Moving from Impacts to Action:
Actionable climate knowledge for risk management and adaptation planning in EAP




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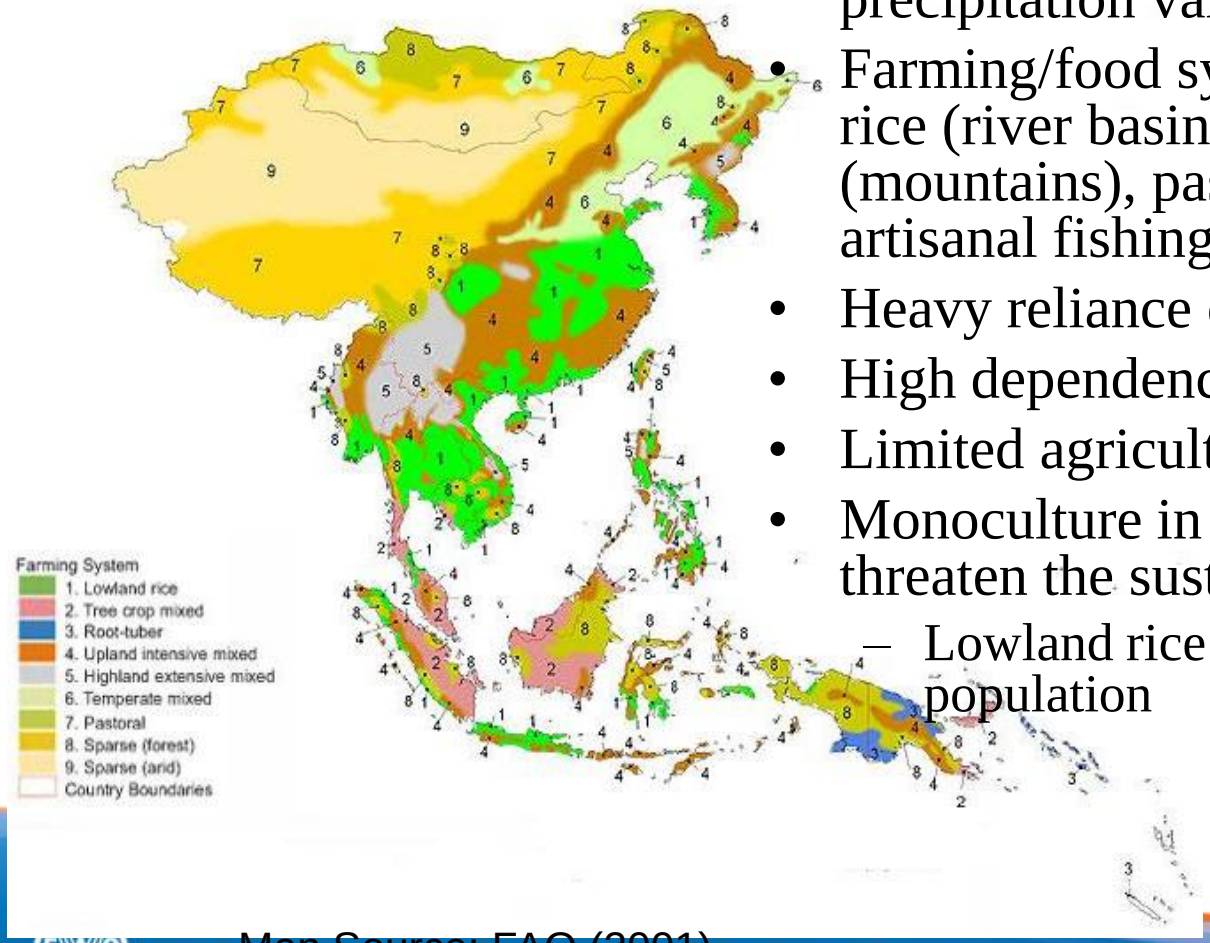
The EAP region's agriculture is particularly vulnerable to climate change

