Climate Risks: Assessment and Management in Agriculture

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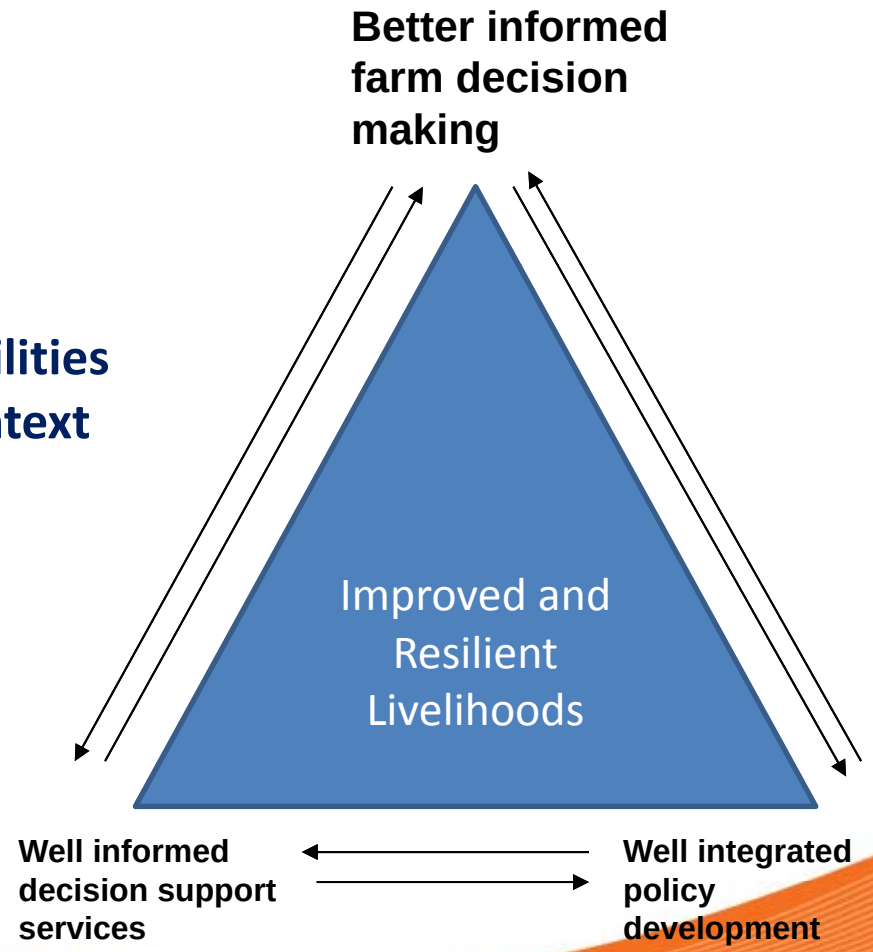
Outline

- Climate risk management – relevance in the context of resilience building and adaptation
- A risk Management framework
- Reducing risks and bridging yield gaps
- Improving decision support systems
- Data, tools and methods for application
- Strengthening institutional and local capacities
- Conclusions and recommendations

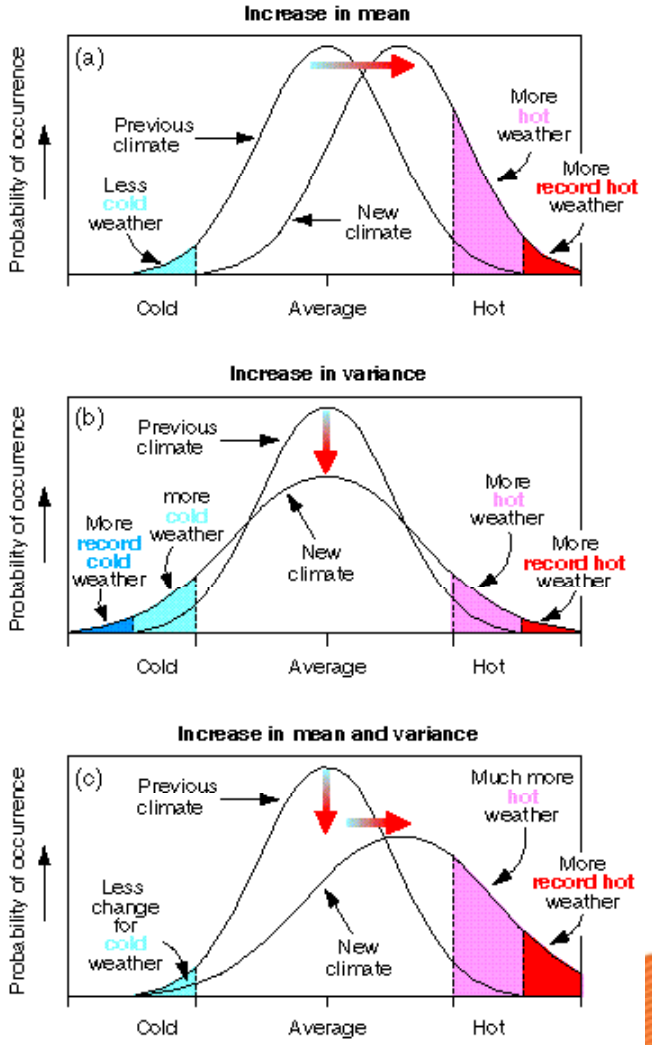
Transforming uncertainty into risks
towards building resilience

