

# Land use change

## Introduction

SDG target number 15, “Life on land”, aims to “sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss” (UN, n.y.). In order to protect the life on land, we need to source out the main problems. How we use our land is one of the biggest challenges to biodiversity and life on land (Dobson, et al, 1997). Land use-change can both halt and promote biodiversity, so it is very important that it is given more attention and research. Two main problems that we will focus on in this paper is intensive agriculture and deforestation. A different world is possible, so we will also highlight the solutions of a more sustainable farming system and restoration ecology.

## Intensive agriculture

The modern big scale, industrial, intensive agriculture is a threat to life on land for various reasons. The crops in the industrial farming system are often monocultures, leaving “green desserts” with little life of birds, insects and other plants (LAG, 2016). This way of farming is not done on nature’s premisses, or the premisses of the local communities. So it is not very socially sustainable either (ibid).

Another problem associated with the industrial farming system is the high dependency on products from the petrochemical industry (Young, 2012, 108). These include pesticides, fertilizers and herbicides (ibid). This affects both climate change, due to the emission of greenhouse gasses, and the local and regional environment, due to pollution. Pesticides and fertilizers have shown to affect the biodiversity and the soils in a negative matter in some areas (Oosthoek, 2013), and many scientist see pesticides and fertilizers as a threat to life on land.

The industrial farming system is also connected to deforestation. In Brazil, rainforest is cut down in order to make room for soy or eucalyptus plantations (LAGT, 2016). In Norway, this soy is used for fodder for animals (ANL, 2019). So a lot of the meat- and milk production in Norway is not so Norwegian after all; it relies on brazilian resources. This is a good example of how the industrial farming system connects different corners of the world, increasing the need of transportation and an increase in CO<sub>2</sub>-gases.

## **Deforestation**

Forests are taking a considerable part in combatting climate change, mitigating around 2 million carbon dioxide each year as well as being a supplier of 40 % of the world's renewable energy (UN News, 2019). The 2030 plan of the United Nations Forum on Forests (UNFF) is to increase the Earth's forests with 120 million hectares by: "contribute(ing) to sustainable development and provide economic, social, environmental and cultural benefits for present and future generations" (UNFF, 2017, s.1). This is a timely statement for many reasons: large-scale industrial farming, like Soy and Oil Palm, has taken valuable land, but has also overridden local/regional farming-systems and their expertise, while at the same time (in some instances) producing win-win discourses stating climate change and poverty reduction in the Global South is the main objective. There can be both positive and negative examples of using reforestation as a way of combatting climate change, but the issue of these projects is that they don't end up creating long-lasting economic, cultural, social (etc.) wins for the local peoples, nor do they compensate former land-use well enough. Deforestation in itself is a threat to biodiversity and wild-life, and solutions to the loss of forest mustn't be one-sided win's or temporary solutions, nor must they be simple veiling's of a continuous massive extraction of CO<sub>2</sub>. Having the knowledge that agriculture is the main driver of deforestation, while human population growth is fast paced and expanding, makes it more urgent to create common global goals for sustainable solutions. Detailed research has been forwarded by the International Panel of Experts on Sustainable Food Systems (IPES-Food), Sustainable Development Goals (SDG), Food and Agricultural Organization (FAO) and UNFF for the UN, to mention a few. The aforementioned social, cultural, economic issues (e.g.) is now being addressed by the UN emphasizing inclusion and continuous assessments for the current and future sustainable change for the sake of Earth and its inhabitants. Positive changes in agriculture and forests conservation through new scientific research and smarter technology (for example the possible use of algae, using different species, taking less space) being only a part of the solution.

How we view nature and our planet has changed over the last centuries, whether we focus on its uses, see us as part of it or want to re-wild it (e.g.). But the matter of fact is earth and its myriads of life is a network dependent on each other. One doesn't grow without the other and there are no solutions in one-sided wins. Therefore, when solutions are being proposed; the growth of the network as a whole, is being forwarded (see SDG goals 2030).

## **Solutions**

### **Sustainable farming systems**

Luckily there are alternatives to the intensive agriculture-system. Small scale farmers and environmental activist all over the world are fighting for a more environmentally friendly and just food system (Young, 2012, p.24). The concept of food sovereignty has gained a lot of attention in recent years. Food sovereignty is about more local and less corporate control of the food system (ibid). Basic human rights, the conservation of rural environments, agrarian reforms, the right to territory and protection of the environment are key objectives.

Food sovereignty is an integral and broad concept that focuses on place specific solutions. In Norway, there are a lot of different things we can do to have a more sustainable farming system. We can produce more organic and biodynamic food, and most importantly, use our own local resources. By letting the animals graze in the outfields, instead of eating imported soy-fodder, we help the environment in two ways. We put less pressure on brazilian soy production, and we help maintain our cultural landscape and the species that depend on it (ALN, 2019, p. 20). Almost one third of the red-listed species in Norway depend on the cultural landscape (ibid, p. 11). Sustainable norwegian agriculture is to produce norwegian food on norwegian resources.