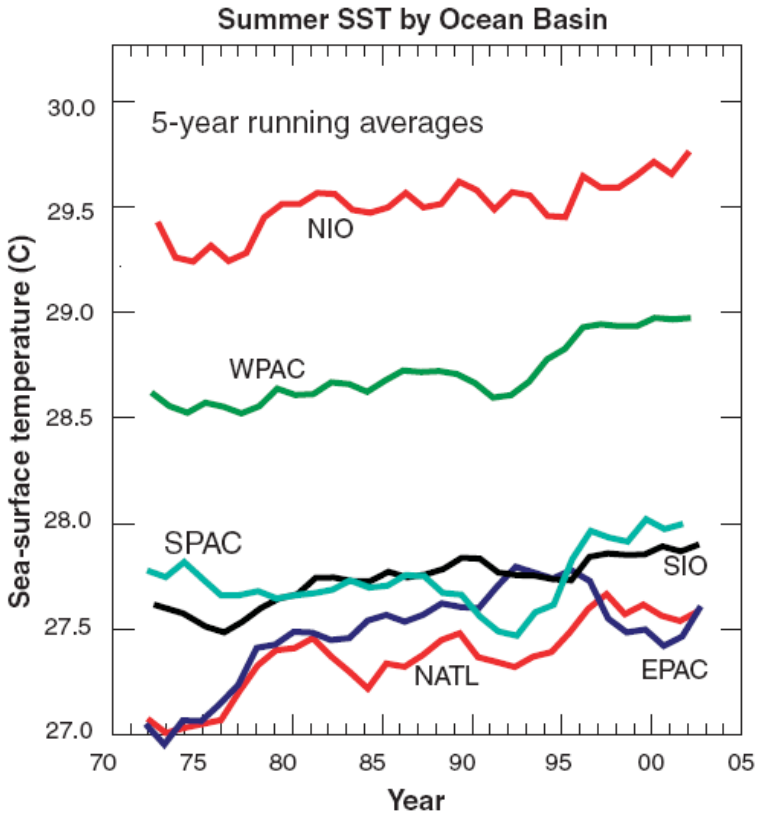


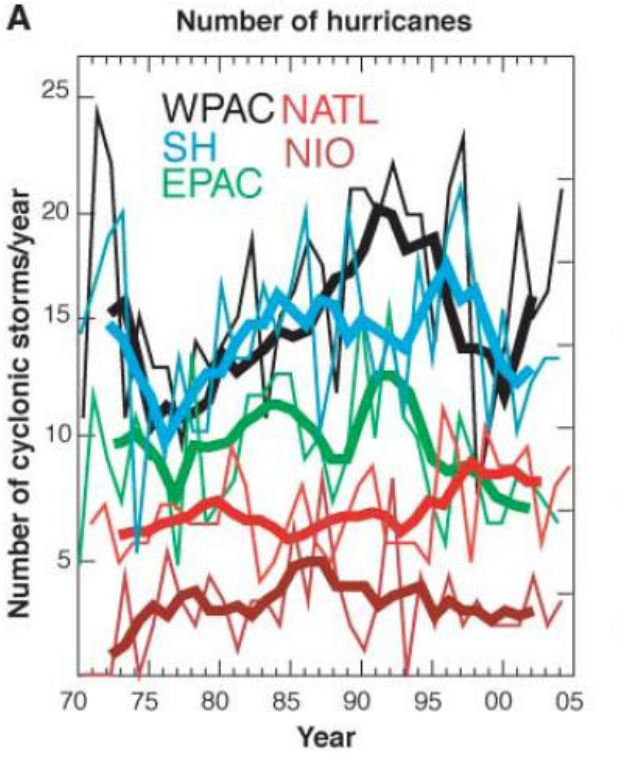
- Climate of EAP region is diverse, with a wide range of temperature and precipitation variability
- Farming/food systems encompass lowland rice (river basins), upland intensive mixed (mountains), pastoral (arid deserts), artisanal fishing (coasts and small Islands)
- Heavy reliance on agriculture (~62%)
- High dependency on marine resources
- Limited agriculture infrastructure
- Monoculture in intensive farming systems threaten the sustainability
  - Lowland rice – 17% area; 42% agric. population

Map Source: FAO (2001)

Impacts of quick and slow-onset hazards and creeping changes in climate are increasing

- **Quick-onset** hazards are already affecting the production systems (Storms in the Philippines, Viet Nam; temperature induced flash floods in Mongolia; floods in Mekong; red river etc.,)

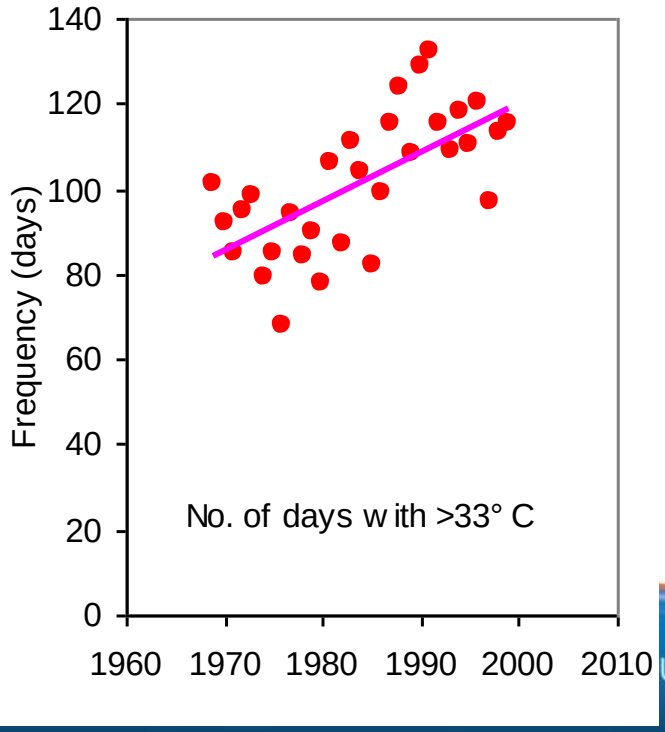


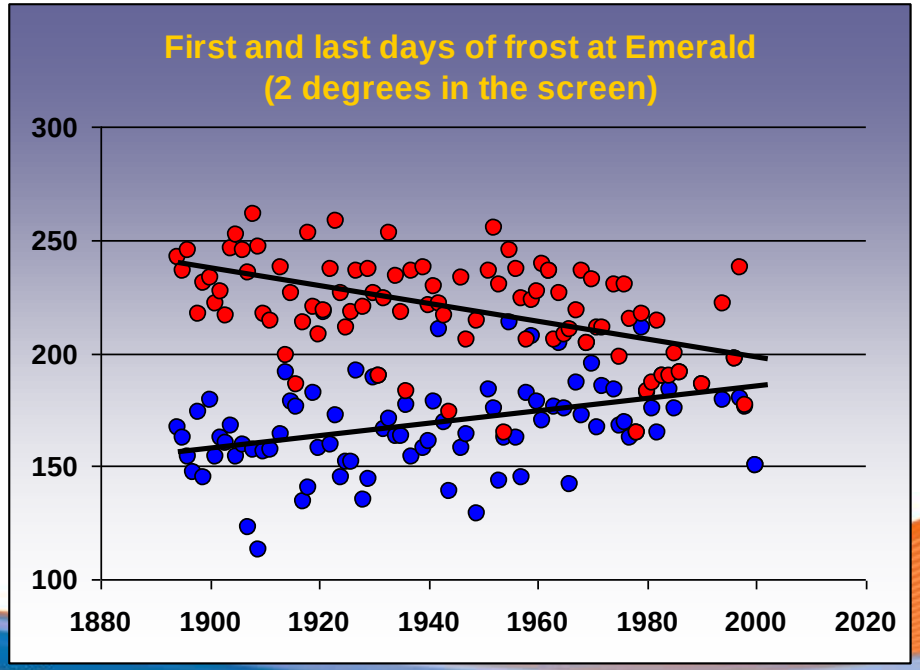


Webster et al. (2005)

Impacts of quick and slow-onset hazards and creeping changes in climate are increasing

- **Area affected by slow-onset** climate extremes (e.g. drought, dry and wet spells) are expanding (e.g China, dzud in Mongolia, North East Thailand, Central highlands and northern mountains of Viet Nam; ENSO associated droughts in Indonesia, Philippines and Pacific Islands)
- **Creeping changes** in climate lead to crises in the future (e.g. changing rainfall pattern, salinity intrusion in Mekong, seasonality, temperature increase and associated length of growing period)

