

**SEMINAR NASIONAL BIODIVERSITAS SAVANA NUSA TENGGARA
BALAI PENELITIAN KEHUTANAN KUPANG, 24 NOVEMBER 2015**

Pengelolaan biodiversitas untuk mendukung pembangunan nasional

SUTARNO, A.D. SETYAWAN

Jur. Biologi FMIPA UNS Solo
Ketua MBI Pusat, Sekretaris MBI Pusat
nnsutarno@yahoo.com



**SEBELAS MARET
UNIVERSITY**

Convention on Biodiversity



“

At least 40 per cent of the world's economy and 80 per cent of the needs of the poor are derived from biological resources. In addition, the richer the diversity of life, the greater the opportunity for medical discoveries, economic development, and adaptive responses to such new challenges as climate change.

”

— *The Convention about Life on Earth*, *Convention on Biodiversity web site.*

What is Biodiversity?

- **Biological diversity is the variety and variability among living organisms and the ecological complexes in which they occur.**
- **The total of all living organisms found on Earth: plants, animals, microorganisms and the genes they contain and the ecosystems they are a part of.**



Biodiversity is the totality of

- Genetic diversity
 - Species diversity
 - Ecosystem diversity
- Diversity: A generic term for heterogeneity. The scientific meaning of diversity becomes clear from the context in which it is used; it may refer to heterogeneity of genes, species, or habitats.



Genetic diversity

- the range of genetic material present in a gene pool or population of a species.
- This covers distinct populations of the same species or genetic variation within a populations, e.g. Human population of Lesser Sunda Islands

