Welcome

How can **El Niño** long-range warning systems provide **real benefits?**

Who is with you today?

Michael H. Glantz
Director, Consortium
for Capacity Building

Kareff Rafisura
Disaster Risk Reduction
UNESCAP

Bapon Fakhruddin
Natural Hazards Specialist
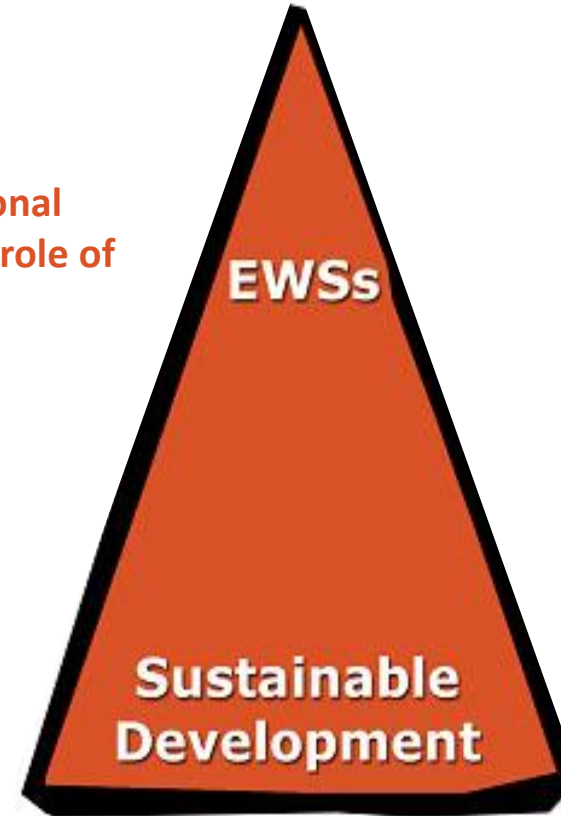Tonkin + Taylor

Michael H. Glantz

Director, Consortium for Capacity Building
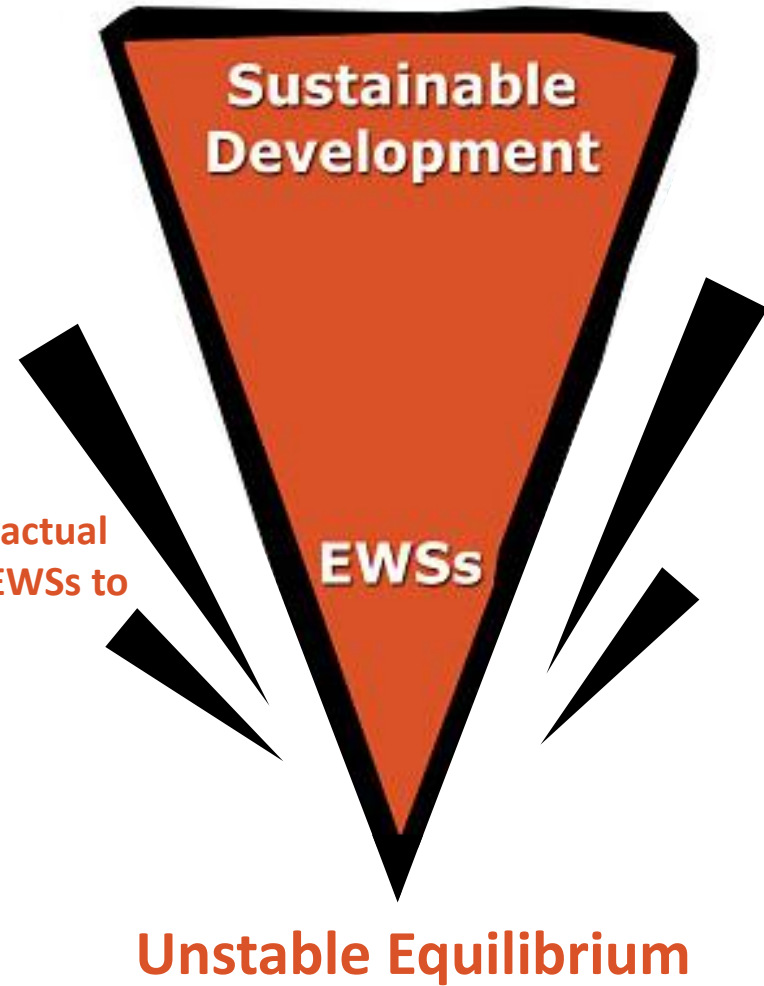
Heightened value of early warning systems

A.

