

# The Global Environment

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# Ecological System and Biosphere

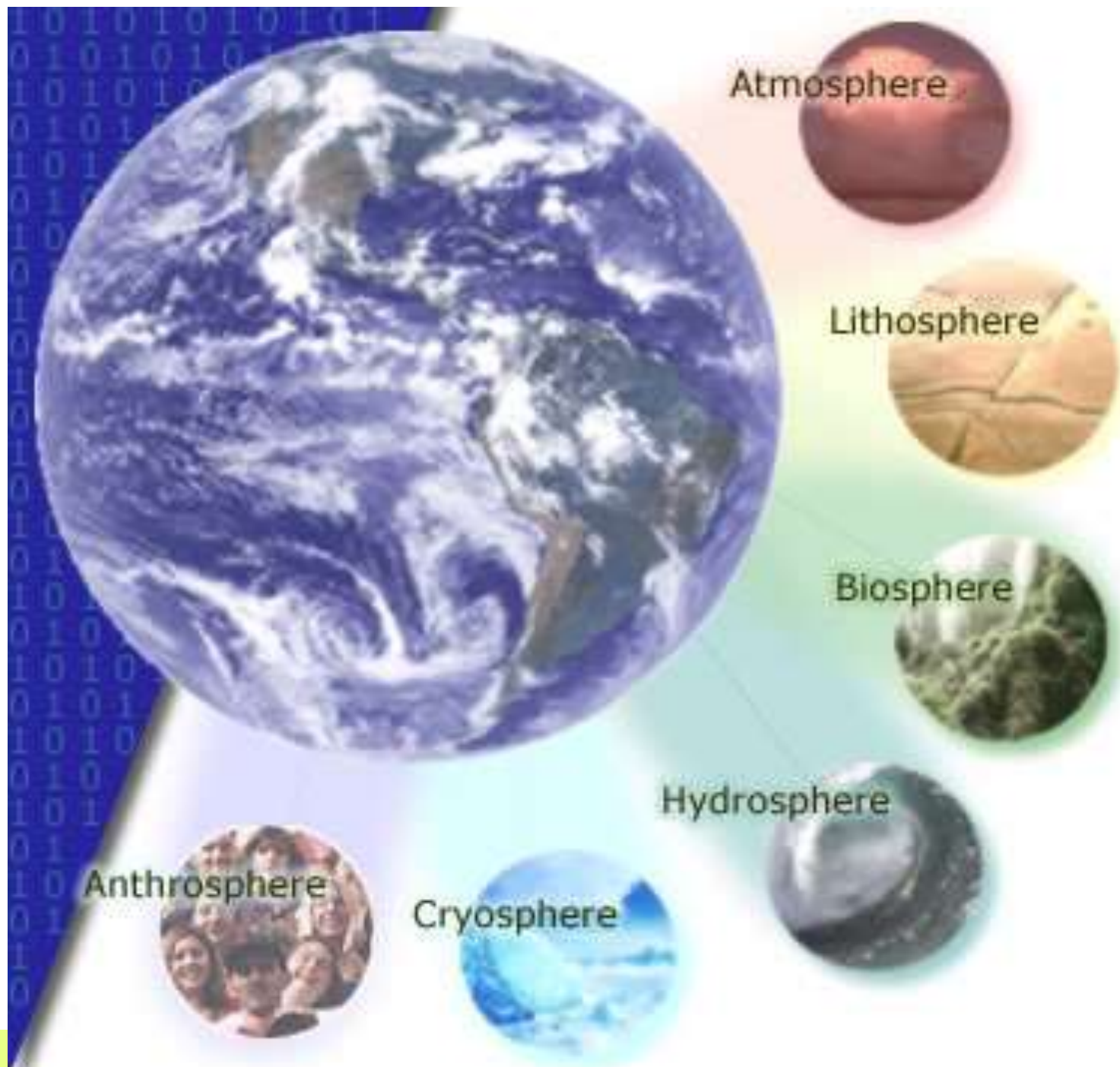
- The ecological system in which we live, and we are a part is the biosphere which is the largest and most complex.
- The biosphere is the thin covering of the planet that contains and sustains living organisms.
- Portion of biosphere may be in the hydrosphere ( water ), atmosphere (air ) or lithosphere (rock, and crust of earth ).
- Biosphere consists of, among many other things, plants, trees, insects, fish, micro-organisms and people



A familiar scene on Earth which simultaneously shows the lithosphere, hydrosphere and atmosphere.

