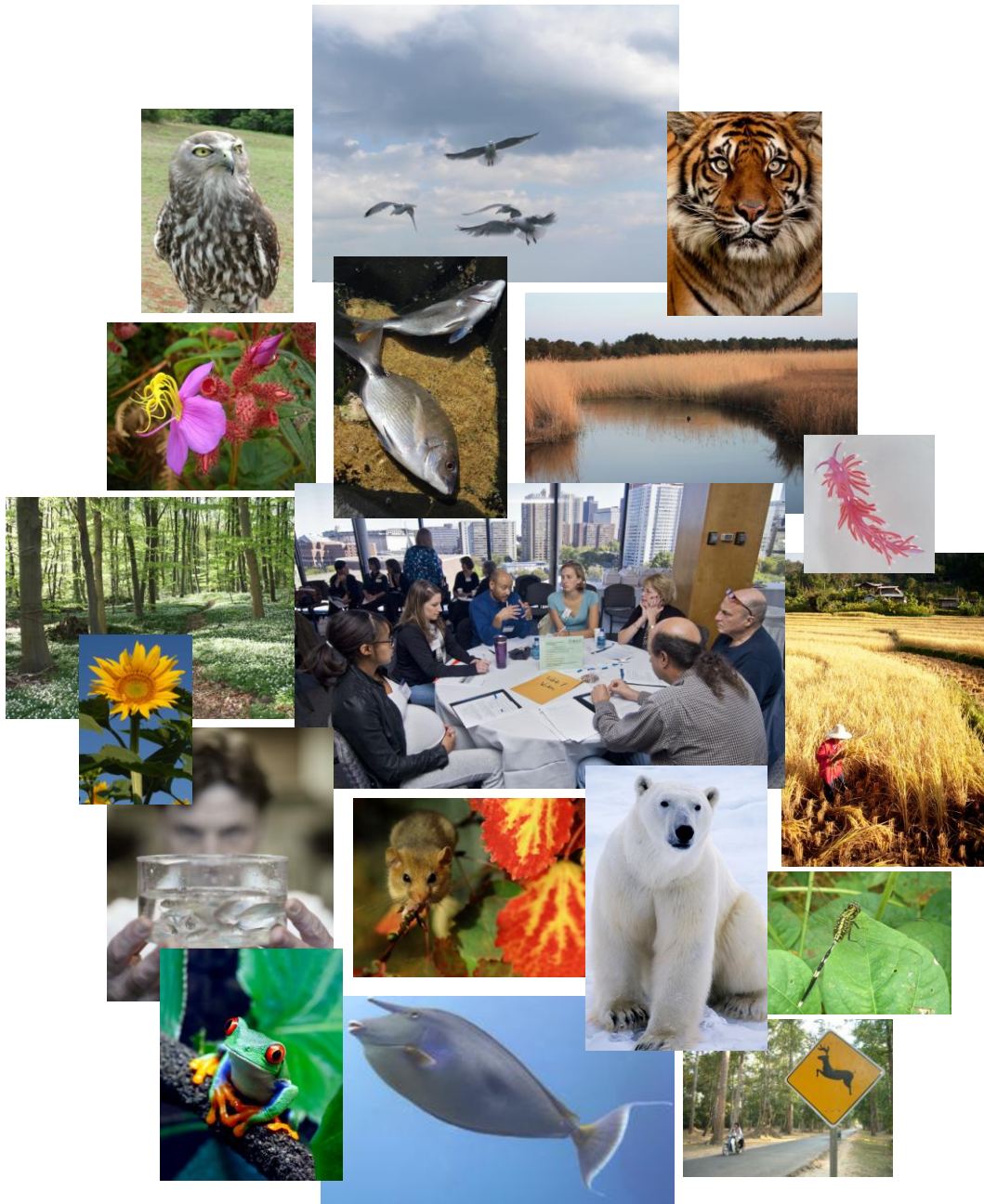




# World Wide Views - Biodiversity

## Information Booklet



This information booklet is made to serve the specific purpose of informing participants in the World Wide Views 2012. The publication is provided by The Danish Board of Technology to all partners in the World Wide Views alliance. Read more about the project and the partners on [wwviews.org](http://wwviews.org).

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## Information Material for Citizens

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## 0. Foreword

**Welcome to World Wide Views on Biodiversity!** We have invited you to take part in World Wide Views because political leaders need to learn about your views on what should be done about global biodiversity loss. Biodiversity is a term for the variety of nature and life on Earth, for all the kinds of plants, animals and micro-organisms on land and in the water (both freshwater and the sea). In the past 30 years, human demands on nature have led to a serious decline in biodiversity.

In intact nature a full range of different organisms interact, ultimately providing vital goods and services for humans. These include clean water and air, food, fuel, fibres and medicine, healthy soil, enough plant nutrients, crops and livestock. The richer the diversity of life, the greater the opportunity for medical discoveries, economic development and responses to challenges such as climate change. Biodiversity is not only the basis of but also the glue that holds together life on Earth. Its loss will affect all people around the world, but there are different opinions on what and how much should be done to protect it. At the World Wide Views meeting, you will have the opportunity to share your views on biodiversity, its loss and ways to protect it with fellow citizens. This booklet provides basic information about biodiversity and what might be done to stop its loss, along with different points of view about possible actions. It will serve as a common basis for the discussions at the WWViews meeting on September 15th 2012. No additional knowledge about biodiversity is needed to participate.

The focus of the booklet is on issues that will be addressed at the UN Biodiversity conference, COP11, in India in October 2012, where representatives from countries around the world will meet to discuss policy measures to stop the worldwide decline of biodiversity. WWViews on Biodiversity will provide the representatives and other decision-makers with your opinions: the views of the citizens. To participate in WWViews on Biodiversity, however, you do not necessarily have to believe it is important to halt the loss of biodiversity. You can be in favour of or against that opinion. The issues of biodiversity relate also to economy, development and issues of justice and fairness. That is why debates should go beyond solely involving policymakers, industries, experts and NGOs to include the general public. Politicians determine the future of the planet, but you as a citizen will have to live with the consequences of their decisions. This makes your opinion important. Have your say!

**How to read the document:** The paper consists of four parts. The first part is a general introduction to biodiversity, its status and past decline and how the loss of biodiversity might affect us. Also, the Convention on Biological Diversity as an international agreement that deals with biodiversity is presented. The second part goes into detail with Biodiversity on Land. How agriculture influences biodiversity, what protected areas can do to save biodiversity and what might be necessary to stop the loss of natural areas and biodiversity. The third part is about important aspects of Biodiversity in the Sea, covering two thirds of the earth's surface. Marine biodiversity and fishery are closely connected, so you will hear about how to stop the collapse of fish stocks, how to save coral reefs and what problems are faced when trying to establish Marine Protected Areas. The fourth part is about global sharing of burdens and benefits. How to raise money for biodiversity protection and how to spend it wisely is one of the key issues at the COP11. Also, the so-called Nagoya Protocol is discussed, an international agreement made in 2010 that will set up rules for legal access to biodiversity in other countries and for fair and equitable sharing of benefits that arise from utilization of these resources.

