

## **Impact of Agriculture on Deforestation**

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### **Abstract**

Agriculture can be considered as a major cause of deforestation and its impact on deforestation is huge. Due to large population, the demand of food is high and in order to fulfill the demand of food of society, deforestation takes place on large scale. High demand of food promotes commercial farming that leads to the acquisition of lands on large scale. Forests are converting into farmlands for large scale farming. This causes adverse effect on environment, climate and health. It also damages natural ecosystems and biodiversity. By giving the importance of environmental protection and health, this review paper discussed about the impact of agriculture on deforestation. This review discussed diverse aspects of deforestation caused by agriculture. Currently, climate change is the major issue in front of the world that is why it is necessary to grow agriculture sector with forest protection policy that will help to secure and protect the nature.

**Keywords:** Agriculture, Commercial Farming, Climate Change, Deforestation, Land.

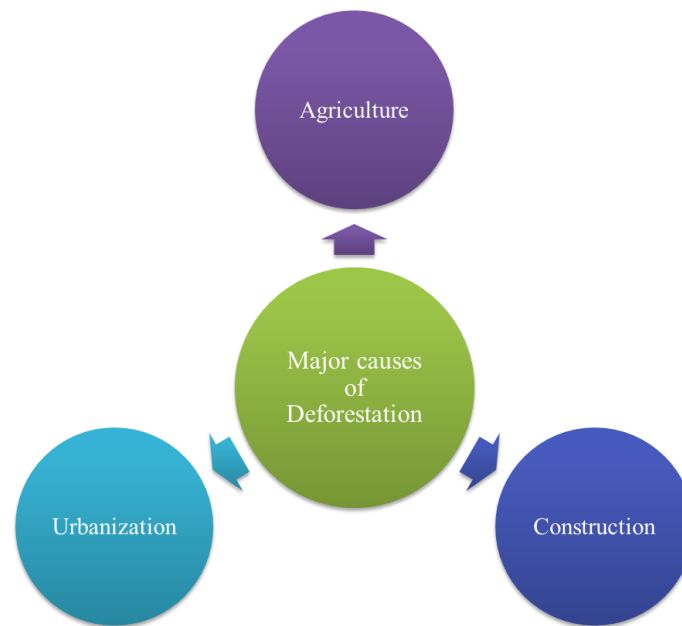
### **Introduction**

Presently, climate change and global warming are the two major issues in front of the World. All countries are trying hard to protect environment and nature so that we can give better future to our next generations. Deforestation is the major cause of climate change and global warming. Destruction of rainforests takes place on large scale that leads to the rising of the temperature of the environment[1]. The population of the world continuously increasing due to which there are two major demand arises by the population, first, high demand of food and second is lands for construction of buildings. In order to fulfill the high demand of the food, agriculture sector grows exponentially[2]. Commercial farming is the major sector of agriculture which produces food on large scale for fulfilling the demand of the society. In the past, people doing farming using their own small piece of lands (generally known as subsistence farming). The main purpose of the subsistence farming is to produce food for their families and their near ones. Subsistence farming can't fulfill the high demand of food because it is done on a small scale[3].

Commercial farming usually done on a large land farm by utilizing heavy machinery, some skilled and non-skilled labors. Heavy machines are used to perform various tasks of farming. Commercial farming generally capital intensive because it needs lots of capital investment for land acquisition, machines, fertilizers and seeds etc. Commercial farming is an emerging agriculture field due to various reasons including high yield, high employment and low cost food etc. Apart from various advantages, there are some drawbacks are associated with the commercial farming such as deforestation, destruction of natural rainforests, lack of lands available for cultivation, increase rate of lands, wastage of crops like vegetables and fruits if not consume within few days just after harvesting and promote use of chemicals such as fertilizers, insecticides and plant growth regulators. Among the all drawbacks associated with the large land farming of commercial farming, deforestation and destruction of natural rainforests are the serious issues. For the commercial farming, large land requires to start the farming on commercial level that leads to the land acquisition on high level. Natural forests destroy on large scale and transform into landforms resulting into climate change and global warming. This review article provides an overview of impact of agriculture on deforestation. Different aspects of deforestation caused by agriculture will be discussed in upcoming sections.

