



Livestock, Climate
and System
Resilience

Cost of inaction, benefits of action and benefit-cost analysis of investment in restoration/rehabilitation of livestock systems

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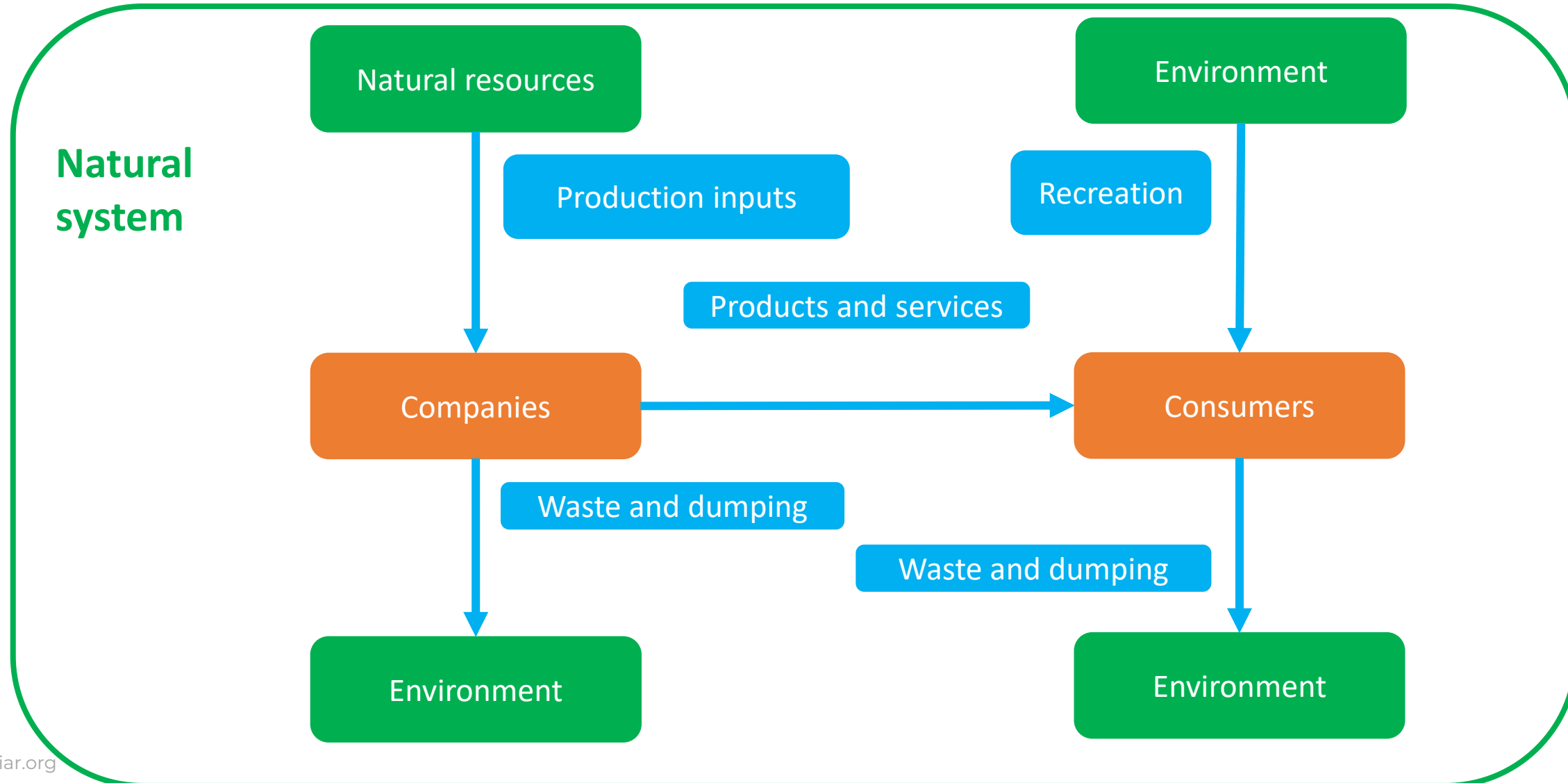
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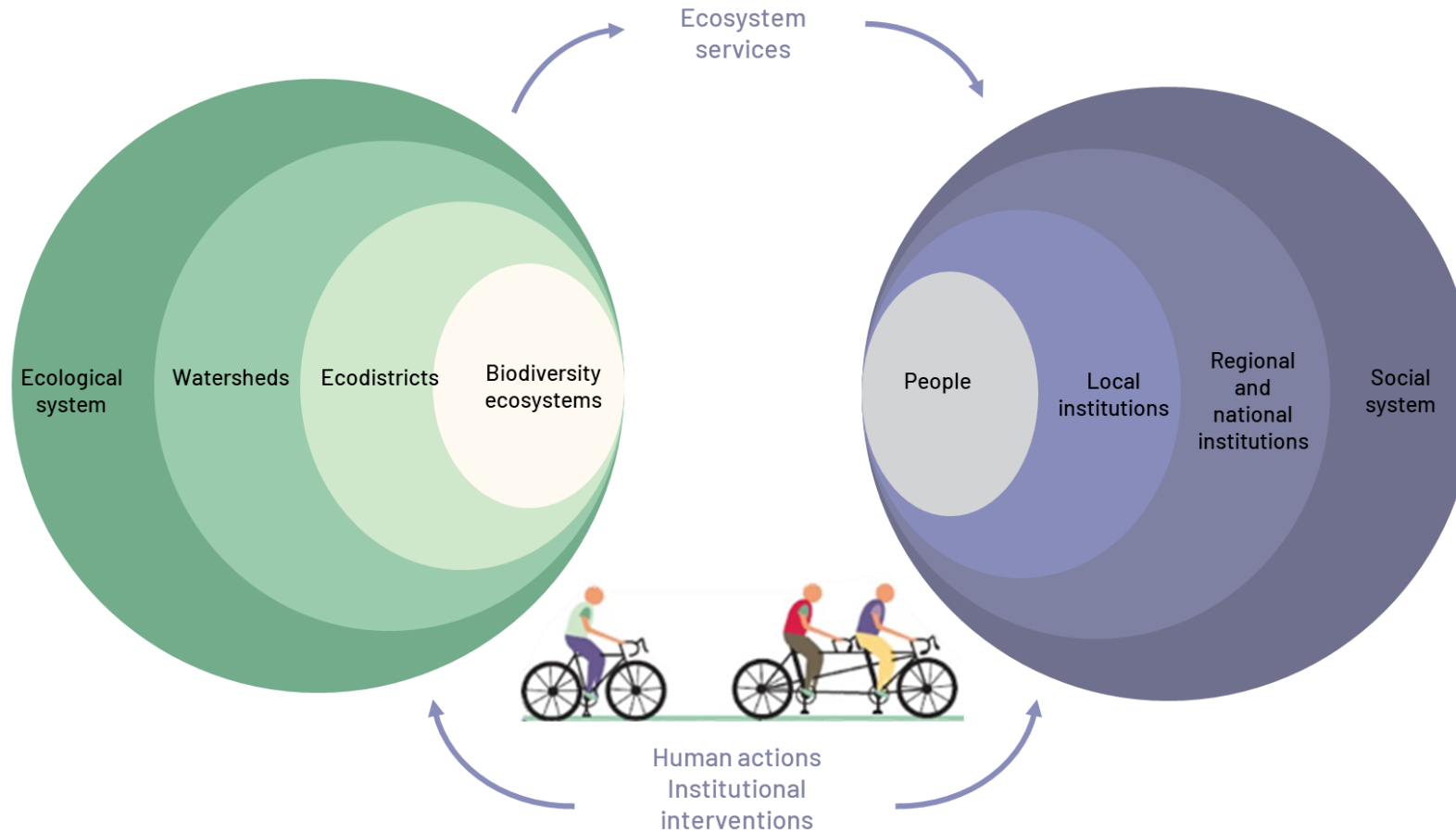
Traditional view of economic-environmental relations



