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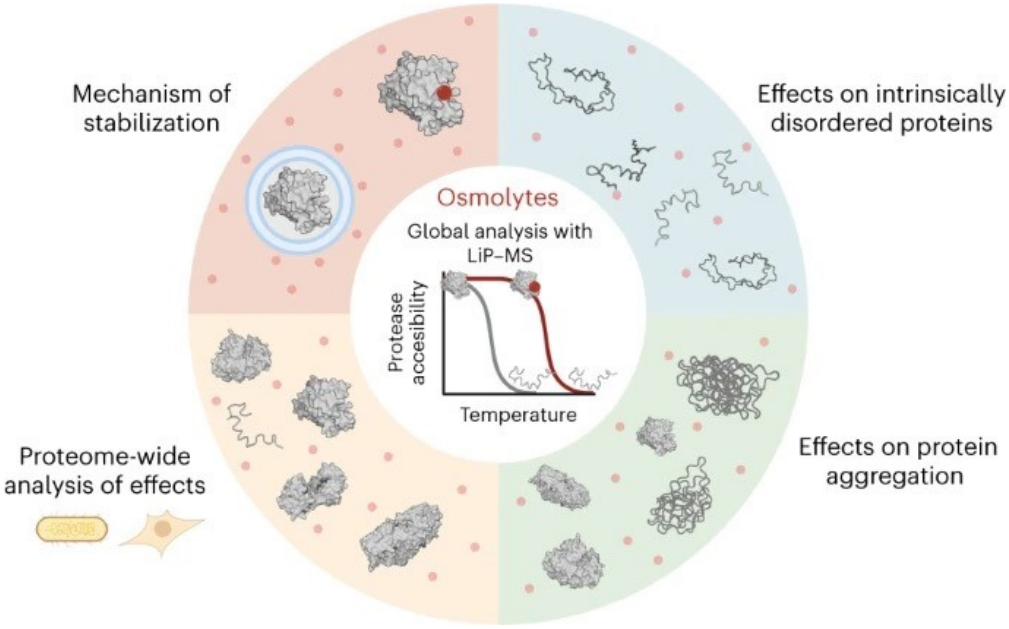
Osmolyte

Recent research reveals that small molecules known as osmolytes help proteins stay stable and functional under stress.

- **Osmolytes**- These are ***small molecules*** that stabilize proteins and preventing them from misfolding and ensuring proper function.
- They help cells survive stress and maintain protein stability.
- This makes them potential targets for drug development.



- **Technique Used-** ***Covalent magnetic tweezers*** to observe protein folding and interaction with osmolytes.
- **Types of osmolytes**
  - **Compatible Osmolytes**- These molecules help stabilize proteins without disrupting their normal function.
  - Examples include urea and glycerol.
  - **Counteracting Osmolytes**- These molecules protect proteins by counteracting the effects of denaturing conditions.
  - Examples - Trimethylamine N-oxide (TMAO) and certain types of amino acids.
- **Findings -** Different osmolytes have varied effects on proteins.
  - **TMAO -**At high concentrations (1.5M), it significantly increases the strength of Protein L, enhancing its resistance to unfolding.
  - Low concentrations have minimal effect on protein unfolding.
  - High levels of TMAO are associated with heart diseases.
  - **Trehalose-** Stabilizes the unfolded state of Protein L.

- **Implications -** Insights into osmolyte-protein interactions can guide the ***development of new drugs*** for neurodegenerative diseases and conditions related to protein misfolding.
- This finding could advance treatments for diseases like ***Alzheimer's and Parkinson's***.

Reference

PIB | Osmolyte

Extended Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA)

The extended Pradhan Mantri Surakshit Matritva Abhiyan has been recently launched by the Ministry of Health & Family Welfare (MoHFW).

- **Launch year**- 2016
- **Nodal agency**- Ministry of Health & Family Welfare.
- **Objectives**- To improving the quality and coverage of Antenatal Care (ANC) including diagnostics and counselling services as part of the *Reproductive Maternal Neonatal Child and Adolescent Health (RMNCH+A) Strategy*.
- To provide free, comprehensive ***antenatal care*** on the ***9th of every month to all pregnant women*** in their ***2nd/3rd trimesters*** at designated public health facilities by medical officers.
- Identification and line-listing of high risk pregnancies.
- Appropriate birth planning and complication readiness for each pregnant woman.
- Diagnostic services for conditions like anemia, gestational diabetes, and hypertension.
- Special focus on adolescent and early pregnancies.
- Providing nutritional supplements at health centers.

