



# Climate Change Impacts on Agriculture Livelihoods and Adaptation in Asia

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# Outline

- Agriculture livelihoods in Asia and underlying key vulnerabilities
- Climate change impacts: Observed and projected
- Adaptation options
- Concluding remarks

# Agriculture an Important Livelihood

- “Livelihood is a means of making a living. It encompasses people’s capabilities, assets, income and activities required to secure the necessities of life. (IFAD). Livelihood activities are what we do to make a living every day!
- In Asia, 58% of total population is living in rural areas out of which 81.8% are dependent on agriculture for their livelihoods (FAOSTAT, 2011)
- Agriculture employs 24.7% of total population in Asia and contributes to 15.3% of total value added GDP (FAOSTAT, 2011; World Bank, 2011a).

# Climate Change and Livelihoods

- In general, people dependent on agriculture and natural resources are more vulnerable to climate change, but vary depending on location, socio-economic conditions and level of preparedness (Begam et.al, 2011).
- The negative impacts are pronounced after 2050 due to severe negative impacts on rice production with significant economic costs (Zhai and Zhuang, 2009).
- These negative impacts on agriculture productivity would have significant impact on the aggregated household welfare, food security and poverty in the region.

# Key Vulnerabilities: Agriculture and Rural Poverty

- Rural areas are largely excluded from economic growth story in Asia:
  - To begin with, high levels of rural poverty compared to the urban poverty, with relatively higher poverty incidence in the least developing countries in the region (FAOSTAT, 2011).
  - Burgeoning small holding and peasant farmers
  - Large areas under rain-fed agriculture, poor infrastructure development and poor access to markets
  - Land use changes including increasing deforestation and resultant decline in ecosystem services

# Key Vulnerabilities in Asia

- Unsustainable water use and dense population with high dependence on agriculture (Indo-Gangetic basin), inherently low precipitation (e.g. Karkheh basin, Iran), and high population combined with intensive agriculture (Yellow River) (Mulligan et al., 2011)
- In arid central Asia: deserts, relative underdevelopment due to focus on monoculture agricultural exports, and social, economic, institutional upheavals (Lioubimtseva and Henebry, 2009)
- Projected:
  - Farmers cultivating winter maize in India: relatively more vulnerable than wheat farmers due to high reduction yields with climate change in the already highly irrigated maize (Knox et al., 2011)
  - High vulnerability of fisheries based livelihoods in Bangladesh, Cambodia, Pakistan and Yemen: Predicted warming, coastal salinity intrusion, and limited capacity to adapt to potential impacts (Allison et al., 2009)

# Observed impacts of climatic vagaries on livelihoods

Observed change / Impact	Country/ Region	References
Poor are disproportionately impacted by climate related hazards	East and South Asia	Kim, 2011
Increased migration due to environmental (e.g. rapid onset disasters), social and economic reasons	Mekong region	Warner, 2010; Black et al., 2011
Farmers leaving farming due to repeated droughts	South Asia	Kulkarni and Rao, 2008
Loss of crops, income and fallows	Cambodia	Nguyen et al., 2009

# Projected Impacts on Agriculture Livelihoods

Projected Impacts	Country/Region	Projection Details	References
Negative impact on rice crop, increase in food price and cost of living, increased poverty	Asia	GTAP Model, projections for 2030, scenarios: Impacts resulting low, medium and high productivity	Hertel et al., 2010
Significant decline in crop yields of rice (25%) and wheat (40%) with resultant impacts on livelihoods	Asia	Climate impact projections for 2050	Knox et al., 2011
Loss of livelihoods to indigenous people from declining alpine biodiversity	Tibet/Himalayas	Qualitative observations	Salick et al., 2009; Xu et al., 2009

# Adaptation Options

- Overarching observations:
  - Greater need for technologies and policy options providing sustained income generation potential and mitigation potential in a changed climate (Bhandari et al., 2007; Rosenzweig and Tubiello, 2007; Paul et al., 2009).
  - Hidden and unexpected livelihood opportunities can be maximized by simple interventions (Xu et al., 2009)

# Adaptation Options: Asia

Aspect/ Issues	Country/ Region	Recommended/ Potential Adaptation strategies	Benefits/ Co-Benefits	References
General (droughts, floods etc)	General	Weather index insurance, cattle insurance, seed banks, credit facilities, assisted migration, cash for work	Poverty cantered adaptation, creation of assets and access to resources	Barrett et al., 2007; Tanner and Mitchel, 2008; Jarvis et al., 2011
General	Asia	Community based adaptation	Capture information at the grassroots, help integrating disaster risk reduction, development, and climate change adaptation, connect local communities and outsiders, and addresses the location specific nature of adaptation.	Aalst et al., 2008; Heltberg et al., 2010; Rosegrant, 2011
General	Asia	Improved forest management	Resilient livelihoods, buffer from shocks	Chhatre and Agrawal, 2009
General	Asia	Securing rights to resources, community forest tenure rights	Resilient livelihood benefits to the poor indigenous and traditional people	Macchi et al., 2008; Angelsen et al., 2009
General	General	Assisted migration	Build financial, social and human capital	Barnett and Webber, 2010

# Adaptation Options: Specific Countries

Aspect/ Issues?	Country/ Region	Recommended/ Potential Adaptation strategies	Benefits/ Co-Benefits	References
Delay and shortfall in rainfall	Indonesia	Access to credit and public works projects	Able to protect food expenditure in the face of weather shocks	Skoufias et al., 2011b
Droughts and floods	Philippines	Bundling of improved varieties and agronomic practices and combination of production and market support	Economic benefits and social learning	Acosta- Michlik and Espaldon, 2008
Biodiversit y loss	Tibet	Greater involvement of traditional and indigenous people in climate change adaptation decision making	Indigenous knowledge from the years of living in close harmony with nature	Byg and Salick, 2009; Salick et al., 2009
General	Vietnam	Yield growth and improving agriculture labour productivity	Rural poverty reduction and livelihood diversification	Janvry and Sadoulet, 2010

# Conclusion

- Livelihoods have to be made
  - Sustainable: Contributes to the wellbeing without impacting the environment and future generations (IFAD)
  - Resilient: Enables people to maintain stability during sudden shocks (e.g. natural disasters) (Leach, 2008)
  - Robust: Enables people to change strategy before it is too late, especially in stresses lasting long-term as in the case of slow onset events (Pain and Levine, 2012)
- For this to happen, there is a need for creating a bundle of capitals (natural, social, physical, human and financial capital) and certainly bring people out of poverty.

# Conclusion

- Greater investment is needed for agriculture growth in Asia: GDP growth from agriculture will have four times impact on poverty reduction than GDP from non-agriculture sectors.
- Securing rights to resources is essential for greater livelihood benefits to the poor indigenous and traditional people.
- Low-risk liquidity options such as microfinance programs and risk transfer products can help lift rural poor from the poverty by providing buffer from shocks.
- We should not ignore the importance of managed migration that would be critical for areas with limited livelihood options and areas that have reached limits to adapt.

**Thank You!**  
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