The information in this booklet comes from reports written by scientists all over the world. They have explored many aspects of biodiversity for years to establish how nature works and where the limit for human activity might be. They tell us what we actually know and what we do not know, so we can all make informed decisions about what to do.

**How this document was produced:** This booklet was written by BIOFACTION Vienna in close cooperation with the Danish Board of Technology, the coordinator of World Wide Views. A Scientific Advisory Board double-checked the information given.

Vienna, June 2012



## 1. Introduction to Biodiversity

This first chapter provides an overview over biodiversity around the world. Important terms used in the booklet and issues raised are explained. The causes and consequences of biodiversity loss over the past 30 years – as far as known – will be described along with relevant political activities. This chapter also assesses the benefits of biodiversity and the consequences of biodiversity loss on an individual, national and global level.

### 1.1. What is Biodiversity?

**Biological diversity, or biodiversity for short, describes the variety of life on Earth. It covers all the kinds of plants, animals and microorganisms on land and in freshwater and the sea. Biological diversity occurs on three levels: species, ecosystems and genetic information (See box 1.1).**

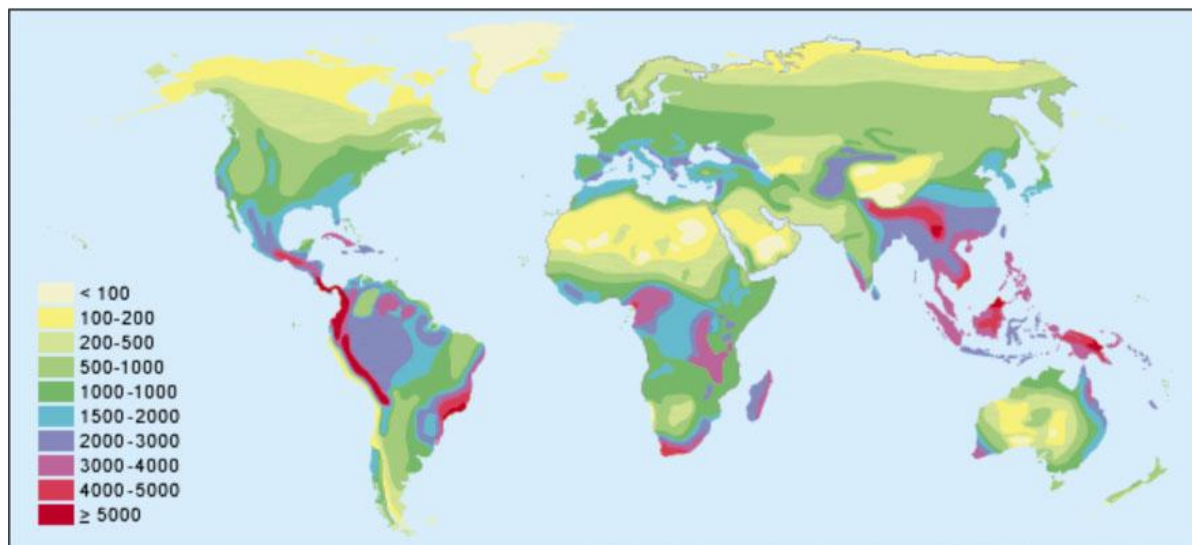
Probably **10 to 30 million different kinds of plants, animals and microorganisms** live on the planet on land, in soil, in freshwater and in the sea. Around 2 million plants and animals are known and scientifically described to date. Scientists discover around 15,000 new species every year. Some species are found around the world, others are very rare. Some species are found in only a single place. For example, Australia is home to different species of kangaroos found nowhere else on the planet. Many endangered plants have been recorded only from a single location.

Biodiversity refers to all life forms, the ecosystems in which they live and the relationships they are part of. For example, in the ocean it starts with tiny plant organisms (called phytoplankton) that can utilize energy from the sun. The plankton is eaten by small animals, which are in turn eaten by larger animals such as different types of fish, reptiles, or mammals. Seaweed, fish and shellfish are food for billions of people everywhere, and many people in developing and developed countries depend on seafood. Biodiversity thus serves as the basis for the livelihoods of people.

Areas that hold extraordinarily high numbers of species are termed biodiversity hotspots. Note, however, that not only untouched wilderness may house a high diversity in species. For a long time, humans have been influencing – and taking care of – environments adjoining villages, like farmlands, forests or grasslands. Carefully used, such green areas are often inhabited by a variety of species that rely on them. In many parts of the world, growing cities and industries as well as rapid population changes, however, threaten such landscapes as well as the knowledge and practices people used to help maintain them.

**Box 1.1:** Biodiversity exists on three levels:

- 1) A **species** is one kind of animal, plant, bacterium, e.g. Honey Bee, Yeast, Red Kangaroo, Pacific Bluefin Tuna. Members of the same species share most of their genetic information and are able to mate.
- 2) An **ecosystem** is the place, e.g. a lake, a forest, a coral reef or a desert, where plants, animals and micro-organisms live together and influence each other.
- 3) The **genetic information**, inside each organism, contains blueprints for what a species looks like, where it can live and how it will multiply. There are little differences among the members of one species.



**Figure 1.1:** Some areas in the world have higher biodiversity than others. Here, as an example, a map of the diversity of plants is shown. Colour indicates the number of plant species per 10,000 km<sup>2</sup>. (Source: Barthlott et al. 1999, amended)

## 1.2. Biodiversity Benefits

**Biodiversity has a value of its own.** Almost every culture in the world cherishes nature, the land and the life it hosts in its tradition, in religion or spirituality, in education, health or recreation. **But humankind also depends on biodiversity** and the goods and services it provides.

### Goods

Many different animals, plants and other life forms together build up functioning ecosystems such as forests, freshwater, soil or oceans. Healthy ecosystems with a high biodiversity provide goods such as food, fibre, timber and biofuels, but also medicine and freshwater to humans. Biological diversity is also a source for new crops and livestock, since most crop plants and farm animals stem from wild relatives. Natural compounds from animals, plants and microorganisms are the basis for new drugs for treating human diseases.

### Services

The services provided by biological diversity (the so-called ecosystem services) are often considered free of charge and indispensable at the same time. For example, micro-organisms provide nutrients for plant growth and green plants produce oxygen. Rain and wind create soil from rock, and plants and other organisms make it richer and thicker over time. Oceans cover almost three quarters of the planet. They hold not only huge amounts of water but also living systems that shape the planet. The oceans transport everything that is in them over large distances; they control the global climate and provide food. Small algae in the sea produce huge amounts of oxygen that land animals also breathe. At the same time, carbon from burnt fuels is taken up from the air and stored.