### **DEFORESTATION AND ITS MAJOR CAUSES**

Deforestation or destruction of natural rainforests is a serious issue currently facing by the world. Deforestation refers to the reduction in the natural rainforests across the world[4]. Due to continuous reduction in the number of natural forests, there are various issues rises such as global warming and climate change. Deforestation caused by many ways and some of the major causes shown in the Figure 1.



**Figure 1: Schematic Representation of Major Causes of Deforestation.**

*1. Agriculture:*

Agriculture is the major cause of deforestation today. High demand of food promotes expansion of commercial farming that resulting in deforestation. In general, commercial farming usually done on large land and continuous expansion of commercial farming agricultural sector increase the land acquisition on large scale. In order to make landforms for agriculture, destruction of natural rainforests takes place at high level that enhances the temperature of the environment and increases the level of carbon dioxide (CO<sub>2</sub>) in the atmosphere.

*2. Construction:*

Construction is the second main reason of deforestation. In order to develop new infrastructure (such as roads, rails, water and power supplies), deforestation plays a crucial role. The new infrastructure serves to human lifestyle in different ways such as transportation, transformation and energy generation. In order to transport the goods or products (i.e. fruits, minerals and spices etc.), a transport connectivity plays an important role. Some goods such as coal and natural gas are collected manually that is why it requires construction of large extraction and transportation infrastructures.

*3. Urbanization:*

For the survival, most of the people headed towards cities for the employment. The movement of the peoples from rural areas to urban areas is also a reason of deforestation. From the last few years, the rapid urbanization growth has been noticed. It has been identified that exponential growth of housing and consumption sites takes place. In order to host more people in urban area, deforestation takes place to develop more and more housing colony and industrial sites.

## **EVOLUTION OF AGRICULTURE**

Agriculture is the major source of living of majority of the population because it provides food to everyone. Evolution of the agriculture mainly takes place due to the growing population. High demand of the food

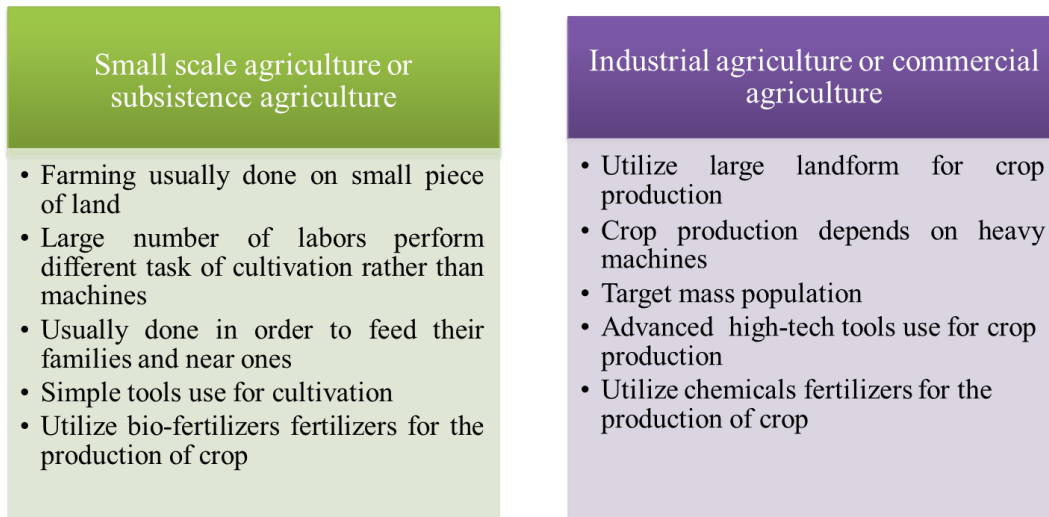
revolutionizes the agriculture sector by adapting advanced technologies. Earlier, humans were depending on forests for food. There were usually hunted living the forests and hunted animals for food[5]. They utilized handmade simple tools for hunting. As time passes, the humans enhance their knowledge and explore various things as a result they discovered fire. After the discovery of fire, they had started to cook their hunted food on fire by hanging on top of that. After the first phase of agriculture, people started to explore plants, vegetables and fruits as their food. Forest is the major source of various types of plants, vegetables and fruits due to which they can get their food easily.

