Management of Agricultural Residues

Why in news?

Recently, CSIR-Indian Institute of Chemical Technology (IICT), Hyderabad has developed a method to convert crop residue into nutrient-rich cattle fodder.

- **Crop residue burning –** India faces a major challenge with agricultural residue, especially paddy straw and wheat husk, often burned by farmers.
- **Contribution to pollution -** This contributes significantly to air pollution and greenhouse gas emissions.
- **Ecofriendly Cattle Fodder** – Over the past few years, scientists at the premier institute have been working on converting rice straw and other crop residue into nutrient rich fodder for the livestock.
- Scientists have now shown that rice straw when treated with a relatively simple chemical process could effectively help bridge the gap in the country's fodder needs.
- **Delignification** – The process involves removing lignin (a complex polymer in plant cells) using a simple chemical method.
- Treated rice straw becomes more palatable and digestible for cattle.
- **Field trials and results** – The fortified fodder was tested at ICAR-National Research Centre on Meat, Hyderabad.
- Buffalo calves and sheep showed better food intake, digestion, and up to 3.7 times higher weight gain.
- Methane emissions dropped, making it climate-friendly.
- **Testing in dairy cattle** – The field trials of the fortified fodder showed "remarkable" improvements in digestibility of buffaloes as palatability (acceptability of a food) increased from 20% to 60%.
- It is also a cost-effective and sustainable cattle nutrition.
- **Compressed Biogas (CBG) from crop residue** – CSIR-IICT also developed a ***Dry Anaerobic Digester*** with Unique Hydrodynamics (DAD-UH) to produce CBG and Fermented Organic Manure (FOM) from rice husk/straw.

An anaerobic digester is a system that uses microorganisms to break down organic matter in the absence of oxygen, producing biogas (a renewable energy source) and digestate (rich in nutrients).

- From 1 tonne of biomass, about 100–140 kg of CBG can be generated.
- **Viable business model** – Under the Centre's SATAT (Sustainable Alternative Towards Affordable Transportation) programme, 2-tonne CBG plants can be established.

'*SATAT*' *scheme on CBG encourages entrepreneurs to set up CBG plants, produce & supply CBG to Oil Marketing Companies (OMCs) for sale.*

- It ensures market linkage and guaranteed purchase.
- **Government support and industrial application** – Telangana's Agriculture Secretary supports the model for setting up Agri-based CBG plants on government land which aims to prevent stubble burning and promote Agri-industrial development.
- **Economic benefits for farmers** – The process helps address fodder shortages and reduces feed costs.
- Farmers become direct beneficiaries by increasing income through better livestock productivity.
- **Circular economy & environmental sustainability** - "Waste to value" concept: residue becomes fodder, gas, and manure.
- It promotes eco-friendly farming, supports clean energy goals, and strengthens the rural bioeconomy.

Reference

The Hindu| How Crop Residue Can Provide Nutritious Cattle Fodder

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