- **Uncertainty**
  - randomness with unknown probabilities
- **Risk**
  - randomness with known probabilities
  - Risks are largely location and context specific; product of hazard and vulnerability
- **Risk Management**
  - The systematic processes of identifying, analysing and responding to risks

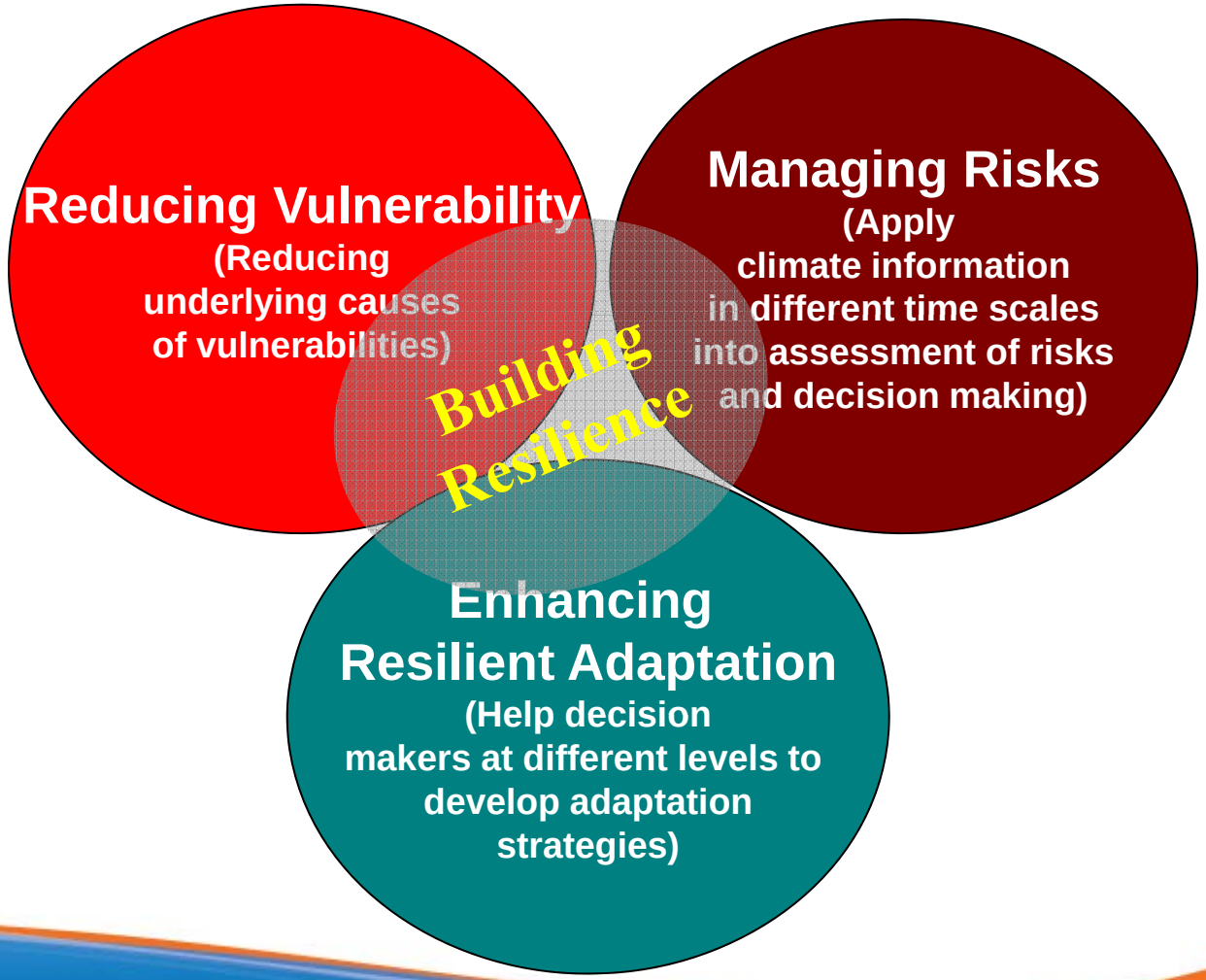


Adaptation to long-term changes starts with managing climate variability

- **Effective management of climate risks on shorter-time scales**
  - Contributes to manage baseline problems
  - Contributes to current development priorities and reduces vulnerability (win-win opportunity)
  - Matches with shorter planning horizons of the farmers
- Uncertainties associated with climate change projections and impacts

