UNITED NATIONS ESCAP
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CAPSA
Centre for Alleviation of Poverty through Sustainable Agriculture

CAPSA-MARDI Regional Training Workshop on Transfer of Agricultural Technology with Specific Focus on "Application of ICT for Resilient Agriculture"
18-20 July 2017, Putrajaya, Malaysia

Technological innovation for enhancing agricultural resilience to natural disasters and climate change

This Presentation

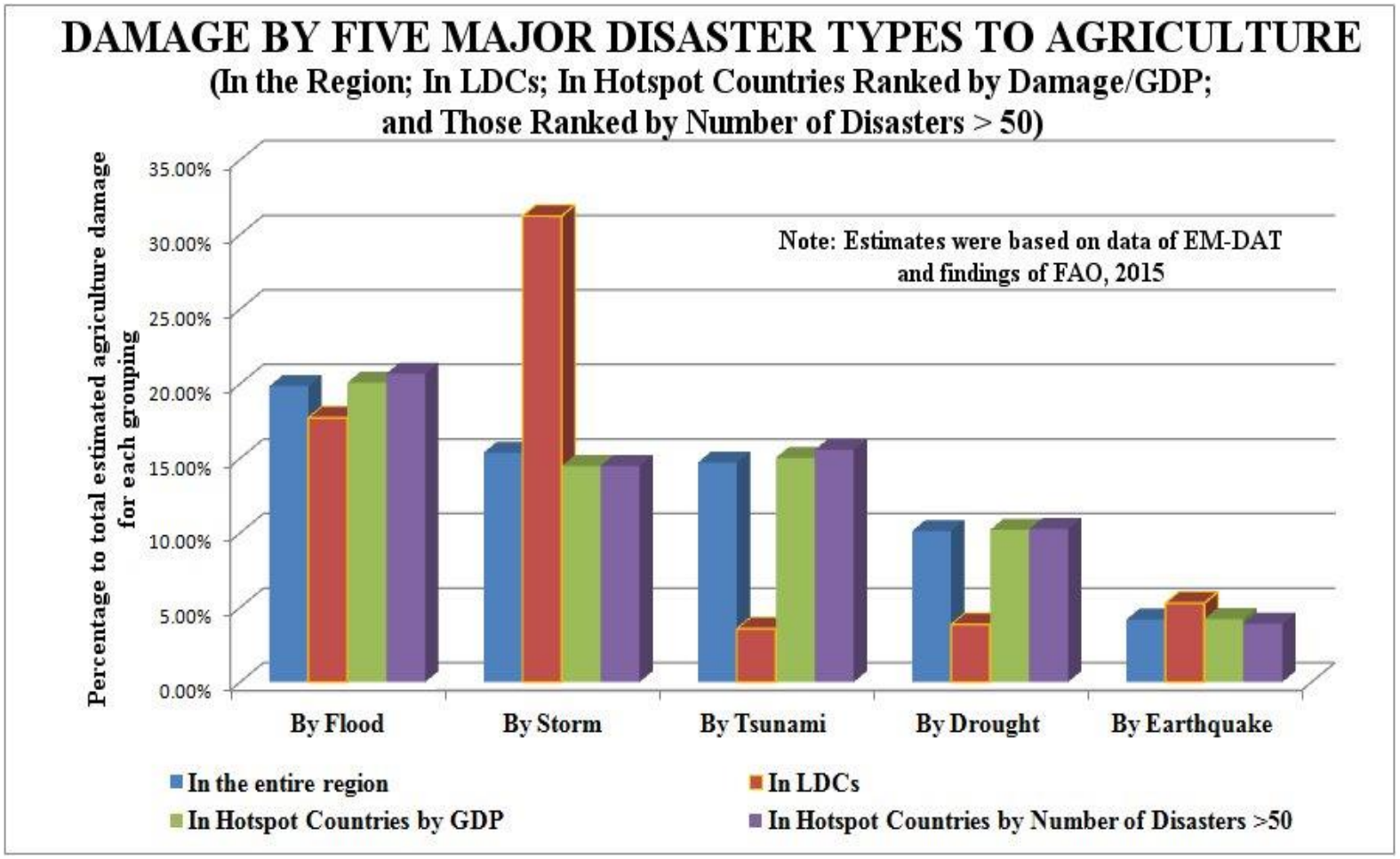
- Background
  - CAPSA GC11 (2015) recommended CAPSA to focus on Agricultural Innovation
  - CAPSA GC12 (2016) recommended CAPSA to focus on Resilience to Natural Disasters and Climate Change
  - Dialogue with Potential Donors (2016) suggested CAPSA to focus on Resilience to Natura Disasters
  - In-house and consultant study on technological innovation for enhancing agricultural resilience to natural disasters enhancing agricultural resilience to natural disasters (Dec 2016 – ongoing)
  - Objective to support Evidence-based Policymaking
  - Stocktaking, Issue mapping and Overview