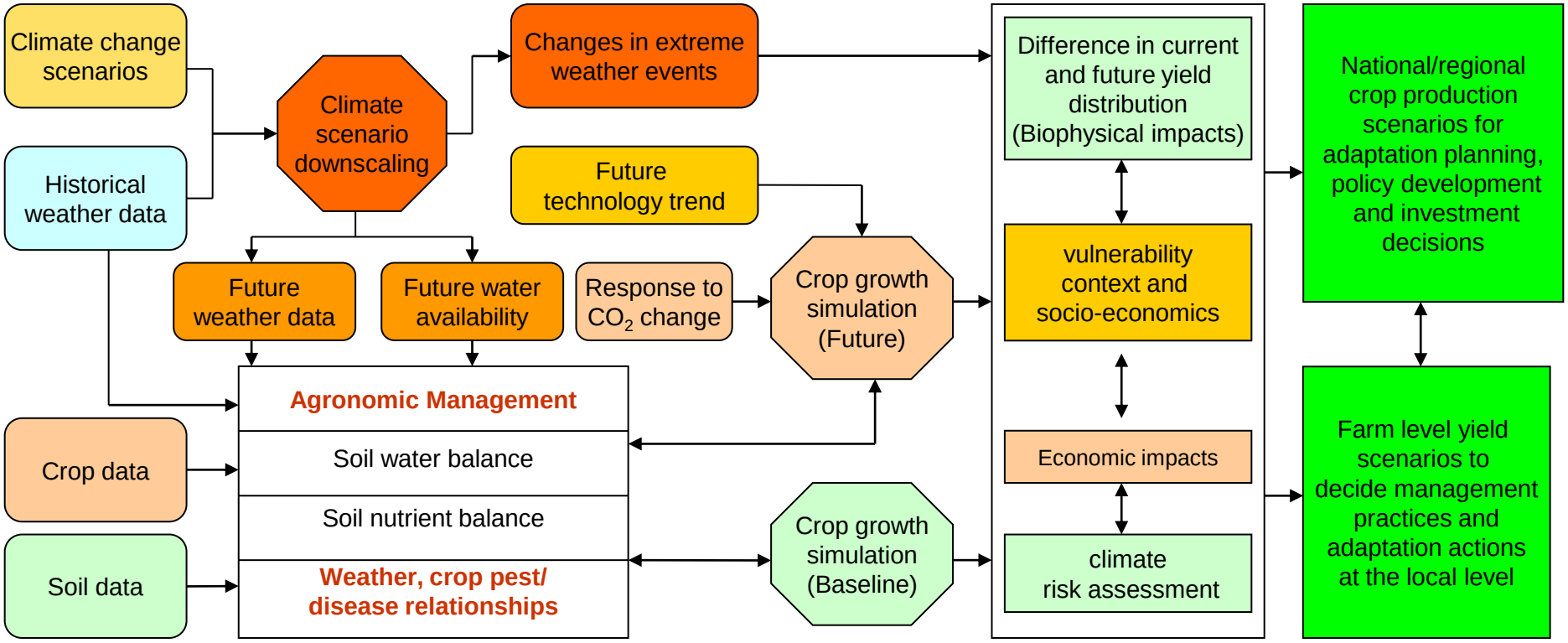




Demand - Supply mismatch

- **Demand for climate information is diverse:**
  - localized, timely and easily understandable
  - matches diverse cropping systems and decision cycles
  - Suitable for user needs – Policy makers, Institutions, Ag. service providers, irrigation managers, input suppliers, market intermediaries, local cooperatives, micro-financing, farmers, fisherman, livestock herders
  - Climate, crop and livelihood data base
- **Supply is often constrained by insufficient data and resolution**
  - Users often perceive that the information is general, data and technical terms not easy to understand
  - Narrow, specific and precise information
  - Fit the problem to the available tools and methods at hand
  - scales of climate outlooks/scenarios and local agriculture decision making

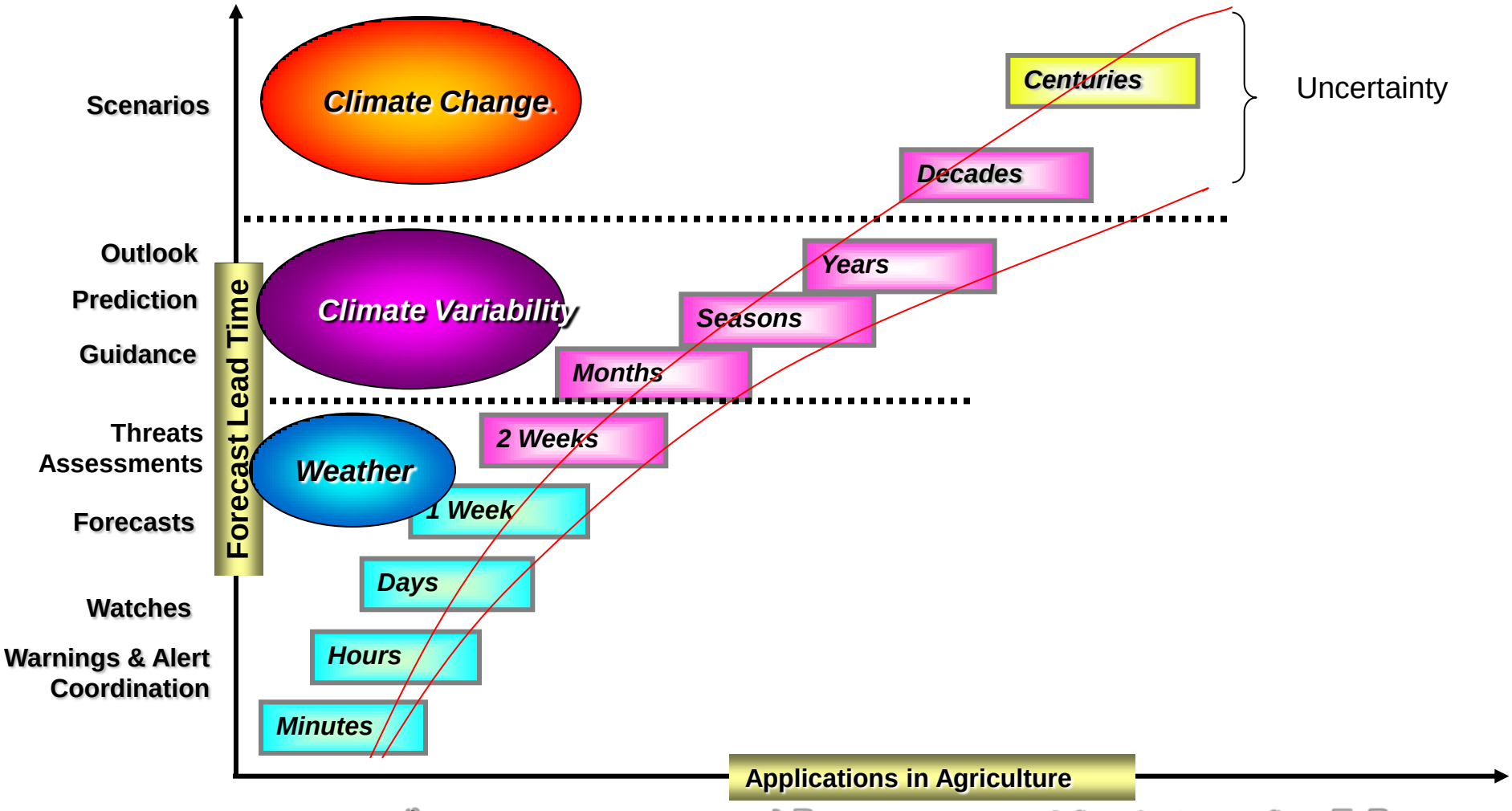
Data and information flow in a generic climate change impact assessment framework