When people started to live on lands, they explore different ways to find their food. In initial phase, people did farming on small piece of lands in order to produce food for their family members. This was the time when small scale farming comes into the picture. Small scale farming usually performed by rural farmers because they don't have enough capital. In small scale farming, manpower is use in order to perform various tasks of the cultivation on the land. Small scale farming is need oriented rather than profit oriented. The main advantages of small scale farming are high quality food, environmental friendly, better supervision, more productivity and possibility to quick decision in frequent weather and climate conditions. Another advantage of the small scale farming is to provide employment because it utilizes large number of labors rather than machines for farming[6]. Later on, due to the drastically growth in population, the demand of the food increase that can't fulfill by small scale farming system.

High demand of food takes agricultural sector on industrial level. Industrial agriculture usually utilizes large farmland in order to produce food on large scale. High yield and generation of capital are the two primary objective of the industrial agriculture. In order to perform various tasks, different types of heavy machines use. The benefits of industrial agriculture are high yield, more employment; provide food to everyone on low cost and development of local infrastructure. There are some drawbacks are also associated with the industrial agriculture on the other side. These drawbacks included high emission of carbon dioxide (CO<sub>2</sub>), destruction of natural rainforests, soil erosion and low quality food due to utilization of different types of chemicals in crop production for the various purposes such as soil management and crop protection from pests. These days, peoples are also gives to health that is why they prefer quality food over low cost food. For this reason, most of the people started to produce food in their balcony or garden through natural process without using chemicals. This type of framing known as organic farming. Generally, it utilizes bio-fertilizers and grow crops though natural process. The quality of the food is very rich in organic farming and food full of nutrients.

#### **TYPES OF AGRICULTURAL SYSTEM**

The evolution of agriculture gives us mainly two types of agriculture system (shown in Figure 2). The primary objective of the both agricultural system is same to produce food. Each agricultural system targets different number of peoples in order to feed. The major difference is based on the farm size because both are targeting different number peoples to feed.



**Figure 2: Schematic Illustration of Types of Agricultural Systems and Difference between Them**

**IMPACT OF AGRICULTURE ON DEFORESTATION**

Every year, commercial farming or industrial farming contributes to the deforestation of natural rainforests lands. Commercial farming plays an important role in food industry because it provides food to the large population at low cost. It produces food on large lands by utilizing the machines, professionals, seeds and fertilizers. The main objective of the commercial farming is to generate revenue by producing food. Since, commercial farming industry has enough capital for investment, it expands its business on large scale for that it required lands for farming. Most of the land owned by the rural farmers and they doing cultivation on their small piece of land form in order to feed their families. Due to lack of lands, deforestation takes place on large scale for converting the forests into large area lands farms. Deforestation mainly caused by commercial or industrial farming that shows negative impact on environment, humans, animals and birds. Some of the main effects caused by deforestation are discussed in Table 1.

