

Using climate knowledge to create sustainable agricultural systems

G Srinivasan

Regional Integrated Multi-hazard Early-warning System (RIMES)

2017 APEC Climate Symposium:

Building Resilient Agro-food Systems from Production to Consumption: Interdisciplinary Approaches for Sustainable Food Security using Climate information

August 18-20, Can Tho, Vietnam



About RIMES

- ✧ Established on 30 April 2009
- ✧ Intergovernmental, owned and managed by Member States
- ✧ Registered with the United Nations under Article 102 of UN Charter
- ✧ UN ESCAP support for RIMES institutional development
- ✧ Currently, India is RIMES Council Chair

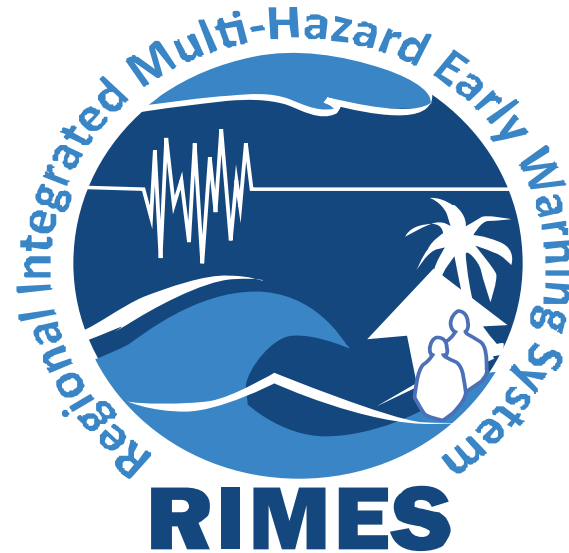


Regional Integrated Multi-hazard Early warning System (RIMES)

Regional: 32 Member and Collaborating States in Asia and Africa

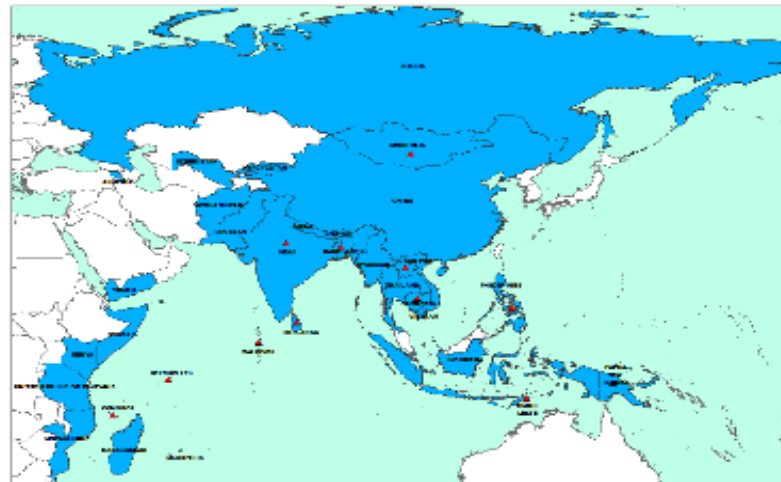
Integrated: links science with generators and users of early warning information

Multi-hazard: started with tsunami and earthquake, and expanded to include hydro-meteorological hazards



Early warning: with mandate to provide early warning services for enhanced preparedness for, responses to, and mitigation of natural hazards

System: consists of regional technical support unit, connected to national and local systems

