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Climate crisis and the dual burden on crop and livestock farming

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ABSTRACT

Climate change is exerting increasing pressure on global food systems, particularly in regions dependent on both crop cultivation and livestock rearing. Rising temperatures, unpredictable precipitation (droughts, floods), extreme weather events, pest and disease outbreaks, and resource scarcity are jointly hurting crops and animals, creating a dual burden. This affects food security, rural incomes, and resilience of smallholder farming communities. Recent events in India—unseasonal rains, heat waves, livestock shelter flooding—and emerging policies aimed at adaptation and mitigation illustrate the scope of the challenge and some of the responses. This article examines the biophysical and socio-economic impacts, recent examples, and policies for improvement, with focus on integrated strategies to enhance resilience in both crop and livestock sectors.

Objectives

1. To analyse recent real-world instances where climate change has simultaneously affected crops and livestock, showing how the dual burden manifests.
2. To assess existing policy measures in India addressing this dual burden—what is working, what gaps remain.
3. To propose policy and practice improvements that strengthen resilience of mixed crop-livestock farming systems under climate stress.

1. Impacts: Recent Examples

Here are a few recent incidents that illustrate how both crop and livestock farming are impacted in tandem by climate disruptions:

- **Flooding in Punjab (2025):** Over 1,400 villages and about 371,475 acres of farmland were submerged. Crops have been lost; livestock shelters too have suffered, leading to hygiene and disease risks. Wikipedia
- **Heavy rains & pest attack in Belagavi, Karnataka:** Floods damaged tens of thousands of hectares of crops (soybean, pulses, vegetables) AND increased pest outbreaks. While that directly hits crops, livestock too suffer: feed quality declines, disease pressures rise in damp environments. The Times of India
- **Heat wave of 2025 in India–Pakistan:** Extreme temperatures (up to ~48°C in some places) affected crop development (reduced yields) and livestock suffering (heat stress, lower productivity). Wikipedia
- **Dairy & crop farming in Telangana:** A study of agricultural scientists' perceptions found that in 2021–22, climate parameters changes are significantly affecting both crop and dairy systems—milk yield, fodder availability, crops both under stress. eBook Icar

These examples show how climate events don't discriminate: crops suffer from floods, droughts, heat, unseasonal events; livestock suffer from loss of feed, water stress, disease, shelter damage etc.

2. Policies and Measures: What India (some other cases as well) is Doing

Here are some of the key policy instruments relevant to the dual burden, as well as how they address or fall short:

Policy / Scheme	What It Does	How It Helps Crop & Livestock / Where Gaps Remain
National Livestock Mission	Supports breed improvement, entrepreneurship in poultry, sheep, goats, piggery, as well as feed & fodder development. Animal Husbandry & Dairying	Helps livestock adapt via better breeds and fodder supply. But often lacks strong linkages with crop-fodder cycles or climate-specific support (e.g. for heat stress or shelter infrastructure).
Modification of National Livestock Mission (2024)	Additional activities added: entrepreneurship support for horses, camels etc.; fodder seed processing infrastructure with subsidies; breed conservation etc. www.narendramodi.in	These address fodder, one of the biggest livestock vulnerabilities. Still, scale and speed of implementation are critical. Also, crop losses during extreme events need better integrated risk coverage.
Crop Insurance Schemes (e.g. Pradhan Mantri	Offers financial risk mitigation against crop failure from natural calamities. The Cabinet approved renewal and	These schemes help crop farmers; livestock insurance or risk coverage is often weaker.

Fasal Bima Yojana, Weather-Based Crop Insurance)	enhancement of these schemes till 2025-26 with large funding. The Times of India	Also, insured sums, claim settlement delays, and coverage of mixed system losses need strengthening.
Budget 2025: Emphasis on climate-smart agriculture	Increased funding for micro-irrigation, drought-resistant varieties, promoting organic farming & natural farming. Emphasis on environmental sustainability in agriculture. Farmonaut®	Such policies help reduce input costs, improve resilience of crops. But livestock-specific climate actions (heat tolerant breeds, shelter, water) often lag behind. Integration is needed.
Schemes promoting renewable energy in agriculture (e.g. solar pumps, PM-KUSUM)	Reduce dependence on fossil fuels, provide reliable energy for pumping water, etc. The Hindu Business Line	Helps ensure water for crops and livestock, especially in heat or drought. But requires cost support, maintenance, training, plus fallback when solar not sufficient.

3. Policy & Practice Improvements: Recommendations

Based on the examples and existing gaps, here are suggested improvements to better handle the dual burden:

1. **Integrated Risk Coverage & Insurance**
   - Expand insurance schemes to cover livestock losses (feed, shelter, mortality, disease) along with crop damage.
   - Develop index-based livestock insurance (heat index, rainfall deficits) to trigger payouts.
   - Ensure faster, transparent claim settlement so farmers can recover quickly.
2. **Breed Improvement & Genetic Resilience**
   - Invest more in developing or promoting livestock breeds or varieties resilient to heat, drought, and diseases.
   - Support crop varieties that mature early or are tolerant to water stress, flood or salinity.
   - Maintain germplasm diversity to allow future adaptability.
3. **Fodder & Feed Security**
   - Ensure that fodder production is linked with crop residue management: crop residue can be used as livestock feed.
   - Build fodder storage infrastructure so feed is available in lean seasons.
   - Promote agroforestry, multi-crop systems where fodder trees/shrubs are interspersed.

4. **Water & Shelter Infrastructure**
    - Improve water availability via rainwater harvesting, micro-irrigation, watershed management.
    - Provide incentives for livestock shelters that are designed to withstand heat, heavy rainfall, flooding.
    - Ensure animal shelters have good drainage, cooling/ventilation, hygiene to reduce disease risk after floods.
5. **Forecasting, Early Warning & Advisory Systems**
    - Use AI, IoT, remote sensing to provide localized forecasts for crops & livestock (e.g. impending heat waves, flood risk).
    - Mobile extension services should include livestock advisory (feeds & health) during climate events.
    - Promote climate-smart advisory combining both sectors.
6. **Cross-sector (Crop + Livestock) Planning & Extension**
    - Encourage farming systems that integrate crops and livestock; plan land, water, labour for both together, not in silos.
    - Agricultural extension services should include training that spans both sectors.
7. **Financial & Incentive Support**
    - Subsidies and credit facilities for climate-resilient inputs (seeds, shade structure, solar panels, feed storage).
    - Incentives for practices that reduce greenhouse gas emissions from livestock (e.g. better manure management).
    - Recognize and reward sustainable practices (carbon credit schemes, payments for ecosystem services).

4. CONCLUSION

The climate crisis is already inflicting dual and interacting burdens on crop and livestock farming. While India (and other countries) have begun implementing policies to address climate risks—crop insurance, livestock mission, climate-smart agriculture—they often treat the two sectors separately. Mixed farming systems, smallholder farmers, and marginal areas remain especially vulnerable.

Bridging the gap requires integrated policies, stronger risk coverage, resilient breeds, infrastructure investments for water, shelter & feed, and more real-time advisory and forecasting systems. If well designed and implemented, such reforms can safeguard food security, livelihoods, and build a more climate-resilient agricultural future.

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