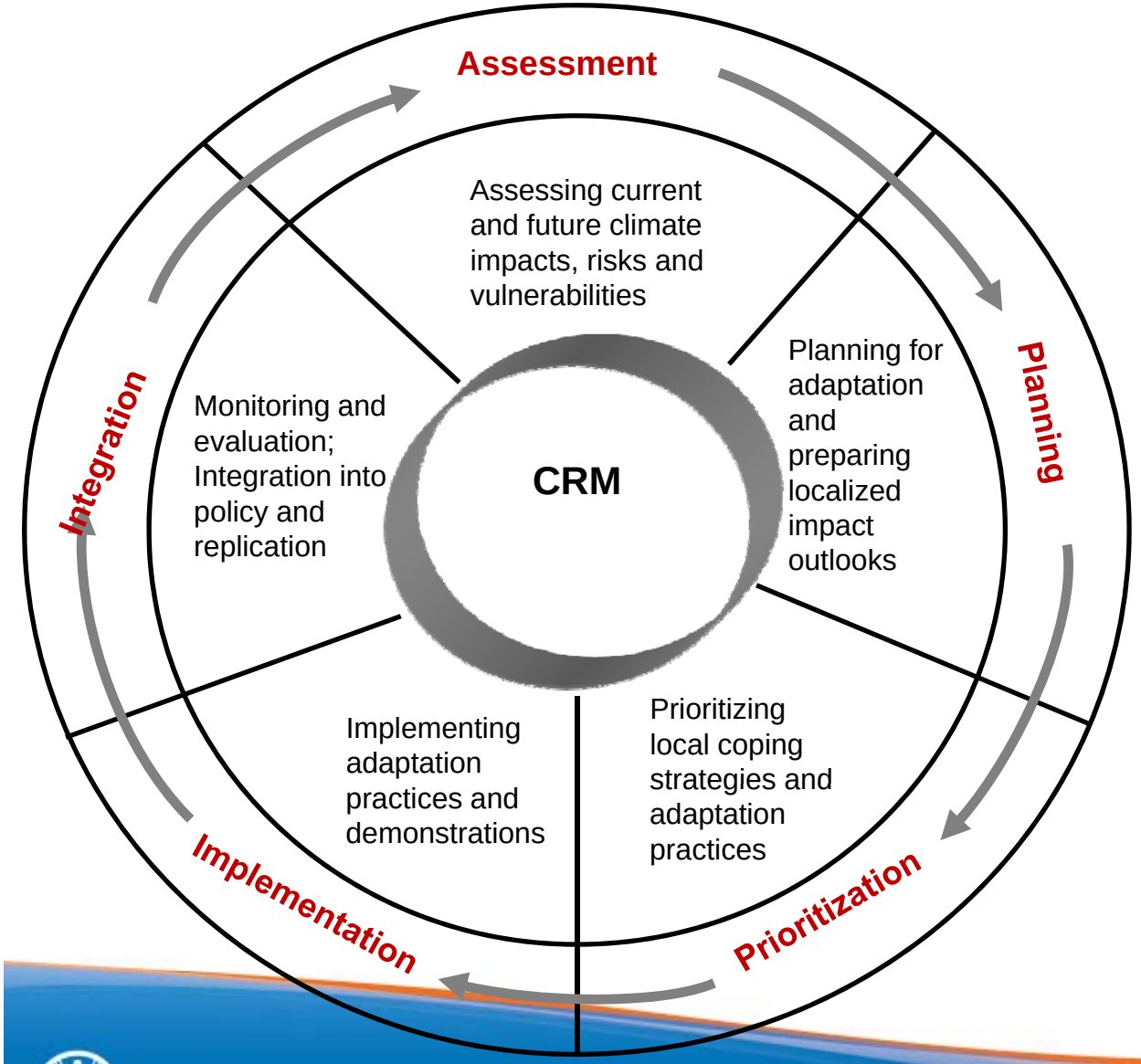


Comprehensive strategy for building resilience and adaptation



A risk Management framework

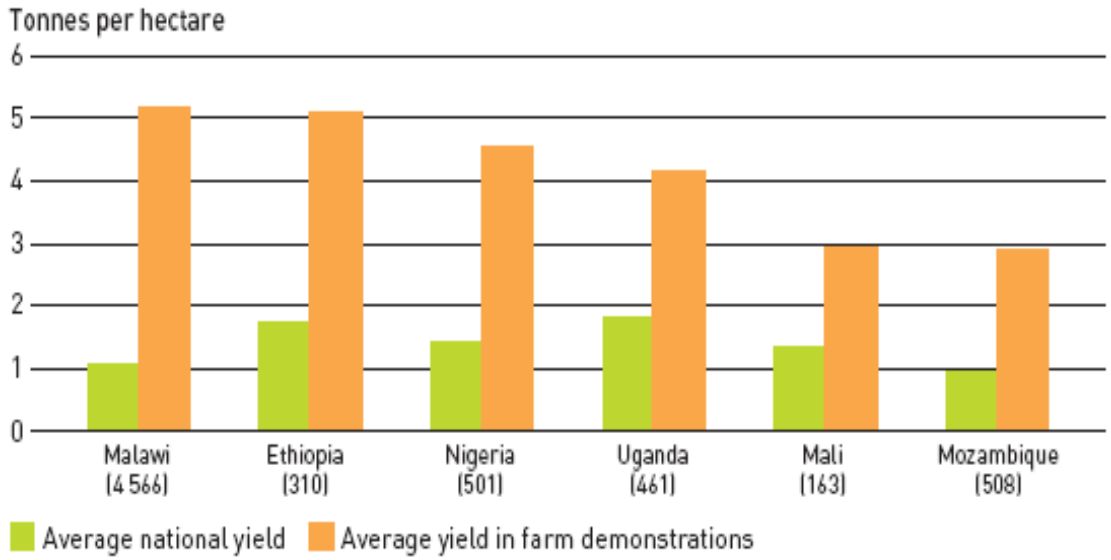
A Risk Management Framework



1. **Participatory and experiential learning**
2. **Cross-sectoral**
3. **Building on existing systems**
4. **Integrating short-term and long-term options**
5. **Cross-cutting priorities (gender, capacity building, coordination, communication and partnerships)**