### **Restoration ecology**

This is the scientific study supporting practice of ecological restoration, which is the practice of renewing and restoring degraded, damaged, or destroyed ecosystems and habitats in the environment by active human intervention and action. Restoration ecology draws on a wide range of ecological concepts. Here are some of these.

**Disturbance** means here natural disturbance, e.g. fire as a natural cause. Differentiating between human-caused and natural disturbance is important if we are to understand how to restore natural processes.

**Succession** is the process by which a community changes over time, especially after a disturbance. Here, ecosystems change from simple organization with few dominant pioneer species to a more complex community with more species.

**Fragmentation** is disturbances where biological systems are fragmented into smaller parts through land use changes and natural disturbance. This decreases the size of populations and increases their isolation, making these smaller populations more vulnerable to extinction. This also decreases the quality of habitats.

**Ecosystem function** describes the basic and essential processes of any natural systems.

Primary succession provides good evidence of the power of natural processes in re-creating ecosystems without aid (Dobson, et al, 1997). The problem with leaving restoration to natural

processes is that they take time. This problem can however be overcome with artificial intervention once identified. This again is most successful if they use or mimic natural processes. Restoration ecology is beginning to provide opportunities to reverse the trend and to create new habitats for biodiversity. A single outstanding case is the restoration of the 10,000 ha of barren land around the nickel smelters at Sudbury, Ontario. (Winterhalder, 1996). As one of two ways to slow the rate of species extinction and ecosystem service decline, the other one being conservation, it's important to restore degraded habitats.

Even though we shouldn't let environmental damage occur in the first place, human development and population growth mean that damage is inevitable. The demands on land use are so large that they will be converted to agriculture landscape. These lands will be "marginal", they won't be used for long. Ironically, these poorer soils may contain a higher biodiversity than rich soil. Most attempts at sustainable use of natural resources have focused at the population level, but we also need to consider the use of natural resources at the landscape level. The only way to ensure this resource is to rigorously protect biodiversity in nature reserves and other natural habitats.

## **Conclusion**

The way we are managing our land today is harmful for life on land, and particularly for biodiversity. If we pay more attention and research, and use sustainable farming systems and restoration ecology, it is possible to change our path. We can create a world that is sustainable for both people and the planet.

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**Fact figure on poster:**

FAO (2018), Biodiversity for sustainable agriculture- FAO's work on biodiversity for food and agriculture,

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**Infographic on poster:**

Harvesting Machines. Photo: GRIMME REXXOR, Wikimedia.

[https://commons.wikimedia.org/wiki/File:Grimme\\_REXOR\\_\(15617752793\).jpg](https://commons.wikimedia.org/wiki/File:Grimme_REXOR_(15617752793).jpg) [Sett 15/05/2019]

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Small copper. Photo: Tore Berg

<https://www.flickr.com/photos/28092414@N03/3241539971/in/album-72157613200337148/> [Sett 15/05/2019]



# Land use change: problems & solutions

In order to achieve SDG target number 15 and protect the life on land, we need to source out the main problems. How we manage our land and land use change are one of the biggest challenges to biodiversity and life on land. Intensive agriculture and deforestation are two of the biggest land use challenges. Luckily, solutions do exist, such as sustainable farming-systems and restoration ecology.

## Industrial farming

The big scale, industrial, intensive farming system is harmful to life on land in several ways. The reliance of pesticides, fertilizers and herbicides affects both climate change, due to the emission of greenhouse gasses, and the local and regional environment, due to pollution. Pesticides and fertilizers also affect the biodiversity and the soils in a negative matter in some areas.

The crops in the industrial farming system are often monocultures, leaving “green desserts” with little life of birds, insects and other plants. This way of farming is not done on nature’s premises, or the premises of the local communities. So it is not very socially sustainable either. The industrial farming system is also connected to deforestation. In Brazil, rain forest is cut down in order to make room for soy or eucalyptus plantations.



Large scale industrial farming.

