Climate-resilient feeds and forages

Improved forage production and animal nutrition for increased productivity, reduced emissions and improved livestock producer resilience

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Feed shortages remain the largest constraint to livestock productivity

Poor-quality feeds limit milk production and increase greenhouse gas emissions per unit of milk or meat.

Up to 40–60% more milk with improved forages

Improved forage grasses can significantly increase dairy productivity, strengthening farmer livelihoods while lowering emission intensity from livestock systems.

Up to 21% lower daily methane emissions with improved feeds

Improved feeding strategies can reduce methane emission intensity by ~12% while increasing animal productivity (~17%).

19,000 forage accessions conserved by ILRI

One of the world's largest collections of livestock feed plants supports the development of climate-resilient and low-methane forage systems, drawing on a CGIAR-wide collection of about 71,000 forage accessions

The challenge

Feed shortages remain the most widespread constraint to livestock productivity in smallholder systems across the global tropics.

Farmers often rely on low-quality crop residues and degraded grazing lands that provide insufficient nutrients for livestock. Climate change is worsening the problem by altering rainfall patterns, increasing drought frequency and reducing forage productivity and quality.

Poor-quality feeds also increase methane emissions from ruminants. When animals produce less milk or meat, more animals are needed to meet demand, raising emissions.

Improving feed quality is therefore essential to increase livestock productivity, strengthen farmer livelihoods and reduce emissions from livestock systems.

Proven solutions

ILRI and its partners are advancing climate-smart feeding systems that improve livestock productivity while delivering climate co-benefits.

- **Improved feed genetics**

Breeding forage grasses and legumes and improving crop residues to increase feed productivity, nutritional value and tolerance to drought and climate stress.

- **Low-methane feeds and forages**

Identifying feed plants containing natural anti-methanogenic compounds that reduce methane production in the rumen while maintaining animal productivity.

- **Farmer-tested feeding strategies**

Participatory trials help farmers integrate improved forages, crop residues and other locally available feeds into more productive feeding systems.

- **Decision-support tools for feeding systems**

Tools such as FEAST and the On-farm Feed Advisor (OFA) help diagnose feed constraints and balance livestock diets using locally available feeds. The OFA mobile app supports improved ration formulation and can increase milk production by around 10%.

- **Feed processing and supplementation technologies**

Technologies that improve the use of poor-quality feeds such as crop residues through processing, and supplementation .

Sustained investment

ILRI's work on climate-resilient feed systems builds on long-term investments in livestock feed research, global partnerships and farmer-centered innovation.

Global forage genetic resources

ILRI's forage genebank conserves 19,000 accessions from more than 1,500 species supporting the development of climate-resilient and low-methane forage varieties.

Feed innovation and scaling

Collaborations such as the Ethiopia Forage Seed Consortium and the Forage Working Group in Kenya strengthen forage seed systems and expand farmer access to improved forage varieties.

Low-methane forage research

Scientists are breeding grasses and legumes with natural anti-methanogenic compounds to reduce methane emissions while maintaining livestock productivity.

Decision tools for feed systems

Tools such as FEAST and the On-farm Feed Advisor (OFA) help diagnose feed constraints and support improved feeding strategies.

Invest in improved feeds and forages to deliver rapid gains in livestock productivity while reducing emissions from the dairy and livestock sector.

Scan the QR code to read more.

These solutions are curated under the Livestock and Climate Solutions Hub.

Led by the International Livestock Research Institute and CGIAR, the Hub brings together evidence-based innovations that support sustainable, low-emission livestock systems in low- and middle-income countries. By connecting research, partners and investors, the Hub helps identify, package and scale practical solutions that combine climate mitigation, adaptation and improved livestock livelihoods.

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The International Livestock Research Institute (ILRI) is a non-profit institution helping people in low- and middle-income countries to improve their lives, livelihoods and lands through the animals that remain the backbone of small-scale agriculture and enterprise across the developing world. ILRI belongs to CGIAR, a global research-for-development partnership working for a food-secure future. ILRI's funders, through the CGIAR Trust Fund, and its many partners make ILRI's work possible and its mission a reality. Australian animal scientist and Nobel Laureate Peter Doherty serves as ILRI's patron.

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