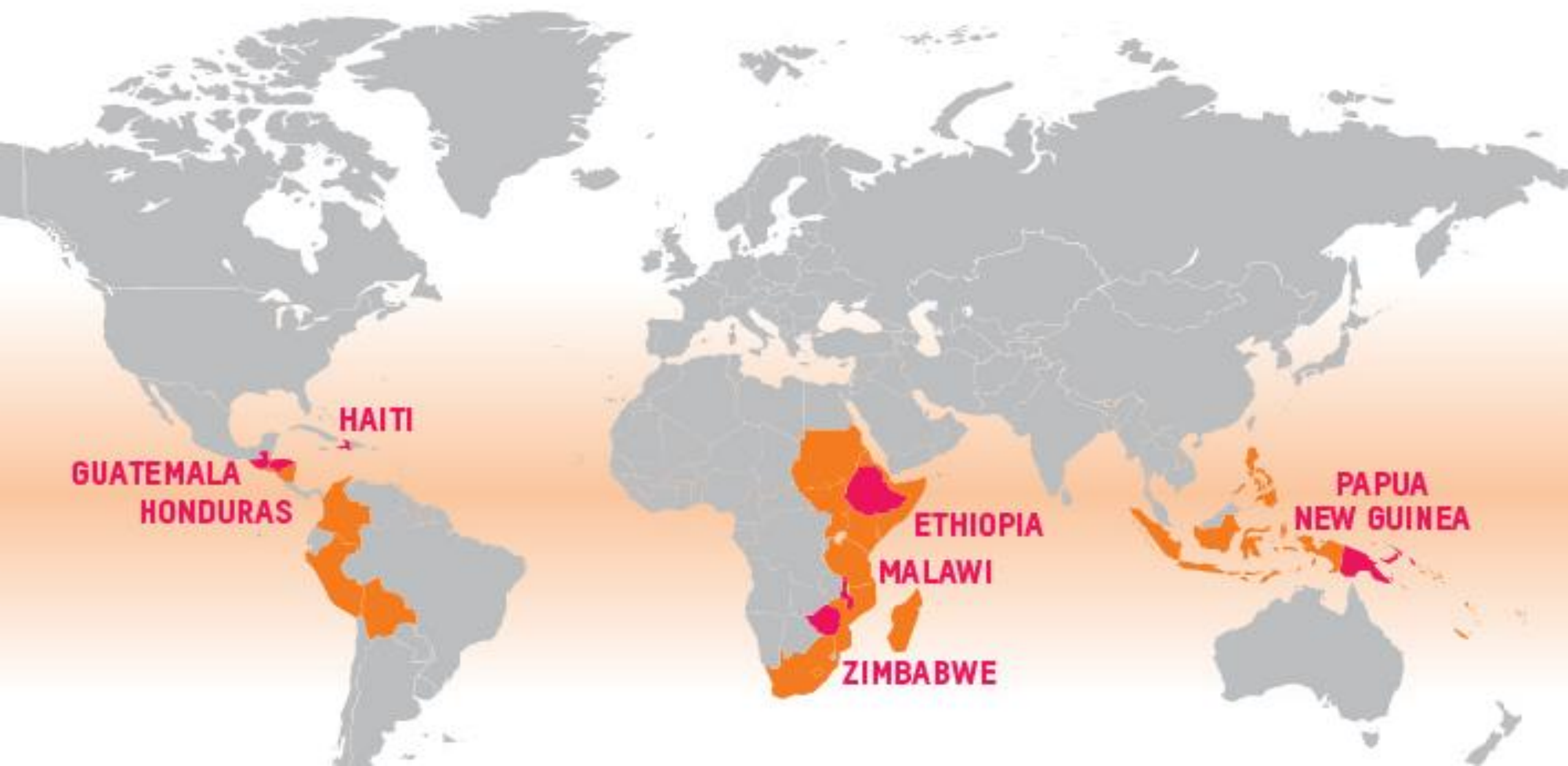**Represents traditional perspective of the role of EWSs in society**

Stable Equilibrium

Heightened value of early warning systems

B.
Represents the actual importance of EWSs to society

Sustainable Development

EWSs

Unstable Equilibrium

DROUGHT. FLOODS. HUNGER.