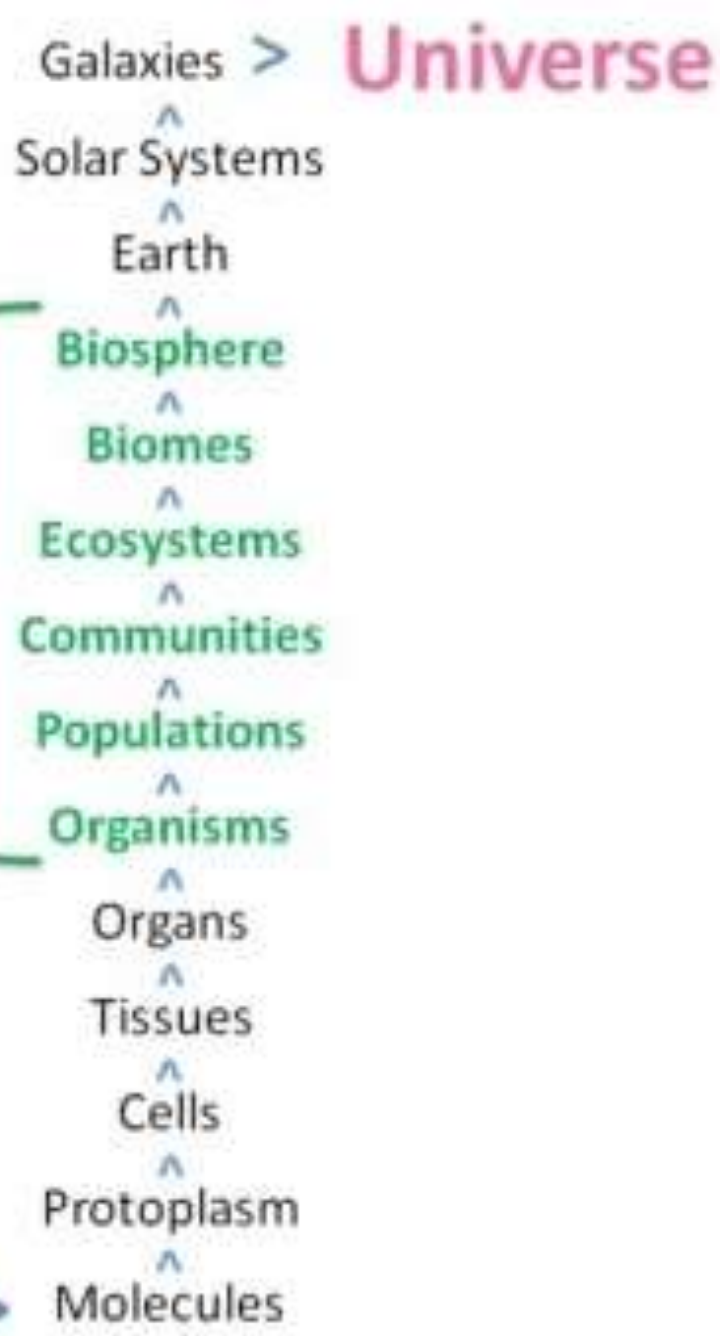






# Levels of Organization

Ecology



- All life in the biosphere is essential if we are to live in a healthy environment in which we and other forms of life can live sustainably in relative security.
- If we do not see how we as individuals interact with and affect the ecological community of which we are part, we will not feel any sense of responsibility toward it.
- Without this sense of connection, we are likely to engage in irresponsible activities that could be harmful to the Earth

# Cause and Effect

- The law of cause and effect states that every action cause a reaction. Everything we sets off a chain of events that extends far beyond our control.
- Thus pollution fills the air with substances that harm people's lungs, rises into the atmosphere to cause global warming, falls back to Earth as acid rain to kill forest and sterilize lakes, and even contributes to the deterioration of the planet's protective ozone layer.



