Africa-Asia Conclave on Loss and Damage Due to Climate Change

Instituting a global agricultural insurance programme as a risk-sharing and transfer mechanism for developing countries

August 25-26, 2016 • Nairobi, Kenya

# Impacts of climate change on agriculture and role of agriculture insurance in building resilience in Asia

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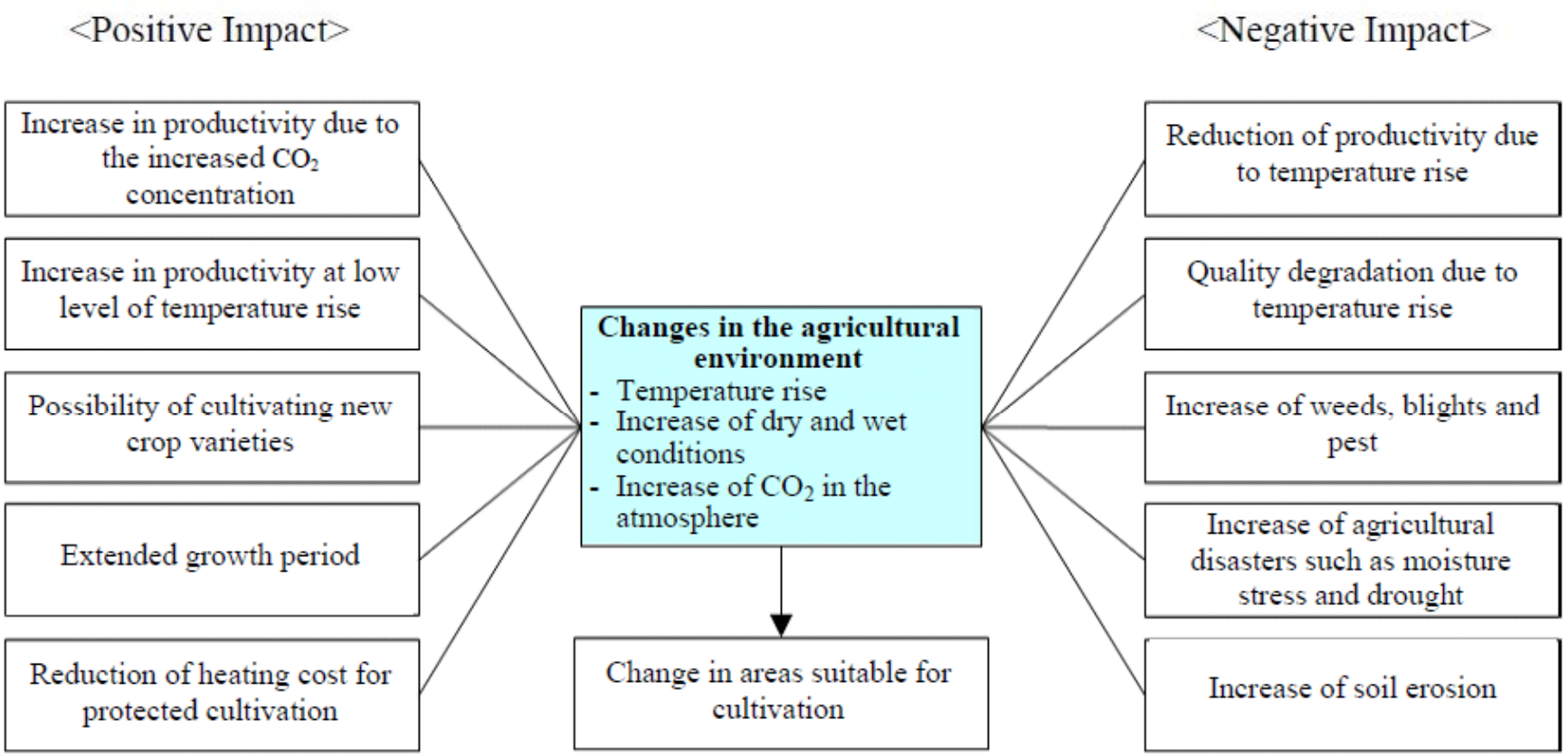
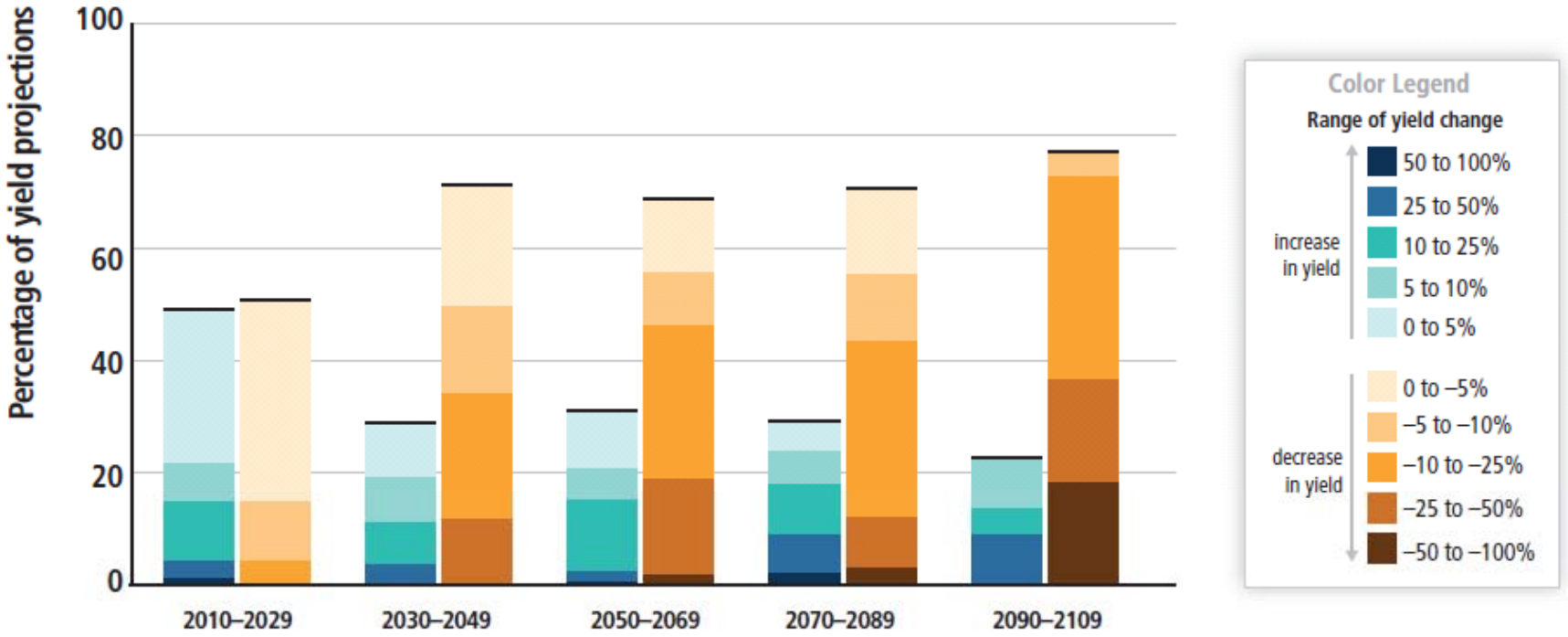
# Potential impact of climate change on agriculture sector



