



Intensive Agriculture and Its Impact on Environment

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ABSTRACT: Intensive agriculture, also known as intensive farming (as opposed to extensive farming), conventional, or industrial agriculture, is a type of agriculture, both of crop plants and of animals, with higher levels of input and output per unit of agricultural land area. It is characterized by a low fallow ratio, higher use of inputs such as capital and labour, and higher crop yields per unit land area.

Most commercial agriculture is intensive in one or more ways. Forms that rely heavily on industrial methods are often called industrial agriculture, which is characterised by innovations designed to increase yield. Techniques include planting multiple crops per year, reducing the frequency of fallow years, and improving cultivars. It also involves increased use of fertilizers, plant growth regulators, pesticides, antibiotics for livestock and mechanised agriculture, controlled by increased and more detailed analysis of growing conditions, including weather, soil, water, weeds, and pests. Intensive farms are widespread in developed nations and increasingly prevalent worldwide. Most of the meat, dairy products, eggs, fruits, and vegetables available in supermarkets are produced by such farms.

KEYWORDS: intensive agriculture, crop, fertilizers, pesticides, livestock, commercial

I. INTRODUCTION

Intensive farms can use sustainable methods, although this typically necessitates higher inputs of labor or lower yields. Sustainably increasing agricultural productivity, especially on smallholdings, is an important way of decreasing the amount of land needed for farming and slowing environmental degradation through processes like deforestation. Intensive animal farming involves large numbers of animals raised on limited land, for example by rotational grazing, or sometimes as concentrated animal feeding operations.¹ These methods increase the yields of food and fiber per acre as compared to extensive animal husbandry; concentrated feed is brought to seldom-moved animals, or with rotational grazing the animals are repeatedly moved to fresh forage. Intensive agriculture, in agricultural economics, system of cultivation using large amounts of labour and capital relative to land area.² Large amounts of labour and capital are necessary to the application of fertilizer, insecticides, fungicides, and herbicides to growing crops, and capital is particularly important to the acquisition and maintenance of high-efficiency machinery for planting, cultivating, and harvesting, as well as irrigation equipment where that is required. It is a method of farming that uses large amounts of labor and investment to increase the yield of the land. In an industrialized society this typically means the use of pesticides, fertilizers, and other chemicals that boost yield, and the acquisition and use of machinery to aid planting, chemical application, and picking.³ In theory, this reduces the amount of land needed for an economically viable farm to grow crops or raise animals. However, in countries such as the United States and Canada these methods are often used to overproduce products as companies attempt to increase their market share. Profit is then diminished so that farmers must continue overproducing in order to stay economically viable, and often seek compensation for low profits via government subsidies.⁴

Characteristics of Intensive Agriculture

Pasture Intensification

Pasture intensification is the increase in value and production that occurs due to inputs such as money, labor, and pesticides, specifically in the pastures on which farmed animals graze. Historians believe that pasture intensification, and agricultural intensification more broadly, was a necessary step in creating the modern societies we have today, as new methods of farming and increasing yield allowed for larger populations to grow. The most common and effective way of increasing inputs throughout history has been to plant or graze more land, leading to an increase in the yield of the farm. Simply increasing the amount of land being used, however, can have serious consequences for biodiversity, which is lost when native plants and grasses are cleared to make room for grazing. In recent years there has been an



increased level of interest in methods of intensification that reduce some of its negative effects. These include cultivating certain crops, such as soybeans, in pastures that cows graze on.⁵

Rotational Grazing

Rotational grazing is a type of pasture intensification that entails breaking grazing areas into smaller paddocks. Farmed animals are rotated through the different paddocks one by one, allowing those not in use to recuperate and regrow foliage. This is distinct from traditional grazing, as typically cattle are allowed to free graze an entire pasture, which destroys the plant life and does not provide adequate time for regrowth. This leads to more land needing to be used to support the farmed animals.

Concentrated Animal Feeding Operations (CAFOs)

Concentrated animal feeding operations (CAFOs) are the predominant type of animal farm in industrialized systems of agriculture. They consist of large numbers of animals on relatively little land. Instead of grazing and gathering their own food, the animals have food brought to them. The animals are confined in small spaces with little room or opportunity to express natural behaviors.⁶

Crop Irrigation

Crop irrigation is the use of manmade systems to control water application and make up for any shortage of natural rainfall. In California more than nine million acres of land are irrigated, accounting for 80 percent of the total water used by businesses and homes. The heavy use of irrigation to grow crops in areas that are not able to naturally sustain them creates risks and challenges, especially because of the ongoing threat of drought in many such places.

