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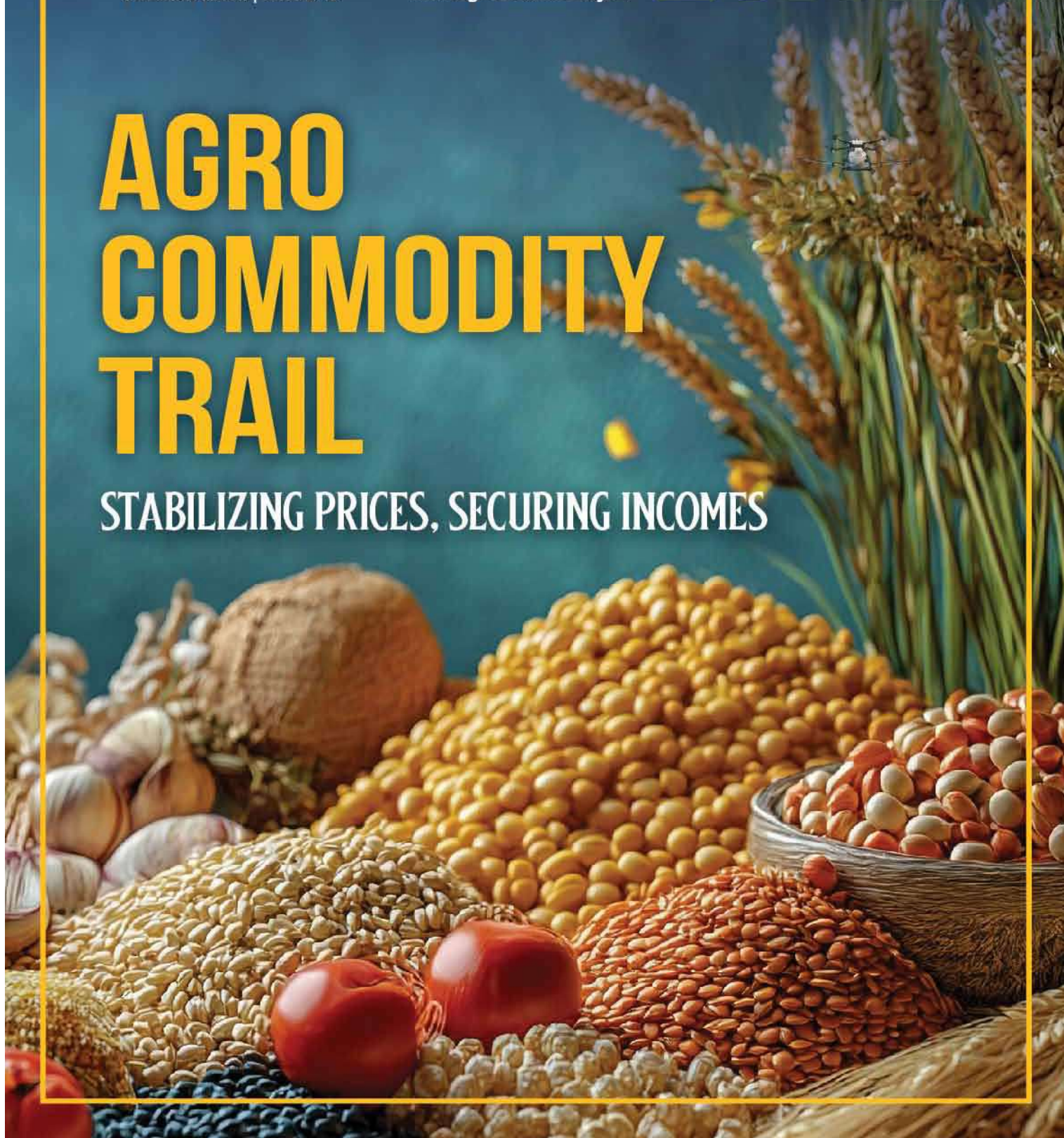
# AGRICULTURE The National Agriculture Magazine TODAY

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# CORN ECOSYSTEM DEVELOPMENT IN INDIA

## UNLOCKING POTENTIAL AND ADDRESSING CHALLENGES

Developing high-productivity zones for corn near demand pockets, expanding mechanization, and adopting improved inputs can boost local corn production while reducing losses.

Corn is India's third-largest cereal crop after rice and wheat, playing a versatile role in agriculture by providing critical inputs for food, feed, and biofuel. India ranks as the 5th largest producer of corn globally and the 14th largest exporter, with production reaching 38 million metric tons (MT) in 2023. Major export destinations include Vietnam, Nepal, Bangladesh, Malaysia, and Thailand. The top corn-producing states are Karnataka, Madhya Pradesh, Bihar, Tamil Nadu, Telangana, Maharashtra, and Andhra Pradesh, highlighting the crop's widespread geographical significance.

### The Rising Demand for Animal Feed

India's livestock and poultry sectors are among the largest consumers of corn, with about 62% of domestic corn production dedicated to animal feed. As demand for meat and dairy rises, the

feed industry has become vital to India's agricultural economy. Corn's high energy content supports economic growth by reducing production costs in the livestock sector, which contributes nearly 4% to India's GDP.