GUATEMALA
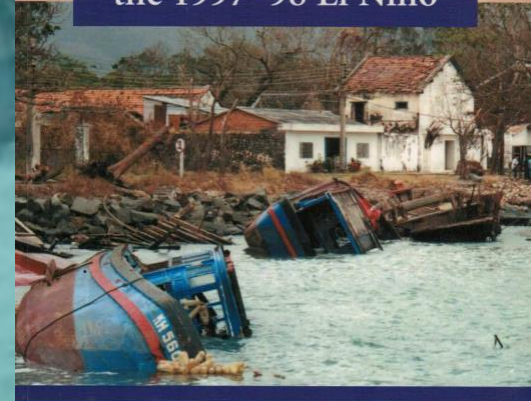HONDURAS

HAITI

ETHIOPIA

MALAWI

ZIMBABWE

PAPUA
NEW GUINEA

Lessons learned from the 1997-98 El Niño

Once Burned, Twice Shy?
Lessons Learned from the 1997–98 El Niño

Edited by Michael H. Glantz

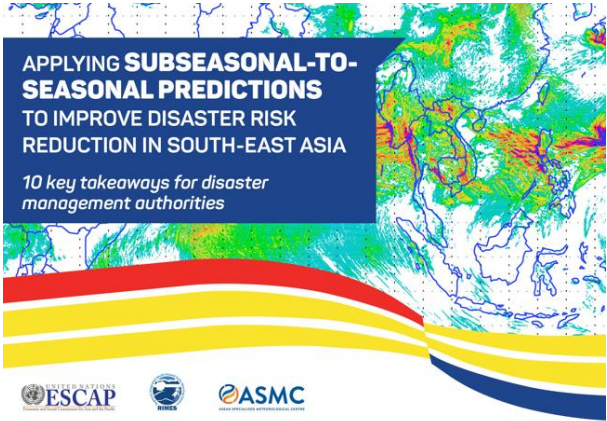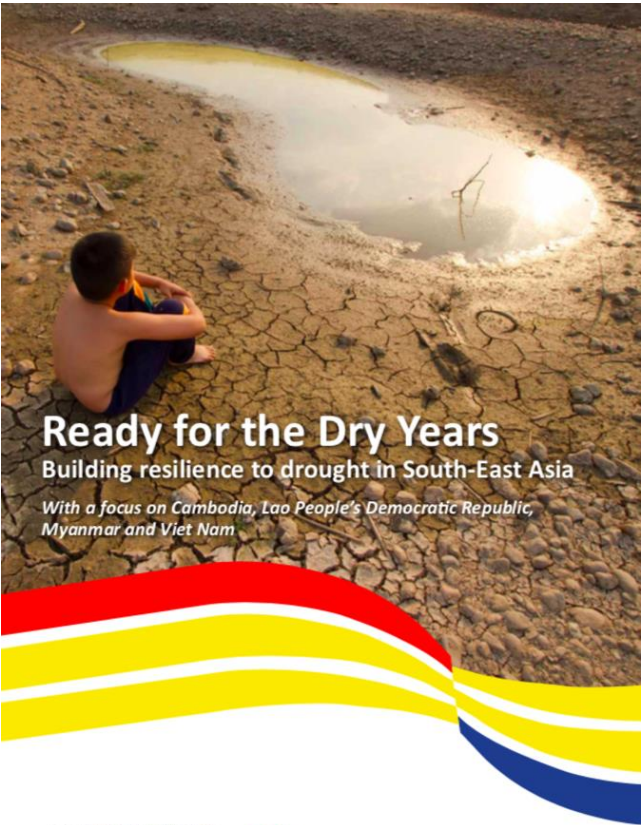**Once burned, twice shy?** – by Michael Glantz

Kareff Rafisura

Disaster Risk Reduction
UNESCAP

Observations from public sector experiences in South-East Asia

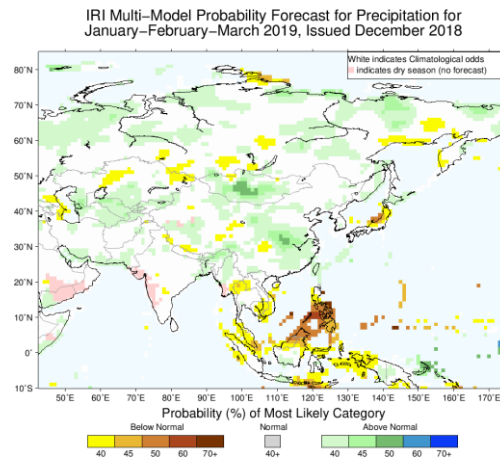# 1. Meeting differentiated information requirements