- On the other hand, the simple act of recycling can save trees from being cut down unnecessarily. Trees absorb carbon from the atmosphere, and this helps offset the effects of global warming.
- There are also many “unseen” consequences to actions. When one action is accompanied by another somewhere else, can create effects much greater than if the first action had occurred on its own. That is the power of community.

Trees absorb carbon from the atmosphere



# Ecosystems

- An ecosystem is a system of plants, animals and other organisms, together with the nonliving components of their environment.
- Our environment is made up of everything that surrounds us as earth, air, water or fire.
- When we eat food a part of it goes to help build and maintain our bodies, a portion goes to energy which affects the environment through our actions and a third portion is eliminated from the body.

- When we die, our bodies themselves return to the environment which they were borrowed.
- In such ways, organisms and their environment are interconnected and interdependent aspects of one world.
- The living and non-living elements of an ecosystem are connected through flows of energy activated by the cycling of chemical elements.

- Forests are an example of a complex system of ecosystems. Forests consist of air, soil, water, nutrients and particular species of animals, birds, insects, micro-organisms, trees and other plant life.
- If some of the trees are cut down, each of the other elements will be affected. Animals and birds may lose their habitats, soil may erode, nutrients may be displaced, and the flow of waterways may change.



Spiny forest at Ifaty, Madagascar, featuring various *Adansonia* (baobab) species, *Alluaudia procera* (Madagascar ocotillo) and other vegetation.



Temperate rainforest on the Olympic Peninsula in Washington state.





# Flora of Baja California Desert, Cataviña region, Mexico.



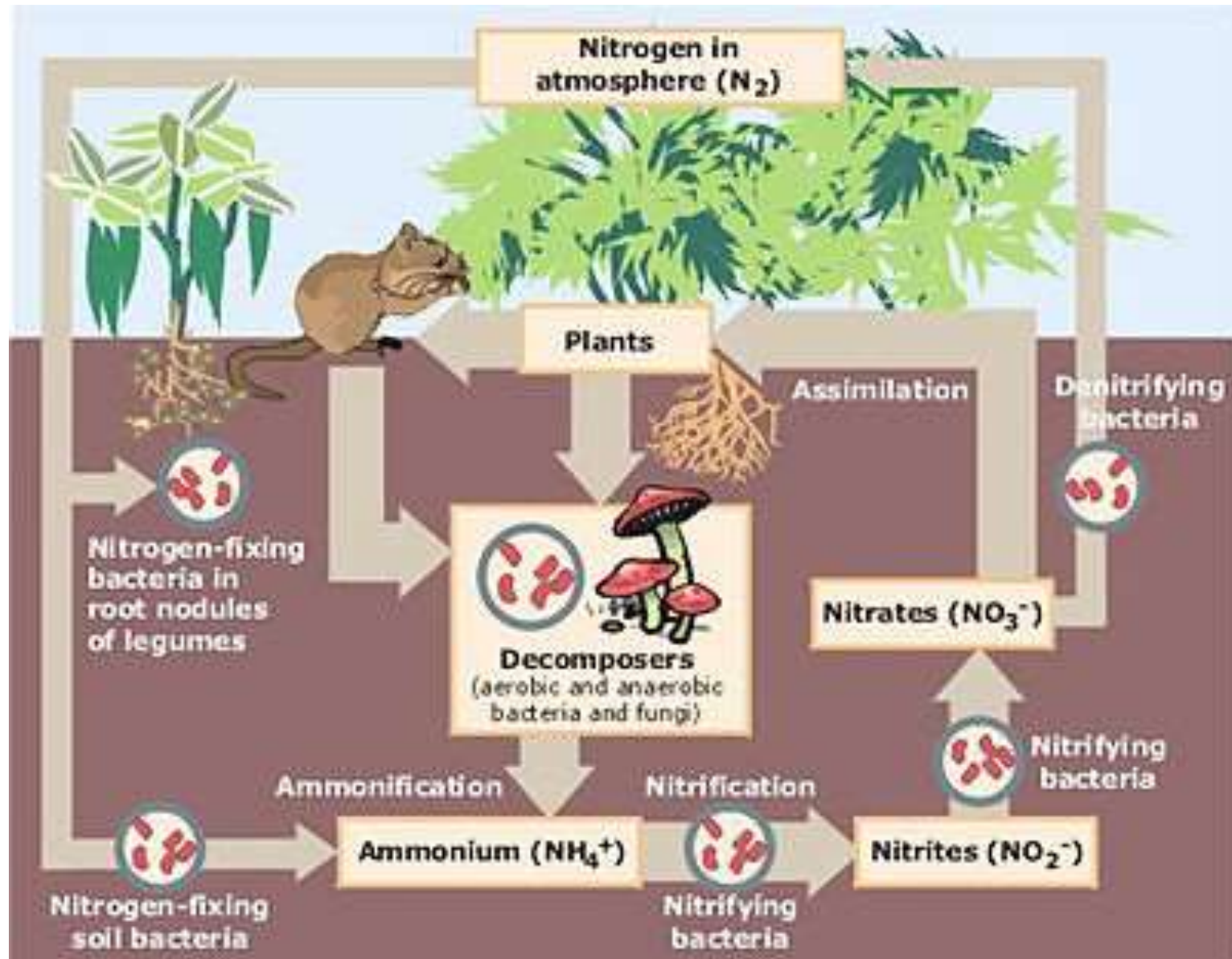
A freshwater ecosystem in Gran Canaria, an island of the Canary Islands.



