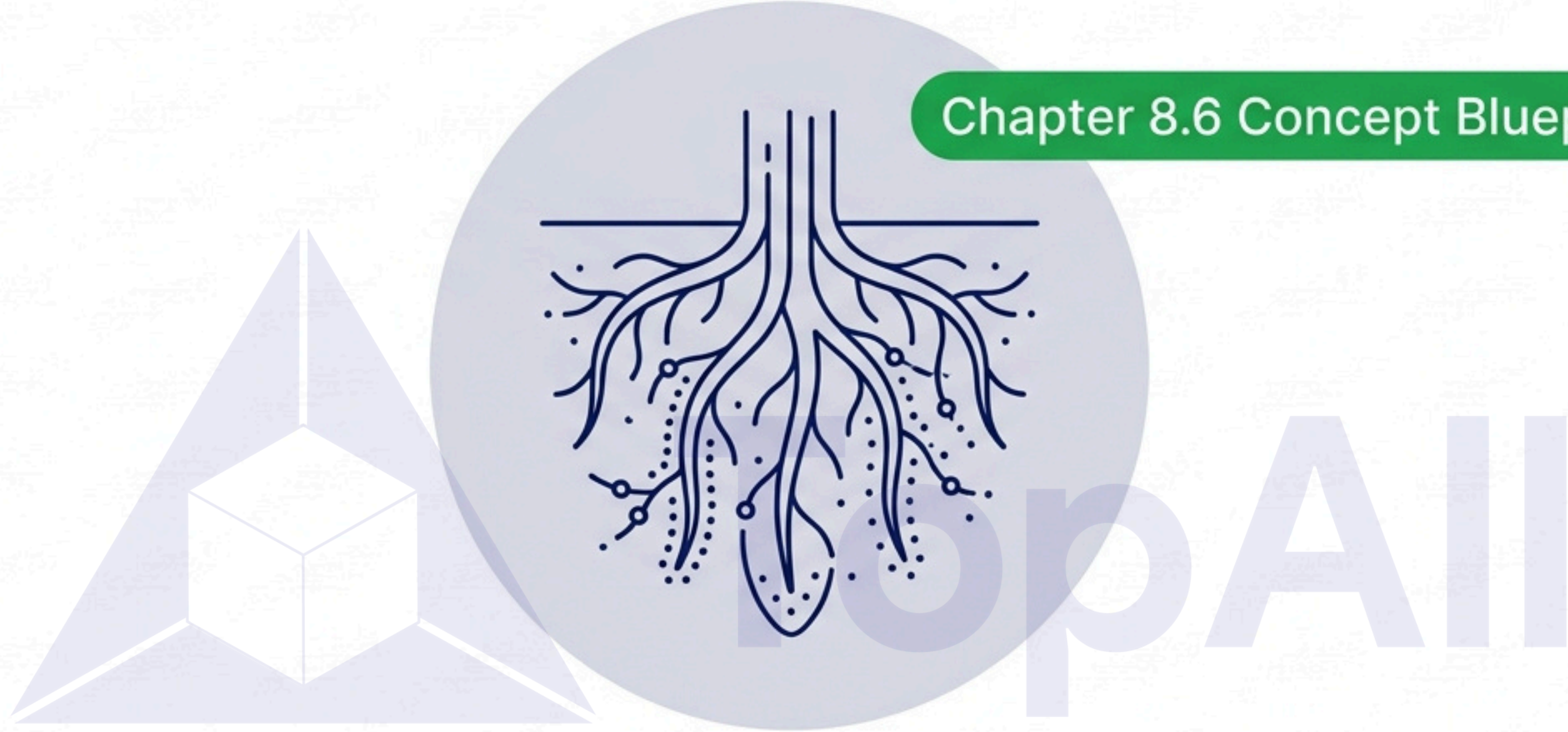




Biofertilisers: Microbes That Enrich Soil

High-Yield NEET Revision | Class 12 Biology
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The Chemical Crisis

Overuse of chemical fertilisers to meet agricultural demand has caused severe environmental pollution.

The Biofertiliser Advantage



The Shift to Organic Farming

Replacing toxic chemicals with biological alternatives that naturally replenish the earth.

**Key Function: Enrich Soil
Nutrient Quality**

Biofertilisers: Organisms that enrich
the nutrient quality of the soil.

Bacteria

Includes both
symbiotic and free-
living nitrogen fixers.

Fungi

Forms crucial root
associations
(mycorrhiza) for
mineral absorption.

Cyanobacteria

Autotrophic microbes
perfect for aquatic
agricultural
environments.



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Bacterial Nitrogen Fixers

Symbiotic

Organism: *Rhizobium*

Location: Root nodules of leguminous plants.

Action: Fixes atmospheric N_2 into organic forms used by the plant as a nutrient.