Coasts have attracted humans for thousands of years. Plants and animals around the coasts store and make available nutrients, filter dirt from rivers and streams, and help to protect the shore from being carried off by storms. Fish, shellfish, and seaweed from the coasts feed humans and animals; they provide fertilizers, drugs, cosmetics, household products and construction materials. Coral reefs are the 'rainforests of the oceans': they provide fish, protect against natural hazards and regulate the climate. Up to half a billion people depend on coral reefs economically. Many developing and developed countries and island nations heavily rely on reefs for both food and livelihoods.

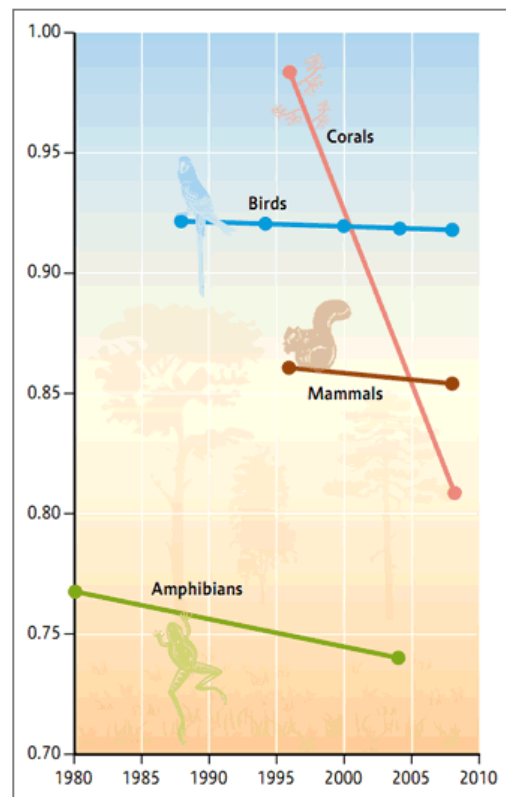


**Figure 1.2:** (LEFT) Honey bee pollinating flower (Source: Gurling Bothma 2012). (RIGHT). In one case, after bees had been killed by pesticides, farmers have started to pollinate their orchards by hand. (Source: Li junsheng)

### 1.3. Biodiversity under pressure

A report of the United Nations published in 2012 highlights the rate of forest loss; threats to water supply and pollution in coastal regions. The overall trend is a **global decline in biodiversity** by almost one third within the last 30 years, and it continues to fall. Up to two thirds of all species might disappear. The five major threats to biodiversity, according to the Living Planet Report 2010 are all caused by human activities.

- **Damage and loss of ecosystems:** Permanent changes in forests, wetlands or mountains make them unsuitable for wildlife and plants.
- **Over-exploitation of wild species:** If humans take too many animals and plants for food or other purposes, the stocks will disappear. Excessive fishing, hunting and logging leads to over-exploitation.
- **Water pollution:** Excess nutrients from too much fertilizer pollute freshwaters and marine ecosystems. Other sources of pollution are wastes from cities, industries and mines.
- **Climate change:** Agriculture, burning of coal and oil, forest clearing and industry release so-called greenhouse gases into the atmosphere, which leads to a rise in global temperatures on land and at sea. Coral reefs, the Arctic Ice or Alpine plants and animals, for example, cannot cope with these quickly changing conditions.
- **Invasive species:** Species that have been introduced to one part of the world from another sometimes spread rapidly and displace native species.



**Figure 1.2:** Decline in birds, mammals, corals, and amphibians from 1980 to 2010 (Source: IUCN 2012)

### 1.4. The Convention on Biological Diversity (CBD)

The International agreement that deals with biodiversity, the so-called Convention on Biological Diversity, was set up at the United Nations Earth Summit 1992 in Rio de Janeiro, when environmental problems of the planet became apparent. The Convention has been signed by 192 countries and the European Union and aims at the **conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits** from the use of genetic resources. The United States of America has not signed the CBD.

In October 2012, representatives of all member states of CBD will meet again in India for the so-called 11<sup>th</sup> Conference of Parties (COP11) to discuss how to halt biodiversity loss. **Twenty aims** – the so-called **Aichi Biodiversity Targets** – have already been agreed on in 2010 at the COP10 in Nagoya

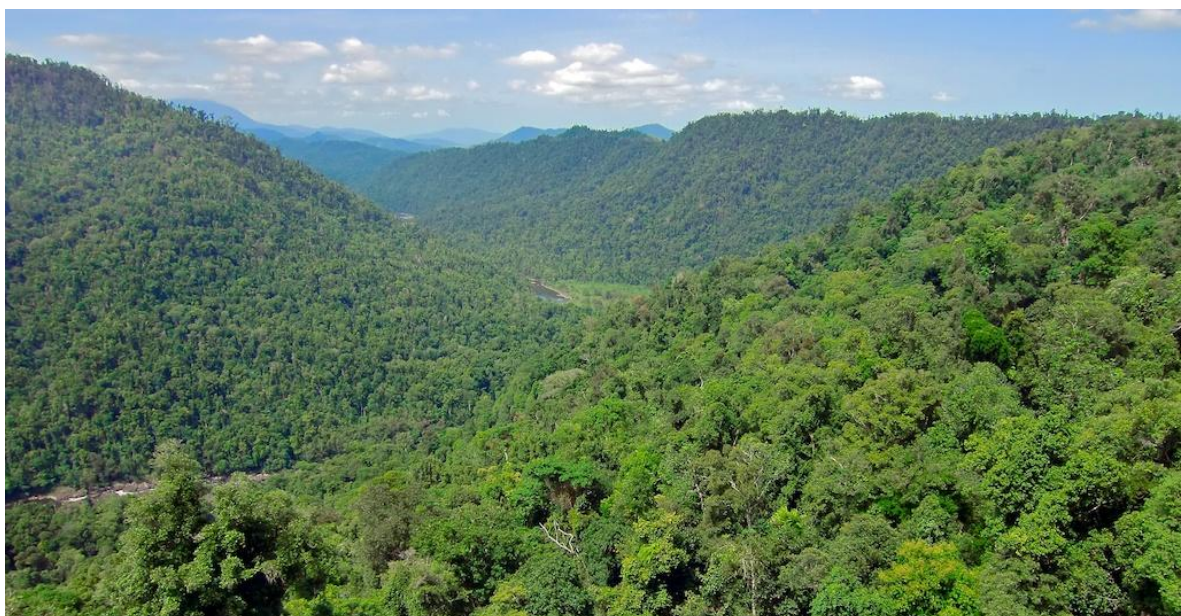
(Japan). According to the agreement made at COP10, these targets should be met by 2020, and the member states are now discussing how to meet them. Different political measures are being discussed to halt the loss of biodiversity. These include laws, taxation, bans, fines, standards, subsidies, incentives or compensations.