Natural Disasters – Threat to Sustainable Development

- Threats of Natural Disasters
  - Asia and the Pacific is the most disaster-prone region in the world. It shared over 40 percent of global disasters, resulting in 60 percent of global deaths and 45 percent global damage between 2005 and 2014.
  - Suffering from a full range of natural disasters.
  - disaster risks are even increasing in face of climate change

  - The agriculture sector absorbs an average of 22 percent of the total damage and losses caused by disasters triggered by natural hazards
  - Mainly water-related, though country specific variation of damages – volcanos , Slow-onset disasters for the SIDs

Natural Disasters damages Agriculture



Challenges for Agriculture

- Challenges for Agricultures
  - Despite the threats, the sector faces the challenge to maintain agricultural production for
    - Macro-level
      - National / local food security (growing population)
      - Raw materials supply for manufacturing
      - Contribution to GDP
      - Foreign Exchange
      - Employment
    - Community level (Rural livelihood)
      - Source of income / employment
      - Maintaining social infrastructure (hard /soft)

Importance of Resilience

- Why resilience?
  - Difficult or even impossible to control disaster itself –enhancing resilience is then important.
  - Avoiding interruption of services
  - Responding after-the-event is ineffective

  - Need to enhance resilience to reduce vulnerability
    "The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to, and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions".
  - Resiliency exhibits two properties : Capacities to resist and recover
  - Resilience is recognized as an integral part of sustainable agriculture(Reference to target 2.4)

Role of Technological Innovation

- Common recognition
  - Technological Innovation plays an important role to maintain, even to increase the performance of Agriculture
  - The 2030 Agenda and the Sustainable Development Goals consider technology as once of the critical means of implementation for sustainable development.
- For making it effectively work
  - Knowing potentials, limitations and costs/benefits
  - Positioned in overall DRM policy / strategy
  - Combined with other measures of interventions (e.g. non-technological options like emergency financing and insurance, social resilience)

Framework for Agriculture's DRR

- The Resilience Programming Frameworks for Agriculture, in correspondent with Hyogo / Sendai Framework, may include:
  1) Developing institutional and enabling frameworks
  2) DRM Strategy-Setting and DRR Planning
  3) Information and Early Warning
  4) Prevention and Mitigation
  5) Response and recovery
- Technological Interventions may play particularly big role in 3) – 5)
- Technology options are compiled in various sources, by various categories under different programmes, including, in particular FAO, Climate Smart Agriculture, CGIAR, IRRI, etc.
- No single source with comprehensive coverage

Areas of technological innovation (1)

- Information and Early Warning
  - Monitoring / Observation
    - Satellite-based Remote Sensing
    - Drone
    - Big data, wireless sensors
    - Link to insurance scheme
  - Risk Assessment tools
    - Assessing localized impacts and risks
    - e.g. Resilience Index Measurement Analysis (RIMA) .
  - Risk Communication Tools
    - Websites
    - Mobile apps
    - National / international programmes (World Bank, CGIAR, FAO's e-Agriculture, etc.)