Interpretation and communication of results

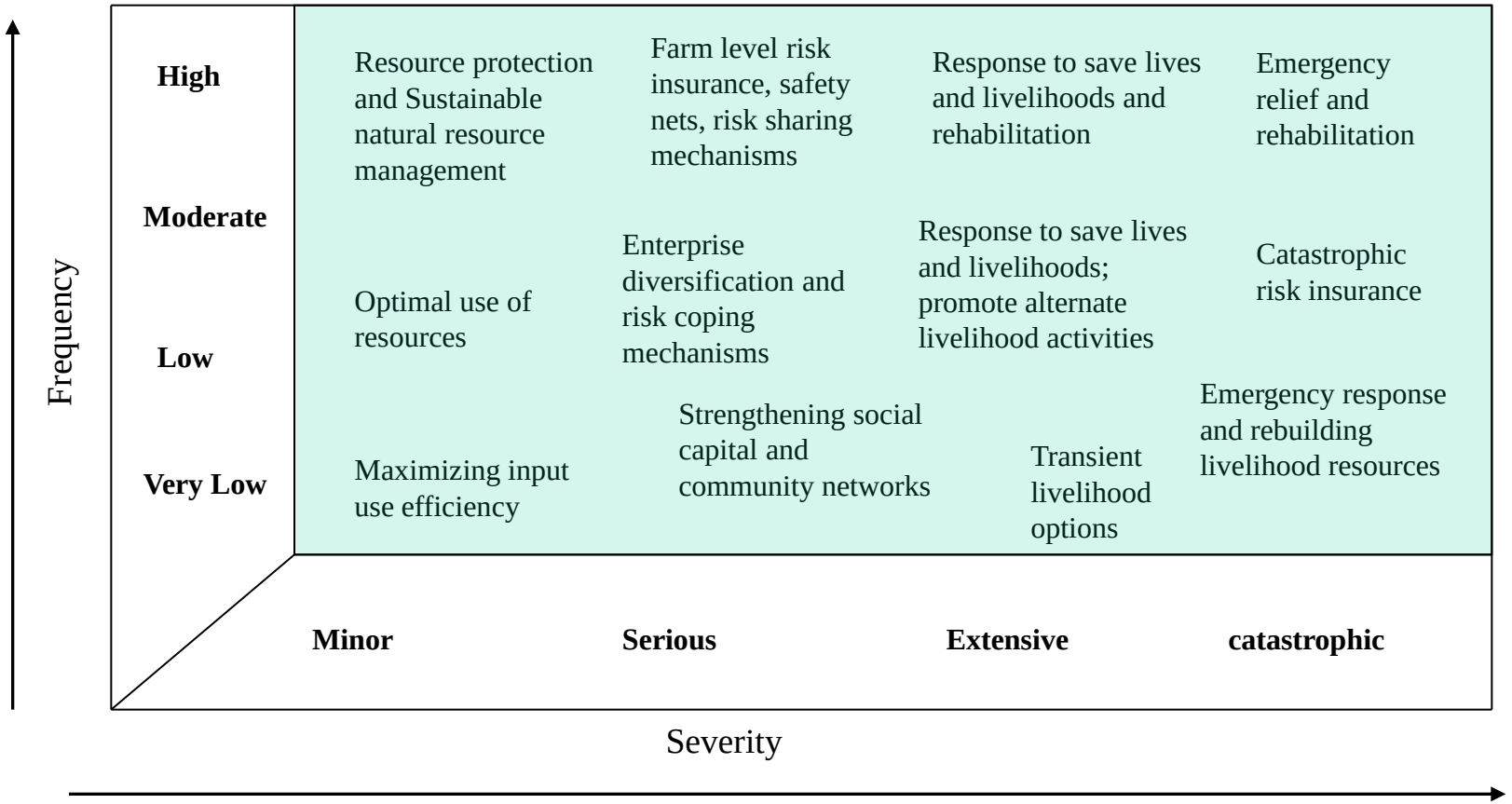
- In East Asia and the Pacific, yields in 2050 for crops will decline from 2000 levels by up to 20 percent for rice, 13 percent for soybean, 16 percent for wheat, and 4 percent for maize because of climate change
- "It is better to be roughly right than precisely wrong" – John Maynard Keynes (1883 – 1946)
- Emphasis on past impacts, current climate variability as an entry point to build resilience (climate risk management approach for adaptation)
- Risk Management approach applies at all time scales

