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News: Maize

- Recently, India's maize industry has undergone a remarkable transformation, evolving from a basic feed crop to a crucial component in the fuel and industrial sectors.

Maize

- Maize is the third most important cereal crop in India after rice and wheat. It accounts for around 10% of total food grain production in the country.
- Maize is grown in temperatures between 18°C and 27°C during the day and around 14°C during the night.
- But the most important factor is 140 frost-free days.
- It is grown mostly in regions having annual rainfall between 60 cm to 110 cm.
- But it is also grown in areas having rainfall of about 40 cm.
- Karnataka, Madhya Pradesh, Bihar, Tamil Nadu, Telangana, Maharashtra, and Andhra Pradesh are the primary maize-growing states.
- Maize is grown throughout the year, predominantly as a Kharif crop (85% of the maize cultivation area is during this season).

- India exported 3,453,680.58 MT of maize worth Rs. 8,987.13 crores in 2022-23.
- Major Export Destinations: Bangladesh, Vietnam, Nepal, Malaysia, and Sri Lanka are key markets for Indian maize.
- Approximately 60% of maize is used as feed for poultry and livestock, while only about 20% is directly consumed by humans.
- Maize is a primary energy source in livestock feed, with 55-65% of broiler feed and 15-20% of cattle feed comprising maize.
- **Starch and Ethanol:** Maize grains, containing 68-72% starch, are used in industries such as textiles, paper, and pharmaceuticals.
- Recent developments have shifted focus to using maize for ethanol production, particularly as a substitute for rice in ethanol blending due to food security concerns.
- During the crushing season, distilleries run on sugarcane molasses and juice/syrup, while in the off-season they use grains, with the recent shift towards maize.

Recent developments in the sector

- The Indian Agricultural Research Institute (IARI) has bred India's first "waxy" maize hybrid (AQWH-4) with high amylopectin starch content, making it better suited for ethanol production.
- The starch in maize is a mixture of two polymers, comprising glucose molecules bonded together in a straight chain (amylose) and in branched form (amylopectin).
- Normal maize starch has 30% amylose and 70% amylopectin, while IARI's waxy maize hybrid has 93.9% amylopectin.
- Amylose starch makes the grain hard, while amylopectin makes it soft, affecting starch recovery and fermentation rates.
- Softness aids in better grain grinding for flour production. Granules with higher amylopectin are more easily broken down into glucose units. The glucose is then fermented into ethanol using yeast.
- Normal maize grains have 68-72% starch, but only 58-62% is recoverable. The new Pusa Waxy Maize Hybrid-1 has 71-72% starch with 68-70% recovery.
- This hybrid offers an average yield of 7.3 tonnes per hectare and has the potential to reach 8.8 tonnes.