- The concept of ecosystem is important because it conveys one of the key insights gained from the science of ecology- everything is related with and interconnected to everything else.
- Since no part of the global ecosystem exists independently of another, none can be affected without affecting the others.
- Ecosystems change over time, but this change is natural and occurs in certain recognizable, repeatable patterns.
- The composition of species of trees in forests, for example, will change in a relatively predictable way over time.



# Biological nitrogen cycling



# Biodiversity

- It is said that there are more species of life on Earth than stars in the visible universe. Conservative estimates put the number at up to 100 million. Of these, only about 1.7million plants, animals and microorganisms have so far been discovered and given names. We are but one of these species.
- Tropical forests are known to contain roughly half of the biodiversity of the entire planet. Most of the Earth is covered by water, where many forms of life live. The deep sea floor has only been partially studied and is now proving to be extremely rich in biodiversity.



# Marine Biodiversity



- Such diversity took millions of years to reach its present, rich and incredibly complex and balanced state. It is now, in our lifetime, threatened with massive devastation, because of human activity.
- Similar to other global ecological problems, species extinction is proceeding rapidly. Unlike many other environmental problems, however it is completely irreversible. Extinction is forever.
- From overpopulation to deforestation, our activity is threatening the existence of the other species with which we share this Earth.

- The predominant causes for the loss of biodiversity and degradation of the biological resources include large –scale clearing and burning of forests, destruction of coral reefs, destructive fishing practices, overharvesting of plants and animals, the illegal trade in endangered species of wild fauna and flora, indiscriminate use of pesticides, draining and filling of wetlands, air pollution, and conversion of wild lands to agricultural and urban uses.
- More than 60 per cent of the world's people depend directly on plants for their medicines. Wild plants and animal species also have high commercial value other than for medicine. They are of resins, oil, dyes and other commercially useful compounds.



# The Earth's Resources

- The resources are from the air, the ground, the water and even the organisms of the biosphere.
- Resources are either 'renewable' or 'non-renewable'.
- Many resources of the non-renewable type (such as petroleum and minerals) are harvested from beneath the Earth's crust, and so the Earth's ecosystems have evolved with only limited exposure to them.
- As a result, many non-renewable resources are 'foreign' to the biosphere and can be harmful to organisms, disrupting the ecosystems of the biosphere.