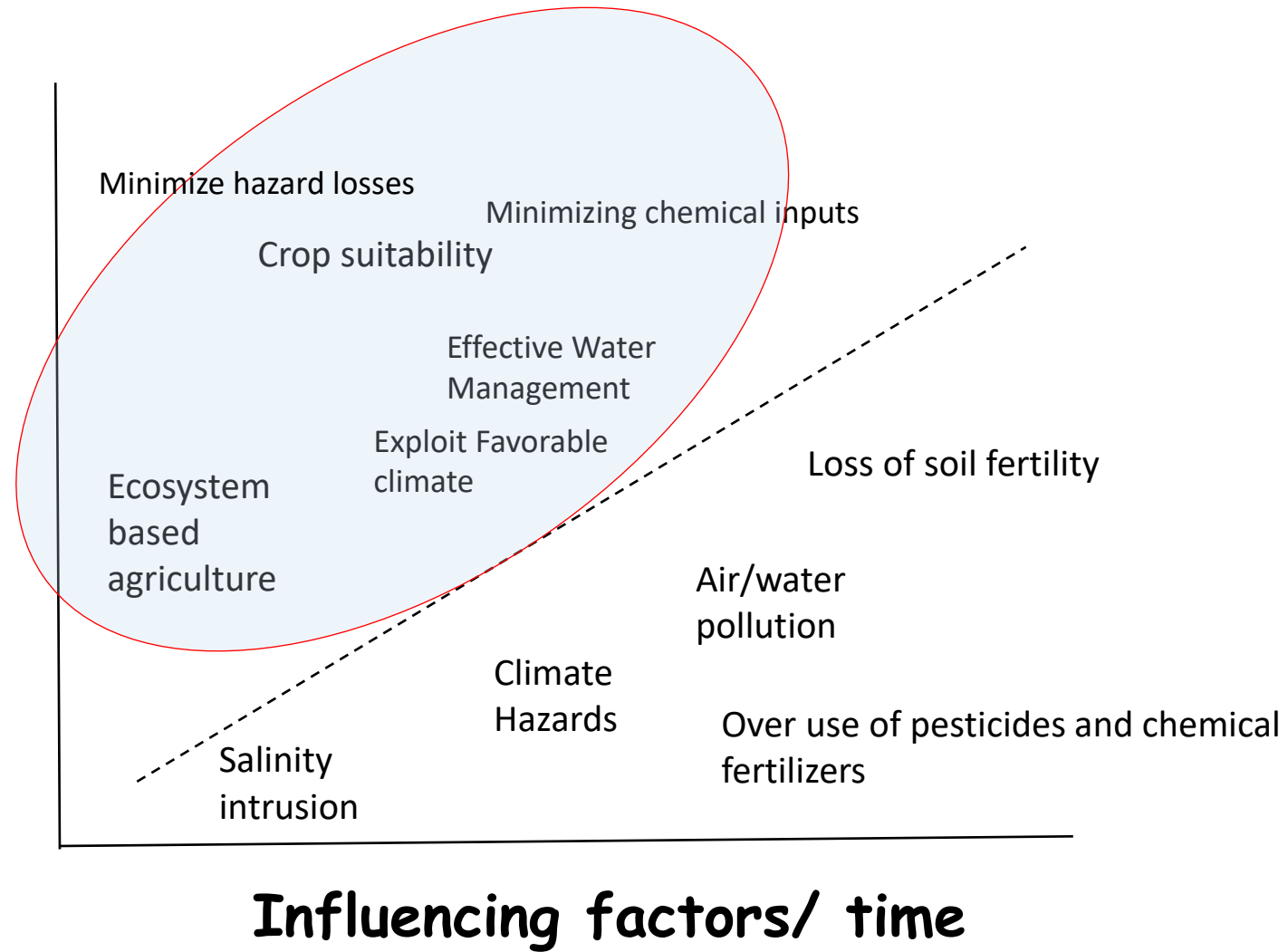




Sustaining agricultural production involves minimizing impacts of adverse climate and maximize the favorable periods

*– Making more effective use of climate information
SDGs/DRR/CA*

**Sustenance of
Agriculture
Yields/Quality/Nu
trition**



Climate Knowledge as an entry point to bring sustainability

Climate & Weather based decisions	Contribution to sustainability
Scheduling irrigation based on rainfall forecasts	Water savings/power saving/soil nutrients retained.
Pesticide and fungicide spraying operations tuned to weather forecasts	less of toxic chemicals in the agro. Ecosystems, improve economic viability, effective spraying operations
Climate outlook based crop choice	Reduced losses, less inputs
Enhanced sensitivity to crop needs – past climate & ‘agricultural history’ of a place	Ecosystem approach to agronomic operations, optimization of inputs

This discussion can be extended to Water/Health/Disaster Risk Reduction

Myanmar Dry zone farmers

Irrigating a 4 acre farm needs operating a pump for a whole day that consumes 2 gallons of fuel

- In an above normal “wet season” paddy crop requires only 2-3 irrigations
- In a below normal “dry-season”, it has to be irrigated about 15 times
- Normal – 9 times.





EC-FAO Food Security Programme



Linking Information and Decision-Making to Improve Food Security

In selected countries of the Greater Mekong Sub-region – Cambodia, Lao PDR and Myanmar

FAO-RAP, Bangkok/RIMES implemented the Climate Component – “Enhancing Utility of Seasonal Climate Forecasts and Managing Climate Change Risks”

Activity 1: Monsoon Forum: enhancing the utility of seasonal climate forecasts

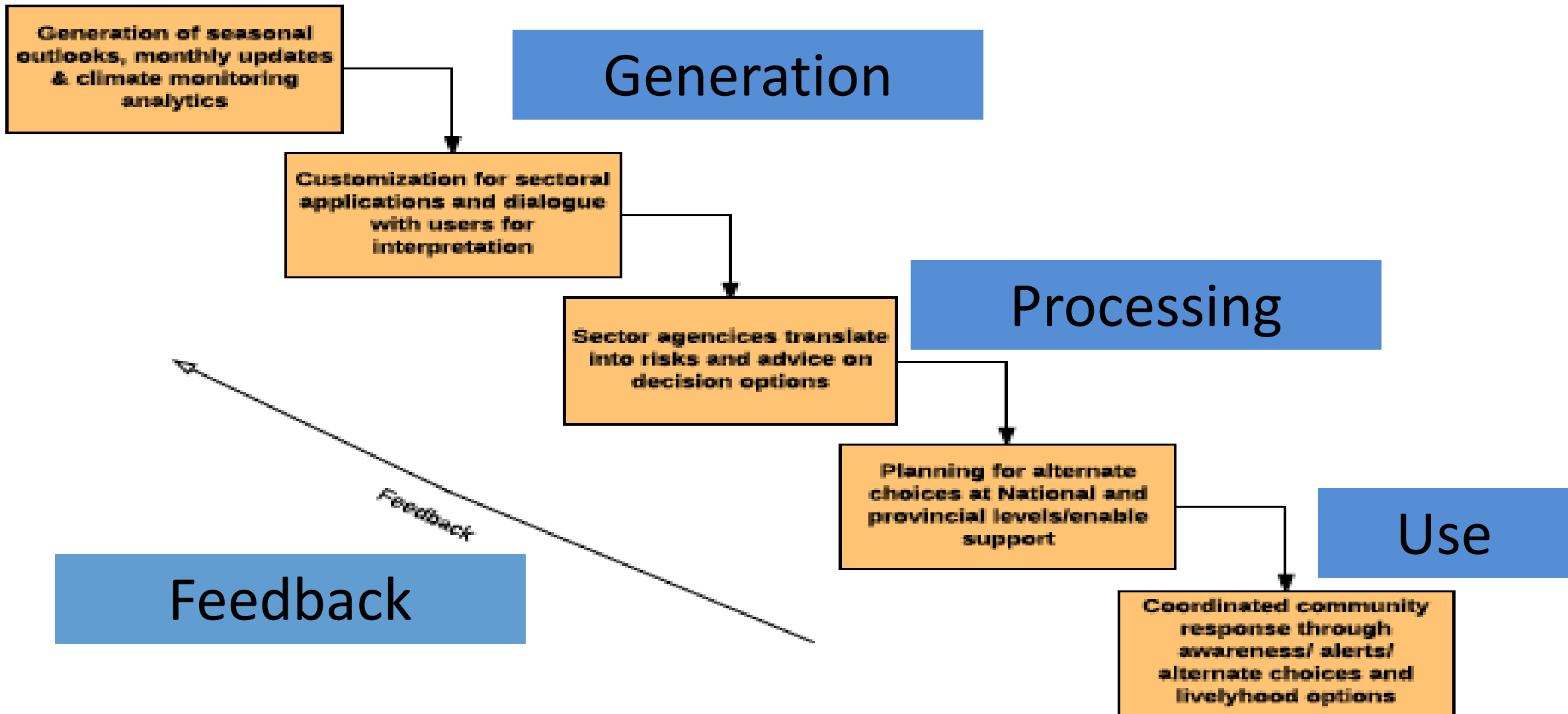
Activity 2: Managing climate change risks