Areas for technological innovation (2)

- Prevention and mitigation
  - Varieties with enhanced resilience
    - Rice variety with submergence tolerance, Salt tolerance, Drought tolerance, Heat tolerant, Resistant to pest diseases, biofortified,
    - early maturity Short cycle varieties
    - Enhanced application of biotechnology / bioengineering),
  - Farming practices for enhanced resilience
    - Integrated farming system, crop diversification/rotation
    - Practices of SRI
    - Water efficient farming (alternate wet-dry, direct seeding) *mulching and thatching,* **Improved soil management**: : management of soil fertility and water retention capacity.
    - Improved irrigation
      - Improving Irrigation hardware (efficiency in rainwater harvesting, canals and pumps)
      - *Wate-efficienct Irrigation techniques micro-irrigation* **Drip irrigation,** *Sub-surface drip irrigation (SDI):*
      - Soft (Better match irrigation with plant needs linked with satellite / drone monitoring,
    - Integrated pest management, enhanced biological control of insects, Ecosystem-based resilience

Areas for technological innovation (3)

- Response and recovery
  - Technology needs
    - Rapid Assessment of Damages
    - Restoration of damaged land, soil, trees (fruits, nuts)
    - Managing weeds, pest animals and invasive ants
    - Decontamination (Salinity, chemicals, radioactivity)
  - Response options
    - Information limited
    - Focus on natural ability to recover

Emerging highlights

- Emerging highlights for technological Innovation
  - Increasing emphasis on response to Climate Change
    - CSA Programmes are spreading
    - Synergy between resilience/adaptation, mitigation and productivity
  - Use of ICT / Big data
    - Data collection for planning responses
    - Information sharing and Risk communication
  - Focus on Underutilized crop species / Indigenous technologies / Scaling up of the farmer led innovation
  - Resilience of post-harvest value chain
    - Recognition that DRR strategies should not only aim at reducing production risks, but also risks throughout the value chains.
    - Security of storage/transport from natural disasters (e.g. fl*ooding* and insects.
      - Disaster proof infrastructure (flooding / high temperature / moisture, etc.)
      - Improved packaging

Policy supports for Enabling Innovation

- Accelerating Innovation
  - Investment in R&D – technology incubation fund
  - Capacity Building / Expert *Education* - - National R&D Centres *University*
  - Support mechanisms
    - Seed – Gene banks, e.g. *crop germplasm collection*
    - *Access to information* - Knowledge Sharing *emerging/existing innovation (e.g. SEARCA information service on biotechnology)*
  - Tech assessment tools
    - *Framework for evaluation of new and emerging technologies is*
    - *systematic crop comparison programmes*
    - *Facilities for field testing*
  - Legislation for Patents, Intellectual Property, Financial Incentives
- Accelerating Dissemination
  - *Information services*
  - Research - Extension – Farmers Networks, Field schools, etc.
  - In-country and international transfer of technologies / knowledge

Stakeholders

- Policymakers - political will to be mobilized for addressing policy / finance / capacity barriers
- Role of Government
- *National Agricultural R&D Centres - Central roles*
- *Private Sectors*
- Academia / University
- Extension and Outreach workers
- Communities and Farmers group

- Different roles at different stages
- Capacity / Awareness to be enhanced (Individual actors)
- Link between Individual Actors (fragmented!)
- Communications in common language

Initiative by CAPSA – SATNET Asia 2012-2015

- **Innovation Network for Food Security and Poverty Reduction in South and Southeast Asia (**SATNET Asia) 2012 - 2015
  - Objective to increase and accelerate the rate of adoption of agricultural technologies that are sustainable, productivity-enhancing and suitable to the poorest and most vulnerable people of South and Southeast Asia, through, *inter alia,*
    - Developing Analytical Framework to assess sustainable, technologies
    - Collect and disseminate of technology information, through a dedicated web portal, series of technology fact sheets, thematic training band publications, farmer-to-farmer learning and policy dialogue events
  - Results included – a web portal connected over 1000 experts across the region, over l70 publications including technology fact sheets, policy briefs, training manuals and other reports, 55 training and dialogue events participated by over 1400 policymakers abd experts.

Way forward

- Lessons learned from STANET Asia
  - high demand for
    - trainings that introduce new technologies and improve the process to support technology innovation /transfer
    - knowledge exchange mechanisms and platforms for networking across stakeholders at regional, subregional and national (in-country) levels
- Future outlook in the area of Disaster Resilient Agriculture
  - Potential of Tech Innovation to be showcased to mobilize policy supports
  - Analytical Work - Continue to develop / expend issue / technology mapping with inputs from member states experts
  - Knowledge sharing and Networking - Revitalizing SATNET
    - Thematic focus group / community of practice
    - Publishing technology monographs / fact sheets
  - South-south dialogue and capacity building in coop with member states and partners

Thank you!

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