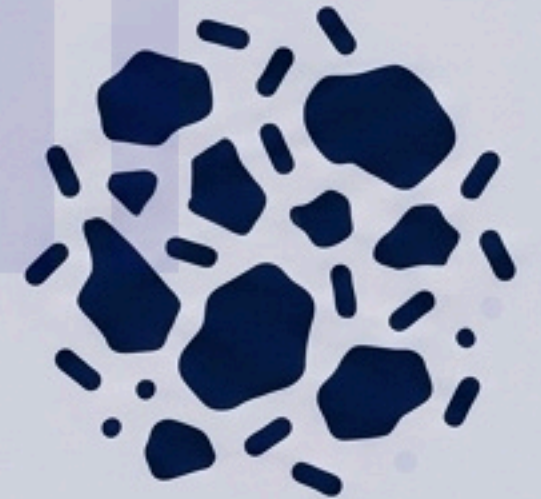


Free-Living

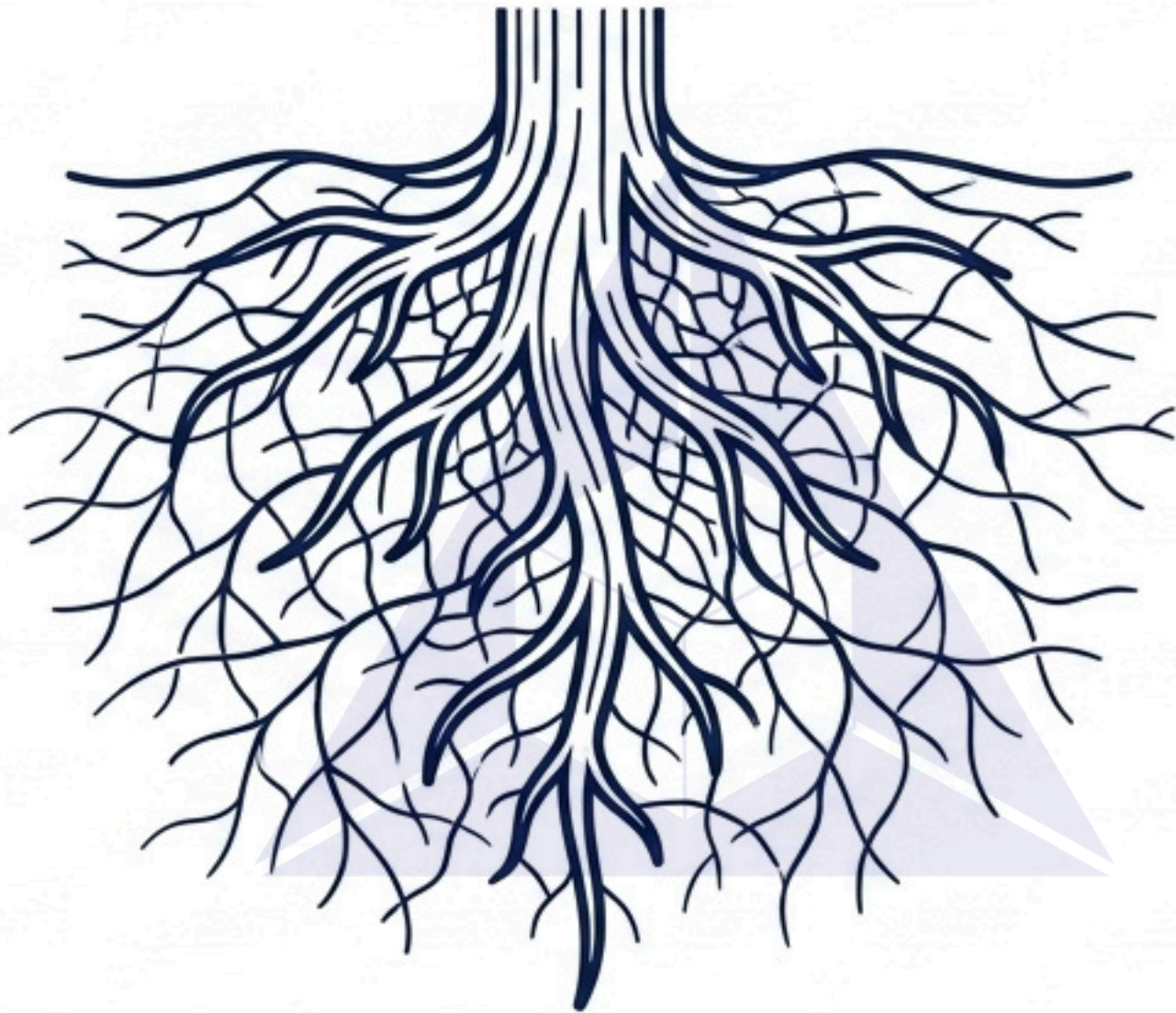
Organisms: *Azospirillum* and *Azotobacter*

Location: Free-living in the soil.

Action: Enriches the nitrogen content of the soil directly.



Fungal Symbiosis: Mycorrhiza



Concept: Fungi forming symbiotic associations with plants.

Key Genus: *Glomus* (many members form mycorrhiza).

Absorbs Phosphorus

The fungal symbiont absorbs phosphorus from the soil and passes it to the plant.

Secondary Benefits

- ✓ Resistance to root-borne pathogens.
- ✓ Tolerance to salinity and drought.
- ✓ Overall increase in plant growth and development.