Phase I: Started August 2010 to September 2011
Final evaluation completed by September 2012

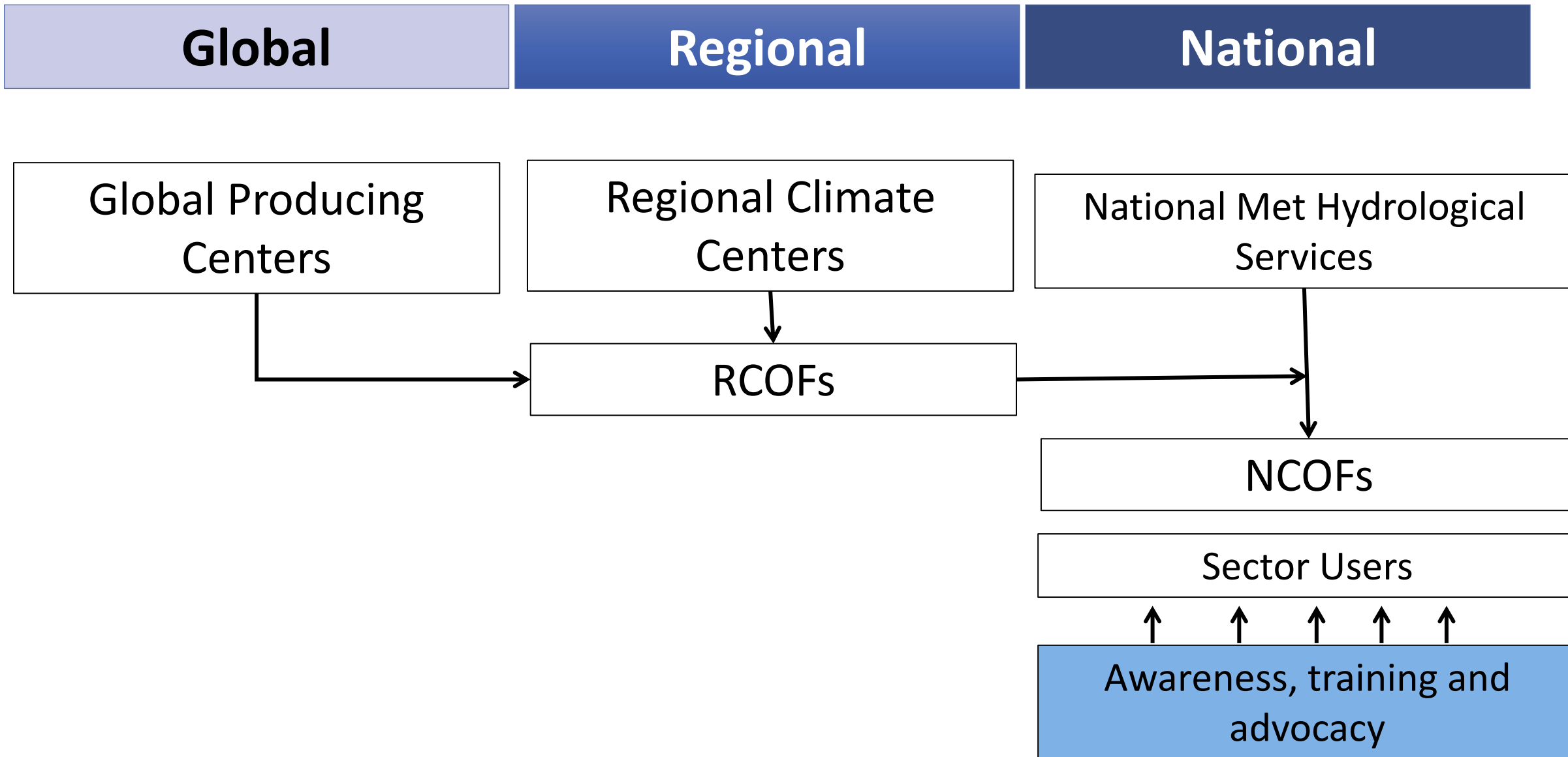
Evaluation

Support to the EU Programme on Linking Information and Decision-Making to Improve Food Security for Selected Greater Mekong Sub- Regional Countries - GCP /RAS/247/EC

- In the field of climate information the major **achievement of the project was in bringing together the users and producers of the information in the Monsoon Forums**. Potentially this process could lead to tailored applications of climate forecasts.
- In terms of **linking information and decision making, the climate work had the most potential impact, but this is still as yet unrealized**.
- Consolidation of the ASEAN Food Security Information System (AFSIS)



Climate information: creating systems that can effectively use such information





This project was undertaken with the financial support of:
Ce projet a été réalisé avec l'appui de



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

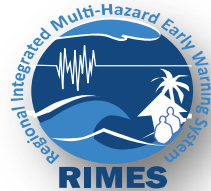


WMO Global Framework for Climate Services (GFCS) project

***Support to GFCS Implementation in South Asia in
cooperation with NMHSs***

Since Feb 2016

Ending March 2018



APEC Climate Symposium 2017 August 18-20, 2017 Can Tho,
Vietnam

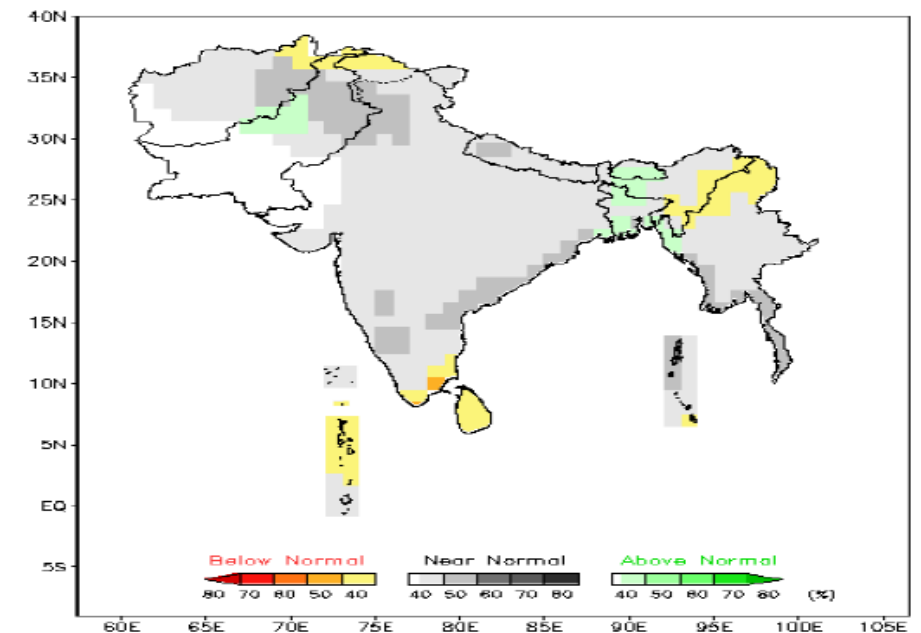
Support to GFCS Implementation in South Asia