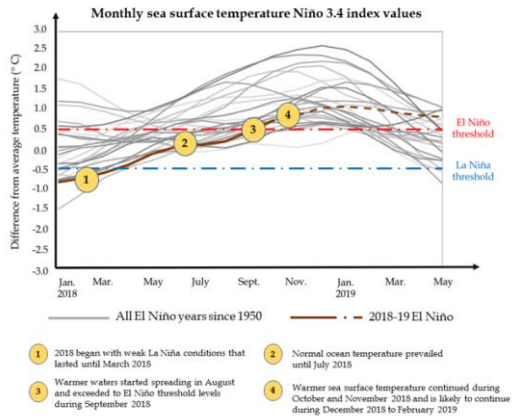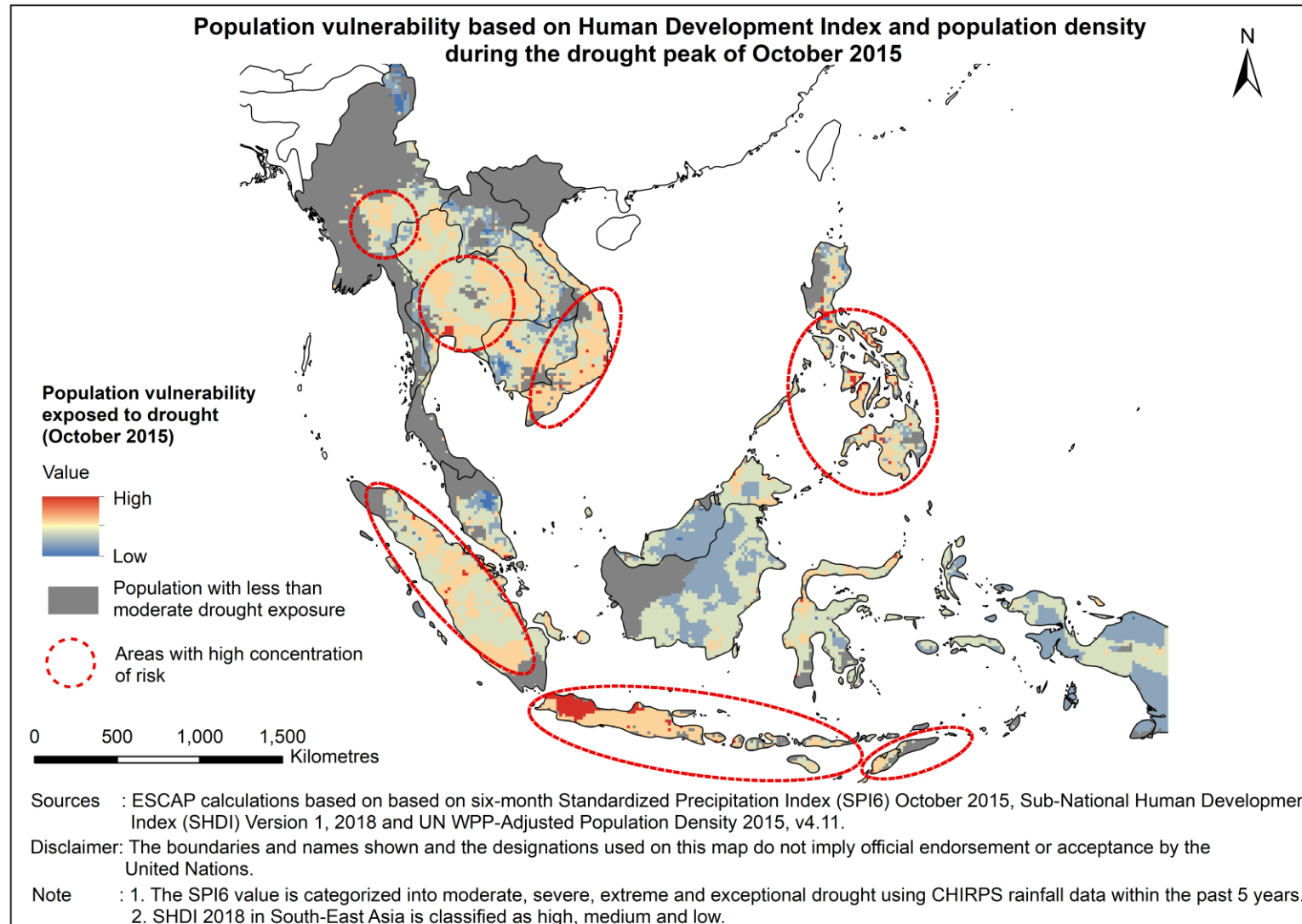**ENSO forecast** → **Climate& hydrological impacts** → **Impacts on sectors** → **Community impacts**

Monthly sea surface temperature Niño 3.4 index values

IRI Multi–Model Probability Forecast for Precipitation for January–February–March 2019, Issued December 2018

2. Early action in vulnerability hotspots, notwithstanding forecast limitations

Population vulnerability based on Human Development Index and population density during the drought peak of October 2015

N

Population vulnerability exposed to drought (October 2015)

Value

High

Low

Population with less than moderate drought exposure

Areas with high concentration of risk

0   500   1,000   1,500
Kilometres

Sources   : ESCAP calculations based on based on six-month Standardized Precipitation Index (SPI6) October 2015, Sub-National Human Development Index (SHDI) Version 1, 2018 and UN WPP-Adjusted Population Density 2015, v4.11.