Genetically Modified Organism (GMO) Seeds

Many of the most abundant crops in the United States are species that have been genetically modified. In 2017, 94 percent of all soybeans, 94 percent of cotton, and 92 percent of corn being planted in the country were genetically modified. Generally, seeds and crops are genetically modified to be larger, more pest-resistant, or to tolerate herbicides better.

Use of Agrochemicals

Modern-day industrialized intensive agriculture uses large amounts of pesticides and fertilizers. These chemicals wreak havoc on ecosystems, polluting water and killing off important species such as bees and ladybugs⁷

II. DISCUSSION

Examples of Intensive Agriculture

Livestock

Most of the farmed animals in the United States live a significant portion of their lives on industrial factory farms that use a variety of intensive methods to produce more meat, dairy, or eggs for less money. One such method is keeping the animals enclosed in small spaces and delivering their food to them. This forces them to grow more quickly and reduces the need for space. Another example of intensive methods in animal agriculture is the use of selectively bred animals that grow more quickly than naturally occurring breeds and get large enough for slaughter in a shorter period of time. This often results in harsh repercussions for the animals themselves, such as difficulty breathing, walking, and standing.



Aquaculture

Intensive agriculture is apparent in every part of the industry, and aquaculture is no exception. One example is the standard practice of housing extremely high densities of fish in artificial tanks, allowing the farmers to control feed, oxygen levels, and a variety of other factors leading to an increase in yield.⁸

Crops

There are several ways that farmers who grow crops use intensive agriculture to produce higher yields. Tactics include the use of pesticides, insecticides, fertilizers, irrigation, and the use of genetically modified seeds.

Intensive Farming Examples of Crops Grown

Here are some examples of crops that are commonly grown using intensive farming methods: Wheat, Rice, Corn, Soyabeans, Vegetables etc.⁹

Basic aspects of intensive agriculture

- The very small landholding is one of the significant characteristics of this type of farming. It is because of the high population density and limited supply of labour.
- Intensive farming is labour-intensive agriculture and is practised in regions of dense population.
- It is found in developing countries of south-east Asia, where agriculture is the mainstay of the population.
- In this type of farming, the use of maximum labour, fertilisers, and high-yielding seeds are used to grow more and more crops and preserve the land's fertility.
- Intensive farming brings about the highest yield per hectare.
- The per capita production of crops is low due to the heavy pressure of the population on the land.
- Cultivation is practised with the aid of irrigation where it is necessary.
- Intensive farming is well developed in areas where the physical environment for crop production is highly conducive.
- Due to heavy pressure on the land, emphasis is given to food crop production, such as rice, wheat, etc.
- Other crops of high cash value, such as jute, cotton, sugarcane, tobacco, and oilseed, are also raised. They form an important part of this type of farming;
- Intensive farmings also show the characteristics of mixed farming as it raises livestock and animals together with crop production.¹⁰

III. RESULTS

Advantages of Intensive Farming

1. High crop yield

One of the main rewards of intensive farming is the production of high crop yields. Agricultural products such as meat, eggs, milk, fish, and cereals are highly demanded in the contemporary world's food markets such as restaurants and supermarkets. Satisfying the market demands has only been achievable through intensive farming because the yields are produced in large quantities on a small piece of land.

2. It means more variety of food can be produced

Since intensive farming mainly focuses on mass food production in a specific food crop or animal production, it leads to more variety of food for human consumption. Intensive farming requires a lot of labor, capital and resources which makes it more practical to only focus on one production area. Accordingly, the engagement on different areas of the practice by different farmers such as intensive fruit production, intensive vegetable production on any of the numerous options namely onions, cabbage, carrots, tomatoes etc, intensive livestock farming on any of the several options namely poultry, beef, goat, rabbit, pig etc, and intensive aquaculture simply means more variety of food.¹¹



3. It is more efficient

Because intensive farmers utilize less farm inputs and less land per unit of the foodstuff yielded, it is more efficient. The farmer makes more profit by maximizing yields on a small piece of land as opposed to the conventional farming methods that needed large tracts of land but produced less yields/food produce. Since the requirements for equipment, space and other inputs are less compared to the food produced per unit, it is more economical and efficient.

