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Methanotrophic Bacteria for Methane Mitigation

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Why in News

Recently, scientists at the **Agharkar Research Institute (ARI), Pune** have enriched, isolated and cultivated 45 different strains of **methanotrophs (methane-utilising bacteria)** and created the **first indigenous** methanotroph culture.

ARI is an **autonomous institute** under the **Department of Science & Technology**.

Key Points

- Scientists used some of the isolated strains of methanotrophs as **bio-inoculants** in rice plants.
- They found that there was a **decrease in methane emissions in inoculated plants with a positive or neutral effect** on the growth of the rice. This finding could lead to the development of microbial inoculants for methane mitigation in rice.
- Methanotrophs **metabolise and convert methane into carbon-di-oxide enabling them to reduce methane emissions** from rice plants.
 - In rice fields, methanotrophs are active near the roots or soil-water interfaces.
 - **Rice fields are human-made wetlands** and are waterlogged for a considerable period.
 - **Anaerobic degradation of organic matter** results in the **generation of methane**.
 - Rice fields contribute to nearly **10% of global methane emissions**.

Inoculation

- In microbiology, inoculation is defined as **introducing microorganisms into a culture where they can grow and reproduce**. More generally, it can also be defined as introducing a certain substance into another substance.
- Bio-inoculants are living organisms containing strains of specific bacteria, fungi, or algae. These are also known as **microbial inoculants**.

Significance

- Methanotrophs can **effectively reduce the emission of methane**, which is the **second most important greenhouse gas (GHG)** and 26 times more potent as compared to carbon-di-oxide.
- Native methanotrophs isolated from rice fields can be excellent **models to understand the effect of various factors on methane mitigation**.
- Besides methane mitigation studies, methanotrophs can also be used in **methane value addition (valorization) studies**.

Bio-methane generated from waste can be used by the methanotrophs and can be **converted to value-added products such as single-cell proteins , biodiesel**, and so on.

Source: PIB