Disclaimer: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Note   : 1. The SPI6 value is categorized into moderate, severe, extreme and exceptional drought using CHIRPS rainfall data within the past 5 years.
              2. SHDI 2018 in South-East Asia is classified as high, medium and low.

Source: ESCAP and ASEAN (forthcoming, November 2020). Ready for the Dry Years Second Edition.

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3. Established communication channels & decision support tools

El Niño Impact Outlook

Monsoon Forums/Climate Outlook Forums
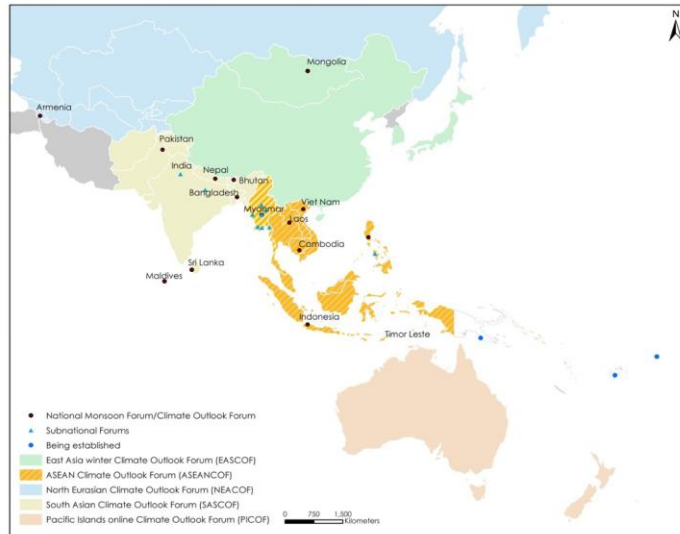
Easy-to-use decision support tools

Climate Field Schools

2015/2016

2018/2019

Challenges
Lessons learned
Improving future planning + response
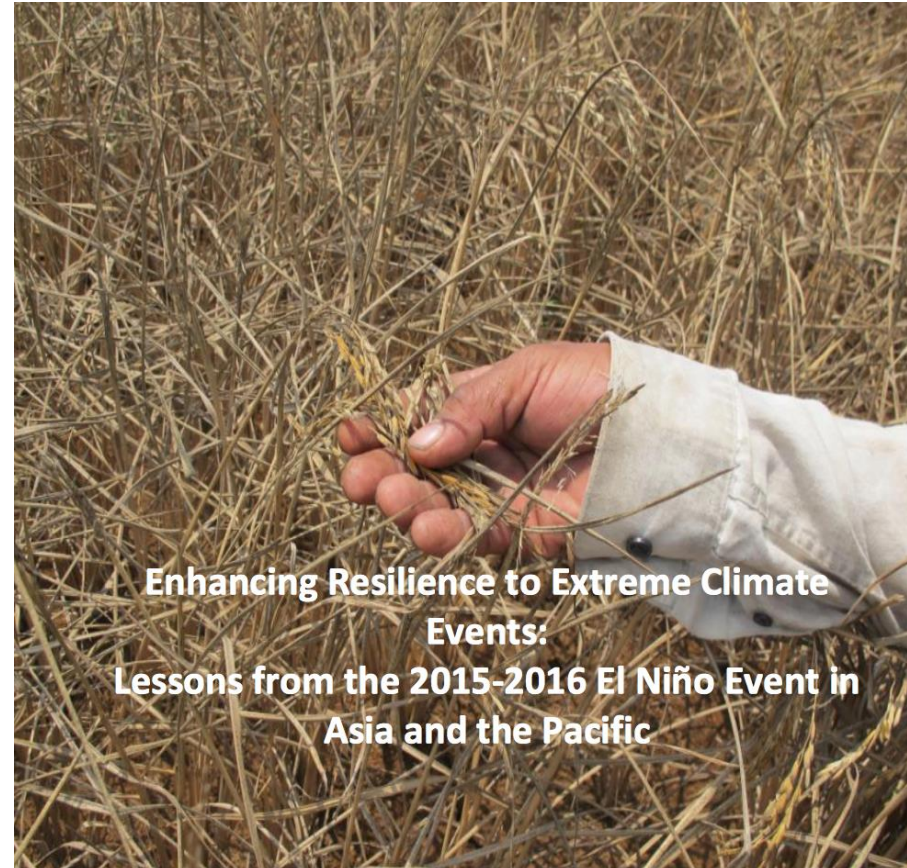
Enhancing Resilience to Extreme Climate Events:
Lessons from the 2015-2016 El Niño Event in Asia and the Pacific