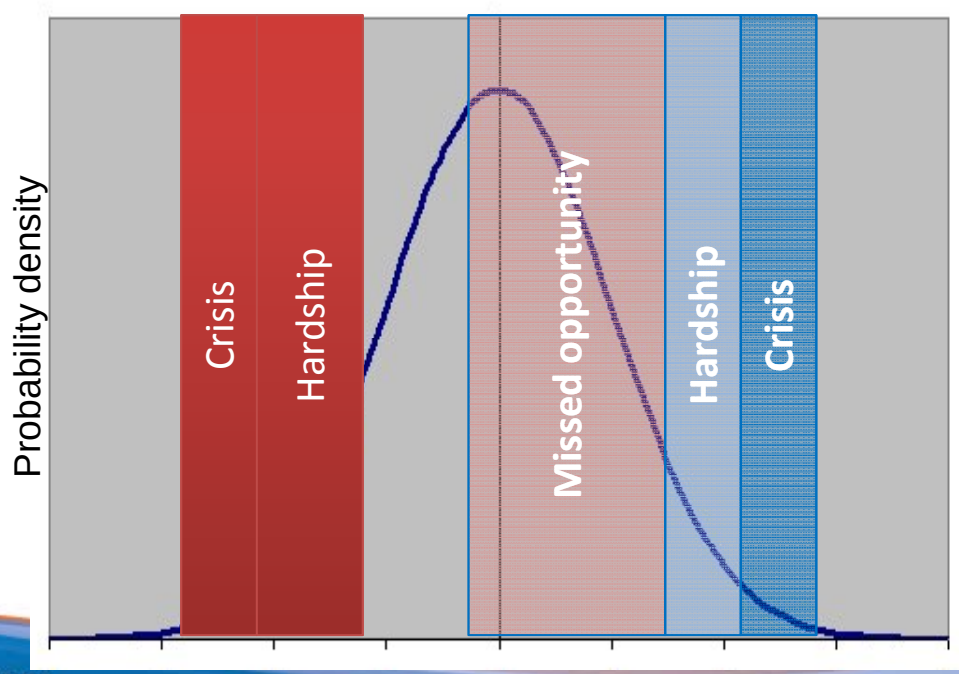
Reducing risks and bridging yield gaps

Managing Risks of Full Range of Variability



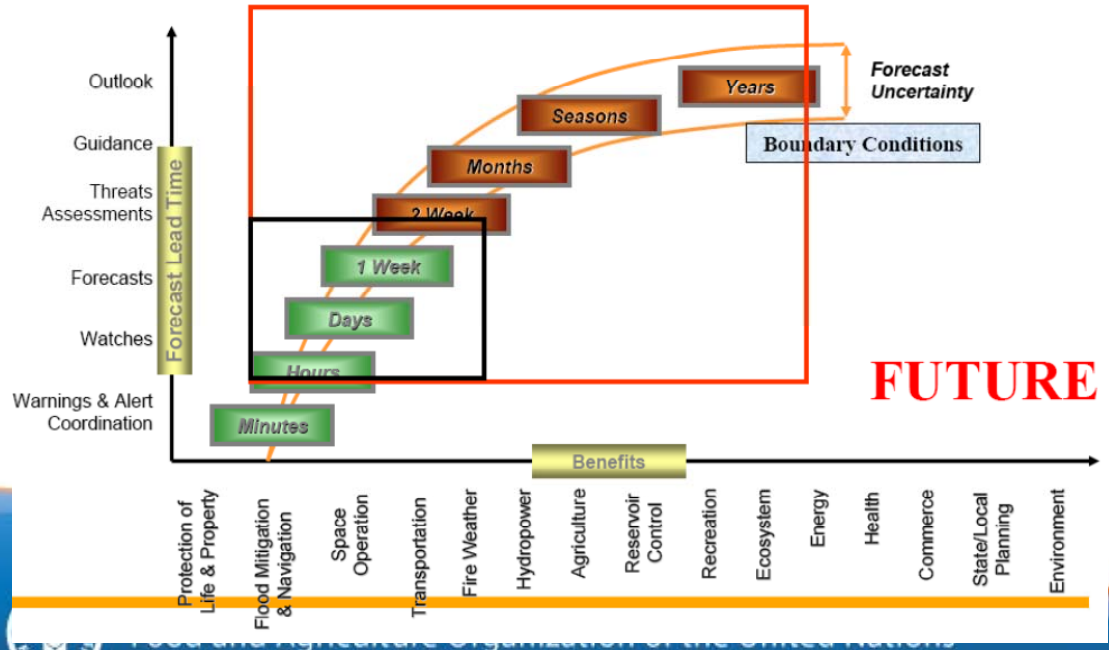
Source: World Development Report, 2008.
Notes: Number of plots in parentheses. Open pollinated improved varieties in all cases except Nigeria, which uses hybrids. Data for 2001 for Ethiopia, Mozambique, Nigeria, and Uganda; 2002 for Malawi; and an average of 2001, 2002, and 2004 for Mali.