Climate science, data and information to advance actionable climate knowledge

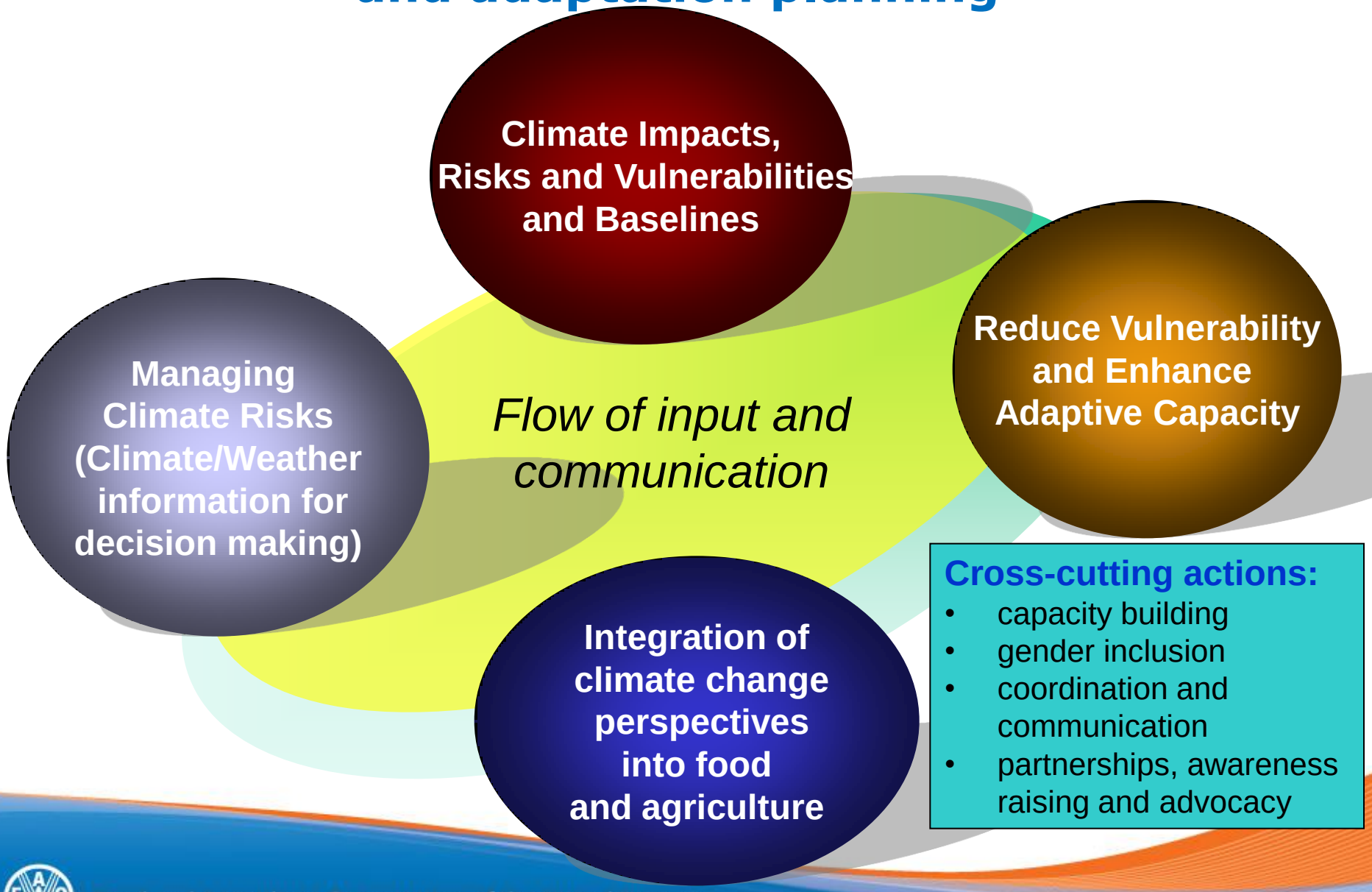


Adapted from: NOAA

Scenario Based Risk Typologies and optimal strategies in agriculture



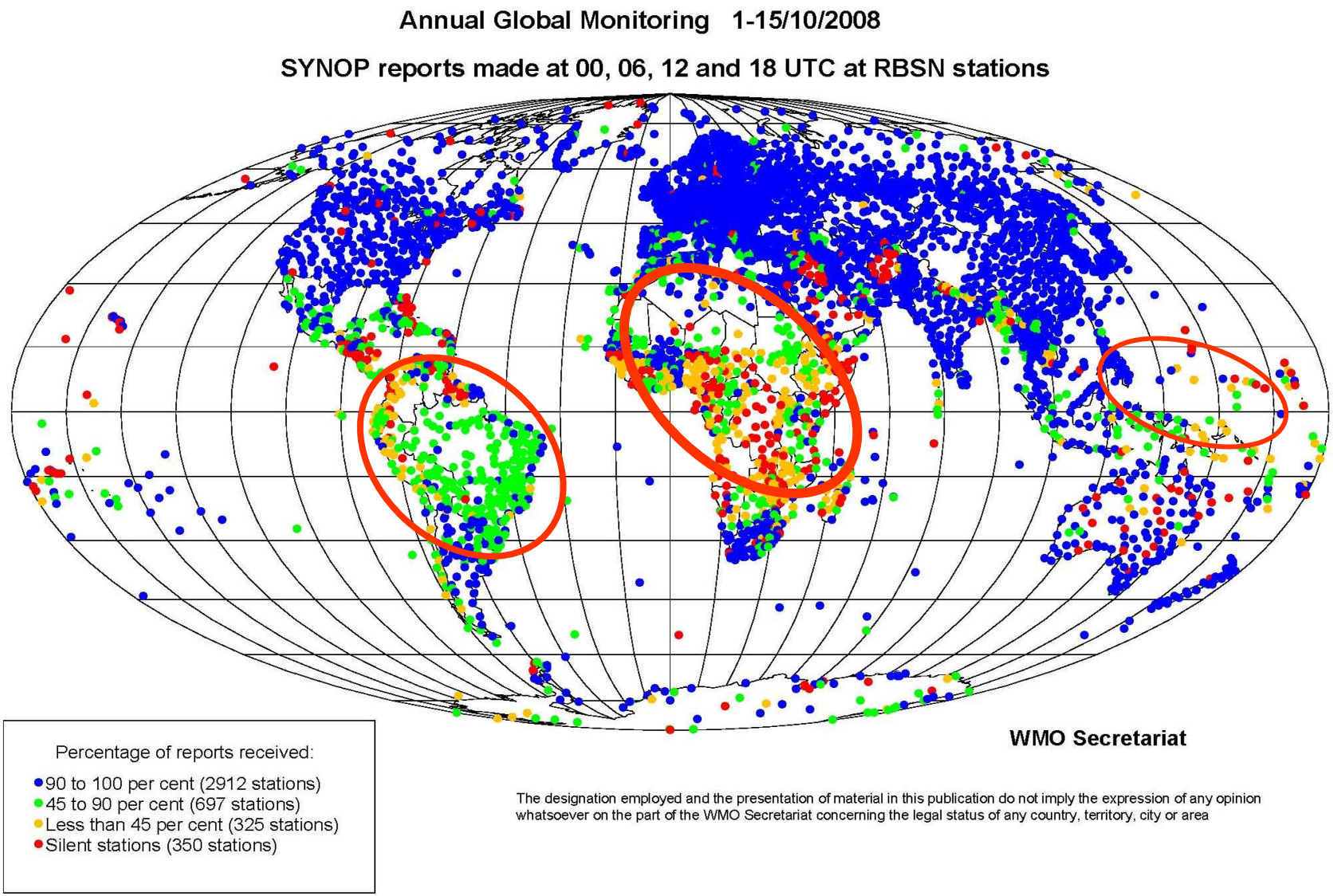
Role of climate knowledge for risk management and adaptation planning



Cross-cutting actions:

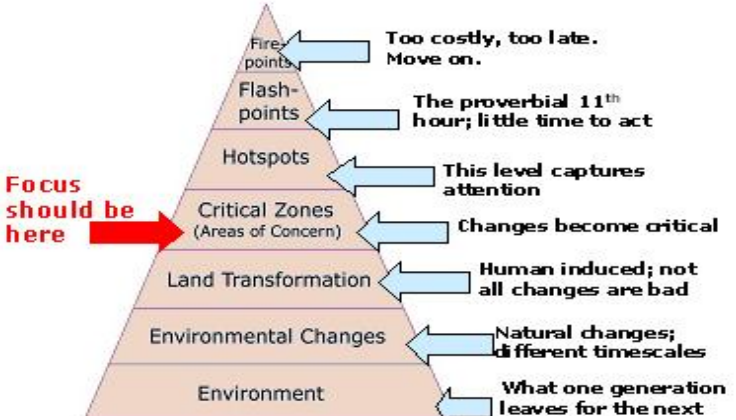
- capacity building
- gender inclusion
- coordination and communication
- partnerships, awareness raising and advocacy