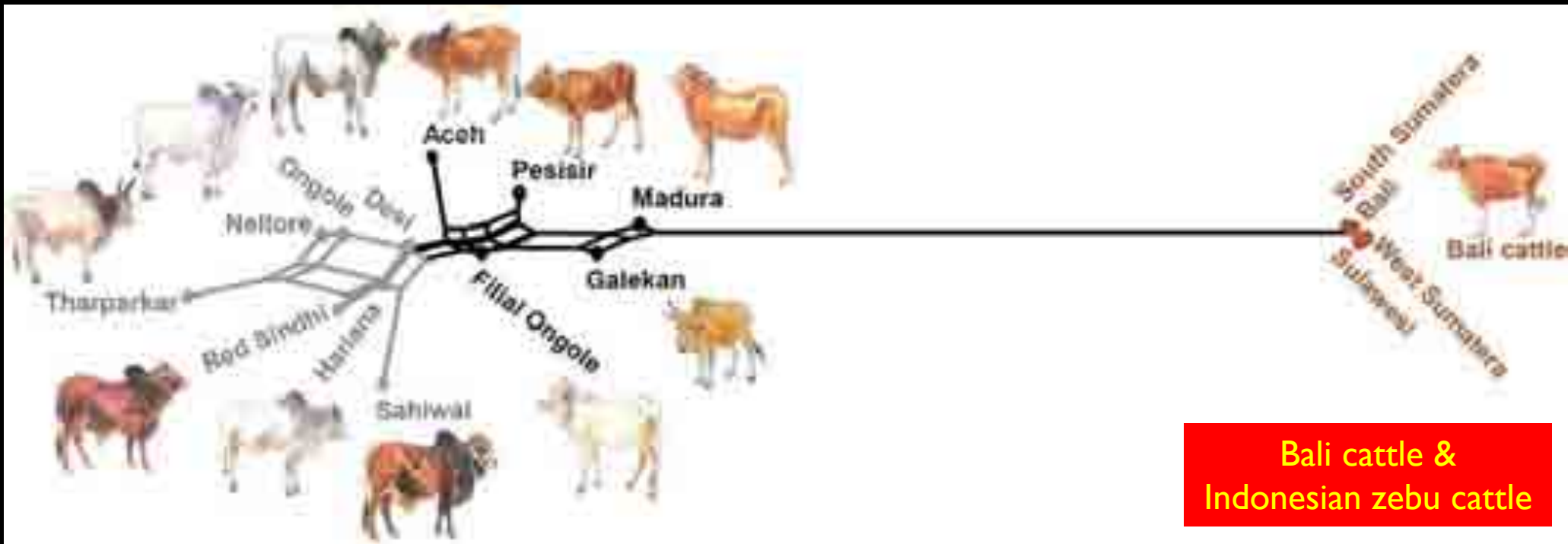


Face of Bali & Nusa Tenggara

Species diversity

- variety among species per unit area. Includes both the number of species present and their abundance, e.g. Indonesian cattle or cerealia

Cerealia



Bali cattle & Indonesian zebu cattle

Ecosystem diversity

- The range of different habitats or number of ecological niches per unit area in an ecosystem, community or biome.
- Conservation of habitat diversity usually leads to conservation of species and genetic diversity
- E.g. savana, rainforest, mangrove, coral, etc.



Why Is Biodiversity Important?

- Biodiversity boosts ecosystem productivity where each species, no matter how small, all have an important role to play.



Soil, Bacteria, Plants; The Nitrogen Cycle

- For example,
- A larger number of plant species means a greater variety of crops
- Greater species diversity ensures natural sustainability for all life forms
- Healthy ecosystems can better withstand and recover from a variety of disasters.
- And so, while we dominate this planet, we still need to preserve the diversity in wildlife.

Benefits of biodiversity

- Biodiversity is **life supporting system**, and also provides inputs for agriculture without which production; either would not occur or would be greatly decreased



Benefits of biodiversity

I. Ecosystem Services

- Protection of water resources
- Soil formation and protection
- Nutrient storage and cycling
- Pollution breakdown and absorption
- Contribution to climate stability
- Maintenance of ecosystems
- Pollination of crops
- Recovery from unpredictable events

2. Biological Resources

- Food
- Medicines
- Industrial use
- Ornamental plants
- Breeding stocks and population reservoirs

3. Social Benefits

- Education
- Recreation and research
- Cultural
- Aesthetic

Biodiversity threat

Main causes of biodiversity loss

More than 16,000 species are threatened with extinction, almost wholly as a result of human action

Habitat destruction

Agriculture, infrastructure (industry, urbanisation, etc)



Sumatran Orang-utan (palm oil plantations)

Global warming

Habitat and food loss from temperature change.

Disruption of migration patterns.

Westington's Solitary Coral (bleaching)



Over-exploitation

Species hunted for food, pet trade, medicines.

Logging, mining, fishing, groundwater extraction.



Great Hammerhead Shark (killed for its fins)

Pollution

(air, land, water)

Fossil fuels, pesticides, sewage, waste, oil spills, sonars, etc



Yangtze River Dolphin (pollution, over traffic)

Accidents / persecution

Ensnarement in fishing nets.

Traps, "pest" control, shooting, poisoning.

Red-headed Vulture (poisoned by drug used on cattle)



Non-native species

eg. cats and rats on islands; water hyacinth in US, Africa, Middle East



Echo Parakeet (introduction of rats and pigs)

Habitat destruction



Global warming

ROB JAKARTA

November-Desember 2007



— Lokasi Masuknya Air Laut

- 1 Muara Angke
- 2 Pluit Karang Ayu
- 3 Tanggul dekat pompa Pluit
- 4 Tanggul lama, Muara Baru
- 5 Tanggul penampungan batubara
- 6 Pelabuhan Sunda Kelapa

Skenario Jakarta tenggelam dalam beberapa tahun ke depan

Skenario Jakarta Terbenam

Perubahan akibat air laut pasang, pasang surut, dan kenaikan muka laut



2010



2030



2050



Over exploitation



Hiu



Paus



Pari Manra



Lumba-lumba

Pollution



Accident



Invasive species



Simmental



Simmental crossbreeds



Limousin



Limousin crossbreeds



Indonesia - Country Description



- Indonesia is located in the tropical belt, is the largest and widest archipelago country in the world, consist of 17,508 big and small islands, there are 5 big islands : Sumatera, Java, Borneo, Celebes and West Irian
- There are two season in Indonesia , May to October is dry season and October to April is rainy season
- Second world's longest coast line (81.000 km)
- In 2000, the total population was 206 million, representing the fourth largest country in the world
- With the population growth rate was 1,49 percent.
- Estimate population in 2006 was 220 million.