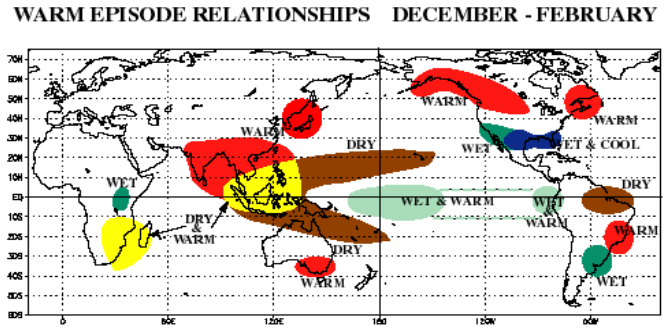
- **Risks of climate extremes on either side of the distribution**
  - Extremes of dry and wet and associated impacts
- **Missed opportunities due to risk averse conservative strategies of decision makers**
  - Low input during normal and good seasons

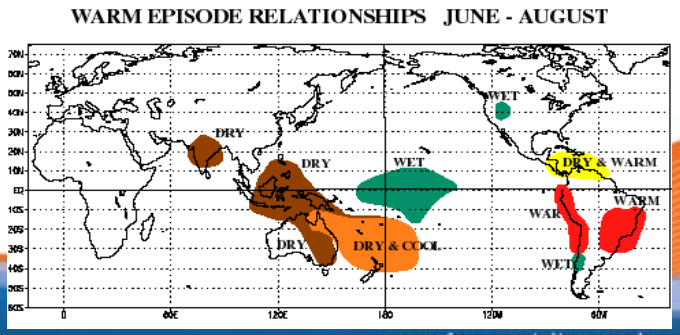


Contribution of climate services is crucial

- **Climate knowledge at all time scales:**
  - **Climate change to understand the trend and alter systems level decisions (cropping or grazing?)**
  - **Seasonal climate information to make strategic decisions (crop type, marketing, forward selling, livestock herding rate etc)**
  - **Intraseasonal forecasts to schedule tactical operations (E.g. Fertilizer, water, and other adjustable inputs.,)**
  - **Weather forecasts for the day to day operations**







Demand - Supply mismatch

- **Demand for climate information is diverse:**
  - localized, timely and easily understandable
  - diverse cropping systems and decision cycles
  - Suitable for user needs –Institutions, Ag. service providers, irrigation managers, input suppliers, market intermediaries, local cooperatives, micro-financing, farmers, fisherman, livestock herders

- **Supply is often constrained by insufficient data and resolution**
  - information is general, data and technical terms not easy to understand
  - Narrow, specific and precise information
  - scales of climate outlooks and local agriculture decision making

Reaching the most vulnerable

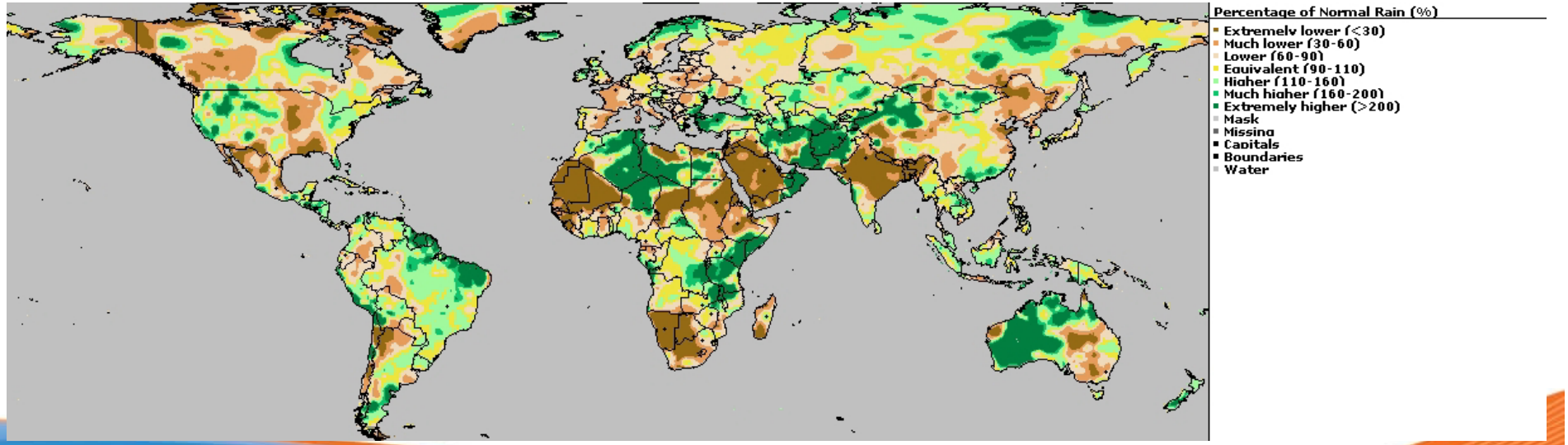
- **Pilot experiences (Ongoing and recently completed FAO projects)**
  - **Vietnam** – Northern Mountain Region
  - **Nepal** – Mid hills and Terai
  - **The Philippines** – Bicol region
  - **Jamaica** – Drought prone uplands
  - **Bolivia** – ENSO induced drought and floods
  - **Peru** – High altitude small holders
  - **South Africa** – Emerging farmers

