

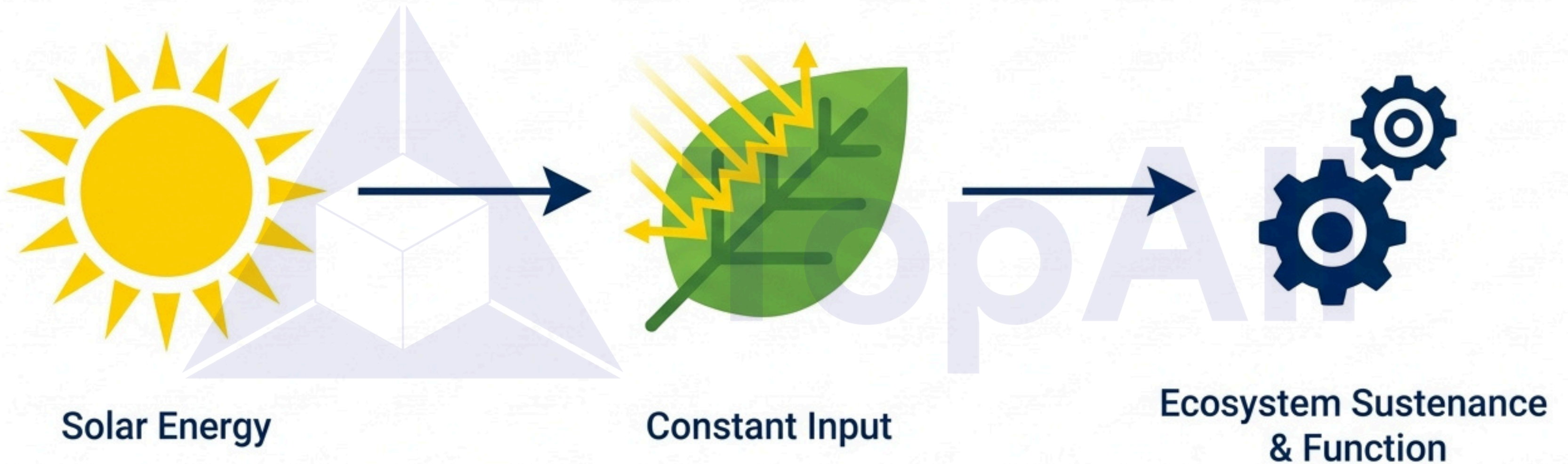
Essential Ecology Concepts

Productivity in Ecosystems

Chapter 12.2 | NEET Concept Deck



The Basic Requirement

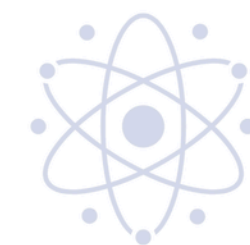


Except for deep-sea hydrothermal vents, a constant input of solar radiation is the foundational requirement for any ecosystem to function.



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$$E=mc^2$$



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Primary Production

The amount of biomass or organic matter produced by plants during photosynthesis.



What:

Biomass /
Organic Matter



Where:

Per Unit Area



When:

Over a Time
Period

Weight: g m^{-2} | Energy: kcal m^{-2}

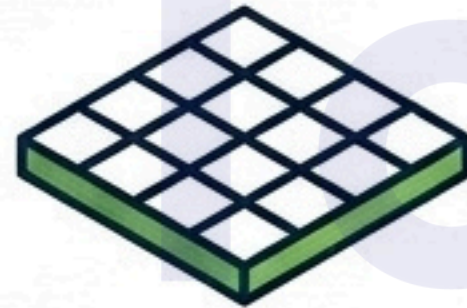
Productivity

The rate of biomass production.



What:

Biomass Rate



Where:

Per Unit Area



When:

Over an Annual
Timeline

Unlike simple production, productivity standardizes the creation of biomass over an annual timeline, allowing ecologists to accurately compare different ecosystems.