## Deforestation

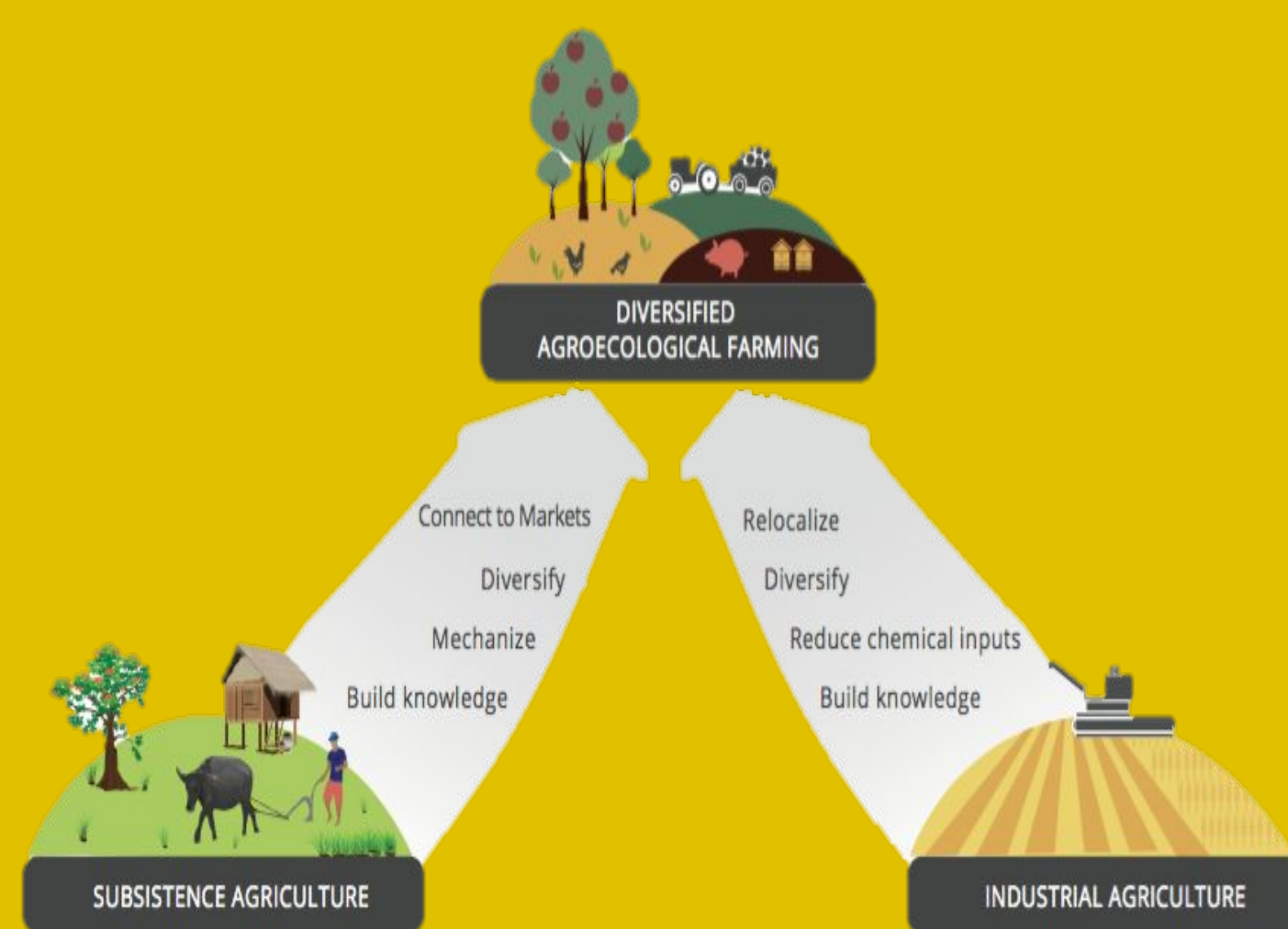
Forests cover around 30 % of the land on Earth and we consider tree’s to be our planets *lungs* taking a considerable part in climate change. Agriculture is the **main driver** of deforestation.

➡ There are **more than 60 000 tree species in the world**. Globally, around 2 400 species of trees, shrubs, palms and bamboo are actively managed for products or services.

➡ **Large-scale commercial agriculture causes 40 percent of forest conversion** in the tropics and subtropics, 33 percent is caused by local subsistence agriculture and 27 percent by infrastructure development and mining, among other activities.

➡ As of 2015, **natural forests accounts for 93 percent of total forest area**.

➡ Globally, natural forest area is decreasing and planted forest area is increasing. However, **the global annual net loss of natural forests decreased from some 10.6 million hectares in the 1990s to 6.5 million hectares between 2010 and 2015**.



Agroecological thinking

## Restoration ecology

Restoration ecology is the practice of renewing and restoring degraded, damaged, or destroyed ecosystems and habitats in the environment by active human intervention and action. Restoration ecology draws on a wide range of ecological concepts; disturbance, succession, fragmentation, ecosystem function, community assembly, and population genetics.

Restoration ecology is beginning to provide opportunities to reverse the trend and to create new habitats for biodiversity. As one of two ways to slow the rate of species extinction and ecosystem service decline, the other one being conservation, it’s important to restore degraded habitats.

## Sustainable farming systems

By growing organically or biodynamically, we can decrease the use of pesticides and artificial fertilizers. By consuming less meat, we decrease the greenhouse emission of locally produced food, we don’t rely as much on transportation, and we support our local farmers. By supporting small-scale farming, we can cultivate more on nature’s premises, and working with it instead of against it.

Using local resources is important in sustainable farming systems. In today’s Norwegian farming system it is cheaper to import soy from Brazil for fodder, than to let the animals graze in the outfields. If we instead could use our own grazing resources, we would contribute to a more sustainable land use in two ways. We would decrease the pressure on the damaging Brazilian soy production, and help maintain the biodiversity in our cultural landscape in the outfields. One third of the red-listed species in Norway depend on the cultural landscape. Thus the use of more local resources equals more sustainable land use in Norway, and on the other side of the Atlantic!



Small copper. Found in an area with cultural landscape