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Socio-ecological system



Socio-ecological systems, also called socio-ecosystems, are based on the perspective of the **"human in nature"**, where it is considered that human societies are embedded in the limits imposed by the ecosphere and have co-evolved with the dynamics of ecological systems. In a process of coevolution, human systems and ecosystems have been molding and adapting together, becoming an integrated and coupled system of humans in nature (Farhad, 2012).

Ecosystem services



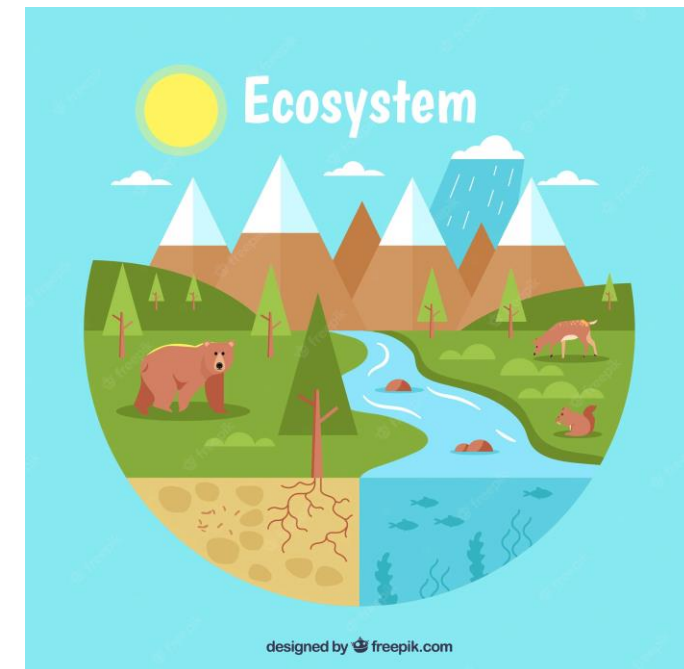
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Ecosystem services are the multitude of benefits that nature brings to society. Biodiversity is the existing diversity among living organisms, which is essential for the function of ecosystems and for them to provide their services.

Ecosystems -living elements that interact with each other and with their non-living environments- providing benefits, or services, to the world.

Ecosystem **services** make human life possible, for example by providing nutritious food and clean water; by regulating disease and weather; by supporting crop pollination and soil formation, and by offering recreational, cultural, and spiritual benefits. While these assets are estimated to be worth USD 125 trillion, they do not receive adequate attention in economic policies and regulations, which means that not enough is invested in their protection and management. In the next section, you can learn more about the four types of services provided by global ecosystems.

Biodiversity encompasses both the diversity within a species or an ecosystem and the diversity between species or ecosystems. Changes in biodiversity can influence the provision of ecosystem services. Biodiversity, like ecosystem services, must be protected and managed sustainably.



Ecosystem services classification



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Provisioning

The material benefits that people obtain from ecosystems, for example, the supply of food, water, fiber, wood and fuel.



Regulation

Benefits obtained from the regulation of ecosystem processes, for example, the regulation of air quality and soil fertility, the control of floods and diseases, and the pollination of crops.



Support

Functions necessary for producing all other ecosystem services (e.g., providing suitable habitat for plants and animals, enabling species diversity, and maintaining genetic diversity).



Socio-cultural

Immaterial benefits that people obtain from ecosystems (e.g., the source of inspiration for aesthetic manifestations and engineering works, cultural identity and spiritual well-being).

Provisioning services



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Foods

Virtually all ecosystems provide the conditions necessary for growing, gathering, hunting, or harvesting food.



Raw Materials

Ecosystems provide a great diversity of materials, such as wood, biofuels, and fibers from cultivated or wild plant and animal species.



Sweet water

Ecosystems play a critical role in the supply and storage of freshwater.



medicinal resources

Natural ecosystems provide a diversity of organisms that offer effective remedies for many types of health problems. They are used in folk and traditional medicine, as well as in the production of pharmaceuticals.

Regulation services



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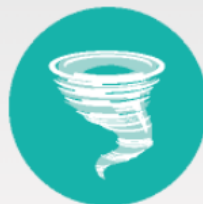
Local climate and air quality

Ecosystems influence local climate and air quality. For example, trees provide shade while forests influence rainfall and water availability, both locally and regionally. Trees and other plants also play an important role in regulating air quality by removing pollutants from the atmosphere.