Indonesia - Biogeography



Global Biodiversity



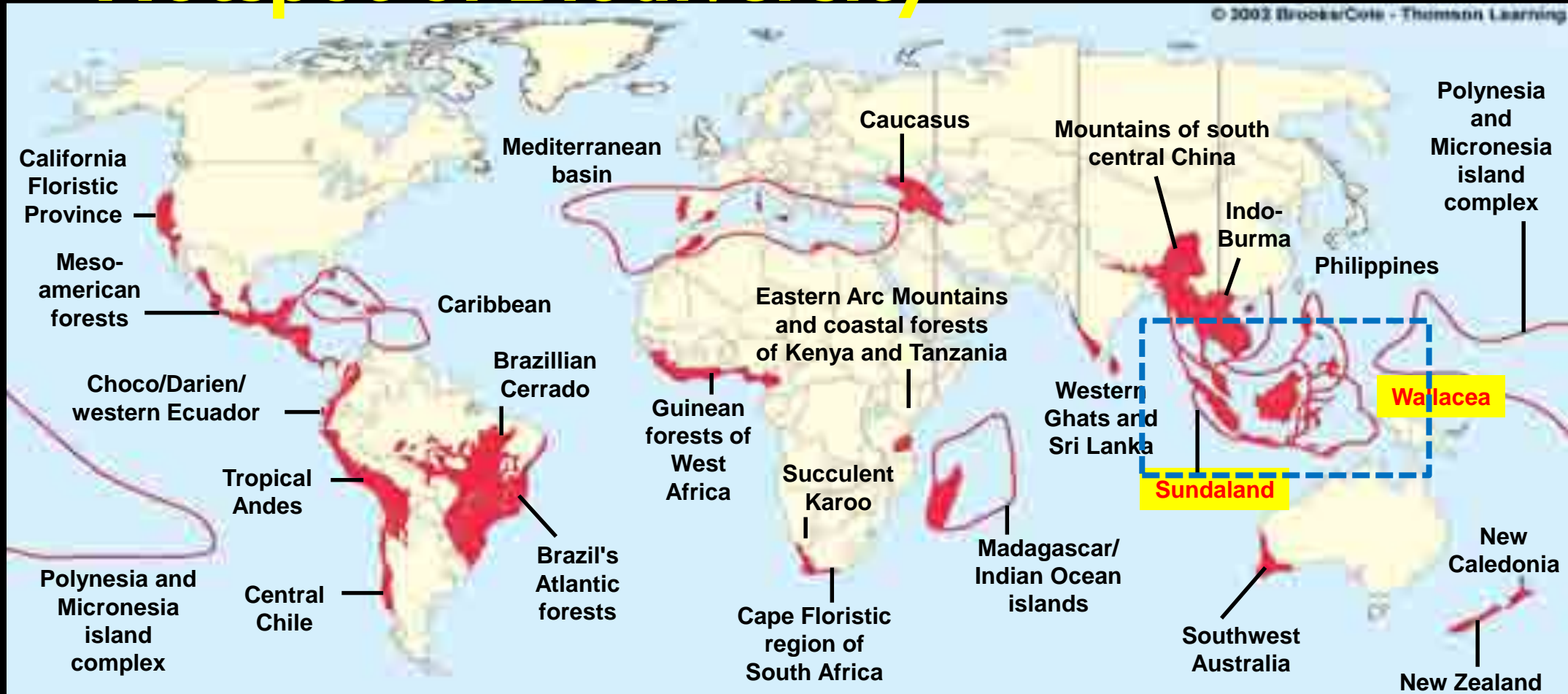
Mega Biodiversity



The 17 Most Biodiverse countries in the world.
What is the Problem with this?

