

This is not an ADB material. The views expressed in this document are the views of the author/s and/or the organizations and do not necessarily reflect the views policies of the Asian Development Bank, or its Board of Governors, or the governments they represent. ADB does not guarantee the accuracy and/or completeness of the material's contents, and accepts no responsibility for any direct or indirect consequence of their use or reliance, whether wholly or partially. Please feel free to contact the authors directly should you have queries.

Climate and Disaster Resilience at the City Level: Kolkata Early Warning System



Gopalakrishna Bhat
Hydrogeologist
Ex-Chairman TARU Leading Edge



URBAN CLIMATE
CHANGE RESILIENCE
TRUST FUND
Asian Development Bank



The
ROCKEFELLER
FOUNDATION

 Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Confederation
Federal Department of Economic Affairs,
Education and Research SAE
State Secretariat for Economic Affairs SECO



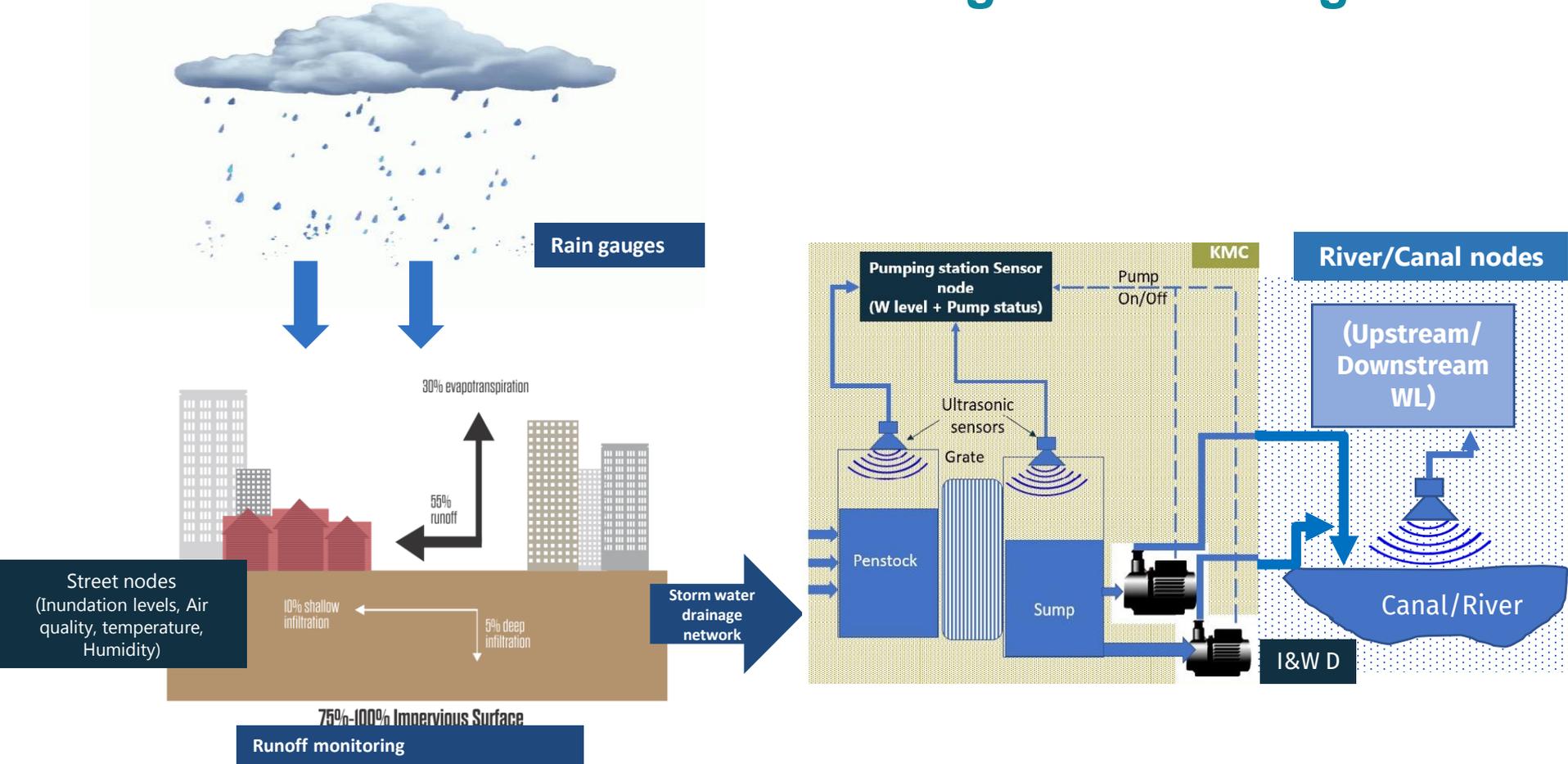
Kolkata Context

- Delta in Monsoon Region, Cyclones, Storm surge
- “Tabletop” flat terrain > “***Sleeping water***” > Pluvial floods
- Vintage, under-designed S&D system
- Dense & Old settlements, S&D augmentation challenges
- Climate change
 - Shifting/increasing peak rainfall
 - Cyclone intensification, SLR, Storm surge
 - “Urban rain island” effects

