

# Monocropping and animal welfare in sustainable agriculture



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## Sustainable Agriculture

### Background to Problem

Sustainable farming focuses on the production of food using “ farming techniques that protect the environment, public health, human communities, and animal welfare” (Sustainable Agriculture-The Basics, 2018). Modern Agricultural methods are used to match the supply and demand of the rising population, however, this solution may not be sustainable as it requires a high level of fertilisers, freshwater, and herbicides which lead to soil erosion and runoff water pollution. (Chen & Zhang, Y.-H, 2015)

### Why did we choose this topic?

Farming has always been an integral part of society and its products are vital for our survival. The increase in populations means a greater demand for resources, therefore farming must be done in a more sustainable way. We chose this topic because it directly impacts our day to day lives. The choices that we make as a society directly impacts the manufacturers. Unsustainable farming affects animal welfare, the soil, our health, the water supply, and the environment/climate.

This report has been split into 2 parts. Section A focuses on monocropping. It evaluates why this practice was not sustainable and it explores the solution to this problem and whether they are sustainable solutions. Section B focuses on animal welfare more specifically animal welfare within factory farms. It evaluates the different ways in which factory farming is harming the

environment and the human population and then it explores the different solutions that are being put forward and evaluates their sustainability.

## Section A: Monocropping

What is monocropping?

Monocropping is the process of planting only one crop in the same place every year, these types of crops are known as monoculture crops. This type of farming is advantageous as it allows the farmer to focus on one crop and only purchase necessary tools. Supporters of monocropping claim that this method is more profitable than changing crops around every year. However, this method is unsustainable as it destroys the environment and is less profitable than organic means of farming.

Planting the same crops in the exact same position every year drains the nutrients from the earth and leaves the soil weak and unhealthy. This unnatural soil is incapable of supporting healthy plant growth forcing farmers to use chemical fertilizers to boost the growth of plants and fruits. However, the use of chemical fertilizers further destroys the already ruined soil by contributing to nutrient depletion. This unsustainable process also encourages the spread of pests and diseases, which requires more chemicals to stop them from spreading. The effects of monocropping on the environment is disastrous when pesticides and fertilizers enter groundwater or become airborne as this creates pollution. (Gardening and Gardening, 2018)

## Solutions to Monocropping

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## Genetically Modified Crops

Genetic modification of plants involves adding a specific stretch of DNA into the plant's genome, giving it new or different characteristics. This could include changing the way the plant grows or making it resistant to a disease. The new DNA becomes part of the GM plant's genome which the seeds produced by these plants will contain. (Royalsociety. org, 2018)

This method is a good way to provide farmers a bigger profit, whilst spending less time on resources. It also adds nutritional value to crops that lack necessary vitamins and minerals which can prove to be beneficial in malnourished populations, as they can receive more nutrients from their diet. They do not require the use of synthetic chemicals thus reducing the amount of unknown substances entering our water systems. The precise evaluation and testing of GM crops and other products mean they are safe for human consumption. In fact, research shows that they are safer compared with traditional crops.

GM crops are known to be dangerous to various insects because new crop genes can be deadly to them. The simple fact that genetically modified crops are not naturally cultivated, is an immediate threat to the environment. Moreover, GM plants leave residual substances(with unknown effect) which can remain in the soil years after crops are removed.

The transfer of genes from GM crops to wild plants creates more weed, which led to the use of herbicides which are toxic to many mammals, amphibians and ecosystems. The problem with introducing GM genes on genetic diversity is that these genes can spread to other organic farm crops and <https://assignbuster.com/monocropping-and-animal-welfare-in-sustainable-agriculture/>

threaten crop diversity in agriculture. The decrease of crop diversity will have a direct impact on our ecosystem and would affect the population dynamics of other organisms. If a large-scale plantation releases a GM strain during pollination, cross-pollination may occur and create a hybrid strain. Allowing a greater possibility of ecological novelty or new artificial strains being introduced into the environment which could potentially reduce biodiversity through competition.

(Editor, 2018)

### Cover crops

Crop rotation is the act of changing the type of crop grown on a certain piece of land from year to year or every season (Mohler and Johnson, 2009). Cover crops are used to help to prevent soil erosion, regulate water, reduce weeds and increase biodiversity. Fundamentally, cover crops can improve soil quality because all the different plants provide several materials that are good for the soil and the more crops you rotate the higher quality soil you will get. (The Ohio State University, 2009). It also increases the harvest because a different variety of crops are planted each season and the available nutrients in the soil provide nourishment to all plants. A large study that was done by the American Chemical Society states that Crop yields on farms in developing countries that use sustainable farming rose by 79 percent in the past four years (ScienceDaily, 2018). There are many benefits of using cover crops, these include:

- cut fertilisers costs,
- reducing the need for herbicide,

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- improve yields by enhancing soil health,
- prevent soil erosion and
- conserve soil moisture.