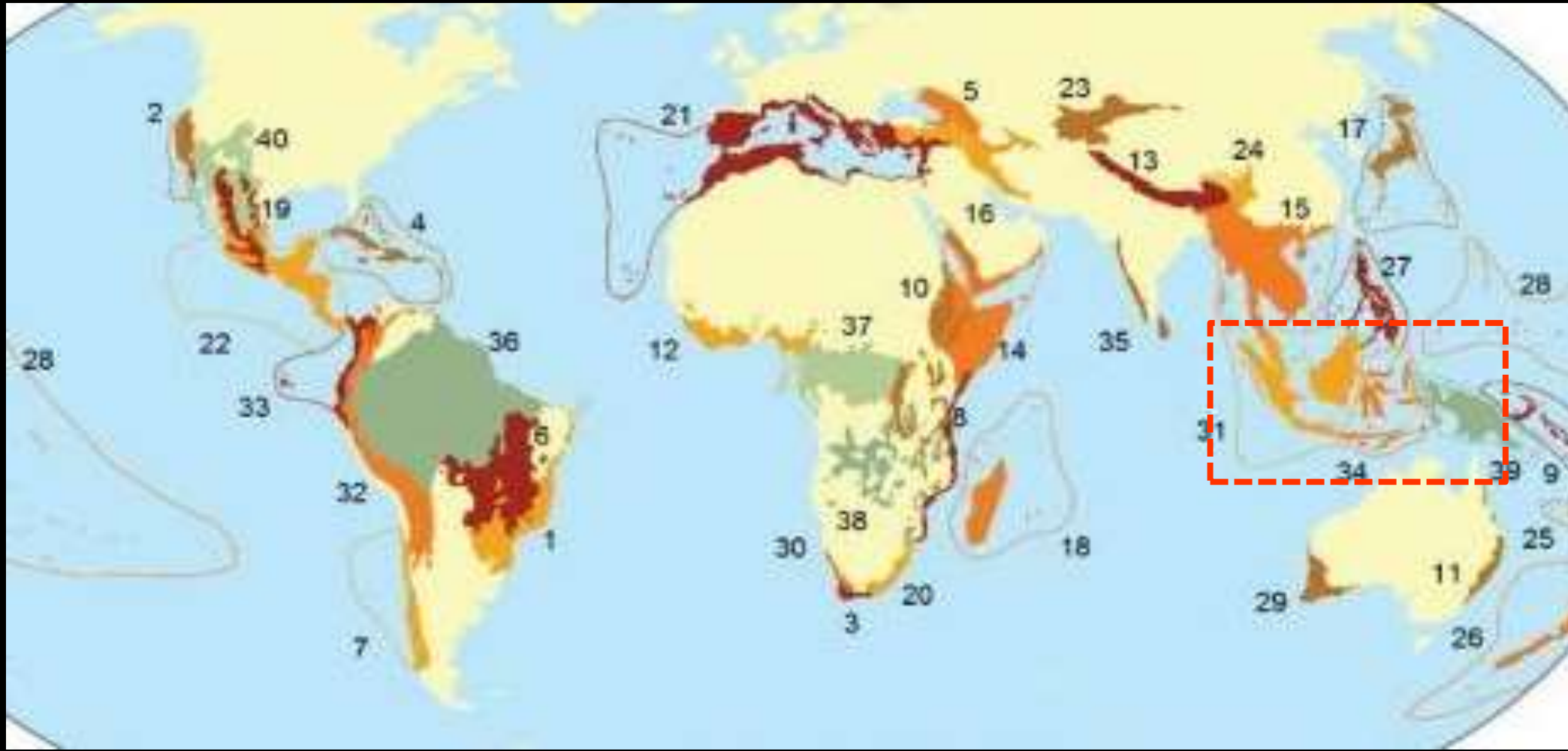
Hotspot of Biodiversity

© 2002 Brooks/Cole - Thomson Learning

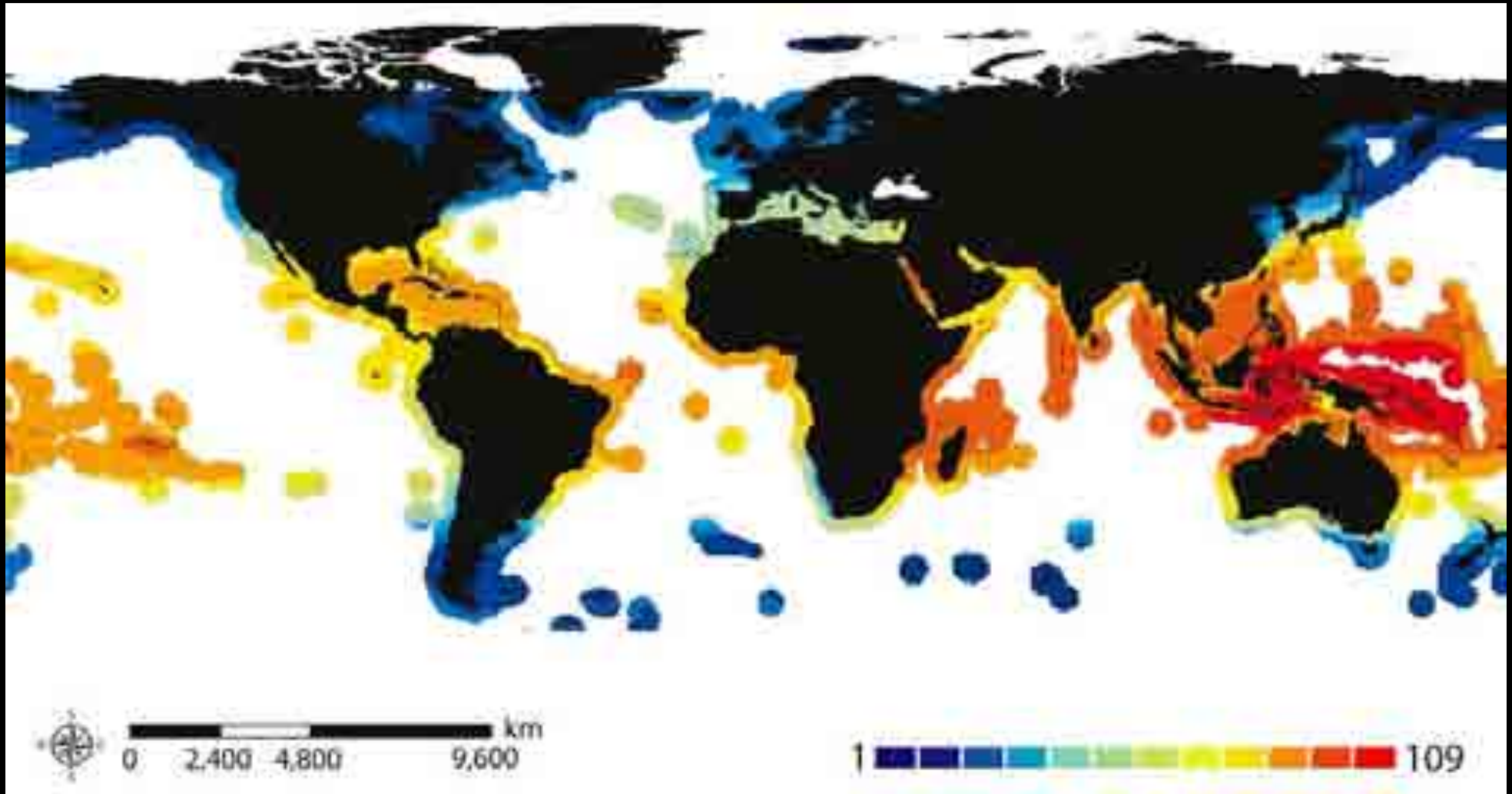


Biodiversity Hotspots need special consideration

High-biodiversity wilderness areas



Hotspot of Marine Biodiversity



Marine biodiversity – Coral Triangle



Revised MDG monitoring framework: proposals by the IAEG

**New Target (Goal 7): Reduce biodiversity loss,
with a significant reduction in its rate by
2010**

Proposed indicators:

- Proportion of species threatened with extinction
- Proportion of fish stocks within safe biological limits
- Water use to total water resources