Gaps in climate monitoring infrastructure and data collection networks, arrangements for data sharing…

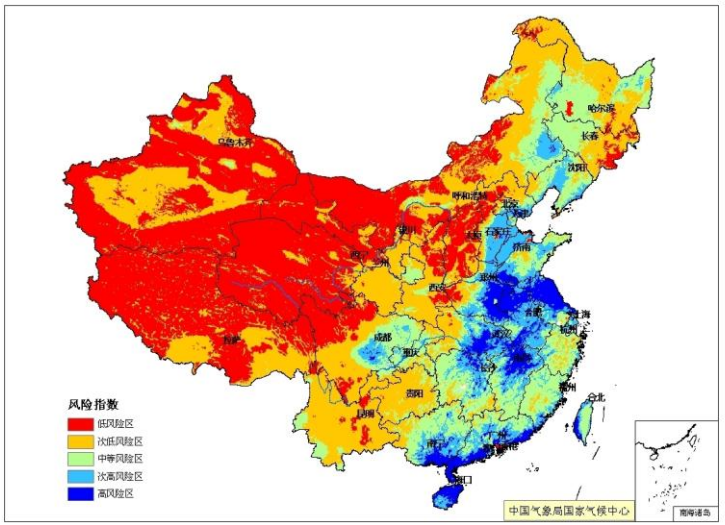


Policy relevant climate information

- Climate risk and impact *'hotspot' (critical zones) and Adaptation Areas of Concern (AOCs) – medium range forecasting (5 – 10 years) of impacts and vulnerabilities*



- Changing boundaries and crop suitability zoning (e.g winter wheat in high latitudes)



- Seasonal patterns of risks and impacts in agriculture and food security (e.g ENSO outlooks and associated impacts; crop yield forecasting)

Localized climate services for farmers

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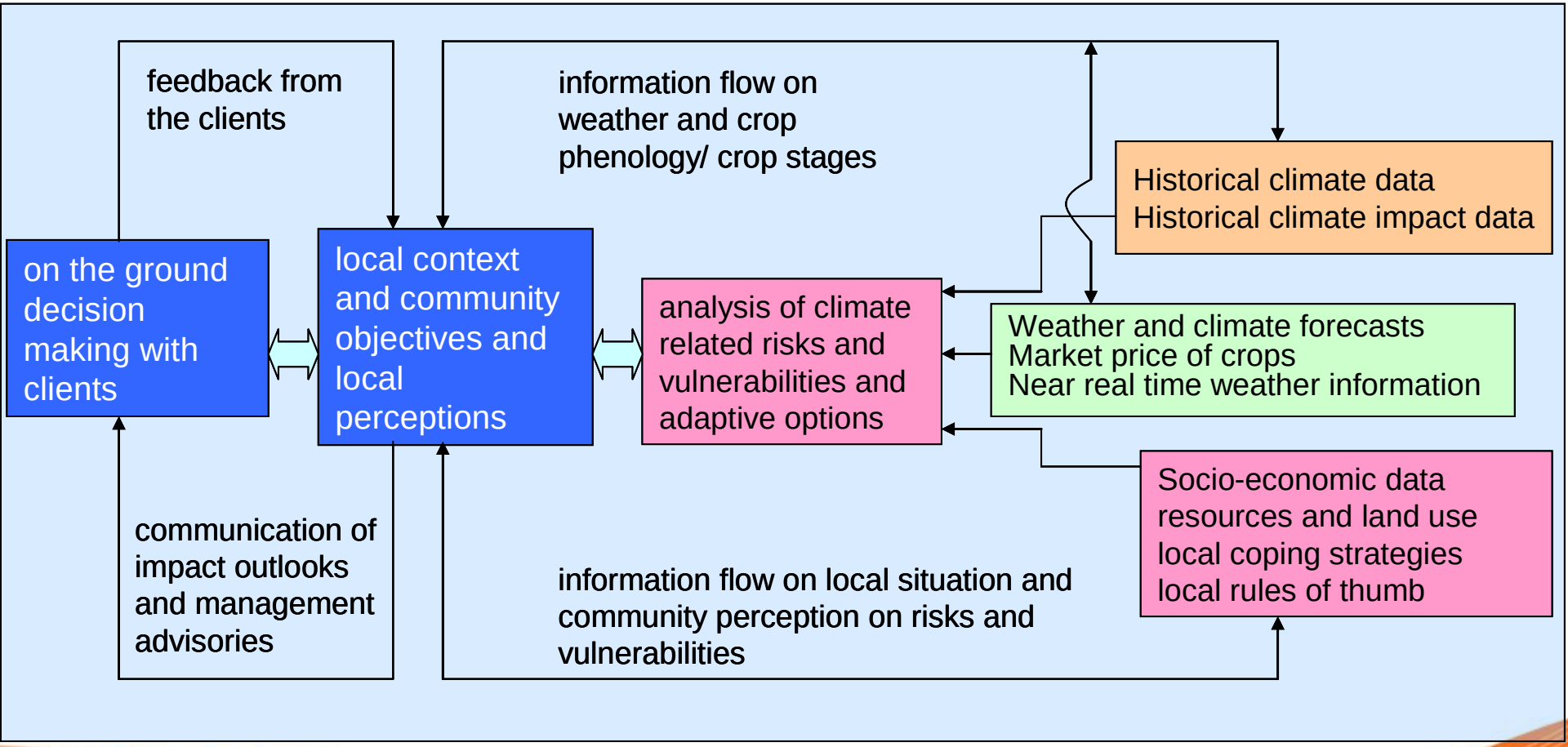


Managing Climate Risks by Incorporating Weather and Climate Information for Decision-Making

- Prioritize information needs of vulnerable groups
- Enhance use of existing forecast products
- Customize extended range forecasts – intra-seasonal and seasonal
- Train agriculture services to interpret and prepare localised *impact outlooks* and *management alternatives*
- Implement reliable communication strategies to reach the end users
  - Climate Field Schools
  - Farmer Participatory Climate Workshops
  - Climate Information Centres
  - Village Knowledge Centres
  - Discussion Support Software

Expanding the coverage of early warning and climate information

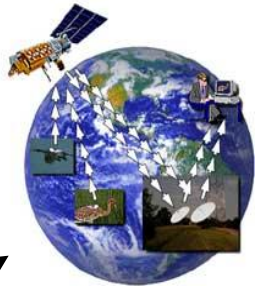
Weather website

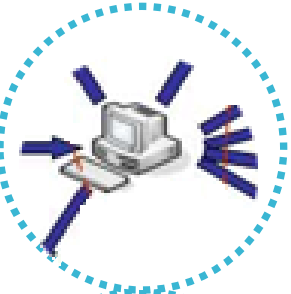
Electronic screen for meteorological early warning

