Assessment of Risk and Vulnerability of Agricultural Systems to different climate change scenarios at regional, national and local levels, including but not limited to pests and diseases.

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Director, CRIDA
Risk and Vulnerability and Affected Sectors of Agriculture

- Drought
- Cyclones
- Floods
- Heat wave
- Hail storm
- Sea water inundation
- Agriculture
- Horticulture
- Livestock
- Poultry
- Fisheries
## Extreme events – increased frequency of occurrence

<table>
<thead>
<tr>
<th>Year</th>
<th>RF % departure (June-Sep)</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>-8</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>-15</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>-19</td>
<td>All India drought</td>
</tr>
<tr>
<td>2004</td>
<td>-13</td>
<td>Drought like situation</td>
</tr>
<tr>
<td>2005</td>
<td>+5</td>
<td>High temperature in Jan</td>
</tr>
<tr>
<td>2006</td>
<td>-23</td>
<td>Floods in arid Rajasthan &amp; AP</td>
</tr>
<tr>
<td>2007</td>
<td>+7</td>
<td>Drought in high rainfall NE India</td>
</tr>
<tr>
<td>2009</td>
<td>+5</td>
<td>High temperatures in Jan-Feb</td>
</tr>
<tr>
<td>2010</td>
<td>-8</td>
<td>All India drought</td>
</tr>
<tr>
<td>2012</td>
<td>+6</td>
<td>Warmest year</td>
</tr>
<tr>
<td>2011</td>
<td>-8</td>
<td>Failure of Sep rains in AP</td>
</tr>
<tr>
<td>2012</td>
<td>-12</td>
<td>Drought in Punjab, Haryana, Gujarat,</td>
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<tr>
<td></td>
<td></td>
<td>Karnataka, Cyclone &amp; Floods in AP</td>
</tr>
<tr>
<td>2013</td>
<td>-12</td>
<td>Drought in Bihar &amp; Jharkhand, Floods in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Uttarakhand, Phailin cyclone</td>
</tr>
<tr>
<td>2014</td>
<td>+7</td>
<td>Floods in J&amp;K, Cyclone Hudhud,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>widespread hailstorm in March</td>
</tr>
</tbody>
</table>
Vulnerability of Indian Agriculture to Climate Change – district Level Assessment

Source: Vulnerability Atlas (www.nicra.icar.in)
Seasonal rainfall situation - Monsoon 2014

Country As A Whole: -12
- North West India: -21
- Central Peninsula: -19
- South Peninsula: -7
- East & North East India: -12

Regional rainfall situation

- Drought
- Flood
- Cyclones
- Heat wave
- Hailstorms
- See Water Intrusion
Assessing vulnerability of agriculture to climate change is the pre-requisite for developing and disseminating adaptation technologies.

Planning and decision making need this information to prepare strategies for addressing the adverse impacts of climate change/to identify vulnerable regions for allocating resources.

Vulnerability of Indian agriculture to climate change was assessed at district level following IPCC framework of

Exposure (of future climate),
Sensitivity and
Adaptable capacity.
Risk and Vulnerability Assessment ..........

@ National, State and District level planning

@ State action plan implementation

@ Crop planning and resource target decisions

@ National programs such as NMSA, NICRA, NAF to address vulnerable agro-eco systems
@ Districts that are relatively more vulnerable to climate change were delineated and the important factors contributing to vulnerability were also identified.

@Such information will be useful for planning and targeting investments for adaptation research and policies.

@Therefore, concerted efforts are required for adaptation to reduce the vulnerability (Research + Technology + Policy Support)
Development and implementation of adaptation strategy necessitate socio-economic empowerment of farmers besides developing competencies in acquiring knowledge and skills related to adaptation practices.

The envisaged adaptation of agriculture to climate change will require substantial funds to support vigorous and concerted efforts by national/international research and development institutions.
To promote the adoption of climate-resilient strategies we need to facilitate transfer of climate-resilient technologies from developed countries to developing countries so that the in-house efforts of adaptation get further strengthened.

Possible sources of technical & funding supports should be identified for promoting climate-resilient adaptation technologies. Any form increased pesticides usage need to discourage.
@Exchanging information and providing technical advice on improving efficiency, productivity and resilience of agriculture at regional and national scales should be considered.

@ Strong research on regional level vulnerability index development for Agril systems (Field, horticulture, Livestock, Poultry, Fishery sectors) needed.

@ Besides, capacity building and awareness on multiple advantages of climate-resilient, sustainable agricultural technologies should be promoted.
Farm Pond Technology for Dryland Systems

Thanks