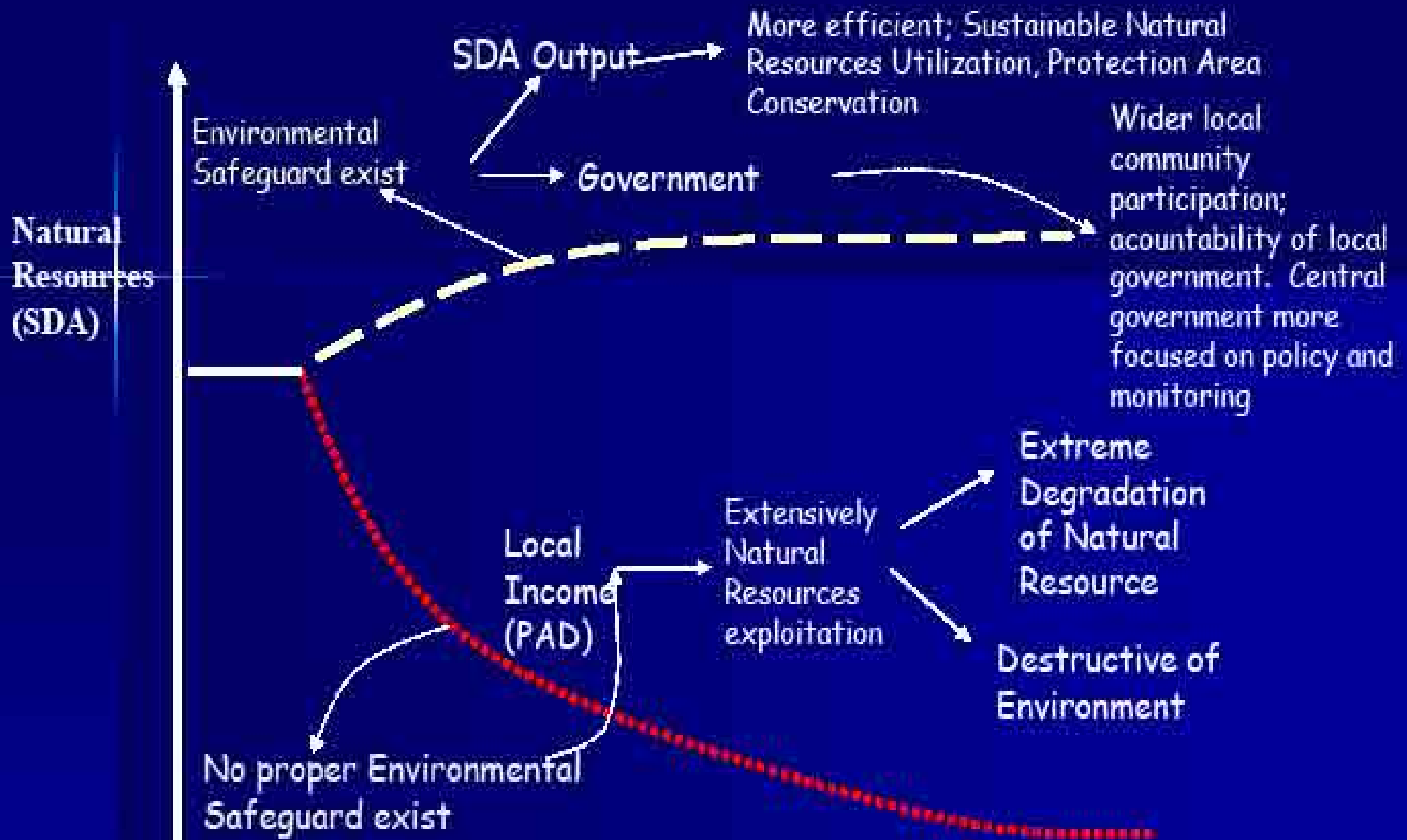
Biodiversity indicators

- Biodiversity indicators are easier to understand, communicate and act upon when they are linked together in a set that connects policies to outcomes.
- Four kinds of indicators are needed to make a joined-up set:
 - **Responses** – policies or actions to prevent or reduce biodiversity loss.
 - **Pressures** – the threats to biodiversity that responses aim to address.
 - **State** – the condition of biodiversity and how it is changing.
 - **Benefits** – amount and change in benefits and services that humans derive from biodiversity.



National Biodiversity Strategies and Action Plans – Indonesia

- **Examples of achievements in implementation**
