INCREASING CLIMATE RESILIENCE
Addressing the impact of extreme events on agriculture and the way forward
Over the last decades there has been a rising trend in the occurrence of disasters worldwide and related economic impact. This is particularly notable for climate related disasters - such as droughts, floods and storms - which are of significant concern to agriculture given the sector’s dependence on climate. The FAO study on The Impact of Disasters on Agriculture and Food Security highlighted that, between 2003 and 2013, one quarter of the total economic impact of climate-related disasters in developing countries was absorbed by agriculture, with the share rising to 84 percent when only drought is considered. The rising trend in weather and climate-related disasters, also driven by climate change, is likely to exacerbate impacts on food security and rural livelihoods in developing countries, unless relevant climate change adaptation (CCA) and disaster risk reduction and management (DRR/M) measures are taken to better understand disaster impacts and enhance resilience.

As part of its strategic objective on increasing the resilience of livelihoods to threats and crises, FAO works with member countries to enhance and harmonize the assessment of damage and losses from disasters in crops, livestock, fisheries, aquaculture and forestry, as well as the monitoring and evaluation of DRR/M and CCA good practice technologies in agriculture. Advancements and improvements in the field of damage and losses monitoring are crucial to support global and regional initiatives on climate change adaptation in agriculture.

For more information:
www.fao.org/emergencies/how-we-work/resilience
www.a2rinitiative.org
Climate-related disaster trends

**Average climate-related disasters**

<table>
<thead>
<tr>
<th>Period</th>
<th>Average per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980-1990</td>
<td>149</td>
</tr>
<tr>
<td>2004-2014</td>
<td>332</td>
</tr>
</tbody>
</table>

**Average economic damage of climate-related disasters**

<table>
<thead>
<tr>
<th>Period</th>
<th>Average per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980-1990</td>
<td>USD 14B</td>
</tr>
<tr>
<td>2004-2014</td>
<td>USD 100B</td>
</tr>
</tbody>
</table>

In the last seven years on average, 22.5 million people were displaced from their homes each year by climate-related disasters, mostly floods and storms, equal to 62,000 people every day.

*Source: FAO (2016), based on EM-DAT CRED*
The impact of disasters between 2005 and 2015

1.8 billion people were affected by natural disasters over the past decade in developing countries. 64% of all damage were affected by climate-related disasters. 94% of all damage due to natural disasters were climate-related.

Source: FAO (2015), based on EM-DAT CRED
Damage and losses from climate-related disasters in agriculture

Source: FAO (2015), based on PDNAs

Share of climate related disasters’ damage and losses absorbed by agriculture in developing countries (2003-2013)

- Damage: 17%
- Losses: 31%
- D&L: 25%

Source: FAO (2015), based on PDNAs
Natural disasters causing greatest damage and losses to agriculture 2003-2013

Of these natural disasters, 9 are climate-related disasters

<table>
<thead>
<tr>
<th>Natural Disaster</th>
<th>Year</th>
<th>Full Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colombia floods</td>
<td>2010-2011</td>
<td>$824 M</td>
</tr>
<tr>
<td>Thailand floods</td>
<td>2011</td>
<td>$1.3 B</td>
</tr>
<tr>
<td>Pakistan floods</td>
<td>2010</td>
<td>$1.9 B</td>
</tr>
<tr>
<td>Pakistan floods</td>
<td>2011</td>
<td>$5.3 B</td>
</tr>
<tr>
<td>Philippines cyclone Ondoy and Pepeng</td>
<td>2009</td>
<td>$845 M</td>
</tr>
<tr>
<td>Yemen TS038</td>
<td>2008</td>
<td>$1 B</td>
</tr>
<tr>
<td>Philippines Typhoon Haiyan</td>
<td>2013</td>
<td>$1.4 B</td>
</tr>
<tr>
<td>Uganda drought</td>
<td>2008-2011</td>
<td>$863 M</td>
</tr>
<tr>
<td>Kenya drought</td>
<td>2008-2011</td>
<td>$10.5 B</td>
</tr>
<tr>
<td>Indonesia Tsunami</td>
<td>2004</td>
<td>$860 M</td>
</tr>
</tbody>
</table>

*Not climate-related disaster*

Source: FAO (2015), based on PDNAs
Damage and losses by type of hazard

Share of climate related disasters’ damage and losses absorbed by agriculture in developing countries (2003-2013)