The cover crop cuts fertiliser costs by reducing the number scavenging and mining. (SARE, 2007. pp 9)

Cover crops reduce the use of herbicides as they can beat weeds for minerals and allow the growth of the canopy leaf which blocks sunlight and changes the frequency of the light waves. (SARE, 2007. pp 10) Cover crops improve the yield by increasing the infiltration of surplus surface water which then improves the structure of the soil of the plant. (SARE, 2007. pp 10) The major benefit of cover crops is that they prevent soil erosion by reducing crusting and soil erosion caused by weather such as rain and wind. Cover crops can help conserve soil moisture by diminishing water evaporations and trapping the water. (SARE, 2007. pp 11)

To successfully use the method of crop rotation you need more equipment thus making it costlier. In addition, rotating crops also require educated skilful farmers, this will be time consuming as farmers will have to learn and master the agricultural practice of organic farming (Editor, 2018).

### Agricultural indicators

It is crucial that we measure sustainability appropriately, there are different indicators shows that how viability is measured in agriculture. It is implemented to show the effect on the environment such as the soil, water, air, biodiversity, habitat and landscape. There are some indicators such as

water use shows the total consumption of water for agricultural production. Another index is climate change which shows the effect of greenhouse gas emissions. Land use is another indicator which indicates the area of agricultural land. The amount of fertiliser used is vital when measuring sustainability as this can have effects on the environment such a thing can have a negative impact on biodiversity.

(Eurostat, May 2018)

## Section B: Animal Welfare

What is Industrial animal agriculture?

Industrial animal agriculture is a method of raising animals at an incredibly fast rate at minimum cost. It is “ characterized by high stocking densities and close confinement, forced growth rates, high mechanization, and low labor requirements.” (Negative impacts of factory farming, 2013). It was the solution that was initiated to deal with the increasing demands of today’s consumer at the expense of not only the animal’s welfare but that of the environment and everything that benefits from it. The most popular animals to be subject to this type of farming for their meat are pigs, chickens, rabbits, cows, ducks, and turkeys. Minks, chinchillas, and foxes are subject to these conditions because of their highly sought-after fur. Two-thirds of all meat come from factory farms. (Make it Possible, 2018). Unsustainable animal agriculture is the biggest crisis of our generation producing 65% of our global nitrogen oxide emissions (Factory Farming: Environmental Damage, 2018) which is 300 times worse than carbon dioxide. (Meet NO<sub>2</sub>, the greenhouse gas 300 times worse than CO<sub>2</sub>, 2014).  
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## Effect on Humans

In terms of social sustainability, factory farming is indeed partially socially sustainable. The technology used causes increased efficiencies and higher production rates which mean that food production is increased. Factory farming allows for livestock products to reach the market faster and provide more of a food resource. (Futureofworking. com, n. d.). Assuming that no antibiotics were used with the livestock, the health benefits are similar and this allows for more people to be fed, subsequently improving quality of life for current and future populations. In addition, there would be more employment opportunities as several components of factory farming, processing and packaging requires the involvement of skilled and unskilled labour. Factory farming automation to help provide food resources. In the past, farming meant an intense amount of daily manual labour to produce a crop. Mechanization has helped to reduce that workload. Factory farming brings automation into the equation, which further reduces individual workloads. Factory farmed foods contain stress hormones, residual antibiotics and unhealthy fats and proteins. They may have anti-nutritional elements. Factory farming increases the fat content of foods being eaten. The weight of the average chicken might be more than double what it was 60 years ago, but so is the fat content of the animal proteins that are being sent to the market. In some instances, the fat content of chicken is over 220% higher today than it was in the 1950s (Farming, n. d.). This fat can be rendered out in some forms of cooking, but it doesn't all disappear. There may be more foods because of factory farming, but not all of it may be as healthy as the foods that were eaten in the past.