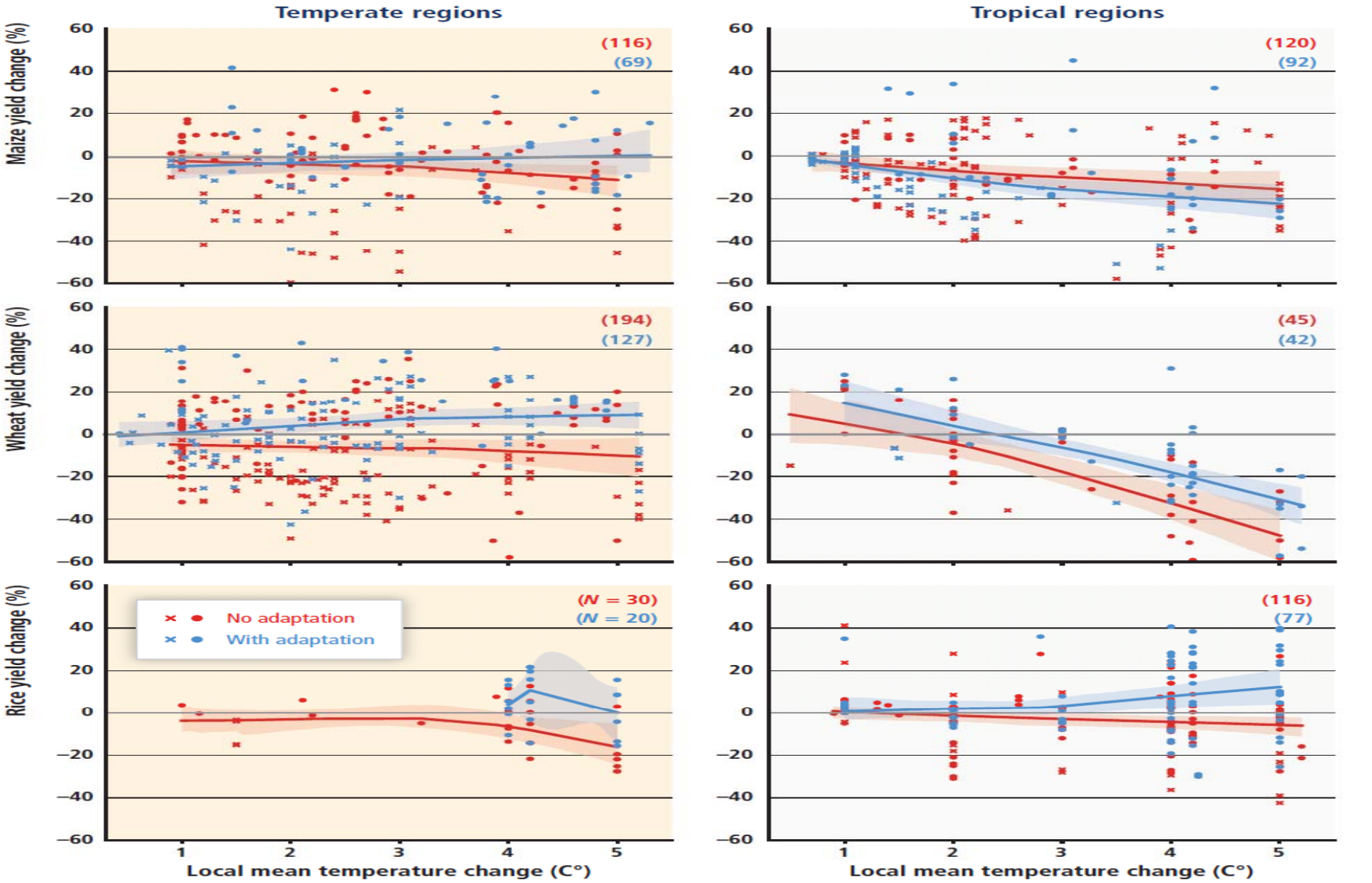

Source: Kim, Chang-Gil and et al. (2009), p.38.

# Projected changes in crop yields due to climate change over the 21st century



# Specific impacts

- The effects of climate change on crop and terrestrial food production are evident in several regions of the world - Negative impacts of climate trends have been more common than positive ones.
- Climate trends are affecting the abundance and distribution of harvested aquatic species, both freshwater and marine, and aquaculture production systems in different parts of the world.
- A large negative sensitivity of crop yields to extreme daytime temperatures around $30^0$C have been identified for several crops and regions.
- Evidence confirms the stimulatory effects of $CO_2$ in most cases and the damaging effects of elevated tropospheric ozone on crop yields.
- All aspects of food security are potentially affected by climate change, including food access (affordability and allocation), utilization (pests, animal diseases, human diseases), and price stability.
- For the major crops (wheat, rice, and maize) in tropical and temperate regions, climate change will negatively impact production for local temperature increases of $2^0$C or more above late-20th-century levels, although individual locations may benefit.