Task Cluster 1

- RCOF and Climate Services User Forum (CSUF)
- Supporting (National Climate Outlook Forums (NCOFs)



South Asian Seasonal Climate Outlook Forum 9, 27-28, Nay Pyi Taw, Myanmar



Support to GFCS Implementation in South Asia (cont.)

Task Cluster 2

- Capacity Development of Users: Enhance use of climate information – profiles, gaps, needs, training



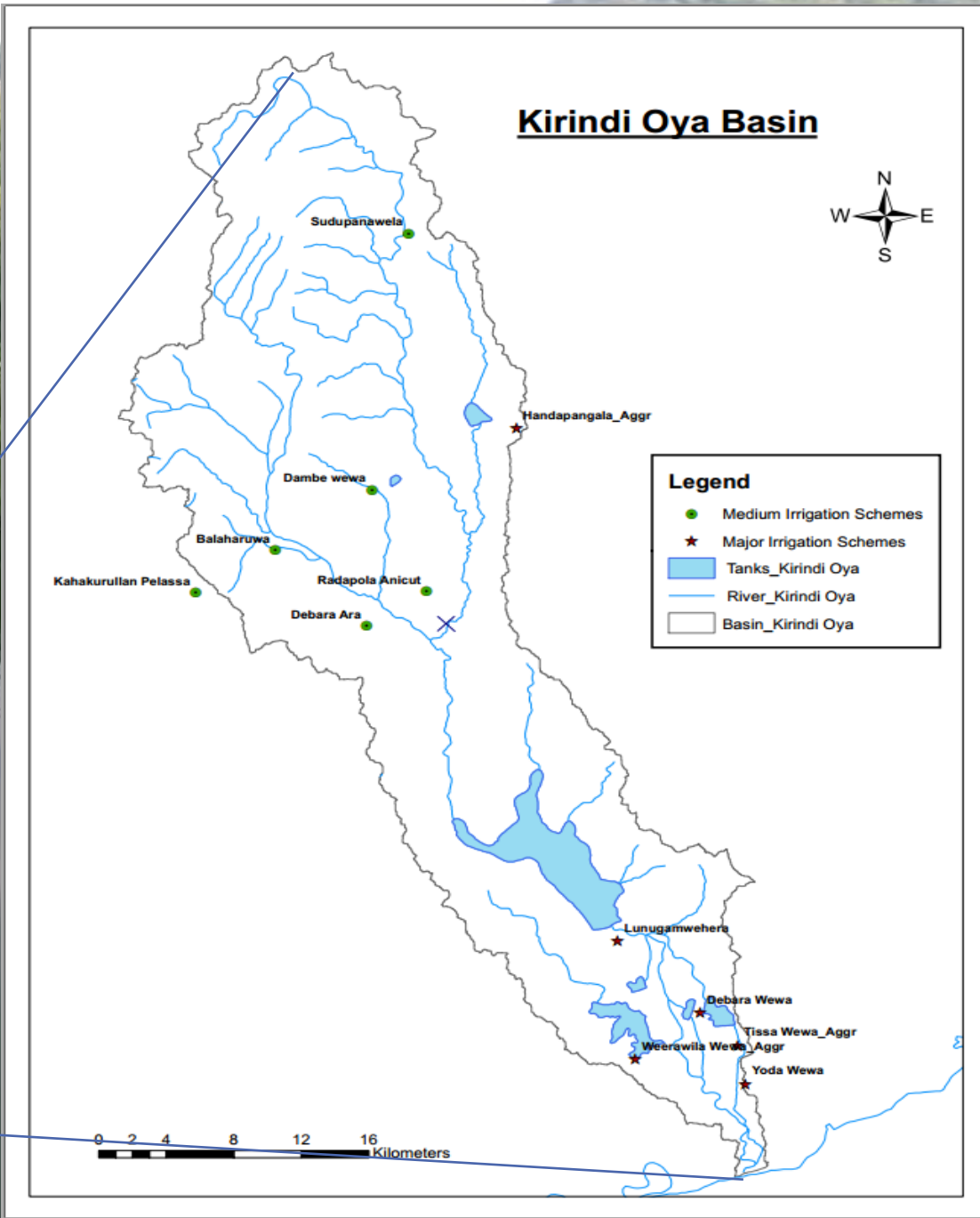
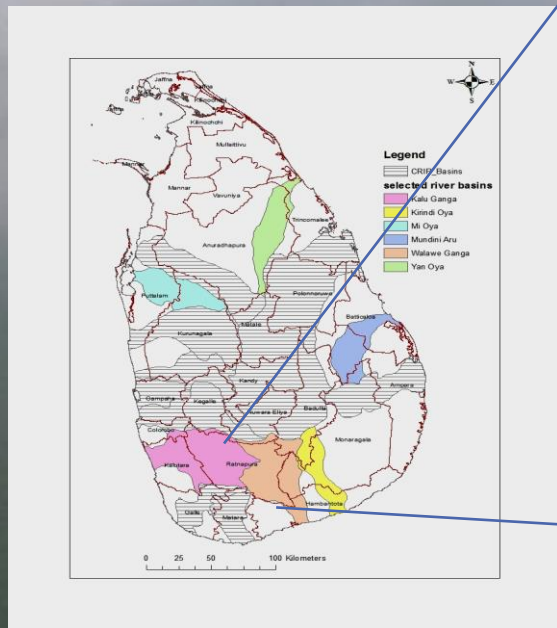
Support to GFCS Implementation in South Asia