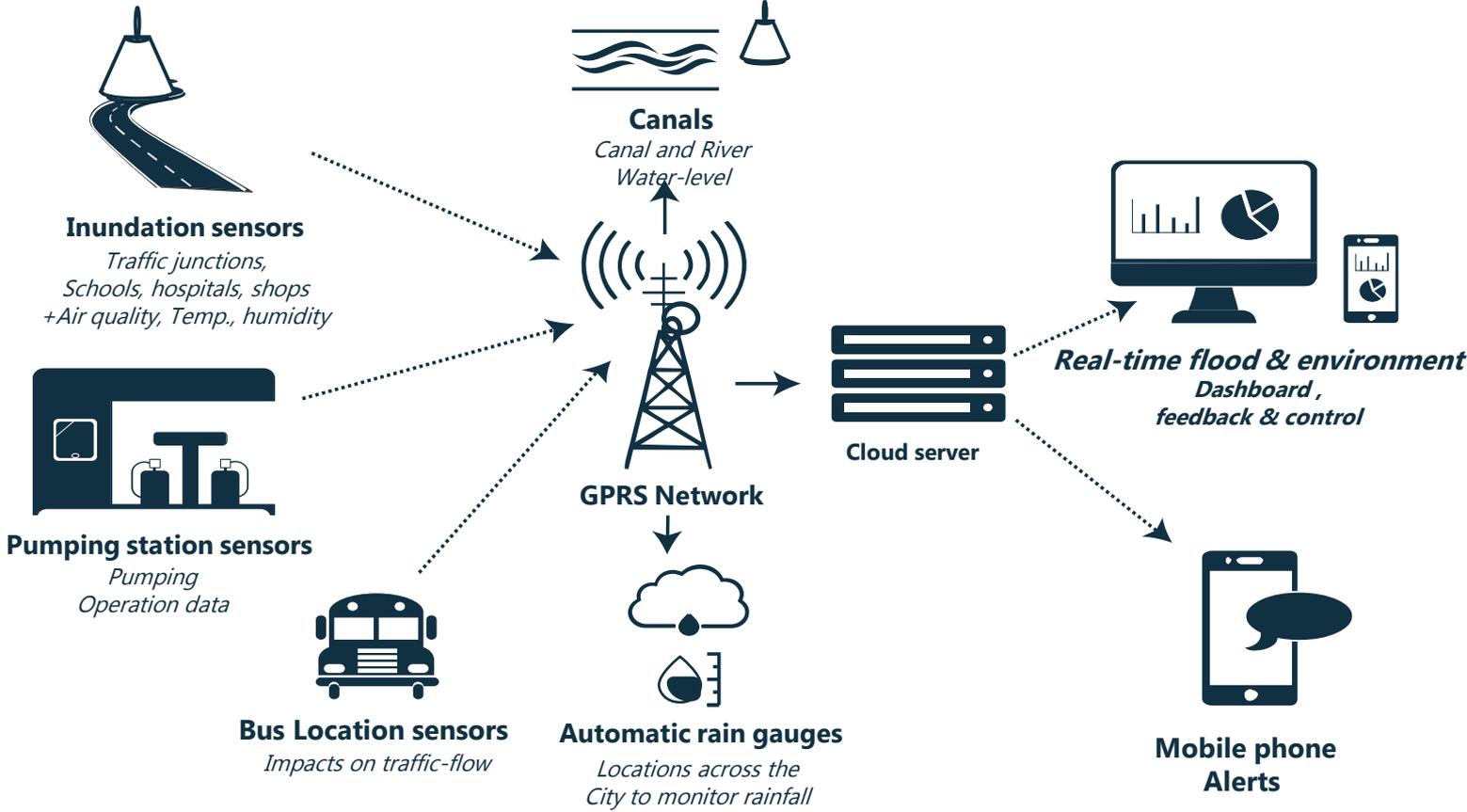
Why Early warning System

- Four to six floods every year, once in a decade devastating floods
- Traffic jams get worsened by Floods-impacting livelihoods and property, Poor worst affected
- Early warning can enable rescheduling activities, re-routing traffic-work from home
- Integrating urban environmental monitoring possible:
 - air quality, heatwave monitoring, noise etc

Rain to canals: Understanding Flood routing



System Architecture



How FFEWS can strengthen urban resilience in Kolkata

Data	Potential Uses
Multi-parameter data (Rain, water levels, pump status, Air quality, Temperature, Humidity)	Understand risks better
	Enable Informed action to address existing and emerging Climate Change challenges
Forecasts	Line departments, Commuters and other users can get advance warning and avoid risks
	Prepositioning of pumps, evacuating lakes and other equipment possible
Flood scenarios	Training staff about risks to improve response
	Climate informed Land use and Infrastructure planning
Flood warnings	Enable quick evacuation and save assets
	Flood status informed traffic control
Granular time series flood data	Develop Flood risk knowledge among citizens
	Design Risk insurance & claim validation
	Research & Development
	Informed Climate Change resilience building

-  Forecast
-  Real-time
-  Slide Show ▼
-  Scenarios
-  Flood Model
-  Reports
-  Devices
-  Settings ▼
-  Notifications



**Together, Let us make Kolkata safer
Thank You**

Thank you



URBAN CLIMATE
CHANGE RESILIENCE
TRUST FUND
Asian Development Bank



The
ROCKEFELLER
FOUNDATION



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Confederation
Federal Department of Economic Affairs,
Education and Research EAER
State Secretariat for Economic Affairs SECO



 Atlantic Council

 Adrienne Arsht-
Rockefeller Foundation
Resilience Center



 iied International Institute
for Environment
and Development



MONASH
University



LoCAL
LOCAL CLIMATE ADAPTIVE
LIVING FACILITY