Carbon sequestration and storage

Ecosystems regulate the global climate by storing greenhouse gases. For example, when trees and plants grow, they remove carbon dioxide from the atmosphere and effectively retain it in their tissues.



Moderation of extreme events

Ecosystems and living organisms create buffers against natural disasters. They reduce damage caused by floods, storms, tsunamis, avalanches, landslides and droughts.



Sewage treatment

Some ecosystems, such as wetlands, filter effluents, break down waste through the biological activity of microorganisms, and kill harmful pathogens.



Prevention of erosion and conservation of soil fertility

Vegetation cover prevents soil erosion and ensures soil fertility through natural biological processes such as nitrogen fixation. Soil erosion is a key factor in the process of land degradation, loss of soil fertility and desertification, and contributes to reducing the productivity of fishing in the lower reaches of rivers.



Pollination

Insects and wind pollinate plants and trees, which is essential for the development of fruits, vegetables and seeds. Animal pollination is an ecosystem service provided mainly by insects but also by some birds and bats. In agroecosystems, pollinators are vital for horticultural and forage production, as well as for seed production of many root and fiber crops. Some pollinators such as bees, birds and bats influence 35% of global agricultural production, raising the production of around 75% of the world's main food crops.



Biological pest control

Activities of predators and parasites in ecosystems that serve to control populations of potential pest and disease vectors.



Regulation of water flows

Regulation of water flows is a key service provided by land cover and land configuration, but its dynamics are poorly understood by most policy makers and land management organizations.

Support services



Habitat for species

Ecosystems provide living spaces for plants and animals; they also maintain a variety of complex processes that support other ecosystem services. Some habitats have exceptionally high numbers of species that make them more genetically diverse than others; these are known as “biodiversity hotspots”.



Conservation of genetic diversity

[Genetic diversity (the variety of genes between and within populations of species) differentiates breeds from each other, providing the basis for cultivars well adapted to local conditions and a gene pool for the development of commercial crops and livestock.

Socio cultural services



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Recreational Activities and Mental and Physical Health

Nature-based recreational opportunities play an important role in maintaining mental and physical health (for example, walking and playing sports in parks and urban green spaces).



tourism

The enjoyment of nature attracts millions of travelers worldwide. This cultural ecosystem service comprises both benefits for visitors and income-generating opportunities for providers of nature tourism services.



Aesthetic appreciation and inspiration for culture, art and design

Animals, plants and ecosystems have been a source of inspiration for much of our art, culture and design; they also increasingly serve as inspiration for science.



Spiritual experience and feeling of belonging

Nature is a common element in most major religions. Natural heritage, a spiritual sense of belonging, traditional knowledge and related customs are important in creating a sense of belonging.

Agriculture, livestock, and ecosystem services: Examples



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| positive effects | Negative effects |
|--|--|
| <ul style="list-style-type: none">❖ Agriculture provides habitats for wildlife and creates landscapes with aesthetic value | <ul style="list-style-type: none">❖ Pesticides, as well as the homogenization of the landscape, can reduce natural pollination |
| <ul style="list-style-type: none">❖ Forests help maintain healthy aquatic ecosystems and provide reliable sources of clean water | <ul style="list-style-type: none">❖ Deforestation and poor management can increase flooding and landslides during cyclones |
| <ul style="list-style-type: none">❖ Animal droppings can be an important source of nutrients and seed dispersal and can maintain the fertility of soils in rangelands. | <ul style="list-style-type: none">❖ Excessive animal excrement and poor management can lead to water pollution and endanger aquatic biodiversity |
| <ul style="list-style-type: none">❖ Sustainable and integrated aquaculture can enhance the flood protection role of mangroves | <ul style="list-style-type: none">❖ Overfishing has devastating consequences for ocean communities, disrupting the food chain and destroying the natural habitats of many aquatic species. |

Integral Valuation: Under No Action, and Action Scenarios



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Ecological valuation

- Identification of ecosystem services
- Unit of measurement and measurement techniques
- Quantification of ecosystem services (lost/prevented from being lost/gained)