### 1.5. Need for citizens' views on biodiversity

Biodiversity loss can have severe effects at several levels: on a person, a family, a village or home town, on a country or a region. Possible effects include rising food prices, lower yields of crops and smaller catches of fish, less drinking water, more frequent flooding or other natural disasters, soil that cannot hold water and nutrients or a landscape that is no longer attractive for tourists. Such effects are all long-term and affect almost all aspects of our lives. Nonetheless, drastic measures to protect or restore biodiversity can in some instances lead to job loss, to forced changes in the working environment, lifestyle or diet. Some people may even lose their means of existence, for example fishermen who are not allowed to catch fish. If more tax money is used for biodiversity protection, less may be available for other important tasks such as social security, job creation, health services, education or research and development. Especially in times of economic downturn, spending scarce money on biodiversity protection may be unpopular.

International agreements are necessary because biodiversity loss is a problem requiring international solutions. Many ecosystems stretch across borders, fishing on the High Seas is largely unregulated, and trade is international. Pollution produced on one side of the planet affects regions on the other. At the same time, national and professional interests as well as different values, worldviews and mentalities among stakeholders make it difficult to reach a global, transparent and democratic agreement. Experts, policymakers and pressure groups will have their say when measures for preserving biological diversity will be discussed at the COP11 in India in autumn 2012. Some of the open questions are: Who will take responsibility for biodiversity loss? How shall the biodiversity goals be reached? What has to be done? How shall the interests of humanity and the natural world be balanced? Do we need regulations? Can we make people behave biodiversity-friendly on their own will or should we set up new laws and economic regulations?

Ordinary citizens are first and furthestmost affected by the outcomes of international decisions. Involving citizens into the discussion process renders more voices heard and gives decision-makers valuable information about which political measures have public support and thus a better chance to succeed.





## 2. Biodiversity on land

On land we find many different types of nature areas, for example forests, grasslands, wetlands or deserts that provide a living space for plants, animals and microorganisms. In this chapter we examine three biodiversity issues: protection of nature areas, the loss of nature areas and the conversion of nature areas into farmland.

### 2.1. Protection of nature areas

One of the measures to protect biodiversity that has been successful in the past was to protect areas that retained a more or less intact nature, such as certain rain forests or savannahs. Such areas often house many plant and animal species in a delicate balance, and human influence has been small so far. They provide shelter, allow species to move, and ensure that natural processes can shape a landscape. Protected areas are very important, and some types have existed for almost 140 years, for example in the form of national parks or nature reserves. Here, human influence and economic activities are limited and often strictly regulated. Most logging, hunting, agriculture, mining, or human settlements are banned. Such areas need to be well connected, well managed, and well financed. Protected areas are also important for humans. UN reports show that they provide a living for nearly 1.1 billion people. The drinking water for over one third of the world's largest cities comes from such areas, as do many wild plants important for improving today's crop varieties.

In 2010, over 150,000 protected areas covered one-eighth (12.7 percent) of the world's land area. Their number and size have grown, but not enough to protect biodiversity effectively, because many are too small or isolated. More than half the sites important for biodiversity – e.g. areas with the last remaining individuals of a rare species or important bird colonies – remain completely unprotected. In addition, some are poorly managed. One of the biodiversity targets agreed on in 2010 therefore calls for increasing the number and size of protected areas globally to at least 17 percent of the total land area by 2020. This means that governments will need to declare many new areas to be protected, or expand existing ones.

This will not be easy. Setting up a new protected area often creates conflicts between opposing interests. Should the piece of land be used for nature preservation or for human settlement or the exploitation of resources? Aims to protect nature often come into conflict with aims of people to make their living from these areas. Farmers might no longer be allowed to cultivate their fields, companies might be hindered to log trees or establish mines or plantations, and road building may become blocked even if a road is much needed. Which aim should come first is often difficult to establish. Without agreements with local people, their needs may not be taken into account and balanced with the need to protect nature. In addition, a lot of money must sometimes be provided to control and maintain a protected area or to compensate farmers or others for their losses.

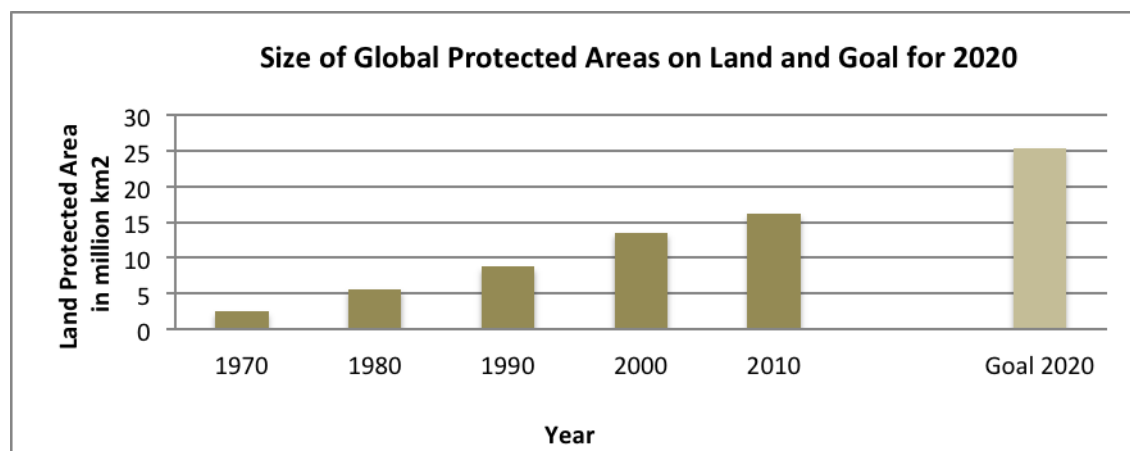


Figure 2.1: Increase of global protected area over time, and the goal for 2020 (Source: UNEP-WCMC 2012)

## 2.2. Reducing the loss of nature areas

While the international community agrees on the need for biodiversity protection on a global scale, individual countries may have social or economic reasons to clear forests and make way for crops, cattle or timber. Creating arable land and generating income for a growing population are important developmental goals.

Reaching an international agreement indicates a common view among countries, but it must also be made to work. In other words, it must be turned into a national law and actions. How this should be done is often subject to conflicts.

For example, with the protection of nature areas, some people fear that without strictly sanctioned new laws – or at least without a better enactment of existing laws – nothing would happen. Others think that laws should be kept to a minimum and that economic (or ‘market’) solutions would be better: accordingly, reducing the profitability of those activities in nature areas that negatively impact biodiversity (e.g. hunting, logging, mining) might protect wild animals and plants more effectively than a law. Apart from laws or economic solutions, other political measures are also possible. For example, biodiversity protection could be integrated in all planning activities in such areas, or local people could be encouraged to better manage natural resources. Making the public aware of the problems associated with biodiversity loss might also be important because any measure must find public support

Nevertheless, some may find that, after all, biodiversity is not important enough to make the protection of nature areas a matter of laws, political decisions or economic measures, and that there are more pressing problems to worry about. If, however, the commitments according to international agreements are to be put into practice, the question is: Which measures are preferred to ensure the protection of nature areas in your country?