TV weather forecasting

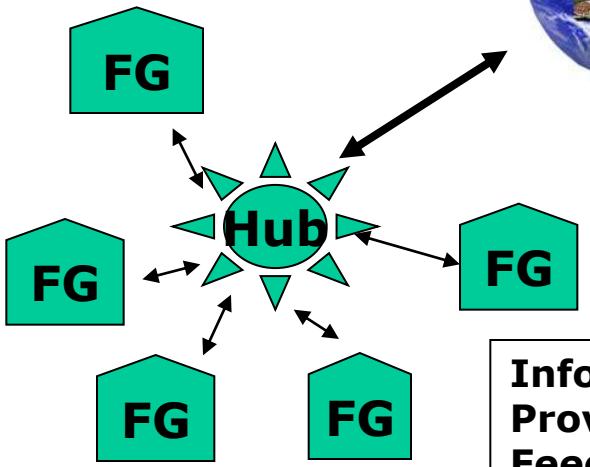
Telephone

Mobile phone





Early-warning dissemination platform

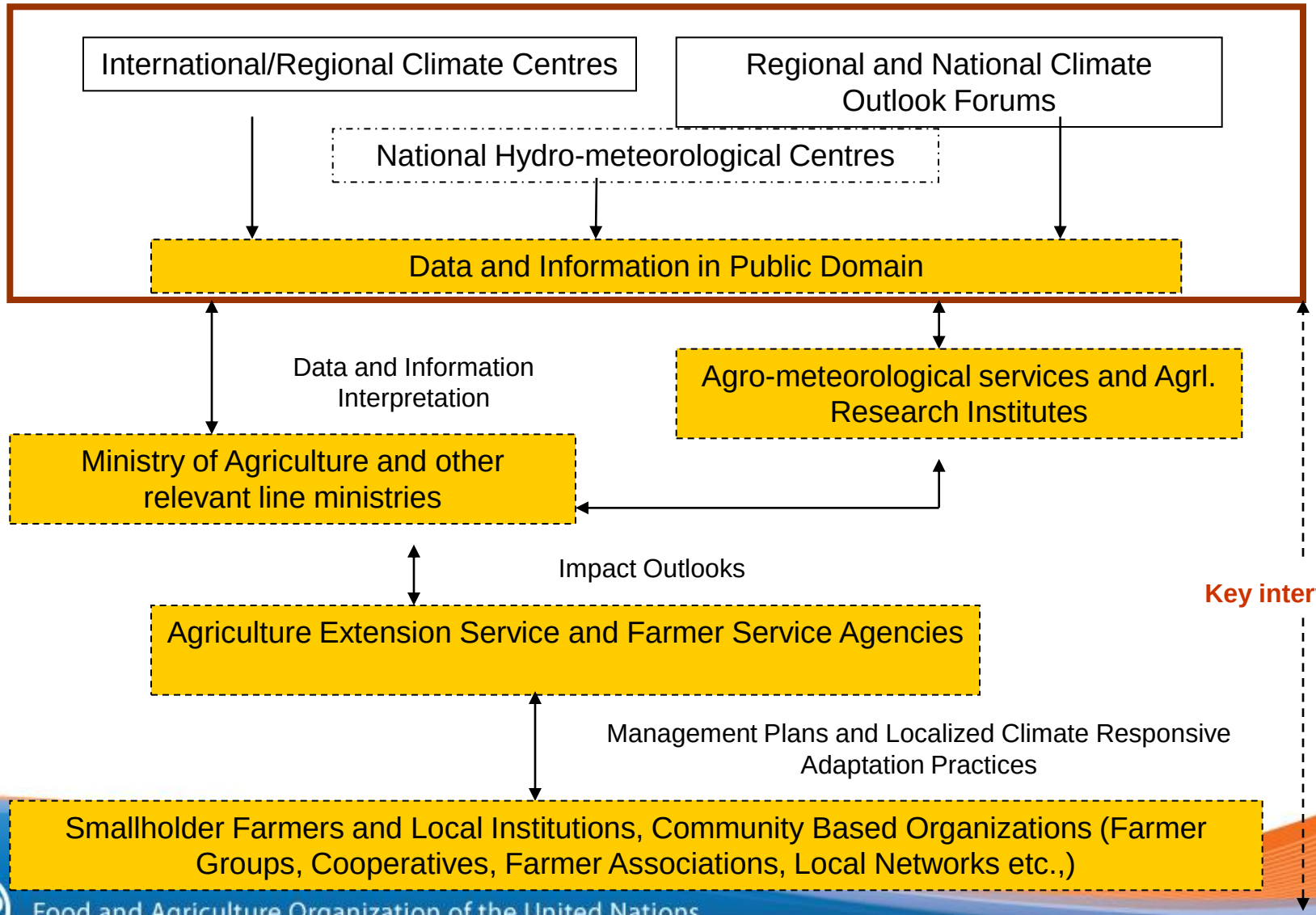


Information Provision and Feedback

Newspapers

Rural meteorological broadcast

Institutional partnerships, knowledge sharing and communication



Institutionalizing climate forecast application in agriculture: Indonesian Experience

Institutional proclivity and evolution

- The directorate of crop protection was created in 1972
- In mid-1980s there was a shift in mandate
- After El Nino 1997, the impacts of climate variability on crop production became a major concern
- The Ministry of Agriculture included CRM within pest analysis and disaster division under the directorate of food crops protection from 2001.
- In 2005 a separate division of Climate Analysis and Mitigation was formed

Risk Management Actions at local level

- At the district level IPM schools are converted into climate field schools
- Farmer cooperatives consider climate information as integral part of their decision
- BMG revisited the climate zones and provides customized forecasts to many districts

Subbiah and Selvaraju (2006) in Climate Prediction and Agriculture: Advances and Challenges – A WMO CLIMAG book

Climate Services for sustainable intensification in Northern Mountain regions of Viet Nam

- The northern mountain region often is affected by climate risks such as drought (winter – spring); whirlwind, flood and flash flood and inundation (summer – autumn)
- Agriculture services promote hybrid rice cultivation in the region
- Climate information plays a key role to support optimal allocation of land area for hybrids and varieties

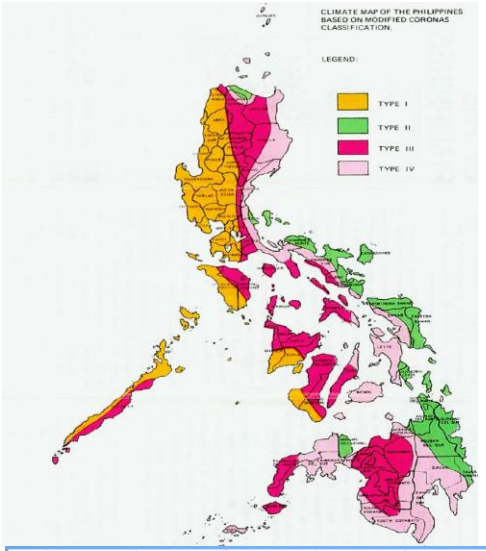
- **Efforts to enhance the use of climate information for stabilizing productivity of hybrid rice**
  - Delineation of areas suitable for hybrid rice cultivation based on climate related hazard and vulnerability
  - Training provincial and district DART officials to prepare impact outlooks and management alternatives
  - Climate information considered to advance community based disaster risk management

