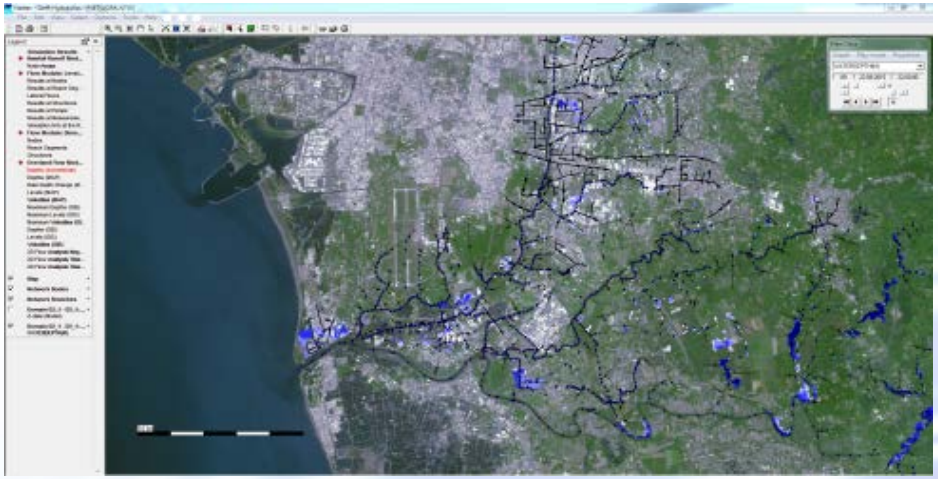
Self-Funded
10-70%

Subsidize Local Government
30-90%

Application of Inundation Sensor Data

Improve accuracy of Forecast and Simulation Model

Rainfall Threshold Value Method
(Black box model)



SOBEK (Hydrodynamic Model)

SOM-RNARX (AI Model)

Conclusion

- Inundation sensor is helpful for immediately collecting disaster information and forecast model improvement.
- Automatic sensor data verification is required in case of equipment malfunction. CCTV is useful to verify if the sensor works well.
- To enhance accuracy of inundation forecast or simulation model, continuing collection of sensor data is necessary, especially for the AI model.

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Thanks for your attention~