Bapon Fakhruddin

Natural Hazards Specialist
Tonkin + Taylor

Dimensions of climate forecasting: Perils, time horizon and confidence level

Long range hazard forecasting and dealing with uncertainty

Nowcasting– Drought Index

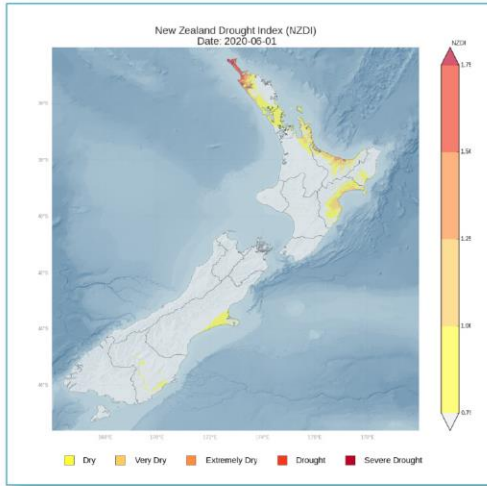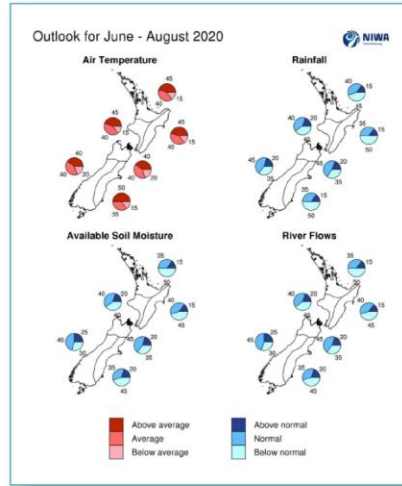New Zealand Drought Index (NZDI)
Date: 2020-06-01

Dry | Very Dry | Extremely Dry | Drought | Severe Drought

Seasonal Outlook (1–3 months)

Outlook for June - August 2020

Air Temperature | Rainfall
Available Soil Moisture | River Flows

Above average / Average / Below average
Above normal / Normal / Below normal

Drought Forecasting

Severe Drought
Drought
Extremely Dry
Very Dry
Dry

	P	SM	Snow	TWS	ET
	In-situ GPM CHIRPS	SMOS SMAP	MODSCAG MOD10	GRACE	MOD16 PT-JPL

T, w — In-situ R/A

Hydrological model

ESP/ FCST

Hydrological model

Nowcasting | **Forecasting**

→ Input   → Assimilation   → Output

Present | **Future**

Strategic Decisions	**Tactical Decisions**
Seasonal Forecast (3–6 months)	21 - 30 days
Planning	**Aplications**
On-going	1 - 15 days

Drought early warning system

Hydro-meteorological Variables
- Rainfall
- Streamflow
- Temperature
- Evaporation
- Soil–moisture
- Groundwater level
- Reservoir/lake level
- Satellite estimated products

Drought indices
- Standardized Precipitation Index (SPI)
- Potential Evapotranspiration Deficit (PED)
- Palmer Drought Severity Index (PDSI)
- Soil Moisture Deficit (SMD)
- Crop Moisture Index (CMI)
- Surface Water Supply Index (SWSI)
- Soil Moisture Deficit Anomaly (SMDA)

Climate indices
- El Nino–Southern Oscillation (ENSO)
- Sea Surface Temperature (SST)
- Southern Oscillation Index (SOI)
- Pacific Decadal Oscillation (PDO) North
- Atlantic Oscillation (NAO)
- Inter–decadal Pacific Oscillation (IPO)
- Madden-Julian Oscillation (MJO Indian
- Ocean Dipole (IOD)