## Effect on Human Health

Experts in the medical industry have been warning the world of the dangers of antibiotic resistance for years and the causes of this immunity are partially due to concentrated animal feeding operations. Animals on factory farms are routinely treated with antibiotics due to their poor living conditions and in some cases to encourage faster growth. In New Zealand for example, chickens are given antibiotics to prevent against necrotic enteritis which spreads rapidly in overcrowded conditions. 50% of the world's antibiotics are used on farm animals which allows resistance to filter down the food chain to humans ultimately threatening human life. " Industrial farms are super-incubators for viruses". ( *Effects of factory farming on human health*, 2018) In 2017 a strand of swine influenza(H1N1) that is found in pig population managed to spread intentionally and kill hundreds of people. The mad cow disease was also a direct consequence of industrial agriculture. ( *Effects of factory farming on human health*, 2018) There are many microbes that have developed antimicrobial resistance in parts due to the effects of factory farming including campylobacter, salmonella, E. coli O157: H7 and enterococcus.

In addition, factory farming has caused us to have a meat and dairy dependent diet which is unsustainable in the long run. Excessive consumption of meat and dairy combined with environmental pollution and lack of exercise is causing an abundance of preventable health problem such as heart disease. (Sayre, 2009)

## Effects on the economy

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Economically factory farming encourages economic growth but is unsustainable due overuse of resources. Production costs are low (Max Braun, n. d.). Use of vitamins, minerals, antibiotics and other substances make animals grow and generate food at a faster rate. Modern processing technologies also reduce overheads increasing profit margins. Factory farming encourages promotion of technology. Since factory farming depends on use of modern technology, there is always quest for improved knowledge and skills. This creates opportunities for economic development within economies. Employment opportunities are increased. Several components of factory farming, processing and packaging requires involvement of skilled and unskilled labour. Improves economic growth. Increased production may have a multiplier effect on other economic activities. It keeps prices down for consumers.

A factory farm can be established almost anywhere. Larger farms are more resilient to changes in the environment, water access, or geographical locations. This means unused or under-utilized lands could be converted into factory farms to help increase global food production capabilities. That is why factory farming is often seen as a potential solution to a hunger crisis that may occur in the future. It can lengthen food availability. Factory farming has helped to innovate new transportation, storage, and processing technologies that have allowed for food products to last longer without spoiling (AnimalSake, n. d.). This has increased the overall amount of food that is available while reducing waste at the same time. Factory farming helps local economies. Factory farms require workers, which means local jobs are created when one is established. Farms need drivers to take their

products to the market. They need meat processors to prepare their product. These jobs require other businesses to support their efforts, like having a local feed store, which helps to create more jobs.

### Effects on the environment

Factory farming is responsible for over 37% of methane emissions which has a global warming potential 20 times higher than carbon dioxide. The process of industrial animal agriculture also releases hydrogen sulfide and ammonia into the atmosphere adding to the greenhouse effect. Pesticides and synthetic fertilisers are derived from petroleum, adding transportation and the amount of energy required to run “ Concentrated Animal Feeding operations, factory farms use about 5. 5 gallons of fossil fuels per acre.” (Good, 2018) In America, the average farm is 418 acres which means that the average American farm “ devours 2, 300 gallons of fossil fuels.” The fossil fuels required in the process emit 90 million tons of carbon dioxide. (Good, 2018) The effect on the air and its addition to the greenhouse effect is undeniable. Emissions from cars are a major contributor to the greenhouse effect but that is negligible in comparison to the effect that unsustainable animal agriculture has. “ Even without fossil fuels, we will exceed our 565 gigatons CO<sub>2</sub>E limit by 2030, all from raising animals” (Goodland & Anhang, 2013)

Factory farming is a big contributor to water pollution. Waste is stored on these farms and sometimes it leaks into waterways which causes toxic algae to bloom in the water creating dead zones and massive fish kills. The waste has high levels of nitrates and once that leaks into drinking water it can

cause spontaneous abortions; blue baby syndrome and bacteria outbreaks- which is responsible for several disease outbreaks in the US. (Good, 2018). “Industrial agriculture sucks up 70 percent of the world’s fresh water supplies” (Good, 2018). This means that humans are only privy to 30% of the world’s fresh water supplies. Clean water is a major problem in developed countries, in fact, we have charities such as water aid that are dedicated to supplying these communities with fresh water to stop them from dying from diseases caused by drinking dirty water. Yet we have the resources to provide the animals on factory farms with clean, fresh water. We are all invested in this inhumane practice of placing the lives of animals higher than that of people, of newborn children, of mothers, struggling to make ends meet. Industrial agriculture is not only killing us through our water supplies, but it is killing the very thing that makes us human: compassion.