Temperate regions
Tropical regions
Maize yield change (%)
Wheat yield change (%)
Rice yield change (%)
(116)
(69)
(120)
(92)
(194)
(127)
(45)
(42)
(N = 30)
(N = 20)
(116)
(77)
No adaptation
With adaptation
60
40
20
0
−20
−40
−60
1
2
3
4
5
Local mean temperature change (C°)

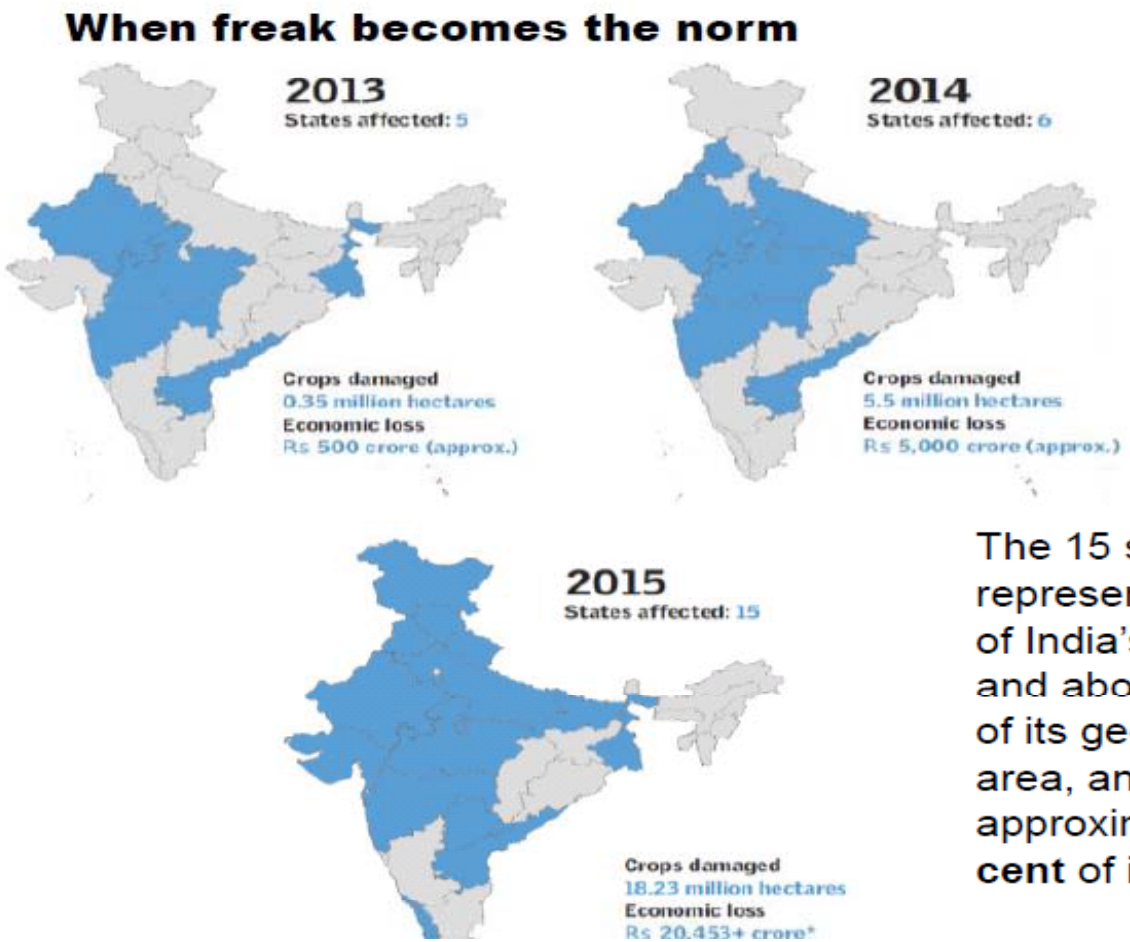
# Projected impacts for crops – World, South Asia and India