Cyanobacteria (Blue-Green Algae)

Nature: Autotrophic microbes widely distributed in aquatic and terrestrial environments.

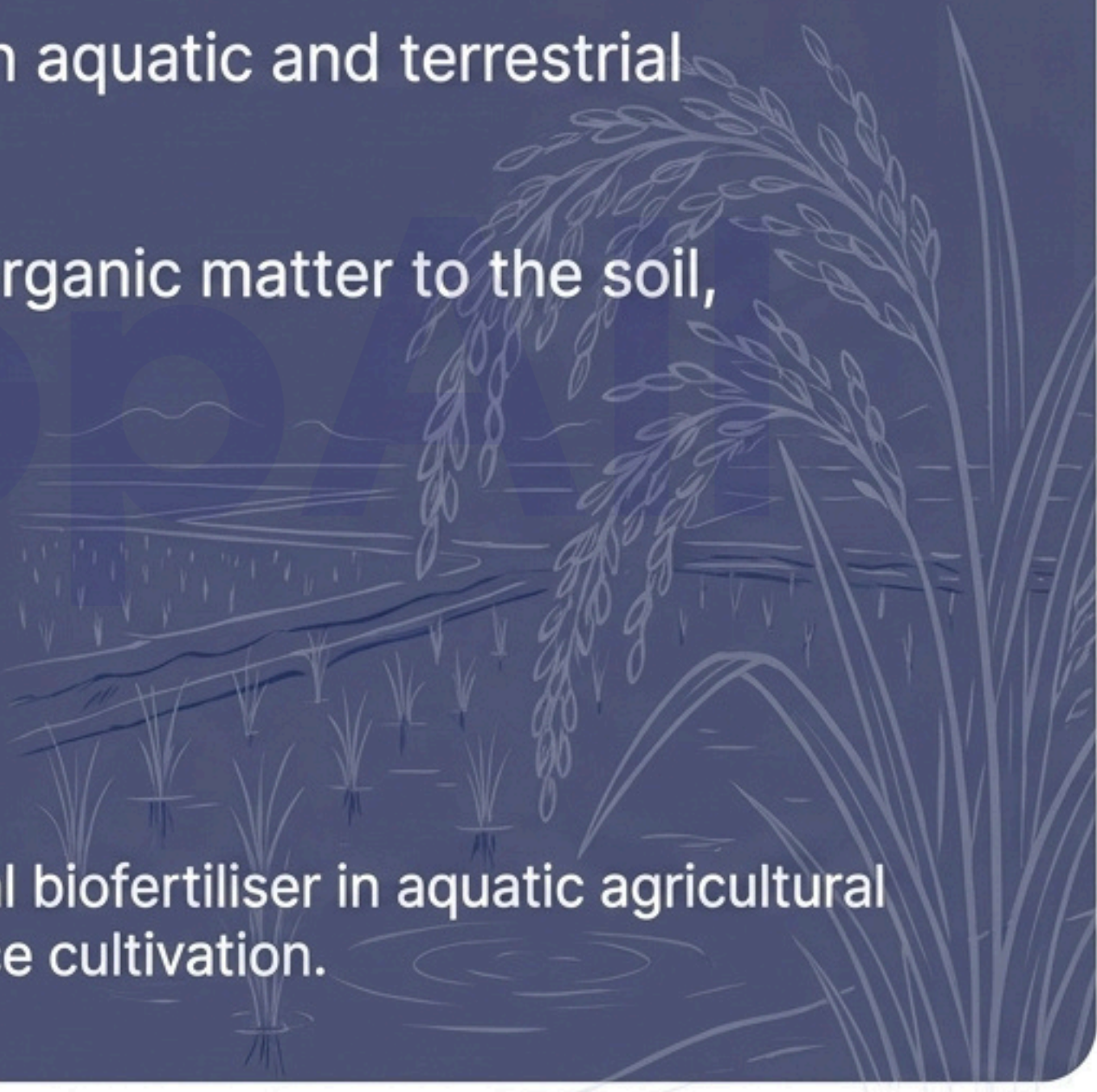
Key Function: Fix atmospheric nitrogen and add organic matter to the soil, increasing fertility.

Key Examples:

- *Anabaena*
- *Nostoc*
- *Oscillatoria*

Highly Important in Paddy Fields

Serve as an essential biofertiliser in aquatic agricultural environments like rice cultivation.



NEET Must Remember: Biofertilisers Master Table



Source	Organism	Lifestyle/Location	Primary Role
Bacteria	Rhizobium	Symbiotic (Legumes)	Nitrogen Fixation
Bacteria	Azospirillum, Azotobacter	Free-Living (Soil)	Nitrogen Fixation
Fungi	Glomus (Mycorrhiza)	Symbiotic	Phosphorus Absorption
Cyanobacteria	Anabaena, Nostoc, Oscillatoria	Autotrophic (Paddy fields)	Nitrogen Fixation & Organic Matter

Ultimate Goal

Replenish soil nutrients and reduce dependence on toxic chemical fertilisers.



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