## 2.3. Converting nature areas into farmland

**Agriculture is the single most important human activity impacting biodiversity.** Therefore, many experts say that any plan to protect biodiversity must take agriculture into account. There are several reasons why agriculture has such a negative effect; one of them is the on-going conversion of nature areas to agricultural land.



**Figure 2.2:** To increase arable land in specific regions from the current level (orange) to the maximum potential (blue), natural habitat would have to be converted (Source: FAO 2002).

**Today, 40 percent of the earth’s total land area is used for growing crops and feeding cattle.** The World Resources Institute states that in many developing countries nature areas are increasingly converted to agricultural land. The United Nations Environment Programme (UNEP) predicts that in Africa and West Asia agricultural land area could nearly double by 2050 and increase by 25 percent in the Asia-Pacific region. Much of this will affect forests. One fifth of the world’s remaining large forests may well become cropland and pasture. Erosion often leads to a loss of fertile land, especially in tropical regions, which forces local farmers to convert additional tropical forests into farmland. All this has dire consequences for biodiversity, because plants and animals naturally occurring in the forests will have no place to live any more.

Another reason why agriculture reduces biodiversity is that farmers strive to obtain the highest yields possible. This implies that plants and animals that would reduce yield are considered as pests and fought. To obtain high yields, not only pesticides but chemical fertilisers and heavy machinery are applied in many places today. The downside of such intensive 'high input' farming is that it not only eradicates many naturally occurring species but also causes soil erosion and heavy pollution. This affects even more species and thus reduces the opportunities for many wild plants and animals to survive.

This has to be seen against the background that the global demand on food is quickly rising. By 2020, the UN estimates that our planet will host 7.7 billion people, and all of them need to be fed. Already today, many people are starving. Some argue that, overall, enough food is produced in the world and that the problem is its distribution. Others say that waiting for a globally more equitable distribution would be futile.

Another challenge is the increasing meat consumption in many countries. Rearing animals to produce meat requires a lot of feed – eating the plants from the required farmland directly would provide roughly ten times more energy. Therefore, eating meat instead of plants increases the demand on crops even more, and they must be grown somewhere.

The problem therefore is how to produce enough food while protecting biodiversity in the best possible way. Several strategies have been proposed. For example, less intensive farming with lower input could offer a chance to avoid many of the downsides of high input farming; nonetheless, the expected lower yield would require more land, in other words it would be necessary to convert nature areas into farmland. Another possibility would be to improve agriculture on existing land, following two different strategies. One strategy is to apply new technology to increase productivity with less input, for example new and better crop varieties. Note, however, that new technology requires special knowledge to apply it, and it is often expensive. Farmers would have to make a high investment, which would be impossible for many. A second strategy is to apply more conventional practices that require less use of pesticides and nutrients, for example crop rotation. These practices also require a lot of knowledge and usually entail more labour, which again is a problem, especially for subsistence farmers.



Alternatively, some people question whether we really need to increase the production of food to such a high level that it damages biodiversity. Rather, we should make efforts to decrease food demand by reducing meat consumption or by using resources more efficiently, wasting less food and distributing it better. The problem here is that this would demand major socio-economic efforts, changes in eating behaviour etc., which may be hard to achieve or at best take a long time to become reality.

All strategies sketched out above have their upsides and downsides. Apart from technical issues, they also imply many value questions. For example, should we make compromises regarding the conversion of nature areas to fields to enable a more biodiversity-friendly way of agriculture? Should we leave the dilemma to the farmers only, or do the consumers also have a responsibility to protect biodiversity when it comes to food production? All this plays a role when considering which general strategy is most promising in matching the future demand for food with the aim to protect biodiversity.



biodiversity when it comes to food production? All this plays a role when considering which general strategy is most promising in matching the future demand for food with the aim to protect biodiversity.



### 3. Biodiversity in the sea

The ocean covers more than two thirds of the world's surface and holds a great amount of biodiversity. In this chapter we examine three ocean-related biodiversity issues: stopping overfishing, protecting coral reefs and setting up protected areas in the High Seas.

#### 3.1. Overfishing

Humans have fished in the sea since ancient times. Now, about 49 million people worldwide are fishermen and another 212 million work in related areas (e.g. repairing boats, selling fish on markets etc.). In total, 261 million people worldwide depend directly on fisheries for their livelihood.

In 1970 the total global fish production was 65 million tonnes; by the year 2000 it had more than doubled to 125 million tonnes. 85 million tonnes were produced by catching wild fish, the rest came from aquaculture (about 40 million tonnes, see figure 3.1 for an example of aquaculture). Catching fish alone, without aquaculture, will be insufficient in order to satisfy the demand for fish because the global marine catch has reached its upper limit. Although more and better equipped fishing boats try

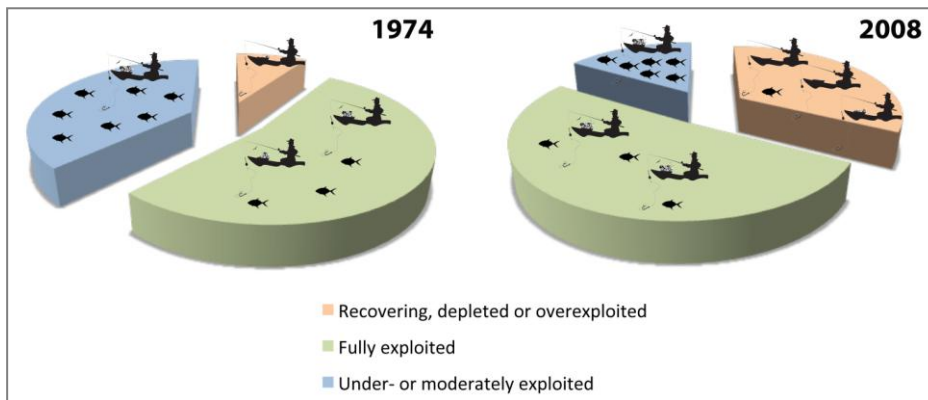
to catch more fish, the capture of wild fish worldwide has not increased since the 1990s according to the United Nations Food and Agriculture Organization (FAO).