| Region | Sub-region | Yield impacts (%) | Scenario | Reference |
|---|---|---|---|---|
| World | | • (I) Maize: –4, –7<br>• (R) Maize: –2, –12<br>• (I) Rice: –9.5, –12<br>• (R) Rice: –1, +0.07<br>• (I) Wheat: –10, –13<br>• (R) Wheat: –4, –10 | A1B<br>CSIRO, MIROC<br>2050 | Nelson et al. (2010) |
| South Asia | South Asia | • Maize: –16<br>• Sorghum: –11 | 2050 | Knox et al. (2012) |
| | South Asia | Net cereal production –4 to –10 | +3°C | Lal (2011) |
| | India | Winter sorghum: up to –7, –11, –32 | A2<br>2020, 2050, 2080 | Srivastava et al. (2010) |
| | | • (I) Rice: –4, –7, –10<br>• (R) Rice: –6, –2.5, –2.5 | A1B; A2; B1; B2<br>2020, 2050, 2080<br>+$CO_2$<br>MIROC; PRECIS/HadCM3 | Kumar et al. (2013) |
| | | • Monsoon maize: –21 to 0, –35 to 0, –35 to 0<br>• Winter maize: –13 to +5, –50 to +5, –60 to –21 | A2<br>2020, 2050, 2080<br>HadCM3 | Byjesh et al. (2010) |
| | Northeast India | • (I) Rice: –10 to +5<br>• (R) Rice: –35 to +5<br>• Maize: up to –40<br>• Wheat: up to –20 | A1B<br>2030<br>+$CO_2$<br>PRECIS/HadCM3 | Kumar et al. (2011) |
| | Coastal India | • (I) Rice: –10 to +5<br>• (R) Rice: –20 to +15<br>• (I) Maize: –50 to –15<br>• (R) Maize: –35 to +10 | | |
| | Western Ghats, India | • (I) Rice: –11 to +5<br>• (R) Rice: –35 to +35<br>• Maize: up to –50<br>• Sorghum: up to –50 | | |

# Projected impacts for crops – Africa

| | | | | |
|---|---|---|---|---|
| Africa | All regions | • Wheat: –17<br>• Maize: –5<br>• Sorghum: –15<br>• Millet: –10 | 2050 | Knox et al. (2012) |
| | All regions | Maize: –24 ± 19 | 2090<br>+5°C | Thornton et al. (2011) |
| | East Africa | • Maize: –3.1 to +15.0, –8.6 to +17.8<br>• Beans: –1.5 to +21.8, –18.1 to +23.7 | A1FI; B1<br>2030, 2050<br>HadCM3; ECHam4 | Thornton et al. (2010) |
| | Sahel | Millet: –20, –40 | +2°C, +3°C | Ben Mohamed (2011) |

# Relief or Insurance? Case study from India




The 15 states represent **75 per cent** of India's population and about **70 per cent** of its geographical area, and produce approximately **81 per cent** of its foodgrains





# Relief mechanism in India

- Ministry of Agriculture and Farmers Welfare and Ministry of Home Affairs are mandated with coordination of relief measures in the event of natural calamities like drought, floods, cyclones, hailstorms etc .
- States have ready availability of funds through State Disaster Response Fund (SDRF) - Central share is 75% while the states contribute 25% to the fund.
- The allocation for SDRF for the period 2010-15 was 5003.8 million USD.
- This has significantly increased for the period 2015-20 to 9122 millions USD.

# Relief mechanism in India

- Items and norms of assistance under SDRF as also NDRF have been significantly enhanced wherein the eligibility for relief has been reduced to 33% of crop loss vis-a-vis 50% earlier.

- Relief is provided largely under following head:
  - Agricultural Input Subsidy for crop loss
  - Emergency supply of drinking water
  - Provision of fodder/feed concentrate
  - Transport of Fodder
  - Repair restoration of damaged infrastructure requiring immediate attention.

# The chaotic and politicized 'relief' scenario

- Problem in declaration of calamity
- Eye estimation is the foundation of relief assessment
- Time consuming and inaccurate assessments
- Frequent cases of corruption in the system
- Insufficient amounts to cover losses
- Large fraction of affected people excluded
- No rationale - Huge differences in relief amounts from Rs13,500 to 18000 to 50,000 per ha for same crop – unseasonal rain and hail

# Role of agriculture insurance


- Increasing frequency of natural disasters often reduces the ability of vulnerable groups to rebound quickly, to respond to the challenges of hunger and malnutrition.
- Farmers use a wide range of strategies to manage risk in agriculture – informal and formal risk management strategies.
- Low cost agricultural insurance schemes are increasingly viewed as mechanism for providing social protection to such risks.
- Agriculture insurance might play an important role in managing climatic and natural risks.
- Government of India has decided to slowly move from relief system to formal insurance system and use part of relief money to subsidize insurance premium.
- However, it is clear that agriculture insurance system in its current form will not be able to help farmers.

# Need for Agriculture insurance

- Farmers need an agricultural insurance mechanism which is affordable, accountable, fair and effective.
- Agricultural insurance can not be built on massive profit maximization but has to be built on principle of reasonable profitability.
- Universal coverage of vulnerable farmers is required.