Task Cluster 3

User Engagement for Application - climate information translation -
Decision support systems developed for these identified sectors –
Water, Agriculture, Health & Fisheries

Sector specific Decision
Support Systems





Sri Lanka – water sector

- The Department of Irrigation (DoI) and Department of Agriculture (DoAg) are regular and active participants in the Monsoon Fora organized by the DoM
- Irrigation Department of Sri Lanka received this message in **October 2015** at the **South Asian Climate Outlook Forum**. These forecasts were reviewed during the **Monsoon Forum organized by DoM**



The Planning & implementation process

- **Engagements with DoM and DoI**
- Project initiation meeting was held on **31st May, 2016** at DoM office Colombo to define the project scope and identify the study basin.
- Department of Irrigation proposed *Kirindi Oya basin* as the pilot location. Basin with a catchment area of 1157 km² is located in the dry zone of southern Sri Lanka and faces challenges linked to water shortage in dry season and floods in the monsoon season.
- **August, 2016 survey of the project site** and discussions with irrigation engineers involved in reservoir operations
- **December, 2016** familiarization to climate information and participatory discussion to share DSS design and data requirements
- **July, 2017** Workshop to handover the system that is currently undergoing testing

Conceptual approach

Weather and Climate prediction data

HEC-HMS
Kirindi Oya basin

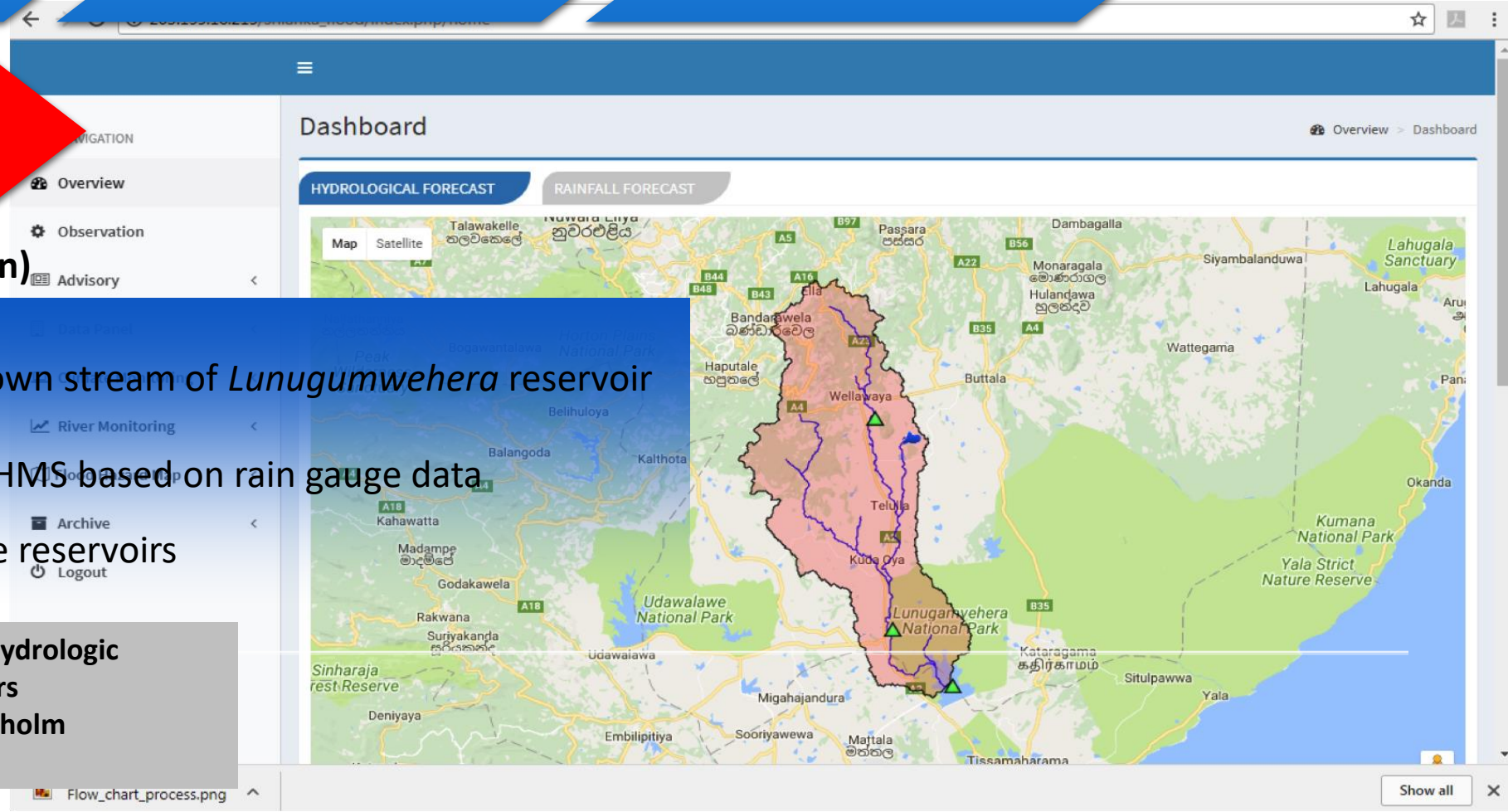
Estimated flows into the reservoir

WEAP
Lunugumwehera reservoir

WEAP model (*Kirindi Oya basin*)

- Model set up for the basin down stream of *Lunugumwehera* reservoir
- Inflows generated from HEC-HMS based on rain gauge data
- Improved management of the reservoirs

HEC-HMS: Hydrologic Engineering Center – Hydrologic Modeling System, US Army Corps of Engineers
WEAP: Water Evaluation and Planning, Stockholm Environment Institute (SEI).

