Disaster Management
Crops in Crisis: Managing Agricultural Disasters and Reducing Risk

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Agriculture is highly vulnerable to natural and man-made disasters. From floods and droughts to pest outbreaks and armed conflicts, these crises result in substantial economic losses and threaten food security. According to the FAO, global agriculture has suffered losses exceeding USD 3.8 trillion over the past 30 years due to disasters—equivalent to 5% of global agricultural GDP. These disruptions not only diminish crop and livestock productivity but also affect rural livelihoods, increase malnutrition, and hinder sustainable development.

This article provides a comprehensive overview of the types, impacts, and management strategies of disasters affecting agriculture, emphasizing the urgent need for effective disaster risk reduction (DRR).

Understanding Disasters in Agriculture

Classification of Disasters

Disasters affecting agriculture can be broadly categorized into:

- **Natural disasters**: Droughts, floods, earthquakes, cyclones, wildfires, and pest outbreaks.
- **Biological hazards**: Transboundary pests (e.g., Fall Armyworm), livestock diseases.
- **Man-made disasters**: Industrial accidents, armed conflicts, chemical spills, and infrastructure failures.

According to FAO (2023), droughts are particularly damaging, responsible for 83% of total damage to agriculture, with long-term effects on soil fertility, food supply, and farmer income.

Impact on Agriculture and Food Security

Disasters have both direct and indirect impacts on agriculture:

- **Crop and livestock losses**: Between 2005–2015, developing countries lost approximately USD 96 billion due to natural disasters.
- **Decreased nutrition**: Global dietary energy losses averaged 147 kcal per person per day from 1991 to 2021 (FAO, 2023).
- **Economic hardship**: In India alone, over 69 million hectares of crops were affected between 2015 and 2022 due to weather events, resulting in a monetary loss of ₹2.27 lakh crore (~USD 30 billion).
- **Social consequences**: Declines in employment, food insecurity, migration, and malnutrition often follow disasters.

Case Studies from India

- **Floods in Kerala (2018)**: Destroyed over 57,000 hectares of agricultural land.
- **Cyclone Fani (2019)**: Killed 34,000 livestock in Odisha.
- **Bihar floods (2020)**: Affected 8.4 million people and vast tracts of farmland.
- **Drought in Rajasthan, Karnataka, and Maharashtra**: Triggered distress migration and malnutrition in rural communities.

The compounded effect of these events reduces the resilience of smallholder farmers, who already face limitations in resources and technology.

Drivers of Disaster Risk

Several systemic factors intensify the risk of agricultural disasters:

1. **Climate change**: Rising temperatures and erratic rainfall patterns reduce crop yields by 2–10%.
2. **Pandemics**: COVID-19 disrupted agricultural supply chains and labor availability.
3. **Armed conflict**: In countries like Ukraine and Syria, wars have destroyed farmlands, disrupted production, and strained global food supplies.

Disaster Risk Reduction (DRR) in Agriculture

Disaster Risk Reduction involves systematic strategies to reduce vulnerabilities and build resilience in agricultural systems. Key components include:

1. Risk Assessment and Early Warning Systems

- Monitoring weather and pest outbreaks.

- Using digital tools and forecasting for anticipatory action.

2. Climate-Resilient Farming Practices

Crop diversification: Reduces dependency on a single crop.

Integrated Farming Systems (IFS): Enhances income through multi-enterprise approaches.

Conservation agriculture: Reduces soil degradation.

Water management: Efficient irrigation (e.g., drip, sprinkler) and rainwater harvesting.

3. Anticipatory Action

Actions taken before disasters, such as:

- Pre-positioning of supplies
- Cash transfer programs
- Ecosystem-based approaches
- Forecast-based financing (FbF)

4. Drought-Specific Strategies

- Promoting drought-tolerant crops
- Managing groundwater resources
- Early sowing and crop rotation
- Public awareness and policy frameworks for water conservation

Institutional and Global Support

National Efforts

National Disaster Management Authority (NDMA) and **State DMAs**: Coordinate response and planning.

Agriculture departments: Guide relief measures, promote climate-resilient technologies.

International Organizations

- **FAO**: Offers technical assistance and capacity-building for risk reduction.
- **UNDP and WFP**: Support community resilience programs.

Financial Institutions

- **Banks**: Provide credit for rehabilitation.
- **Insurance companies**: Offer schemes like the **Pradhan Mantri Fasal Bima Yojana (PMFBY)** to safeguard farmers.

Challenges in DRR Implementation

- **Low awareness** among farmers and agencies.
- **Fragmented policies** with poor coordination between departments.
- **Inadequate funding** for agriculture-specific disaster risk management.
- **Limited inclusion** of agriculture in DRR plans.
- **Neglect of livestock** in disaster planning (Rasool et al., 2014).

Research Insights

- **Kanwala et al. (2022)** found that farmers in drought-prone areas of India increasingly rely on indigenous species like *Khejri* and *Khimp* to cope with climate extremes.
- **Rasool et al. (2014)** reported that 74% of livestock farmers in Kashmir lacked timely information during the 2014 floods, highlighting the need for improved veterinary disaster services.

Conclusion

Agricultural resilience is critical to national food security and economic stability. As disasters grow more frequent and severe due to climate change, proactive and integrated disaster risk reduction becomes indispensable. Strengthening early warning systems, investing in resilient agricultural practices, improving coordination among stakeholders, and including agriculture at the core of DRR strategies will be key to ensuring that crops in crisis don't become communities in collapse.

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