4. Affordable food prices

As opposed to traditional farming, the employ of intensive farming to produce vegetables, poultry, beef, milk, eggs, and fruits has made food prices affordable. The reason for this is that intensive farming requires less space and produces more than the invested inputs. Additionally, it has substantially helped in solving the world's hunger problem. The common people can hence afford to enjoy a nutritious and balanced diet.²⁹

5. Helps in ensuring regulated farming

Various agricultural institutes and environmental protection agencies have taken the initiative to monitor and control the possible adverse effects of intensive farming. Consequently, the agencies and agricultural research institutes have set certain rules and regulations on the use of farm inputs such as fertilizers, pesticides, growth hormones, and herbicides, and have even stated clear measures on how to maintain and manage livestock. This ensures regulated farming which results in healthy, safe, and affordable farm produce.¹²

6. Sustainable supply of food

With the demand for food soaring across the world due to the ever-increasing number of human populations, intensive farming offers the advantage of high crop productivity with the possibility of meeting the food market demands. Besides, it requires less amount of land which means that it significantly contributes to economies of scale in meeting the ever-escalating demand for food supplies.²⁸

Disadvantages of Intensive Farming

1. Poor living conditions and hygiene for livestock

Intensive farming is highly criticized and thought to be cruel to the animals. Because it involves the use of various chemicals, growth hormones and excess crowding on a small space, the outcome is usually poor living conditions and hygiene for the livestock. Keeping livestock above their capacity is associated with pollution and poor hygiene which results in infections and various diseases.¹³

2. Excessive use of agro-chemicals

Intensive farming as earlier stated involves the utilization of numerous types of agro-chemicals including chemical pesticides, fertilizers, herbicides, insecticides, and acaricides. When these chemicals are used they not only destroy their intended targets such as pests, weeds and parasites but also contaminate the food products. The insecticides and pesticides also kill beneficial insects which contribute to biodiversity loss. The workers and humans nearby are equally affected by the chemical sprays and humans who consume the food indirectly take in the chemicals.²⁷

3. Deforestation and alteration of the natural environment

Environmental studies and reports indicate that intensive farming impacts and degrade the environment in countless ways. The removal of trees, slash and burn techniques and the clearing of forest areas to create room for agriculture has led to massive deforestation and soil erosion. As an outcome, natural habitats and wild animals have been heavily



affected as the destructive practices have persistently contributed to habitat loss. The use of chemical fertilizers and herbicides contaminates water soils, wildlife habitats, and water bodies like oceans, rivers and lakes. Fertilizer nutrients in particular are the main cause of eutrophication in most of the world's water bodies such as oceans, lakes, and rivers.¹⁴

4. Risks to human health

The vegetables and fruits are sourced from areas that practice intensive farming and are full of invisible pesticides. The challenge is that the pesticides cannot be washed away easily and since the fruits and vegetables appear clean after a simple wash, humans indirectly consume the chemical pesticides. The consumption of pesticides affects the health of humans with health risks such as physical deformity, skin allergy, and congenital diseases. ADHD in children, for example, is associated with the consumption of pesticides in agricultural food products.

5. Higher risks of cancer and birth defects

Public health publications and cancer statistics prove a direct correlation between the consumption of food sourced from intensive farming areas and an increasing number of cancer victims. The consumption of food products procured from intensive farming areas is also said to be responsible for the increase in the number of congenital abnormality cases. Public health researchers say that the rising cases of children born with defects and cancer are probably caused by the consumption of inorganic fruits, meat, vegetables, and poultry.¹⁵

6. The use of chemical hormones in food

The majority of the food products used in intensive farming systems, especially vegetables, fruits, poultry, and livestock are full of growth hormones. If one takes a keen look at the intensive farming systems, he or she will realize there are many hybrid varieties of plants, poultry and livestock. Most of them are injected with growth hormones and other chemicals to augment production.²⁶