- National Movement on Land and Forest Rehabilitation (Gerakan Nasional Rehabilitasi Lahan dan Hutan, GNRHL)
- Toward Green Indonesia Program (Program Menuju Indonesia Hijau)
- Draft of Act on Management of Genetic Resources
- National Clearing House Mechanism and Biodiversity Profile
- Act no. 21/2004 on Biosafety of Genetically Engineered Products



Integrated Resource and environmental management (IREM)

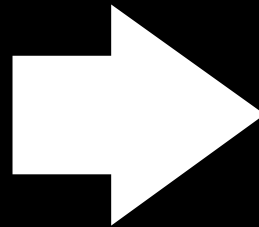
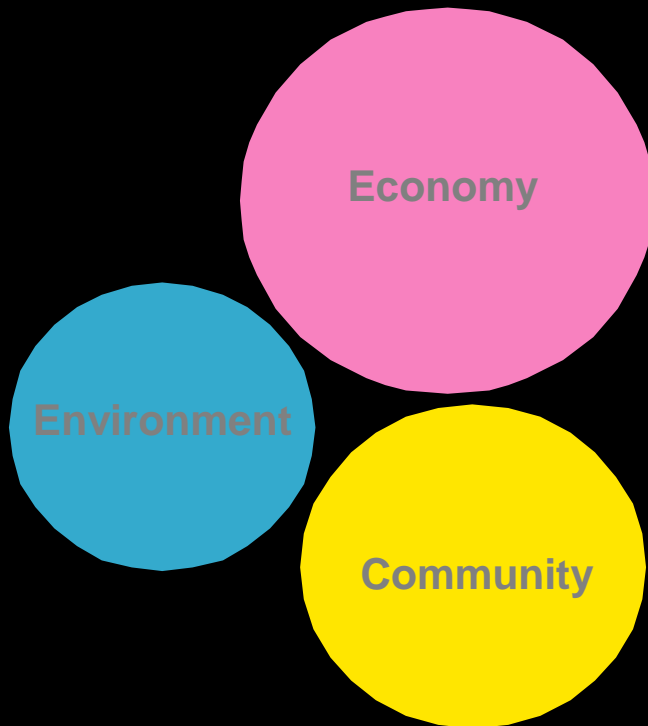
- A holistic and comprehensive approach to resource planning and management that encompasses ecological, social, and economic objectives

Pieces of the Management Puzzle



Conventional versus IREM

Conventional Approach



Integrated Approach