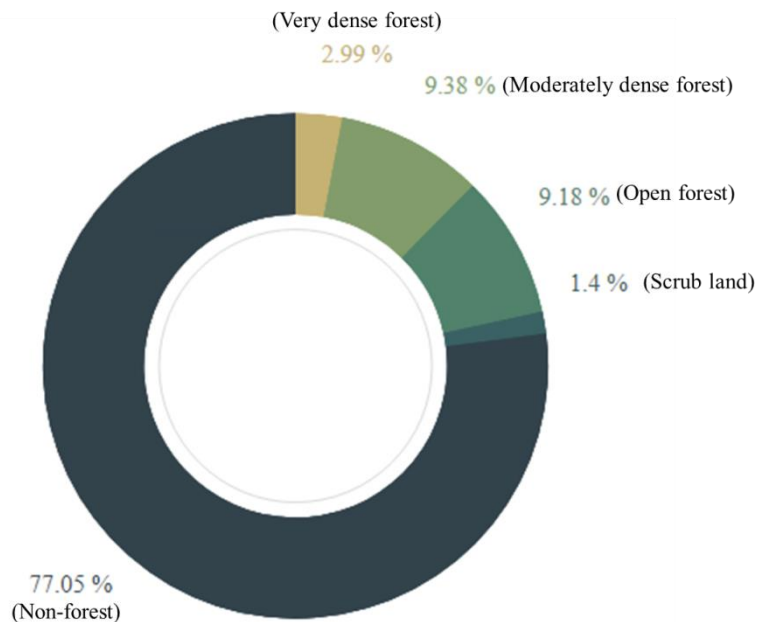
**Table 1: Main Effects of the Deforestation caused by Agriculture and Their Explanation**

Effect on	Explanation
Biodiversity	Biodiversity is widely affected by the deforestation. It is the main threat to the biodiversity. Maximum number of the species of the animals and birds are living in the forests and some rare species of the fauna and flora are found in the forests. The complete ecosystem comes in danger due to the human activities such as deforestation. Forests are providing food and shelter to the many animals and birds.
Local people and their livelihoods	Majority of the people still living in the rural areas and some of the them depends on forests for living. They use forests to hunt and collect raw materials for their small scale farming. Due to lack of forests, many people’s lives affected. It promotes illegal human activities for survival because they don’t have any resource for livelihoods.
Food security	Deforestation is the major cause of soil erosion. Soil erosion reduces the nutrients of the soil that leads to

	the production of the unhealthy food, low yield and food insecurity.
Soil erosion	Forests help to keep soil healthy and maintain the stability. Deforestation threatens the soil and degrades and make weak. Forest soils are rich in organic matters but also resistant to erosion. Roots of the forests help to keep soil intact during heavy rain, flood and landslides.
Climate Change	Trees are well known and important nature’s creation. It helps in balancing of climate and natural ecosystem. Since, trees helps in absorbing the carbon dioxide (CO <sub>2</sub> ) from the atmosphere so in the absence of forests the level of CO <sub>2</sub> in the atmosphere will increase drastically resulting in climate change and global warming.

**STATUS OF FOREST DISTRIBUTION IN INDIA**

Continuous efforts of the government by providing awareness through campaigns and education, peoples start take responsibilities to protect nature. There is a positive change has been noticed in the forest cover in India from last 10 years. India contributed well in planting trees as compared to the other countries[7]. Since the land area of the India is large that is why forest cover plays an important role in reducing the deforestation. The current status of the forest cover in India is illustrated in Figure 3. In has been clear from the figure that, moderately dense forests are largely expand in India followed by open forest and very dense forest. Scrub land in India covers least geographical region of India.



**Figure 3: Schematic Representation of Forest Cover (%) of India in 2017[8].**

Each Indian state contributes very well in forest cover. North east states cover maximum forest cover according to the geographical area of the states. The Current status of the Indian states in covering the forest area is shown in the Table 2. Based on the different parameters, the forest cover area is different in each state.

**Table 2: Current Status of the Forest Cover by Indian States Based on Different Parameters [9].**

Parameter	States
<b>Top 5 states having highest forest cover area-wise</b>	1. 1. Madhya Pradesh 2. 2. Arunachal Pradesh 3. 3. Chhattisgarh 4. 4. Odisha 5. 5. Maharashtra
<b>Top 5 states having highest forest cover as a percentage of total geographical area</b>	1. 1. Mizoram (85.41%) 2. 2. Arunachal Pradesh (79.63%) 3. 3. Meghalaya (76.33%) 4. 4. Manipur (75.46%) 5. 5. Nagaland (75.31%)
<b>The top three states showing an increase in forest cover are</b>	1. 1. Karnataka (1,025 sq. km) 2. 2. Andhra Pradesh (990 sq. km) 3. 3. Kerala (823 sq. km)