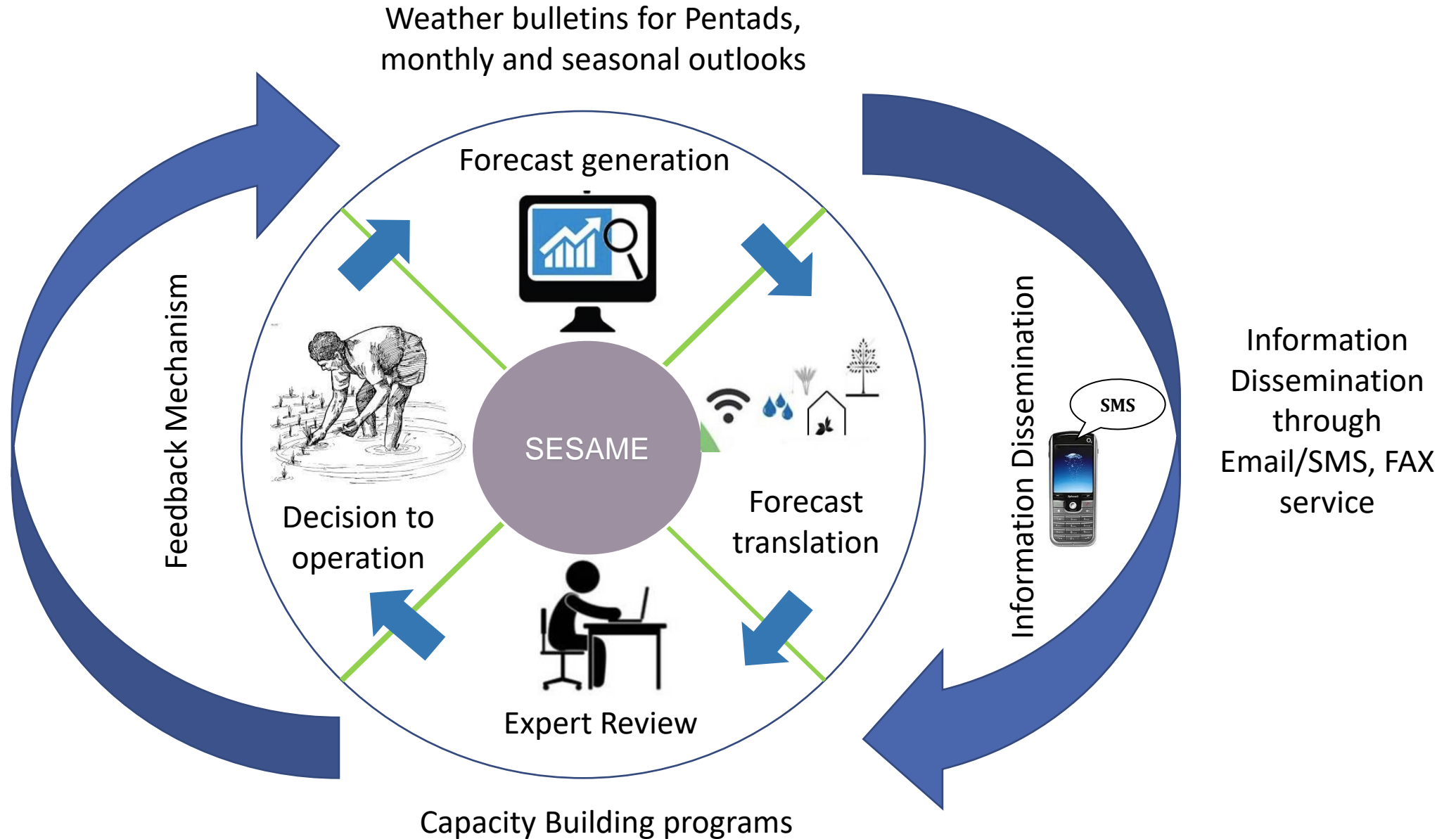




SESAME

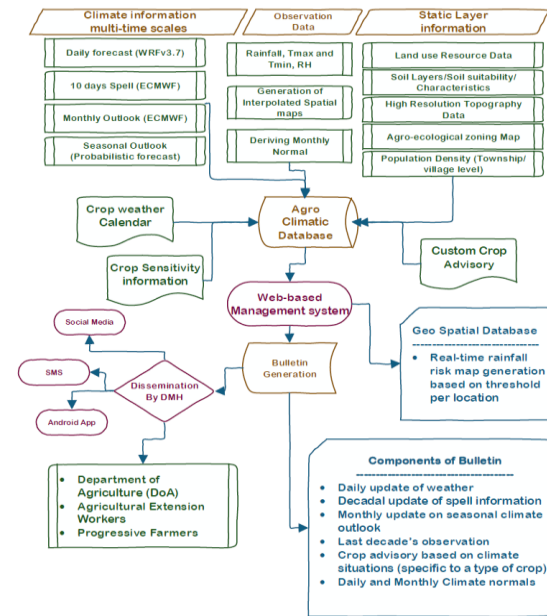
Specialized Expert System for Agro-Meteorological Early Warning
for Climate Resilient Agriculture

SESAME – Tool for decision making for Farmers



SESAME – Specialized Expert System for Agro-Meteorological Early Warning for Climate Resilient Agriculture

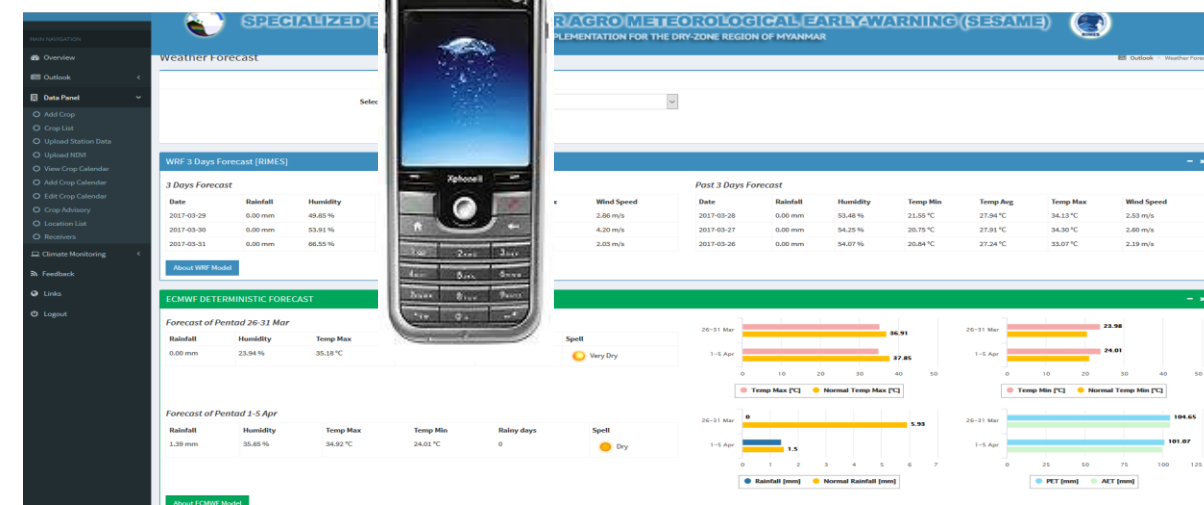
- Forecast Component of different lead time
- Dynamic Crop information panel for expert users
- Weather bulletins for Pentads, monthly and seasonal outlooks
- Real time verification of forecast products
- Validation of information at different levels (NHMS – Agro met staff – Extension Worker – farmer)
- Information Dissemination through Email/SMS, FAX service
- Robust Feedback Mechanism
- Mobile application
 - Android version – available in google play store
- Capacity Building programs
 - on using the tool
 - forecast interpretation