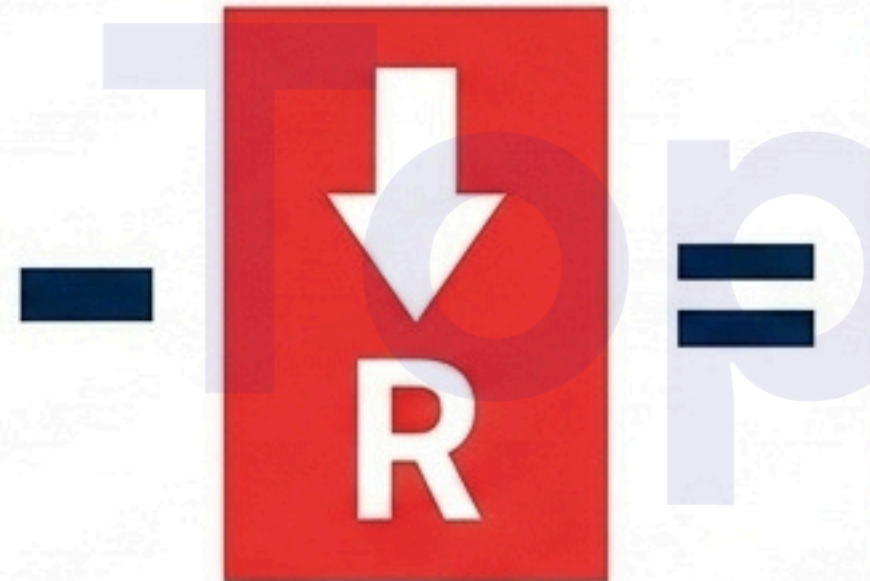
Weight: $\text{g m}^{-2} \text{yr}^{-1}$ | Energy: $(\text{kcal m}^{-2}) \text{yr}^{-1}$

The Productivity Equation

$$\text{GPP} - R = \text{NPP}$$



GPP (Gross Primary Productivity): Total organic matter produced during photosynthesis.

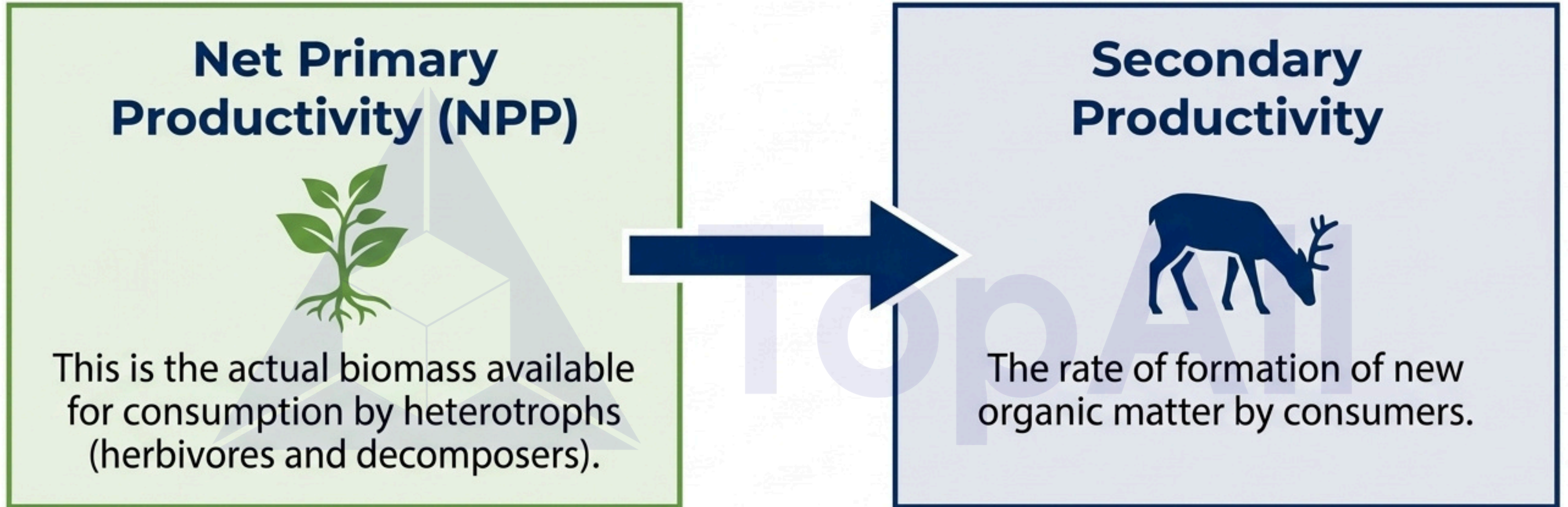


R (Respiration Losses): The considerable amount of GPP utilized by the plants themselves.



NPP (Net Primary Productivity): The remaining biomass stored in plant tissues.

NEET Takeaways: Flow to Consumers



The annual NPP of the whole biosphere is **~170 BILLION TONS** (dry weight).
Oceans contribute only **BILLION TONS** despite occupying 70% of the Earth's surface!



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