Methodology
- Regression models
- Time series models
- Ensembles probability models
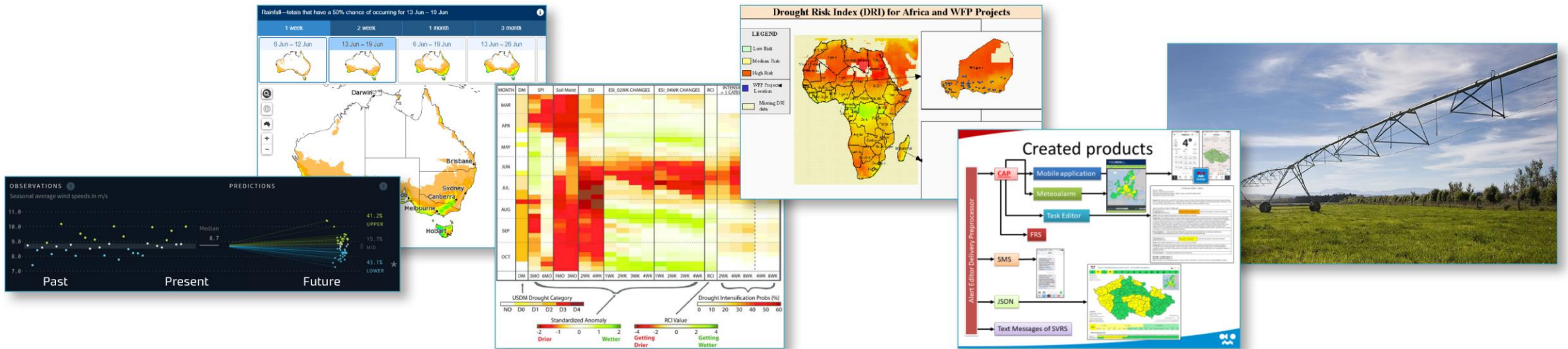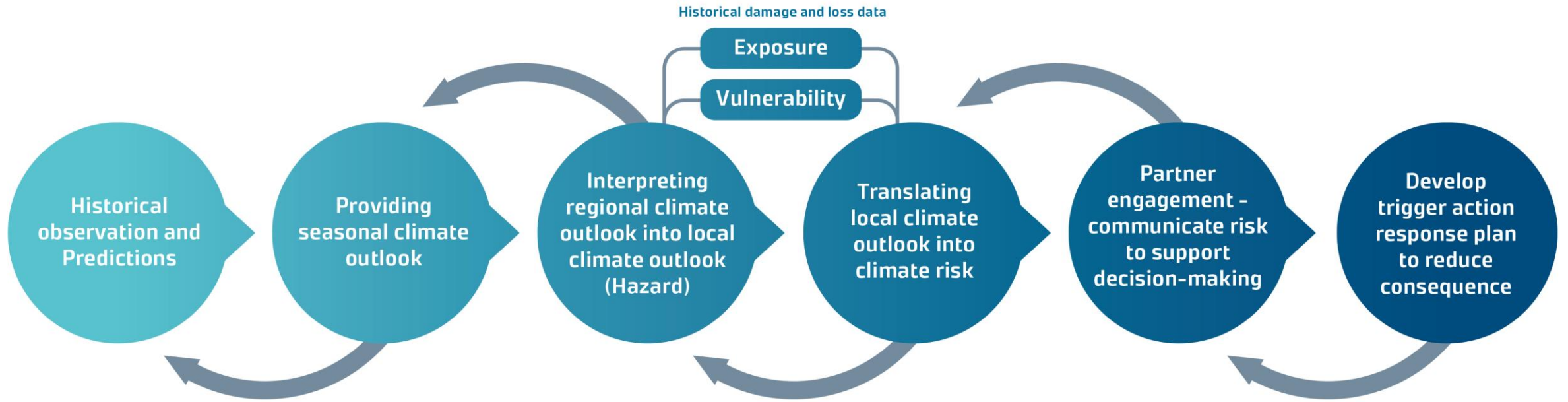- Neural network models
- Hybrid models