Economic valuation

- Identification of economic utilities affected (e.g., farm profit, park fees, etc.)
- Quantification of the value of economic utilities lost/prevented/gained



Social valuation

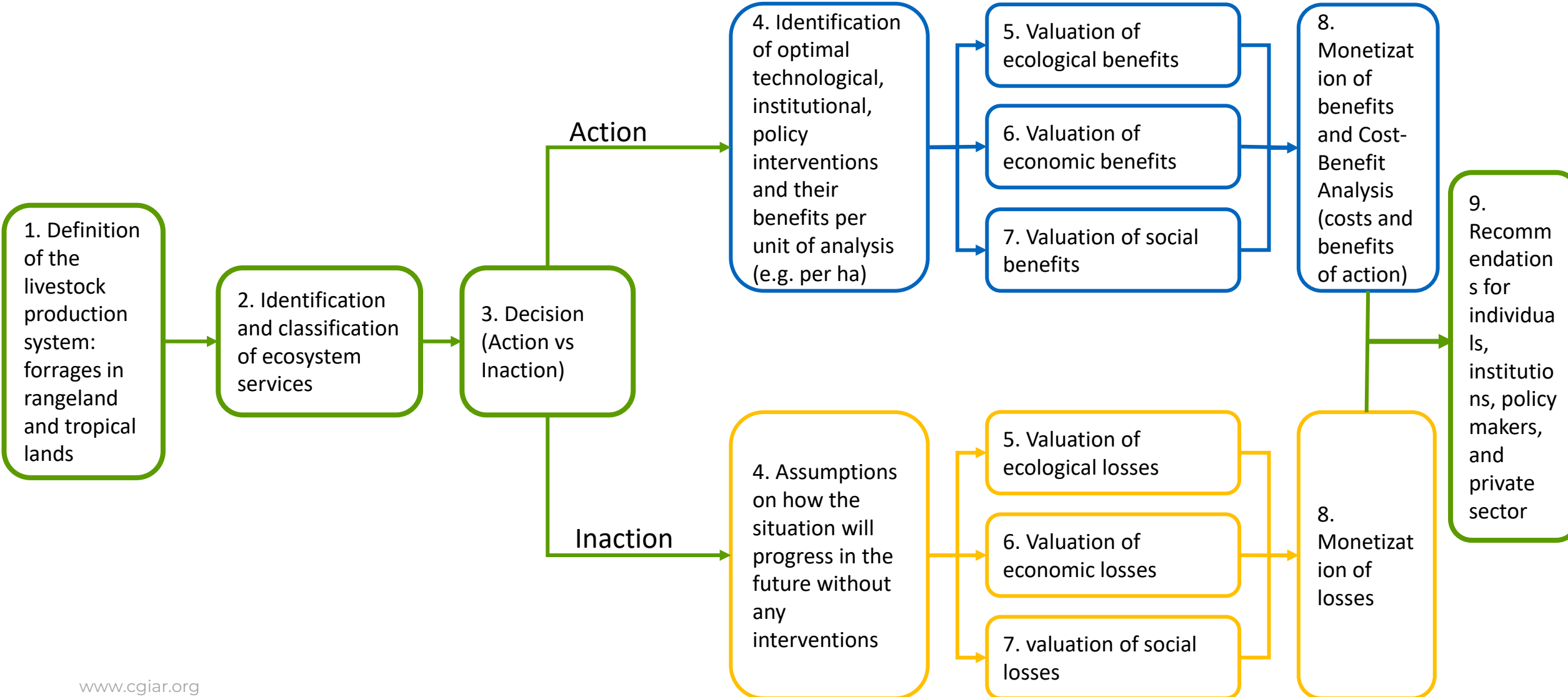
- Identification of social values affected
- Quantification of the social values affected (e.g., # of people sick from pollution)



Monetization and Benefit-Cost Analysis of investment on interventions

- Monetizing the values of all the ecosystem services lost/prevented from being lost/gained
- Estimation of the cost of implementing the recommended interventions
- Benefit-Cost analysis of investment on restoration of livestock systems

Road map 2023 - 2024



Thank you!



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