SMS Alert!

Temp will rise by 3 deg C above Threshold in next 24 hrs.

“PROTECT YOUR GRAPES FROM EXCESSIVE HEAT”



Weather Forecast

WRF 3 Days Forecast (RIMES)

Date	Rainfall	Humidity
2017-03-29	0.00 mm	49.65 %
2017-03-30	0.00 mm	53.91 %
2017-03-31	0.00 mm	66.55 %

ECMWF DETERMINISTIC FORECAST

Forecast of Pentad 26-31 Mar

Rainfall	Humidity	Temp Max
0.00 mm	23.94 %	35.18 °C

Forecast of Pentad 1-5 Apr

Rainfall	Humidity	Temp Max	Temp Min	Rainy days	Spell
1.39 mm	35.60 %	34.92 °C	24.03 °C	0	Dry

Past 3 Days Forecast

Wind Speed	Date	Rainfall	Humidity	Temp Min	Temp Avg	Temp Max	Wind Speed
2.86 m/s	2017-03-28	0.00 mm	53.48 %	21.05 °C	27.94 °C	34.13 °C	2.53 m/s
4.20 m/s	2017-03-27	0.00 mm	54.25 %	20.79 °C	27.91 °C	34.30 °C	2.89 m/s
2.03 m/s	2017-03-26	0.00 mm	54.07 %	20.94 °C	27.24 °C	33.07 °C	2.28 m/s

Spell

20-31 Mar: 23.94 (Very Dry)

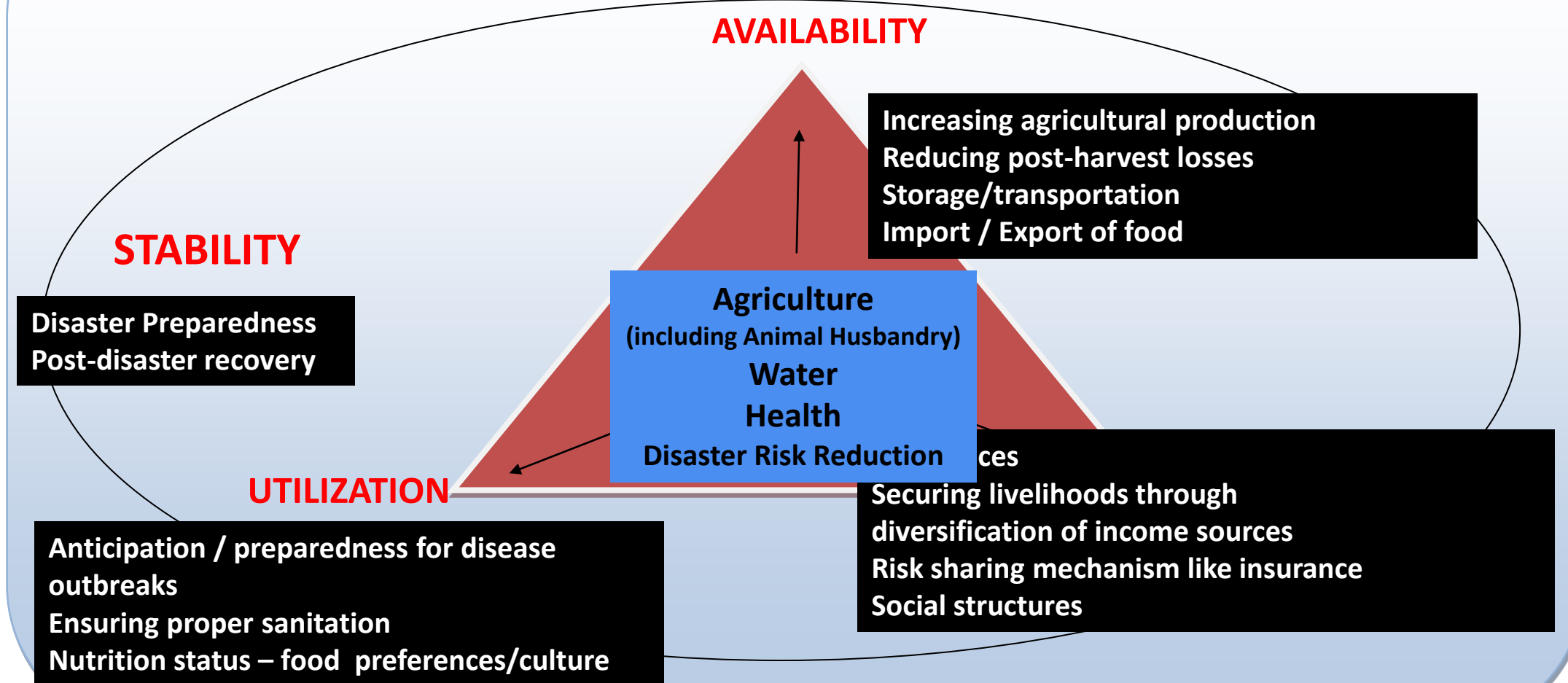
1-5 Apr: 24.91 (Very Dry)

26-31 Mar: 184.65 (Dry)