- **Key interventions**
  - Strengthening/upgrading local observation networks
  - Capacity building
  - Interpretation and development of customized information products
  - Communication to end users

Improving decision support systems

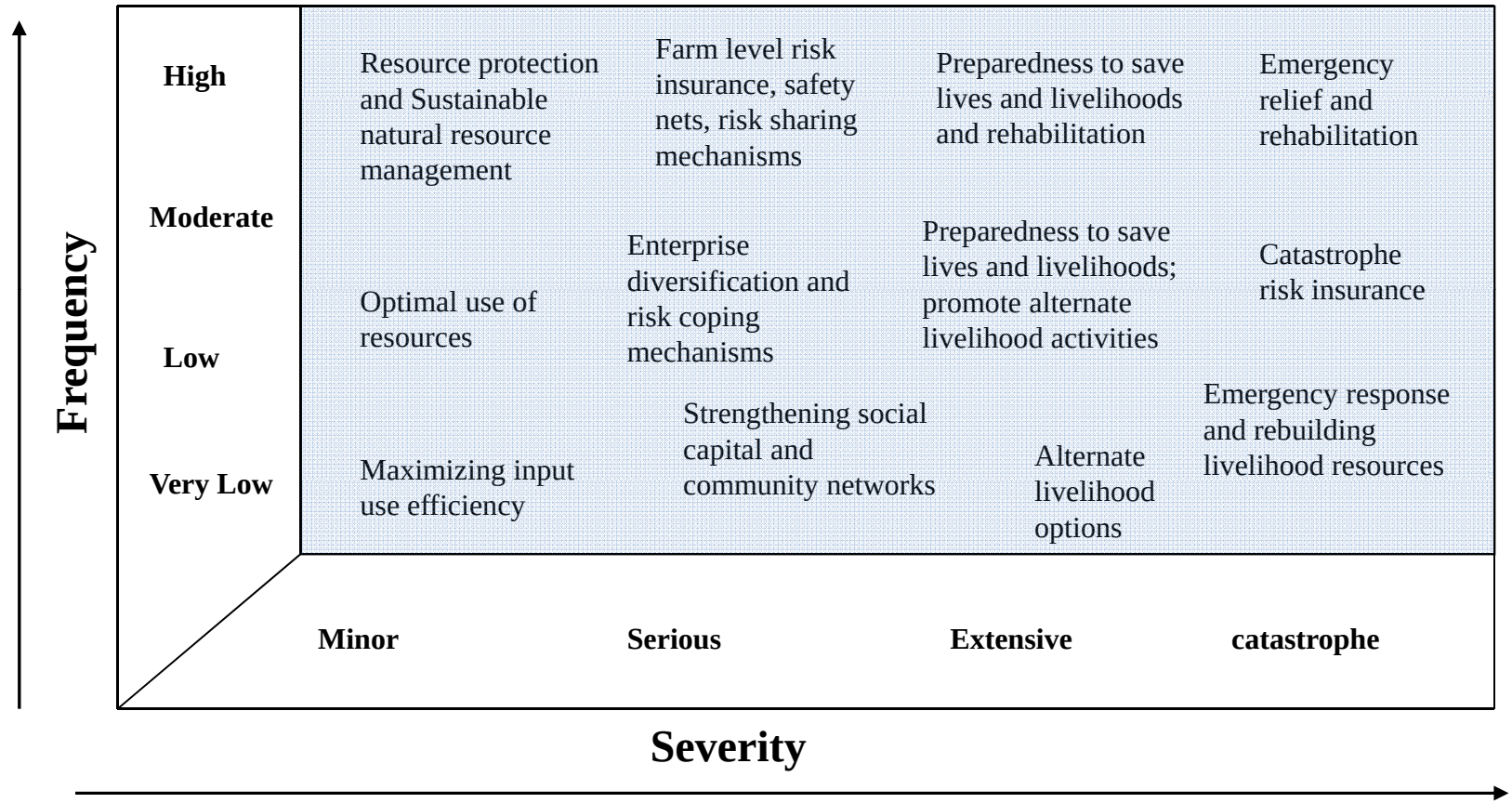
Precipitation Indices and Crop Yield Forecasting