**Figure 3.1:** Aquaculture produces fish and other seafood in floating cages (photo) or artificial lakes (Source: FAO 2012)

#### Exploiting the oceans

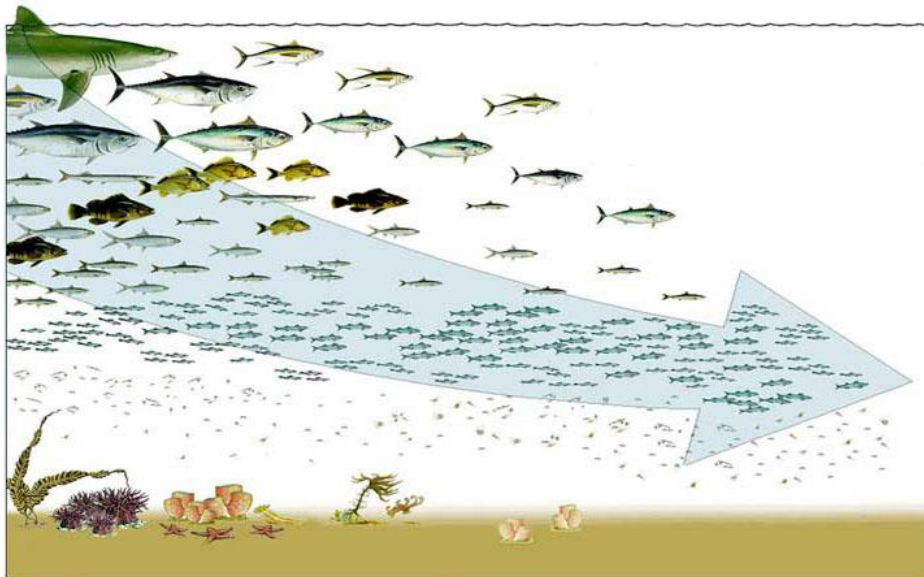
Unsustainable fishing practices cause severe damage. These include bottom trawling (dragging an open cage along the bottom of the sea, destroying wildlife on the ocean floor), the use of poison and explosives near coral reefs, as well as fishing gears that unintentionally kill seabirds or capture marine mammals. The pressure from fishing has also changed the distribution and size of many fish populations. Many fishing areas and stocks are fished up beyond their sustainable limit. **Overfishing is the greatest single threat to marine wildlife and biodiversity** according to the FAO. By 2000, three-quarters of ocean fish stocks were overfished, depleted or exploited. In 12 out of 16 world fishing regions, production levels were below their historical maximum.



**Figure 3.2:** About three-quarters of the world's oceans are overfished (FAO 2010 amended).

### Towards sustainable fisheries

Sustainable fishery aims at catching fish at a rate that leaves the fish populations stable over time. In many countries, fishing quotas are determined in a political process, whereby many stakeholder groups contribute, such as industry, fishermen, and scientists. The fishing industry and scientists usually have different views on the amount of fish to be taken each year, but it is one of the biodiversity targets to avoid overfishing. The European Commission, for example, stated that the total permitted catch in Europe over recent years was 40 percent above the level advised by scientists. In contrast to scientists, who do not depend on fishing, the fishermen prefer higher permitted catch.



**Figure 3.3:** Fishing down the marine food web. After the large fish at the top of the food web are fished out, fisheries must go after smaller fish and shrimps at lower levels in the food web. (Source: Pauly 2003).

### Overcapacity and subsidies

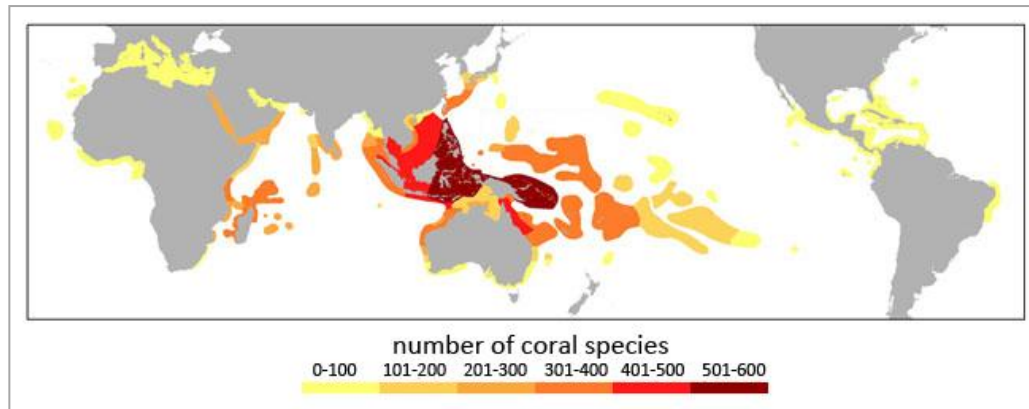
Today, too many boats chase too few fish. Already in 1992, the United Nations Organisation for Food and Agriculture (called FAO) found that the **total fishing capacity in the world was twice that required for sustainable fishing**. As it becomes increasingly more difficult to make a living from fishing, some governments pay their fishermen subsidies or reduce taxes. This in some instances leads to even more fishing boats and to enterprises that can hardly survive. Overcapacity is not only a problem for fish stocks but also for fishermen. They must sometimes compete to the point where it becomes almost impossible to make a living.

The European Commission, China, Vietnam and Japan, for example, aim at reducing their oversized fishing fleets, while in other countries like Indonesia, Cambodia and Malaysia the fishing fleet is still growing. To adjust the fishing capacity to sustainable fishing, it has been proposed to stop using public money for building or modernising boats. Nonetheless, fishermen need to make a living somehow.

### 3.2. Coral reefs

#### Biodiversity in coral reefs

Reefs are underwater limestone structures made from the skeletons of millions of tiny marine animals and plants. Coral reefs are often called “rainforests of the sea” and are among the most diverse ecosystems on Earth. They occupy less than 0.1 percent of the world's ocean surface, about half the area of France, yet they provide a home for a quarter of all marine species including fish, seabirds, sponges and all other types of marine life. They are most common at shallow depths in tropical waters. Coral reefs deliver benefits for tourism, fisheries and shore protection. Economists say that the annual global value of coral reefs may reach US \$375 billion.



**Figure 3.4:** Worldwide location and diversity of coral reefs. Most of them occur in warm tropical waters in developing countries. (Source: NASA 2012)

#### Threats to coral reefs

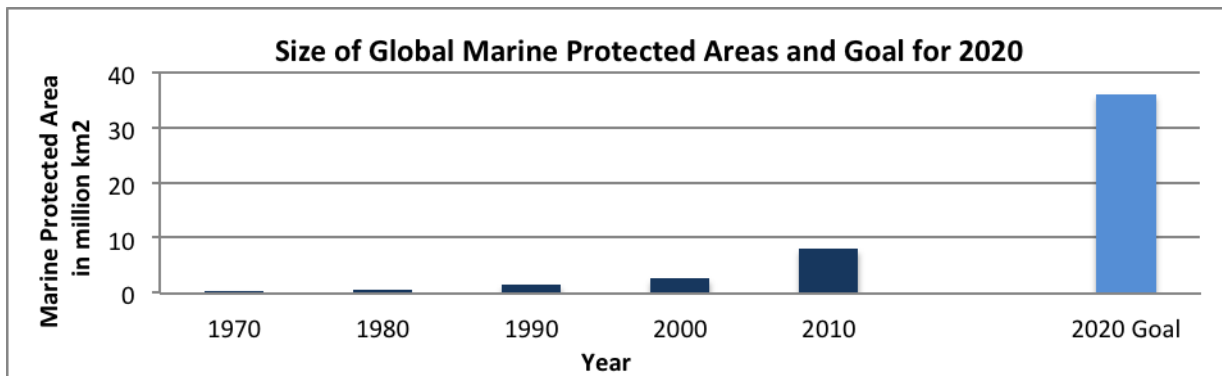
**Coral reefs are fragile.** They are under threat, for example from illegal fishing, overuse and urban and agricultural water pollution (see figure 3.5). Scientists say that more than one third of the world's coral reefs have already been destroyed or are seriously damaged. **Most coral reefs are located in tropical waters, where developing countries do not always have enough resources to protect them.** Protection means e.g. to implement and monitor fishing bans, reduce pollution, establish and deploy eco-tourism plans, environmentally friendly planning of coastal development, or fight coral pests. All these measure cost money.