- Land use associated with the mining disturbs and often displaces human communities and many species of wildlife.
- The smelting of metals and the refining of fuels often releases pollutants into the surrounding air, soil and water.
- These activities degrade the habitat and can create serious health risk for both humans and wildlife.
- Similar negative environmental impacts may occur because of fuel leaks and spills.
- The burning of fossil fuels, a non-renewable resources, contributes to global warming smog and acid rain.

- Unlike renewable resources, the non-renewable resources from the Earth's crust cannot be used sustainably.
- There is a certain quantity or volume of their existence which will not increase with time.
- Therefore, they do not replace themselves when used. At any rate of consumption, these resources will eventually be entirely depleted.
- Products made from non-renewable resources, if not reused or recycled, can end up in landfills, adding to the problem of accumulated solid waste.

# Renewable Resources

- Many different environmental problems also arise from the use of renewable resources, especially if they are exploited to the point of extinction, at which time they consequently become non-renewable.
- If a forest expands at a rate of five per cent a year, and if a community logs five per cent of the trees a year, the timber industry will in fact sustainable and durable.
- In effect, the forest itself is the community's capital, and the five per cent it harvest can be considered the interest, or the profit from the capital.

- However, if that community cuts down 10, 20, 30 per cent or more of its forest each year, then it would be using up its capital and the activity would not be sustainable – the forest would eventually be depleted.
- Many renewable forms of energy, such as solar, wind and geothermal power are increasingly being used to provide energy requirements effectively and most importantly – sustainably.
- It is doubtful whether a community will be able to make a radical shift from non-renewable to renewable resources.



- In the search for sustainability, the emphasis should be placed on the wise use of resources.
- When using non-renewable resources, extreme care and caution should be exercised to ensure the environment is not compromised through pollution, waste or overexploitation.
- In all cases, when using non-renewable or renewable resources, wise energy use and conservation should be exercised to ensure that energy is not wasted needlessly.

# Environmental Impact

- Human beings are just one of many species that form the ecosystem. We humans are unique in many ways, especially in the extent to which we are able to affect our ecosystems—for better or worse.
- Our environmental impact has grown in scale, more rapid and changed in character. Whereas we once affected only small regions, today we are transforming the Earth itself on a global scale.
- Changes which once took decades or centuries are now taking place within a few years.

- There are number of reasons why human civilization has such a powerful effect on the ecosystem. Rapid population growth, combined with the development of fossil fuel-based industrialized societies, has dramatically accelerated environmental impacts.
- The results of this change in the relationship between ourselves and our environment have not all been bad, however. An increase in food production and advances in the field of medicine have resulted in a world population that is overall, healthier and better fed than in previous generations.

- On the other hand, the unintended consequences of many of our activities, especially in the last 200 years, have resulted in serious damage to the environment.
- While we once affected the Earth in relatively insignificant ways, we are now changing the fundamental elements of the planet's life-support systems.

# Sustainability

- As a species we can prosper without damaging our environment if we learn how to manage our relationship with the ecosystems of which we are part. The key, again, is “SUSTAINABILITY”.
- If we are to ensure a healthy Earth where future generations can prosper, we will have to discover ways to achieve and maintain a comfortable standard of living for all of humanity that does not take more from the environment than can be regenerated.



# Agenda 21 and Civil Societies' Action

- Agenda 21 called on all governments to participate fully with community organizations in the search for sustainable solutions to the planet's environment and development crises.
- Today, local communities are involved in much of the action needed to ensure a global shift to sustainable living.
- In rich and poor countries alike, there is movement of community-based organizations that are either acting on their own, combining forces with each other or joining with governments to ensure a sustainable and healthy planet.

# Followings are some suggestions of environmental principles

- Prevent pollution
- Reduce waste
- Use water, energy and other resources efficiently
- Manage the use of natural resources prudently
- Maintain the diversity of life
- Commemorate, protect and respect the world's natural, cultural, indigenous and historical heritage
- Support environmental education and training
- Support local action and community participation
- Promote practices, methods and technologies that reduce negative impacts on the environment

# Questions and Answer



Thanks for your attention