“The reallocation of land necessary to make room for the growing demands” has severe repercussions for the environment. In the United States alone over 260 million acres of forest have been cleared for crop fields which are used exclusively to grow livestock feed. Mass deforestation is occurring just to grow crops to feed the animals that are in factory farms that are being bred solely to feed us. In Brazil, land clearing to grow chicken feed is responsible for the destruction of about 3 million acres of rainforest. Over 100 million hectares of the Amazon rainforest have been cleared to grow soybeans releasing enough carbon in the atmosphere to increase the rate of global warming by 50%. (Good, 2018). Every day up to 137 plant, animal and insect species are lost daily due to the destruction of the biodiverse regions of our planet. The Amazon is home to 10% of the world’s biodiversity and

91% of its deforestation is caused by livestock. Livestock covers 45% of the Earth's total land and it is degrading the land leading to a loss in soil productivity, nutrients and carbon in the ground ultimately leading to the displacement of people in the areas where the land has become 'decertified'. (Hansel, 2018) The amount of land required to produce a pound of meat is unsustainable. According to the National Geographic “, the world's rainforests could diminish and virtually vanish within the next 100 years at our current rate of depletion”. The world's scientists agree that “ the biggest driver of deforestation is agriculture” (Garlow, 2014). The world cannot and should not have to keep up with these growing demands for they are only harming the earth in the process.

What is organic farming?

Organic farming is an agro-ecological system with economic and social dimensions, which aims to produce clean food in safe ways, taking into account natural balance and without disturbing the ecosystem. According to this definition, it includes agricultural systems, for the production of food and fiber, such as cotton and others, with environmental, social and economic content. Organic agriculture also requires major changes in the farming system, depending on the agricultural cycle system, the reuse of in-farm organic materials such as crop residues, animal manure, legume crops, green manure, as well as off-farm organic waste. It also relies on non-chemical methods and methods to control pests (insects, diseases, weeds). (Organic Farming – European Commission, 2018)

Organic Farming- is it the sustainable solution we need?

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Organic farming is the solution that the food industry has been selling to us since the start of the 21st century. But is it really the solution to our problems? “ We must question whether organic foods are being marketed towards us for the good of the planet or to add to someone’s pocket?” (Harris, 2018)

Organics farms have a higher soil quality, water quality, higher biodiversity and emit fewer greenhouse gases. However, on average they yield about 19-25% less product which can lead to “ more environmentally damaging land-clearing” (Seufert & Ramankutty, 2017). This also carries the risk of soil deprivation as the organic matter is not being used efficiently. (Leifield, 2012)The methods used by these farms lead to higher rates of carbon sequestration in soils due to the composting with generates a great deal of methane and nitrous oxide. (Harris, 2018). In addition, under the greenhouses, there is a higher groundwater contamination.

One of the main problems is how hard it is to perform an accurate life-cycle assessment. This is because assessments conducted by the organic industry and environmental groups often overlook the greenhouse gases emitted during manure composting along with the carbon release from tillage. If you “ combine this with the need for more land and more cows to produce the manure to fertilise the crops,” the evidence suggests that, despite all the hyperbole surrounding the organic community’s ideals, claims of a reduced environmental impact are just not grounded in reality.” (Despain, 2017). Tillage is one of the biggest uses of fuels on every organic farm and there is a false promise of no-till or reduced till in the organic farming industry.

However, tillage is a necessary step for controlling weeds on organic farms due to the banning of synthetic herbicides. (Despain, 2017)

## Conclusion

It is imperative that we use sustainable methods in agriculture to ensure that the environment will still be able to provide for future generations. GM crops and cover crops are effective solutions with positive results. Solutions such as organic farming have evolved into issues due to human exploitation and the desire to have a working solution. More research and sustainable development are needed in the agricultural world, but we need to take cautious steps in order to see an improvement that will last.

## Recommendations

The governments of the world need to play their role in ending unsustainable farming methods. They need to invest in the search for more sustainable methods of farming that will keep up with the world's demands. According to Kip Anderson research, the world's major sustainability organisations are blatantly ignoring unsustainable agriculture (Cowspiracy, 2014) as factor in global warming due to the stakeholders involved in the industry. Some of these stakeholders are key members of our governments. This is resulting in poor exposure to the biggest crisis of our generation. Our world leaders need to take the threat of the industrial agriculture to our survival seriously if we are to see a real permanent difference.