- **Recent changes** - The Government has ***expanded the list of high-risk pregnancy categories*** from ***10 to 25***.
- **High Risk Pregnancy (HRP) categories**- HIV, syphilis, severe anemia, pregnancy-induced hypertension, gestational diabetes mellitus, hypothyroidism, tuberculosis, malaria, previous LSCS, cephalo-pelvic disproportion, bad obstetric history, twins/multiple pregnancy, hepatitis B, abnormal fetal heart rate, teenage pregnancy, high fever, RTI/STI, history of stillbirth, congenital malformation, negative blood group, early primi, elderly primi, grand multipara, and short stature.

PMSMA's 'I Pledge For 9'Achievers Awards *'was initiated to recognize the contribution of private sector doctors who volunteered for the PMSMA scheme.*

References

1. PIB | Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA)
2. Ministry of Health | Pradhan Mantri Surakshit Matritva Abhiyan

National Plan for Conservation of Aquatic Ecosystems

The central government is implementing the National Plan for Conservation of Aquatic Ecosystems (NPCA) to conserve and manage wetlands nationwide.

- **NPCA** – It is a conservation program for ***wetlands and lakes.***
- It is formed by merging the National Lake Conservation Plan and the National Wetlands Conservation Programme.
- **Objectives –** To holistically *conserve and restore the wetlands* for achieving the desired water quality enhancement, besides improvement in *biodiversity and ecosystems*.
- To promote *mainstreaming of wetlands* in developmental programming with States by *supporting formulation and implementation* of integrated management plans, capacity development and research.
- **Mode –** It is a ***centrally sponsored scheme***.
- Central assistance is provided *based on state government proposals*, aligned with guidelines and *budget availability*.
- **Regulated by-** The *Wetlands (Conservation and Management) Rules, 2017*, established under the Environment (Protection) Act, 1986.
- **Implemented by-** Ministry of Environment, Forest and Climate Change.
- **NPCA Guidelines** – To facilitate implementation of NPCA by outlining the different steps to be undertaken for preparing and submitting plans before implementation.
- Activities covered - Wastewater treatment, shoreline protection, lakefront development, desilting, stormwater management, bioremediation, catchment area treatment, lake beautification, survey and demarcation, bio-fencing, fisheries development, weed control, biodiversity conservation, education, and community participation.

'Wetlands Rejuvenation' programme

• It aims on *Restoration & Rejuvenation of at least 100 major wetlands* across the country.
• It is structured based on 4 pronged approach.
• **Wetland Brief Document** - Developing baseline information
• **Wetland Health Card** - Rapid assessment of wetlands condition
• **Wetlands Mitras** - Stakeholder platforms to enable collaborative and participatory management
• **Wetland Integrated Management Plan** - Management planning addressing wetlands' biodiversity and ecosystem services, values and threats.
• In continuation to the first cycle, it is now being scaled up to 1,000 wetlands, reaching out to all districts of the country.

Reference

PIB | National Plan for Conservation of Aquatic

NUE rice variety

The scientists have identified major natural variations in rice nitrogen use efficiency (NUE), along with key traits and genes linked to this efficiency.

- **Nitrogen use efficiency (NUE)** - It's the ratio between grain yield or nitrogen uptake by plants to the amount of urea used as input.
- On average, rice plants use only 20–50% of the nitrogen fertilizer applied to them.
- **Significance** - It is used to measure how well rice plants use nitrogen and is crucial for reducing fertiliser waste and environmental pollution.

NUE rice varieties
• Long duration High NUE rice varieties - Khira and CR Dhan 301. • Short duration High NUE rice variety - Dhala Heera variety. • Short duration high NUE varieties are better than long duration varieties.

- **Economic Impact** - Poor NUE causes fertiliser waste worth Rs 1 lakh crore annually in India and $170 billion globally.
- **Environmental Impact-** Less NUE crops cause greenhouse gas emissions and eutrophication in water bodies.
- **Benefits of High NUE varieties -** Enhanced agricultural sustainability by lowering fertiliser input costs, increased farmer productivity and profitability, and reduced environmental pollution.

India is a signatory to the Kunming-Montreal Global Biodiversity Framework (2022), which mandates countries to halve their nutrient waste from all sources by 2030.

Reference

Down to Earth | Rice nitrogen use efficiency