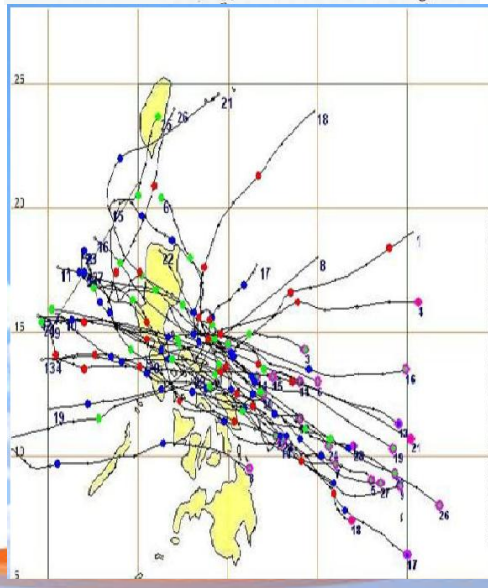
Improved climate and flood forecasting in Bicol region of the Philippines

- The region is prone to flash floods, typhoons, water stagnation, drought and landslides
- Characterized by type II climate
- Between 2000 – 2009, 28 tropical cyclones crossed the region and damaged billions of pesos worth of agriculture infrastructure

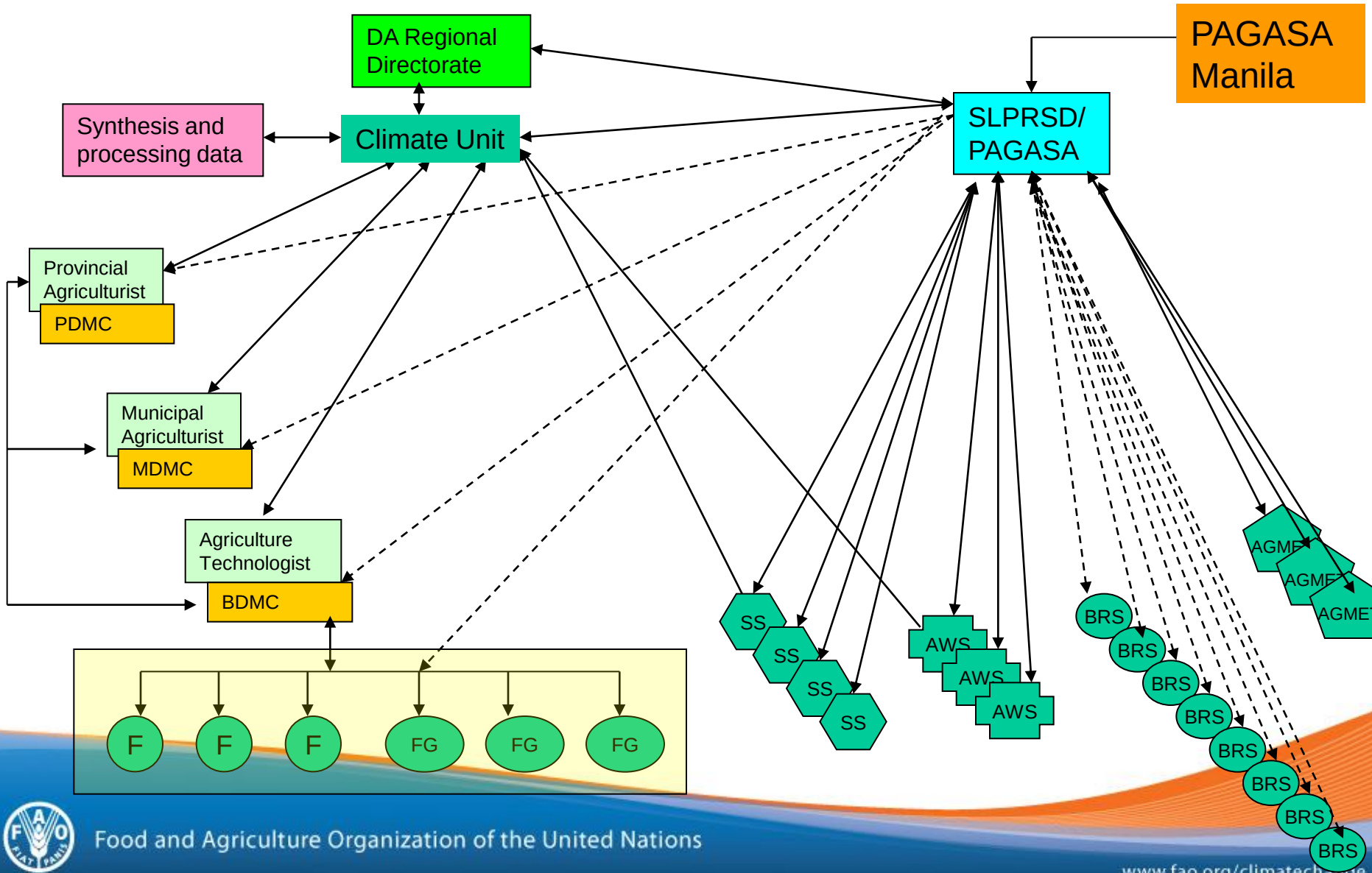
- **Use of climate information for risk management and adaptation**

  - Strengthening monitoring infrastructure at the Barangai level maintained by Barangay captains (9 automated raingagues)
  - Capacity of department of agriculture (DA), disaster managers, local community organizations to interpret climate information and prepare impact outlooks
  - Setting up of communication system for delivery of information on time (SMS message exchange between the PAGASA regional office and Baragay captains)





Institutional arrangements and channels of communication for early warning, weather and climate information products



Opportunities and challenges for enhancing climate services for agriculture in EAP

- An effective information flow system from information providers to users is feasible within the existing institutional systems
- However, an end-to-end institutional feedback mechanisms need to be established
- Such application require significant monitoring infrastructure, database and capacity building efforts at various levels
- Institutionalization of the climate information application system is a key challenge
- On the positive side, ENSO association with rainfall and agriculture has been explained significantly
- Significant developments in converting uncertainties to action at local level
- Demonstration pilot studies showed significant benefit
- Regional and inter-national institutions are active in the field and establishing partnership to learn lessons is prerequisite