Society also needs to change its mindset and relationship with food. We need to make real changes to what we eat; how often we eat and how much

we pay for food. The industry we see today is a result of societies demands for cheaper and faster food. If we can alter this then the manufacturers will not be forced to go to extreme lengths to keep up with our needs. It is a simple matter of supply and demand and we are in charge of how that correspondence works and we can alter it to not only our advantage but that of future generations.

## Bibliography

- *Effects of factory farming on human health* (2018). Available at: <https://safe.org.nz/effects-factory-farming-human-health>[Accessed 21 October 2018]
- Sayre, L., 2009. *The Hidden Health Hazards of Factory Farms*. [Online] Available at: <https://www.motherearthnews.com/natural-health/health-hazards-factory-farms-zmaz09fmzraw> [Accessed 21 October 2018].
- *Negative impacts of factory farming*. (2013) Available at: <http://thegreentimes.co.za/negative-impacts-of-factory-farming/> [Accessed 9 October 2018].
- *Meet NO<sub>2</sub>, the greenhouse gass 300 times worse than CO<sub>2</sub>*. (2014) Available at: <http://theconversation.com/meet-n2o-the-greenhouse-gas-300-times-worse-than-co2-35204> [Accessed 9 October 2018].
- *Make it possible*. (2018) Available at: <https://www.makeitpossible.com/facts/frequently-asked->



[questions.php](#)

[Accessed 9 October 2018].

- Despain, D., 2017. *Is organic farming sustainable? 5 carbon footprint challenges*. [Online]  
Available at: <https://geneticliteracyproject.org/2017/10/27/organic-farming-sustainable-5-carbon-footprint-challenges/>  
[Accessed 29 October 2018].
- Garlow, A., 2014. *This is How Animal Agriculture Causes Deforestation*. [Online]  
Available at: <http://www.onegreenplanet.org/animalsandnature/this-is-how-animal-agriculture-causes-deforestation/>  
[Accessed 17 October 2018].
- Good, K., 2018. *5 Ways Factory Farming Is Killing the Environment*. [Online]  
Available at: <http://www.onegreenplanet.org/animalsandnature/factory-farming-is-killing-the-environment/>  
[Accessed 14 October 2018].
- Goodland, R. & Anhang, J., 2013. Food Choice and Sustainability: Why Buying Local, Eating Less Meat, and Taking Baby Steps Won't Work. 22(6).
- Hansel, H., 2018. *How Animal Agriculture Affects Our Planet*. [Online]  
Available at: <https://blog.pachamama.org/how-animal-agriculture-affects-our-planet>  
[Accessed 17 October 2018].
- Harris, T., 2018. *Project aims to quantify watershed wide water use*. [Online]

<https://assignbuster.com/monocropping-and-animal-welfare-in-sustainable-agriculture/>

Available at: <https://www.westernfarmpress.com/water/project-aims-quantify-watershed-wide-water-use>

[Accessed 28 October 2018].

- Leifield, J., 2012. How sustainable is organic farming?. *Agriculture, Ecosystems & Environment*, Volume 150, pp. 121-122.
- Seufert, V. & Ramankutty, N., 2017. *Organic farming matter-just not in the way you think*. [Online]  
Available at: <https://theconversation.com/organic-farming-matters-just-not-in-the-way-you-think-74124>
- Nair, A. and Delate, K. (2018). Composting, Crop Rotation, and Cover Crop Practices in Organic Vegetable Production.
- Mohler, C. and Johnson, S. (2009). Crop rotation on organic farms. Ithaca, NY: Natural Resource, Agriculture, and Engineering Service (NRAES) Cooperative Extension.
- ScienceDaily. (2018). Sustainable Farm Practices Improve Third World Food Production. [online] Available at: <https://www.sciencedaily.com/releases/2006/01/060123163315.htm> [Accessed 8 Nov. 2018].
- Conserve Energy Future. (2018). Advantages and Disadvantages of Crop Rotation – Conserve Energy Future. [online] Available at: <https://www.conserve-energy-future.com/advantages-disadvantages-crop-rotation.php> [Accessed 8 Nov. 2018].
- Organic Farming – European Commission. (2018). What is organic farming? – Organic Farming – European Commission. [online]
- Organic Farming – European Commission. (2018). What is organic farming? – Organic Farming – European Commission. [online] Available

at: [https://ec.europa.eu/agriculture/organic/organic-farming/what-is-organic-farming\\_en](https://ec.europa.eu/agriculture/organic/organic-farming/what-is-organic-farming_en) [Accessed 22 Nov. 2018].