**Figure 3.5:** Coral reefs are under stress from human activities. (Source SEOS 2012)

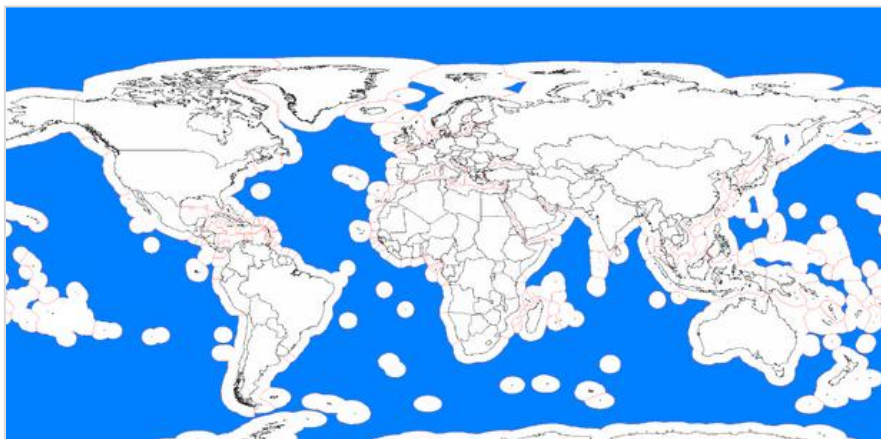
### 3.3. Marine Protected Areas in the High Seas

Marine Protected Areas (MPAs) are **nature reserves in the ocean** that protect marine biodiversity and provide refuge for endangered species and commercial fish populations. Presently about 2 percent of the world's oceans are protected. In comparison, more than 12 percent of the world's land area is protected. One of the Biodiversity targets is to increase the MPAs to 10 percent of the oceans. Today, most MPAs are close to the coast in waters that belong to a country. In the so-called "High Seas", that is the ocean beyond 200 miles from the coast, marine protection is very limited. One of the challenges when increasing the number and size of Marine Protected Areas is that, in the High Seas, no country can on its own establish a Marine Protected Area like it could do within its coastal waters.



**Figure 3.6:** Many new Marine Protected Areas are needed to meet the 2020 goal (Source: UNEP-WCMC 2012).

The High Seas are very important. They cover two-thirds of the ocean surface and, according to the CBD, hold a high amount of biodiversity. Although an international legal framework that covers High Seas exists (the United Nations Convention on the Law of the Sea, UNCLOS), it focuses on specific



aspects only, such as fishing, navigation, pollution or underwater mining, but not on establishing protected areas.

**Figure 3.7.** World map illustrating the High Seas (blue areas) beyond 200 miles from the coast. They are not subject to national laws. (Source: EoE 2012)

Currently, very few Marine Protected Areas exist in the High Seas. In 2002, for example, the neighbour countries Italy, France and Monaco signed an agreement that created the "Pelagos Sanctuary" in the Mediterranean Sea. They agreed to control boats registered in their own country, but boats from other nations cannot be controlled. Another example is the "South Orkneys MPA" in the cold waters of Antarctica. Established in 2010, it does not permit any fishing. The MPA was set up by 35 countries, all members of the so-called Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). Any agreement about an area in the High Seas pertains only to countries who signed it; the rights of other countries remain unaffected. This means that countries who signed the agreement cannot create binding rules for other countries. Thus, the protection of marine areas in the High Seas will be very difficult without a new international agreement (for instance as an additional agreement under UNCLOS). Such an agreement, however, would be legally difficult to establish, it could limit the access of fishing boats to important fishing grounds, and the enforcement could be difficult and costly.



## 4. Burden and Benefit Sharing

International negotiations and agreements on global challenges such as biodiversity protection always raise questions like: **Who is responsible for the protection? Who will pay? Who will gain the benefits of biodiversity? Who will win and who will lose?**

Biodiversity is a complex issue with connections to many other important goals. To raise money for biodiversity protection, a common global strategy was agreed in 2010, but the big question still is: Where should the money and other means such as know-how to conserve, restore and protect biodiversity worldwide come from?

### 4.1. Funds for biodiversity protection

So far, most of the money has been provided through the **Global Environmental Facility** or GEF. This fund supports various environmental activities, for example nature conservation according to the Convention on Biological Diversity in developing countries. The money to GEF comes from voluntary contributions from developed countries (see figure 4.1). The Conference of the Parties (COP) to the Biodiversity Convention decides on the principles and criteria for how the money is going to be spent. Since 2003, GEF has invested most of its biodiversity funds (\$2.9 billion) into more than 2000 protected areas worldwide, covering more than 6.34 million square kilometres (almost twice the size of India).

There is a general consensus amongst all countries that the present funding for biodiversity from GEF, national governments and all other sources are far from sufficient to halt the global loss of biodiversity.

Some people argue that money is better spent on solving more urgent problems than biodiversity. Others think that investing in biodiversity will be an economic advantage in the long term.

#### **Where should the money for biodiversity protection in developing countries come from?**

Developing countries often are unable to afford costly measures to protect biodiversity, and industrialised countries may not want to spend more than they already pay into the GEF.

The question where the resources should come from throws up a number of difficult issues. Some people find that rich countries have reduced their own biodiversity and now want poor countries to protect theirs, so it is the rich countries' responsibility to provide the money for biodiversity protection worldwide. Others find that although developing countries are poor, they themselves should also take responsibility and contribute – perhaps not as much as rich countries, but at least in some way.

So far, rich countries have voluntarily paid money into the GEF. Some people think that this has worked quite well, so that there is no need to collect more money on a mandatory basis. Others argue



that since there are not enough resources for biodiversity protection worldwide, voluntary contributions might be insufficient and we need to make payments obligatory.

Finally, one question is whether the money should come from the states (and, hence, from the taxpayers) only. Instead, aren't there ways of making, for example, private companies or consumers pay? One approach would be to collect fees from polluters or from those who use a particular resource, which could lead to higher consumer prices. The counter argument is that this might be inefficient, difficult to introduce, and hamper economic growth.