- Agriculturally relevant precipitation indices (deviation from normal, water stress, agriculture season length (beginning and end) etc.,)
- Provides continuous information on value added variables relevant to decision making at the regional and national level
- Analysis of meteorological and climatic data allows providing near real-time information about the crop state, in quality and quantity, with the possibility of early warning



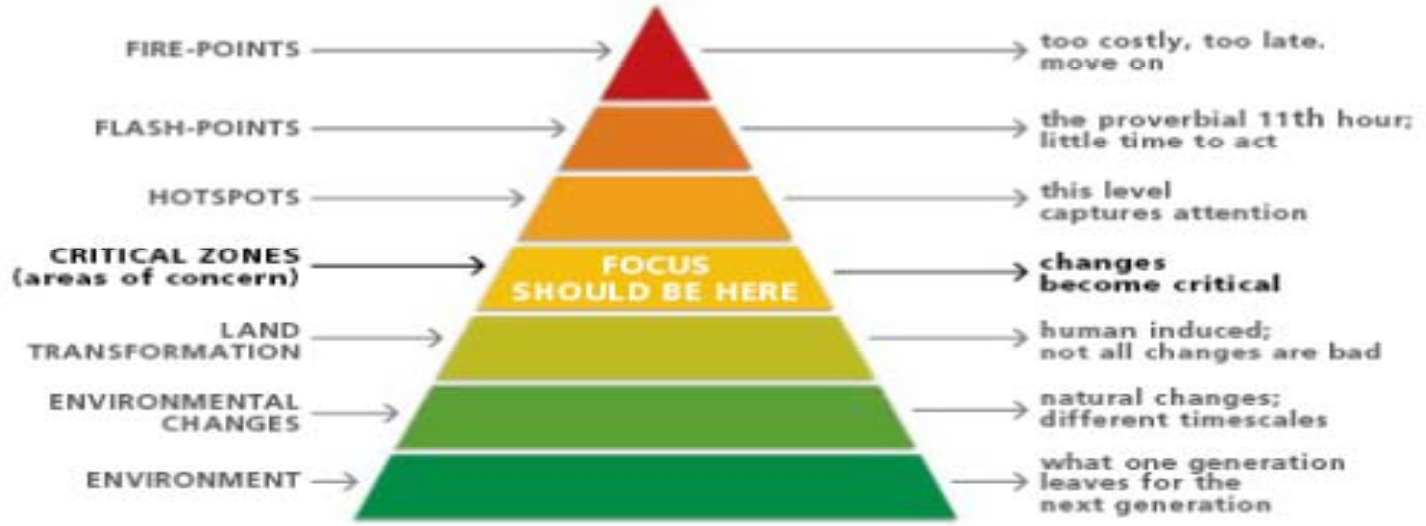
10-DAY TOTAL RAINFALL (mm) - 3rd dekad September 2011

Scenario Based Risk Typologies and Indicative Optimal Strategies in agriculture



Medium Term (5 –10 years) Warning Systems (MTWS)

- The MTWS is intended to fill the gap between seasonal – scale assessments and long-term impact projections
- Identify the future Areas of Concerns (AOCs) and likely hotspots of vulnerabilities and sensitivities



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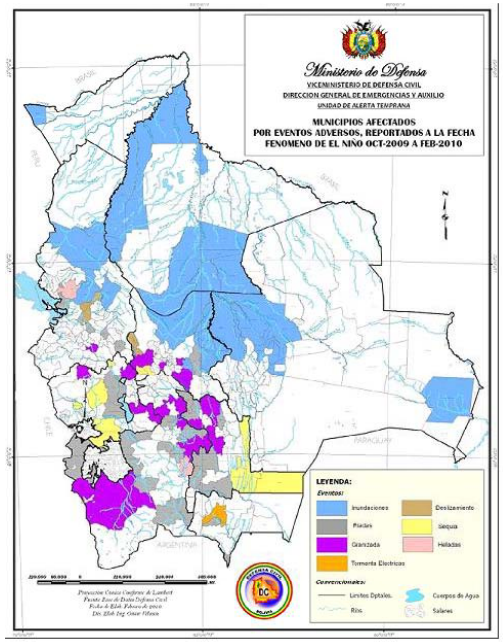
Humanitarian response: Climate services for reducing risks and protecting livelihoods

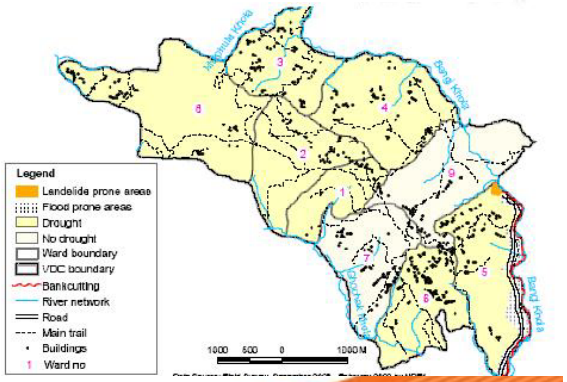
- **Emergencies are on the rise - especially sudden onset disasters and series of low and high rainfall extreme events**
- **Need based early warning systems have important implications**
  - mobilization of resources needed to prepare for, and respond to, emergencies in order to save lives and protect livelihood systems
  - planning for mitigation measures as part of short term responses to build resilience against future impacts

