Updated Year End Review of the Department of Biotechnology

- The department of biotechnology is a functional domain under the Ministry of Science and Technology.
- The department has made significant achievements across domains in the areas of healthcare, agriculture, food and nutrition, bio-energy, and environment. Its work this year were mainly focused on:
- **Plant Research -** Initiatives have been taken to promote transgenic research in plants with emphasis on pest and disease resistance, nutritional quality, plant genome analysis etc.
- **Health Care -** Also, work in human genetic disorders, brain research, commercialisation of diagnostic kits and vaccines for communicable diseases, were taken up.
- **Other Areas –** Biodiversity conservation, food research and biotechnology-based development for rural areas and women were also focused.

Major Programs Undertaken by the Ministry

Health and Medicine

- **National Biopharma Mission -** was launched by DBT in a bid to create a globally competitive biopharmaceutical industry.
- This brings together industry and academia to promote entrepreneurship and indigenous manufacturing in the bio-pharmaceutical sector.
- This flagship program is run in collaboration with the World Bank and will be implemented by the Biotechnology Industry Research Assistance Council (BIRAC), a Public-Sector Enterprise set up by DBT.
- **Brucella-free villages Program -** A pilot was launched in 50 villages covering 10 states by providing for diagnostic kits.
- Brucellosis is a zoonotic disease, seen in animals, and causes economic losses of about 28,000 crores per year.
- **Ready to Use Food (RUTF)** – A nutritional supplement with brand name BIB POSHAN and was developed with financial support from DBT.
- This RUTF is issued in 200g packets and supports food formulations to address Severe Acute Malnutrition in children.
- RUTF is made as a paste that can be safely given to a child at home and is given for a fixed amount of time to get a child back to its normal growth.

- **Iron fortification –** Iron fortification in rice and wheat was taken up by the DBT to address Anaemia.
- Anaemia is caused by Iron deficiency and is widespread globally.
- 40% of the children in school going age are reported to be anaemic.
- Cereal flour fortification with iron (Fe) is the most cost-effective and sustainable way in reducing the prevalence of IDA.

Environment

- **Green remediation** – This is a technology for wastewater treatment.
- DBT is participating in the Swachh Bharat Abhiyan through a range of initiatives including bioremediation of filthy water.
- A DBT supported project has developed phytoremediation treatment process for the degradation of dyes from "textile industrial effluent".
- **Rapid Anaerobic Digester Technology** - Developed by the DBT-ICT research centre, this can process both industrial and municipal waste.
- This can handle any bio-waste and generate biogas within 24 hours, with a methane yield of greater than 90% and generates zero waste.
- It is now being scaled up to 2 demonstration /commercial plants.
- **Demetalizer Kit –** Surface water and groundwater around mines are often laced with heavy metals, making them unsuitable for use.
- De-metallizer kit has been developed from biopolymers for removing such heavy metal ions from the surface and underground water bodies.

Sanitation

- **Bio-toilets -** In an effort to promote cleaner toilets that use lesser resources, DBT in collaboration with the Bill and Melinda Gates Foundation (BMGF) has supported many novel bio-toilet technologies.
- Six new bio-toilet technologies have so far been supported and different aspects of waste collection and management process addressed.
- Also, as the waste in septic tanks is a rich source of nutrients for fertilizers, a Goa-based company, has converted this waste to sanitized soil and fertilizers.
- The technology is to improve septic tanks by converting them into "decentralized wastewater treatment system".
- **The Rhino Digester –** Localised treatment of organic waste generated in apartments and societies is an urgent requirement in rapidly developing cities.
- Hence, Rhino Digester was developed, which is a cost-effective appliance for decentralized waste processing, for which trial runs have started.
- It has been designed to be installed at the society, apartment or

organization, and can convert all organic content of the waste into readily usable resources.

Agriculture

- **Biotech KISAN scheme –** A farmer-centric programme with the objective to demonstrate, scale-up and address issues of local farmers related to water, soil, seed and marketing, with validated technologies.
- This programme is also expected to create strong a strong interaction platform between scientists and farmers.

Bio-energy

- **Ethanol Project -** DBT, in collaboration with ICT Mumbai has developed a technology to convert biomass to ethanol with speed and efficiency.
- While biomass to bio-fuel conversion takes about 4 to 7 days with prevalent technologies, the new technology does the same in about 18-20 hours.
- It produces about 300 litres of ethanol per ton of biomass and can be blended with petrol to be used in vehicles as fuel.
- Also, India's first biomass to ethanol plant for technology demonstration was opened at Kashipur, Uttrakhand.
- Subsequently, the technology was transferred to Bharat Petroleum Corporation Limited (BPCL) and Hindustan Petroleum Corporation Limited (HPCL) to build commercial-scale biomass ethanol plants.

Business Opportunities

- **Scented Rice –** North-Eastern Region (NER) of India possesses a rich diversity of Aromatic Rice (AR).
- Aromatic rice varieties, especially "Joha and Black rice" are of high value both in terms of their unique and deliciousness and medicinal properties.
- But as these are also poor yielders and susceptible to pest attacks, an innovative approach using biotechnology improve yield has been adopted.
- **Phyto-Pharma Plant Mission -** DBT has announced a Rs.50 crore mission aiming at conservation and cultivation of endangered and threatened endemic medicinal plants of North East India.
- The mission will also involve discovering new botanical drugs for unmet medical needs using the rich traditional ethno-botanical knowledge of the North-East.
- It would, therefore, help in improving the availability of authentic raw material for the phyto-pharmaceutical industry, and enhancing farmer incomes.

Research

- **Brahmaputra Biodiversity and Biology Boat (B4) –** This is a unique mission to construct a laboratory on a boat for doing research at different locations in the North-East Region.
- This well-equipped laboratory would contain facilities for analysis of all components of the entire ecosystem of the river and surroundings.
- This lab will link all the local research institutions as well as national and international laboratories along the Brahmaputra.
- B4 will have the capability to analyse soil, water, environment, plant and animal life, human health and agriculture.

Source: PIB

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