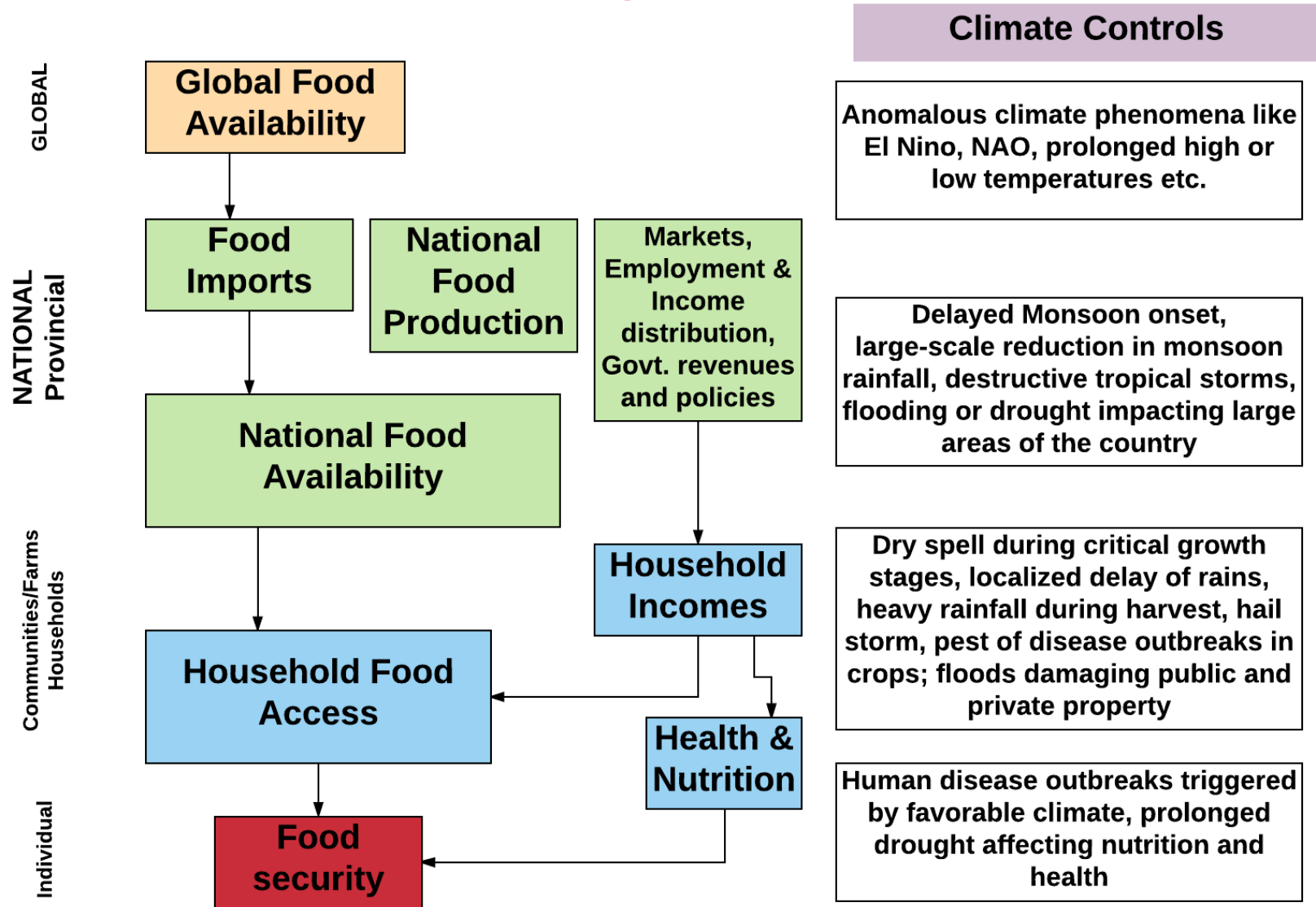
1-5 Apr: 101.67 (Dry)

Temp Max [°C], Normal Temp Max [°C], Rainfall [mm], Normal Rainfall [mm], PET [mm], AET [mm]

Food Security

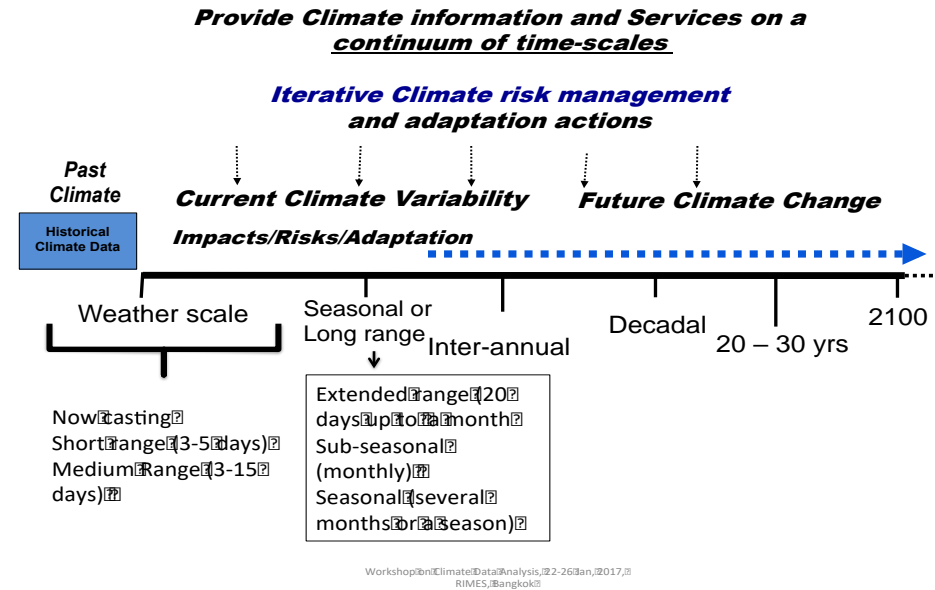


Food Security and Climate



Concluding thoughts

- Climate knowledge and information are pivotal for sustainable systems that ensure food security



- Food security is linked to various key sectors like health and water – provides an ideal point for starting to use climate information
- Past knowledge and emerging trends (both social and technological) need to innovatively used to move towards sustainable agricultural systems & food security
- Leverage all available opportunities to transition



...thank you

G Srinivasan
srini@rimes.int