Data, Tools and Methods for Assessment

Livelihood analysis, vulnerability and risk mapping

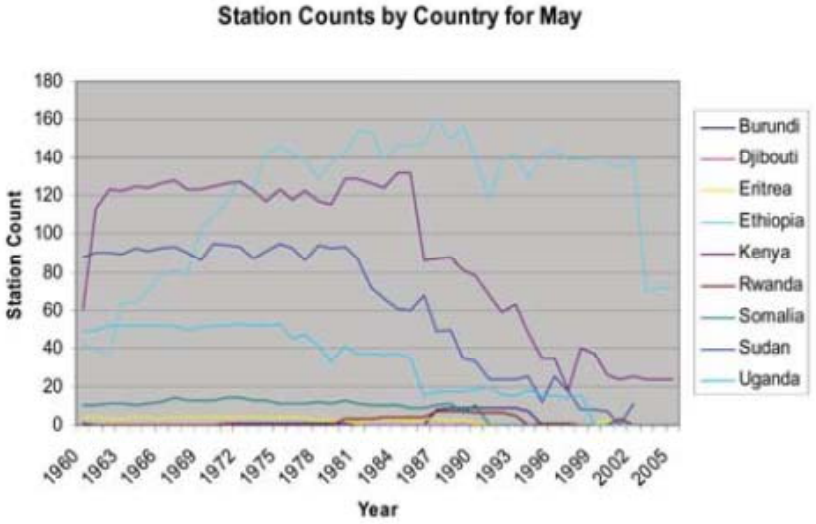
- Livelihood analysis interprets climate related hazards and builds on local strategies.
- Livelihood analysis proposes to develop risk and **vulnerability and risk maps**
- Provide advance information about the livelihood baseline and their vulnerability to weather and climate phenomenon.



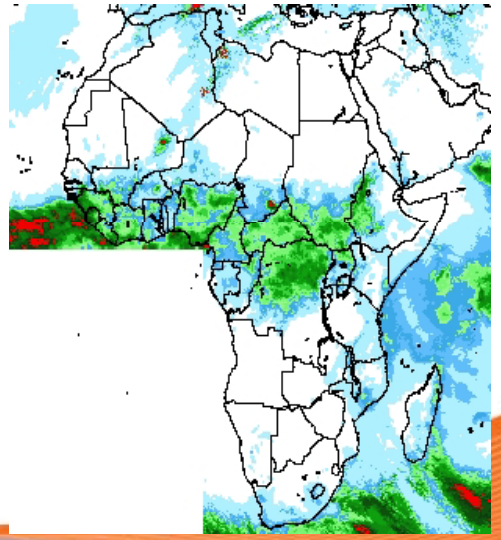


Climate Data

- Synoptic and agrometeorological stations in developing countries are thin and declining
- For example, there are just over 1150 World Weather Watch stations in Africa giving a density of 1/26 000 km^2
- Several existing station data remain paper based and are inaccessible to users



- Efforts need to be strengthened to fill the gaps and increase the resolution
  - spatial interpolation to fill the missing data
  - proxy measurements using satellites
  - Rainfall Estimation



Linking climate data analysis tools and livelihood approaches

- Climate information systems, data bases, hazard specific early warnings, impact assessment tools are well developed over the years
- Livelihood based bottom up approaches brings the social aspects and local perceptions about the climate impacts and local coping strategies
- The livelihood based integrated impact assessment provides a basis for prioritizing livelihood strategies and institutional support

Strengthening Institutions and Local Networks

Farmers social capital

- **Social cohesion (e.g. community networks, local institutions, norms and relationships) is critical for managing climate risks**
  - Providing credible information to farmers as a group can motivate for pro-active decision making
  - Local networks shape the farmers social interactions leading to better participatory decisions

- **Farmers knowledge sharing mechanisms relevant to local context is the key for effective communication of value added climate information**
  - Farmer field schools integrating climate and weather information
  - Farmer participatory climate workshops
  - Innovative Information and Communication Technology (e.g. mobile networks etc.)

Strengthening Institutional and Technical capacities

- **National Meteorological and Hydrological Services (NMHS)**
  - understanding the needs of agriculture support services and farmers
  - development of weather and climate information products

- **Agricultural Support services and Community Based Organizations**
  - development of contingency plans
  - improving impact data collection, monitoring and analysis, developing impact outlooks and management alternatives considering local needs
  - communication of information and receiving feedback

Conclusions

- ✓ **Climate is one of the several factors shaping the risk management strategies**
- ✓ **Managing full range of climate variability (managing risks and opportunities)**
- ✓ **Agriculture support services are well placed to contribute to risk management**
- ✓ **However, number of areas need urgent attention – data, tools, approaches**

Thank you