7. Possibility of poor quality food products

Since intensive farming centers primarily on mass production of nice-looking food products, the production strategies overlook the need for quality and nutritious food products. As a consequence, the quality of foods sourced from intensive farming sites often lacks the same nutrition values as compared to those produced using conventional farming methods or organic farming. Intensive farming simply aims to produce perfectly looking yields and to possibly extend their shelf life instead of enhancing nutritional value and taste which breeds room for poor quality food products in the long run.²⁵

8. Traditional farmers are unable to gain enough profits and less job creation opportunities

Intensive farming as opposed to traditional farming utilizes less space, labor and resources to produce much greater volumes. This makes it very hard for traditional farmers to compete. Also, considering how industrialized intensive farming is, it does not lots of job per unit of food produced which means less job creation opportunities.¹⁶

IV. IMPLICATIONS

Intensive farming can have negative environmental impacts. Intensive farming involves chemicals that negatively impact the environment and native species. Feed for intensively farmed animals is a growing factor in deforestation as well. Growing the food used to feed animals in intensive farming also leads to deforestation in South America and increasingly in other areas of the world.²⁴



Due to reasons below Intensive Agriculture is considered bad

Animal Cruelty

Billions of animals in the United States suffer on factory farms that employ intensive methods to increase profitability. Often they are confined in such small spaces that they can barely move. Standard procedures include debeaking, castration, tail docking, and dehorning. All of these frequently occur without sedation, causing large amounts of suffering and pain for the animals that endure them.²³

Deforestation

Because intensive agriculture has shifted from focusing on maximizing the productivity of small pieces of land to application on farms spanning thousands of acres, it can often drive deforestation even before one considers the sources of animal feed. Because the land must be easily accessible for planting, watering, and fertilizing, trees must be removed to create large expanses of flat land. Growing the corn and soy to feed these animals is a leading cause of deforestation globally.¹⁷

Human Health

Exposure to the pesticides that intensive agriculture tends to use in large quantities can have a number of negative effects on human health. These include irritation to the skin and eyes and negative effects on the nervous and endocrine systems. The mismanagement of the large amounts of manure produced on CAFOs can also lead to health problems in surrounding communities.²²

Pest and Weed Resistance

Following repeated application of a particular pesticide or herbicide, many pest species, both plant and animal, can build resistance. This often results in stronger chemicals being used to destroy the target species, or a larger amount or higher concentration of the chemicals being applied.

Soil Degradation

Intensive farming contributes to soil degradation, as land tends to be planted on repeatedly without providing a break for the dirt to recover its nutrients. This often results in the increased use of fertilizers to make up for the lack of nutrients in the soil.¹⁸

Water Pollution

Intensive farming methods contribute considerably to water pollution. Every year the animals on factory farms in the United States produce billions of gallons of waste. With nowhere else to go this waste tends to be stored in large cesspools and be sprayed over fields. Both of these systems of disposal result in water pollution, as the waste sinks into the groundwater or makes its way into rivers, lakes, or other bodies of water.²¹

Climate Change

The increase of intensive farming methods around the world was noted in 2015 as threatening the world's chance of meeting the terms of the Paris agreement. Both the use of artificial fertilizers and the farming of animals—especially cows, who produce large quantities of methane and are often fed with grains farmed on deforested land—are causes of increasing emissions of greenhouse gases.



Harm to Smaller Farms

The rise of intensive agriculture has dealt a serious blow to small farms. Because the larger, corporate enterprises can afford to produce crops and animals on a much larger scale, they are able to sell them for a lower market price while still being able to make a profit. Smaller farms, however, have been left behind, as they do not tend to produce enough to be able to accept such low prices. This has contributed to many farmers leaving the industry and further social effects for farming communities.¹⁹

V. CONCLUSIONS

The intensification of farming has played an important role in the history of agriculture. It allowed for farmers to feed growing communities around the world. However, intensive agriculture as we know it today is no longer sustainable or necessary. The methods employed have countless negative impacts on the environment, human health, animal lives, and communities, caused by the heavy use of chemicals and the inhumane treatment of animals and workers that are trademarks of modern-day intensive farming. Thankfully, we can take steps to reduce our support of the industry by purchasing locally grown foods from farms that employ more environmentally friendly and ethical methods of production.²⁰

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