India's expanding poultry sector offers significant opportunities for corn producers, driven by both domestic and export demand. However, to sustainably meet this demand, the feed industry must adopt innovative solutions. Developing high-productivity zones for corn near demand pockets, expanding mechanization, and adopting improved inputs can boost local corn production while reducing losses. Additionally, creating an end-to-end value chain will address price volatility and provide assured buy-back options for growers.

Biotech innovations can enhance yield potential and improve the nutritional quality of feed. Incorporating biotech into farming practices enables the industry to produce higher-yielding corn varieties that meet the growing demand for animal feed sustainably.

### Corn's Potential in Sustainable Biofuel Production

In 2021-22, India's crude oil imports amounted to USD 120 billion, meeting about 86% of its petroleum product demand (*Source: PPAC*). With India aiming for a 20% ethanol blend in petrol by 2025, biofuel production has become an important focus for sustainable energy. Corn is emerging as a promising feedstock for ethanol, providing a cleaner alternative to fossil fuels and contributing to energy security. Corn-based ethanol not only reduces greenhouse gas emissions but also supports rural econo-

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mies by creating jobs, particularly in agri-based employment sectors. India's ethanol blending rate increased from 5% in 2019-20 to about 9.5% in 2021-22, driven by a rise in ethanol supply from 2 billion liters in 2019-20 to approximately 4.1 billion liters in 2021-22 (Source: PWC Report).

Using corn for biofuel supports food security by shifting the focus from other food-based biofuel feedstocks, such as molasses and broken rice, to corn, which has a relatively low water footprint and emits fewer greenhouse gases. Developing corn varieties with higher starch content can further optimize biofuel production by increasing ethanol yield, with enhanced drought resistance and pest tolerance, thus contributing to India's renewable energy goals.

### **Economic and Environmental Impact of Corn Production**

Corn production has broad economic implications, affecting food pricing, feed costs, and biofuel economics. For example, a 20% increase in corn prices in 2023, driven by irregular monsoons and supply chain disruptions, underscores the volatility in agricultural stability. Stabilizing prices through policy interventions and building resilient supply chains are crucial steps.

From an environmental perspective, corn's relatively low water footprint, requiring about 450-480 liters per kilogram, is advantageous in water-stressed regions, especially those dominated by water-intensive rice cultivation. Advances in crop science, such as drought-resistant and pest-tolerant varieties, have improved resilience to climate challenges, stabilizing yields. Furthermore, India's total energy supply composition—43% coal, 24% oil, 22% biofuel and waste, 6% natural gas, 2% hydro, and 1% nuclear—highlights the potential for biofuel to diversify the energy mix (Source: PWC Report).

The corn sector in India is a substantial contributor to the economy, supporting employment across the entire value chain, from farming and processing to

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distribution. Maize cultivation, marketing, and value addition alone generate over 1,000 million man-days, providing critical employment opportunities throughout the country. With an impressive contribution of 400 billion rupees to the national GDP, maize stands as a key crop for economic growth. Strategic investments in infrastructure, such as improved storage facilities and robust market linkages, can further enhance farmer incomes, reduce post-harvest losses, and ensure that a greater share of the crop's value directly benefits farmers, fostering a more resilient agricultural economy (Source: ICAR-IIMR).

### **Leveraging Regional Advantages and Technological Advancements**

Certain states, including Maharashtra, Gujarat, and Bihar, leverage favorable climates and modern agricultural practices to drive corn production. These regions offer a blueprint for advanced irrigation and crop management techniques, enhancing productivity and reducing labor dependency. Expanding access to affordable technology and training is essential for building a robust, resilient corn ecosystem in India.

Modern practices such as precision agriculture and data-driven farming have the potential to conserve resources and increase yields. Government programs and private-sector investments in AgTech can drive this modernization, equipping farmers to compete globally. Innovations in corn varieties with higher resistance to pests, diseases, and climate-related stresses can significantly

improve productivity.

### **Addressing Post-Harvest Losses**

India's corn sector suffers from significant losses due to insufficient storage and processing infrastructure, impacting farmers economically and discouraging them from scaling production. Establishing rural processing units and storage facilities can mitigate these losses and strengthen the value chain. Investments in rural logistics, including cold storage and efficient crop handling facilities, can directly impact farmer earnings by preserving yield quality.

Reducing post-harvest losses through the development of corn varieties with longer shelf lives and spoilage resistance is essential. Introducing biotech varieties to improve storage capabilities, reduce food waste, and increase profitability can further strengthen the corn ecosystem.

### **A Sustainable Path Forward**

India's corn ecosystem holds vast potential in food, feed, and fuel sectors. However, unlocking this potential requires addressing technology adoption, environmental impact, and infrastructure gaps. Sustainable farming practices—such as crop rotation, conservation tillage, and precision irrigation—are critical for reducing environmental strain and preserving soil health.

Biotechnology stands at the forefront of these efforts, providing solutions that enhance corn's resilience to climate change, improve yields, and reduce the crop's environmental footprint. Integrated pest resistance can mitigate threats like the Fall Armyworm, which has had devastating impacts in recent years.

Through a balanced approach that integrates economic, environmental, and technological strategies, including biotechnology, India can fully harness corn's potential. Collaboration among policymakers, farmers, and industry leaders will be crucial to creating a sustainable, productive future for India's corn sector, benefiting the agricultural community and the nation at large.