Output
- Lead time
- Initiation and termination
- Nature of severity
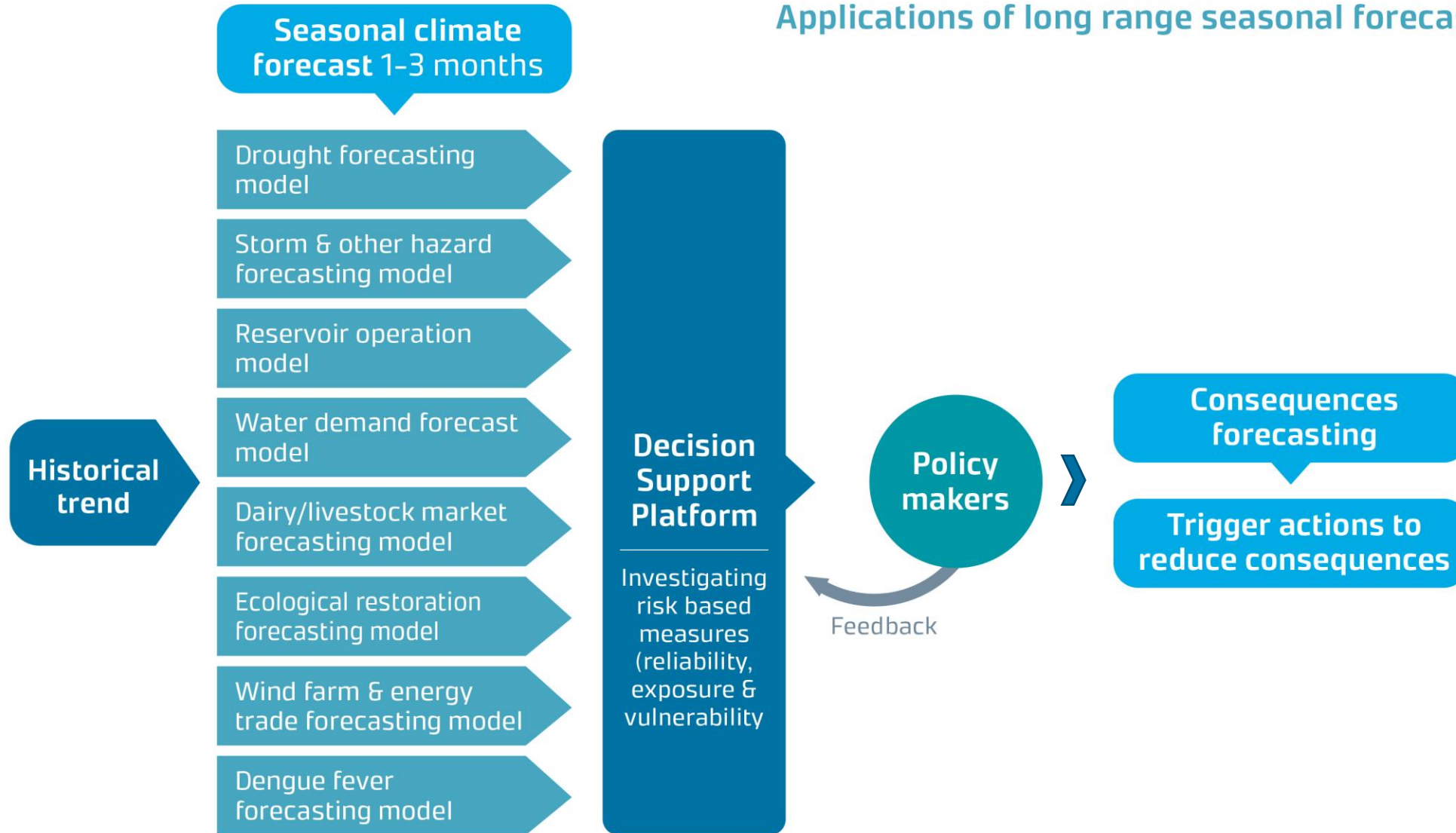- Probability of occurance

Drought warning Spatio–temporal
- Severity (S)
- Duration (D)
- Intensity (I)
- Frequency (F)
- Area (A)

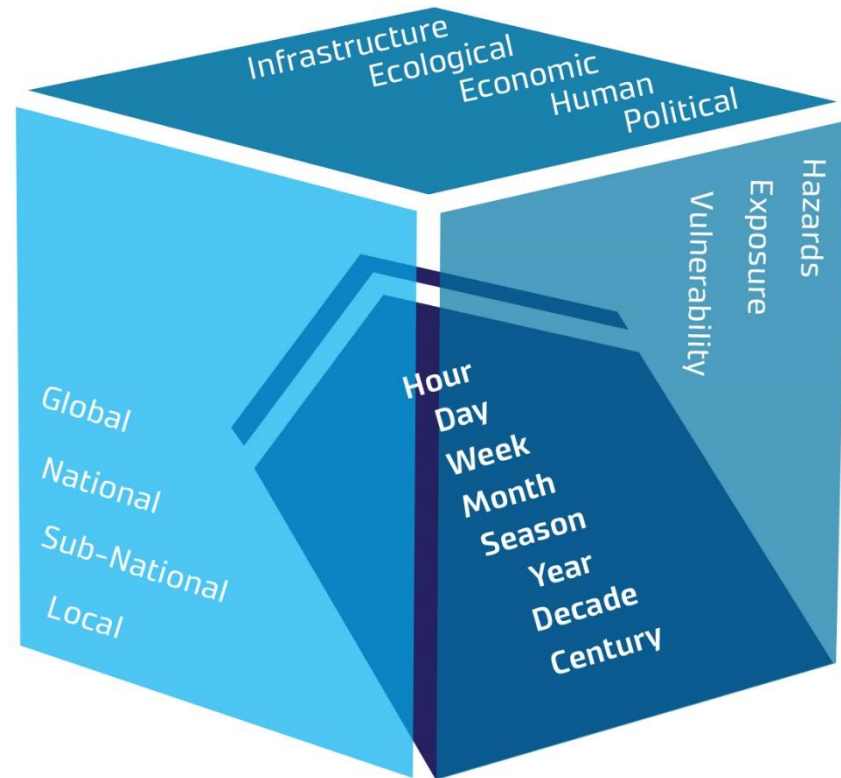# Climate information and application system

Applications of long range seasonal forecasts

Coherence from Global Risk Assessment Frameworks (GRAF)

Q+A