#### **ROLE OF INDIAN GOVERNMENT IN FOREST CONSERVATION**

Climate change is the global issue and government authorities from all across the world put extra hard work and effort in order to tackle this problem. Like other countries, Indian government continuously put efforts to increase the forest cover in order to conserve the forests and natural resources. Central government as well state government work together to overcome this issue. For forest conservation, Indian government makes and implement many polices, rules and laws[10]. Some of these laws and rules discuss in Table 3.

**Table 3: List of Policies, Rules and Laws Implemented by Indian Government in Order to Conserve Forest**

Rule/Law/Policy	Explanation
The Indian Forest Act, 1927	This act was comes into existence in order to differentiate and declaring the area of reserved forest, village forest or protected forest. An amendment has been done in 2012 that declare the restriction of fresh clearance in forests.
Forest Conservation Act, 1980	In this act, an amendment has been done in 1988. The main objective of this act was for the conservation of forest in the country. Government was implemented this act to conserve their natural rain forests. Under this act, it was mandatory to take government approval for any types of diversion of forest for non-forestry purpose.

National Forest Policy	This is one of the main steps taken by Indian government for the conservation of forest within the country. This order ensures the necessity of environmental safeguards, maintenance, enhancement, utilization and restoration of forest areas.
Wildlife Protection Act, 1972	In order to protect natural ecosystem and wildlife, this act comes into existence. The main purpose of this act is to protect animals, birds and plants so that environmental balance can be maintain. It also protects the some of the rare species of the animals and birds.
The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006	The main purpose of this act is to recognize the rights and occupation in forest areas in forest dwelling scheduled tribes and other traditional forest dwellers who have been residing in such forests for generations.

**CHALLENGES OF DEFORESTATION**

As discussed above, deforestation has various adverse effects on environment, climate and health. It is damaging the natural ecosystem badly. If deforestation not stopped then future will be worst. It is important to take responsibility to protect our nature so that we can give a better future to our upcoming generations. In order to tackle the problem of deforestation, there are some challenges in front of us. Some of these challenges are shown in the Figure 4.



**Figure 4: Schematic Illustration of List of Challenges of Deforestation.**

**DISCUSSION**

Deforestation is referred to the loss of trees and forest in the world. Destruction of forests takes places on large scale due to the various human activities such as agriculture, urbanization and construction. Among the all causes, agricultural is the main reason of the deforestation. Increasing nature of population increase the demand of the food due to which the agricultural activities now takes place on industrial level. High demand of food, promotes the expansion of commercial agriculture. Commercial agricultural usually done on large lands as a result land acquisition takes places on large level. Since, there is a limited open land, commercial farming activities promotes deforestation in order to make forests into large farmlands for the production of the food on large scale. There are various challenges in front of the world due to the deforestation caused by agriculture.

Some of these challenges are climate change, destruction of natural ecosystem, climate change and global warming etc. In order to overcome such challenges it is necessary to take responsibility by individuals to protect their nature so that the coming generation will have better atmosphere for living.

## **CONCLUSION**

Climate change is a global issue and in order to tackle this problem, all government authorities put enormous effort to handle the situation. The major cause of deforestation is agriculture because high demand of food promotes the expansion of commercial agriculture in order to produce the food for the mass population. Since, for the commercial farming, large land is required that is why deforestation takes place at large level. It destroys so many natural rainforests and transform into farmlands due to which various problems arise including climate change and global warming, negative impact on biodiversity, increase food insecurity and soil erosion. If this will not stop then future will be worst. It is recommended that in order to reduce the deforestation, firstly each and every person take the responsibility to protect their nature, increase planting and make proper policies and rules for conservation of forest and it must be ensured by government authorities that rules and policies are followed or not.

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