- **Drought**: 84%
- **Storms**: 18%
- **Floods**: 15%
- **Tsunamis***: 14%
- **Earthquakes***: 4%

*A Not climate-related disaster

Agriculture absorbed 84% of total damage and losses caused by drought in developing countries (2003-2013)

Agriculture sectors need to be prioritized in order to enhance the resilience of livelihoods to drought impacts

Source: FAO (2015), based on PDNAs
Damage and losses by agricultural subsector and type of hazard

Share of total damage and losses in each subsector (2003-2013)

- **Livestock**: 85%
- **Fisheries**: 69%
- **Crops**: 58%
- **Forestry**: 89%

Agriculture subsectors are affected differently by disasters

Crops and livestock are the most affected by climate-related disasters, i.e., drought, floods, storms

Source: FAO (2015), based on PDNAs
The impact of large-scale climate-related disasters on crop and livestock production varies by region.

Between 2003-2013:
Sub-Saharan Africa and the Near East were mainly affected by drought.
Asia was mainly affected by floods.
Latin America and Caribbean countries were affected mostly by floods, and to a lesser extent by drought and storms.
Climate change exacerbates spread and impact of food chain threats

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Percentage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>70% of poor depend on livestock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 70% of emerging diseases in humans originate in animals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated annual economic losses from transboundary animal diseases</td>
<td>USD 1.45 billion to 2.1 billion</td>
<td></td>
</tr>
<tr>
<td>Locust plagues can destroy up to 100% of crops</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant diseases can cause up to 80% yield losses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: FAO (2016)
Climate change worsens protracted crises and conflict

- **500 M** people are potentially affected by protracted crises

- Hunger rates in protracted crisis situations are almost **3 times higher** than in other developing contexts.

- **40%** more protracted crises today than in 1990.

- Protracted crises absorb **80%** of humanitarian funds.

- **87%** of people affected by conflict do not flee their homes.

Source: FAO (2016)
The cascading effect of disasters on agriculture, food security, and value chains:

Case study from 2010 Pakistan floods

Direct physical damage to agriculture

- **Assets**: Hatcheries, boats and fishing gear were washed away or damaged
- **Infrastructure**: Animal health clinics, agricultural research and extension offices were damaged
- **Transport**: Access to markets was disrupted by damaged road and rail networks
- **Natural resources and ecosystem services**: Floods destroyed forests, mangroves, wetlands that sustain agriculture & livelihoods

Losses across the food value chain

- Over 2 million ha of standing crops were lost
- Milk production declined
- About 1.5 million animals and 10 million poultry died

Losses to manufacturing (agro-industries)

- The textile sector: loss of 2–3 million bales of cotton

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Losses to manufacturing (agro-industries)

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Impact on agricultural livelihoods, food security and nutrition

Over 60% of households lost much of their food grain stocks.

Food inflation surged to 20% by September 2010 from 12% in July.

Over 70% of farmers lost more than 50% of their expected income. The poorest were the most affected.

Almost one-third of the population had poor consumption intake and 19% were borderline.

4.5 million workers were affected; two-thirds were employed in agriculture.

Macro-economic impact

The agriculture sector growth fell to 0.2% in 2010 from 3.5% in 2009.

The effect on sustainable development

Hinder the achievement of Sustainable Development Goals, especially SDG1: “End poverty in all its forms everywhere”; SDG 2: “End hunger, achieve food security and improved nutrition, and promote sustainable agriculture”; and SDG 13: “Take urgent actions to combat climate change and its impacts”.

Source: FAO (2015)
FAO provides technical support to member countries for the monitoring and evaluation of DRR/M good practice technologies in agriculture.

**Goal:** Enhance understanding of how much damage and losses can be avoided through the implementation of DRR technologies for agriculture at local level, and identify leverage points and potential barriers to upscaling.

Systematic information on disaster impact would provide policy-makers and stakeholders with consistent and standardized data and metadata for evidence-based decision-making on Disaster Risk Reduction and Management (DRR/M), as well as more informed disaster response and recovery efforts.
FAO believes that countries, communities and individuals, together with development and humanitarian actors, can build livelihoods that are resilient to climate-induced disasters.

Adopting a multihazard and cross-sectoral approach and increasing the climate resilience of agricultural livelihoods to threats and crises require action across these four mutually reinforcing areas.

FAO climate resilience efforts contribute to the UN Secretary General collective outcome “the climate resilience initiative (A2R)”, under SDG 13, target 1.1.