## 4.2. Access and Benefit Sharing: The Nagoya Protocol

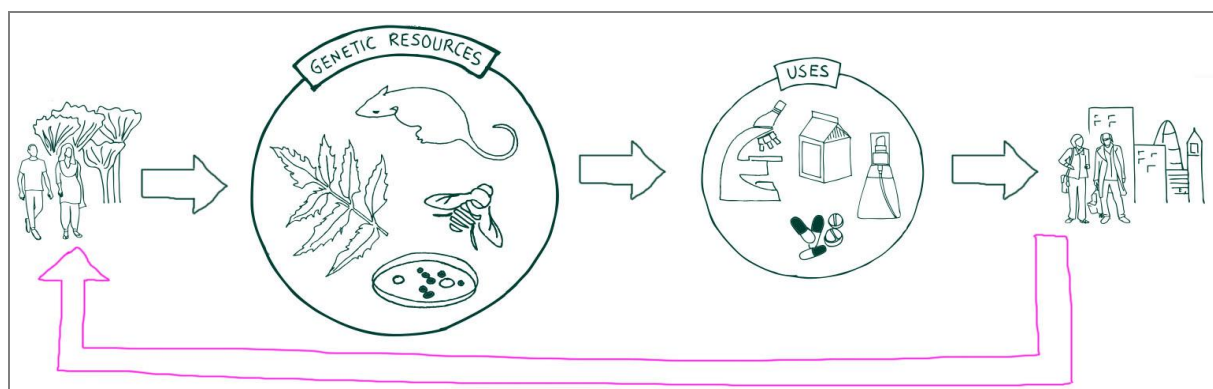
Fair and equitable sharing of benefits from the use of genetic resources is one of the Biodiversity Convention's three main objectives. It is considered to be an important element to realise the other two objectives: to conserve biological diversity and to use it sustainably.

The term '**genetic resources**' refers to units of heredity contained in all living organisms. These determine the properties of the respective organism and are passed on to all offspring. The genetic resources – as well as traditional knowledge about the organisms, its characteristics and appropriate use – can have many beneficial uses for research and when commercially developed, e.g. as new medicine, better food, industrial enzymes, cosmetics etc.

Like other types of resources, genetic resources – and associated traditional knowledge among indigenous and local communities – are not evenly distributed around the world. They are abundant where biodiversity is high, i.e. mostly in tropical and/or developing countries. Companies that can exploit genetic resources because they have the necessary technology, however, mostly come from industrialised countries. Seen from the developing countries' perspectives, this has led to 'biopiracy', a term applied to those cases in which such companies have acquired genetic resources in another country without asking permission and without sharing the benefits from commercial utilization with the provider country.

### The Nagoya Protocol

After years of negotiations, an agreement on "Access to genetic resources and the fair and equitable sharing of benefits arising from their utilization" (the Nagoya Protocol, named after the Japanese city Nagoya where the agreement was made) was reached at COP10 in October 2010. This agreement refers to "providers" as countries that can grant access to their genetic resources in return for agreements on benefit sharing that may result from their use (see figure 4.1). The Protocol also states that in cases where indigenous people or local communities provide traditional knowledge that leads to the identification of a useful genetic resource, they should also benefit. "Users" are those who want to make use of the genetic resources or the associated traditional knowledge. They have to ask permission from the country from which they want to acquire the genetic resources. They also have to agree with the providers on benefit sharing conditions.



**Figure 4.1:** The Access and Benefit Sharing Model. The pink arrow shows that some of the benefits from new products derived from biodiversity will go back to the origin, the country where the biodiversity came from (Source: CBD 2012, modified)

Benefit sharing can be in the form of money and/or cooperation in gaining know-how, for example in research and the transfer of new technologies. The benefits should help to improve conservation efforts and the sustainable use of biodiversity. The Nagoya Protocol will help to establish comparable rules around the world.

#### **A benefit sharing example**

The Kani tribes live in a reserved forests area in Kerala, India. A team of scientists from the Tropical Botanical Garden and Research Institute (TBGRI) was on an expedition into their forests, their guides were Kani men. During the exhausting treks the scientists noticed that the men constantly ate fruits, which kept them energetic and fresh. The Kani tribals were reluctant to reveal the source of the fruits, saying that it was a tribal secret not to be revealed to outsiders. After much persuasion they showed the scientists the plant. The scientists collected some plants to study its properties. It was identified as a rare plant that only occurs in these mountain forests. The plant had been documented before, but its traditional use and special properties were not known. The TBGRI scientists found that the fruit of the plant contained substances against fatigue and used them to develop a drug called 'Jeevani', which is good for health and eases stress and fatigue. TBGRI decided that the Kani tribals should receive half of the income made with the sale of the drug. A Trust Fund was set up with the aim to share the benefits in terms of welfare and development activities for Kanis in Kerala, and to identify other plants and uses by the Kani.



**Figure 4.2:** The plant used by traditional Kani people (LEFT), the final drug for sale Jeevani (RIGHT). Source (Wikipedia and <http://sanjeevaniherbals.com/>)

#### **Scope and Limits of the Nagoya Protocol**

The Nagoya Protocol will first enter into force after 50 countries have ratified (become part of) it, which is expected to happen in the near future. National governments now need to decide and prepare on how in practise they can best live up to the obligations under the Protocol.

While the Nagoya Protocol lays out the rules for Access and Benefit Sharing, agreement is still to be reached on what to do with the millions of species samples (and the genetic resources from them) that were collected in developing countries before the Nagoya Protocol by researchers or companies from developed countries. Some people say, these samples were collected in a correct way in the past. Applying the Nagoya protocol to them is like changing the speed limit for cars on the highway and then fine all car drivers who drove too fast in the past, before the new limit was established. Other people say, the countries where the samples were collected can still be seen as the owners of the material and should thus receive some benefits from its use.

Another issue relates to the fact that the Nagoya Protocol does not regulate genetic resources in marine organisms of the High Seas (fish, algae, fungi etc.). These resources have no owners ("providers") and are presently free for everybody. Today the marine genetic resources are utilized only by a limited number of researchers and companies from few and mostly developed countries.

"The freedom of the High Seas" is a long established tradition, and some believe it to be a value of its own that has to be maintained. Others find that the genetic resources of the High Seas belong to all humankind and that a share of any economic benefits from their utilization should support

conservation of biodiversity in developing countries.

## Acronyms

**ABS:** Access and Benefit Sharing

**CBD:** Convention on Biological Diversity

**CCAMLR:** Convention on the Conservation of Antarctic Marine Living Resources

**FAO:** Food and Agricultural Organisation, is a United Nations Organisation

**GDP:** Gross Domestic Product

**GEF:** Global Environmental Facility

**MPA:** Marine Protected Area

**TBGRI:** Tropical Botanical Garden and Research Institute

**UN:** United Nations

**UNCLOS:** United Nations Convention on the Law of the Sea

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