Planetary Boundary pioneer Johan Rockstrom wins 2024 Tyler Prize for environmental achievement

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Why in news?

The 2024 Tyler Prize for environmental achievement will be awarded to Johan Rockstrom for his groundbreaking contributions and pioneering work to the development of the Planetary Boundaries framework, the science for defining the safe operating space for humanity on Earth.

Who is Johan Rockstrom?

Rockstrom is director of the Potsdam Institute for Climate Impact Research (PIK) and co-chair of the Earth Commission. The framework provides boundaries for world development and a basis for human justice, PIK said in a statement on February 29, 2024.

The prestigious Tyler Prize is often described as Nobel Prize for environment. Rockstrom will receive the award on May 17, 2024, in a ceremony in Potsdam, Germany.

What is concept of planetary boundary?

The concept of planetary boundaries was first proposed by a team of international scientists in 2009 to articulate key natural processes that, when kept in balance, support biodiversity.

The Planetary Boundaries is an international collaboration across multiple Earth system science disciplines. The theory establishes defined boundaries for nine Earth systems, emphasising the critical importance of their stability and resilience in preserving life as we understand it.

Nine planetary boundaries beyond which we can’t push Earth Systems without putting our societies at risk:

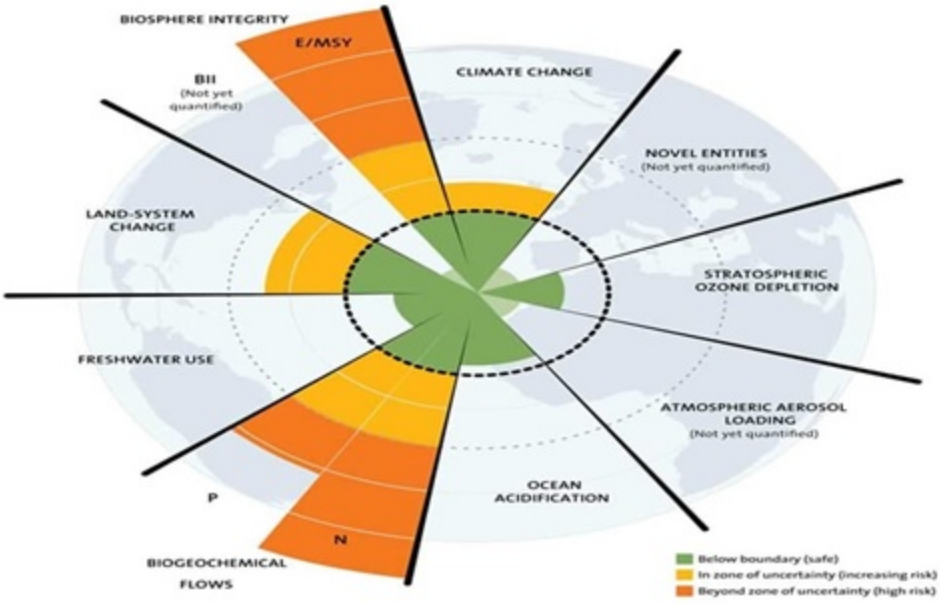
- climate change

- biodiversity loss
- ocean acidification
- ozone depletion
- atmospheric aerosol pollution
- freshwater use
- biogeochemical flows of nitrogen and phosphorus
- land-system change
- Release of novel chemicals.

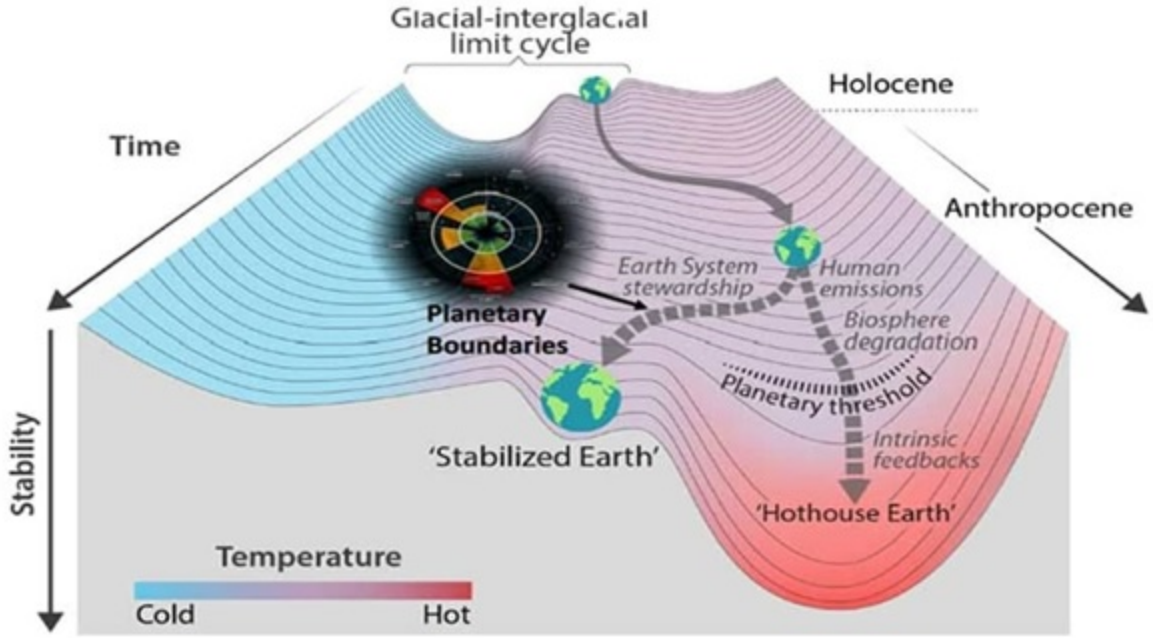
Humanity already exists outside the safe operating space for at least four of the nine boundaries:

- climate change,
- biodiversity,
- land-system change, and
- biogeochemical flows (nitrogen and phosphorus imbalance).

The best way to prevent overshoot, researchers say, is to revamp our energy and food systems.



The nine planetary boundaries, counter clockwise from top: climate change, biosphere integrity (functional and genetic), land-system change, freshwater use, biogeochemical flows (nitrogen and phosphorus), ocean acidification, atmospheric aerosol pollution, stratospheric ozone depletion, and release of novel chemicals (including heavy metals, radioactive materials, plastics, and more).



- **Earth Trajectories:** Think of the Earth's climate taking different trajectories through time — pathways weaving between different climate states.
- Different paths through all the possible climates can be influenced by distinct tipping points.
- Self-reinforcing feedback processes can lock the planet into a particular trajectory for centuries or millennia.
- There is no evidence that modern societies can exist, let alone thrive, in conditions substantially different from the Holocene.