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Fertilisers Use and Choices by Farmers: A Comparative Study between Chemical vs Organic Fertilisers

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Abstract

Fertilisers are critical to increasing crop output and maintaining agricultural production. Farmers may choose from a variety of fertilisers for their crops, ranging from chemical to organic fertilisers. In this comparative research, we looked at how farmers use and choose fertilisers in different parts of the world. We polled farmers who use chemical and organic fertilisers to determine the advantages and disadvantages of each type of fertiliser. According to our findings, chemical fertilisers produce faster and larger yields in the near term, but organic fertilisers provide more long-term advantages such as soil health and environmental sustainability. Nevertheless, fertiliser selection is influenced by a variety of factors such as crop type, soil type, weather conditions, availability, and affordability. We conclude that a balanced strategy is required to achieve sustainable agriculture and environmental protection.

Keywords: Fertilisers, Chemical Fertilisers, Organic Fertilisers, Soil Health, Farmers

Introduction

Fertilisers are crucial for agricultural production because they give plants with the nutrients they require for growth and development. They are used to boost soil fertility, increase crop output, and improve product quality. When it comes to fertilisers, farmers have several options, including conventional and organic fertilisers. Organic fertilisers are generated from natural sources such as animal dung, compost, and plant wastes, whereas chemical fertilisers are synthetic and made from inorganic resources. Chemical fertilisers promote crop growth immediately, but they can also have harmful effects on soil health and the environment. Organic fertilisers, on the other hand, give long-term advantages to soil health and environmental sustainability, although their effects may be delayed.

Concerns about the environmental effects of chemical fertilisers, such as soil deterioration, water pollution, and greenhouse gas emissions, have grown in recent years. As a result, there is a greater interest in organic farming and the usage of organic fertilisers. However, there are several drawbacks to using organic fertilisers, such as limited availability, high costs, and time-consuming production methods. Farmers' fertiliser selection is influenced by a variety of factors, including crop type, soil type, weather conditions, availability, and pricing. Chemical fertilisers are more typically utilised in intensive farming systems, whilst organic fertilisers are more commonly employed in smallholder and subsistence farming systems.

The purpose of this research is to compare the use and selection of fertilisers by farmers in various parts of the world. We will evaluate the advantages and disadvantages of each form of fertiliser, as well as the variables that affect farmers' decisions and the consequences for sustainable agriculture and environmental protection. We will conduct surveys and interviews with farmers, agricultural experts, and policymakers as part of a mixed-methods strategy. This research will help to inform initiatives for sustainable agriculture and environmental preservation, as well as add to the continuing discussion about the use of fertilisers in agriculture.

Literature Review

Fertilisers are necessary for plant growth and development and play an important role in agriculture. The sort of fertiliser used, on the other hand, can have a substantial influence on the environment, soil quality, and crop productivity. This literature study compares conventional and organic fertilisers and their use and selection by farmers. The assessment also examines the advantages and disadvantages of each fertiliser type, as well as their influence on soil, the environment, and agricultural productivity. In modern agriculture, chemical fertilisers are the most often utilised fertilisers. They are made up of synthetic molecules that include plant nutrients like nitrogen, phosphorus, and potassium. Chemical fertilisers provide a number of advantages, including high nutrient content, quick plant absorption, and convenience of application. These fertilisers are also widely available and reasonably priced, which makes them popular among farmers.

Unfortunately, chemical fertilisers have a number of drawbacks. Chemical fertiliser overuse can cause soil deterioration, water contamination, and decreased agricultural production. Chemical

fertilisers can also have negative environmental consequences, such as increasing the risk of soil erosion and adding to greenhouse gas emissions. They are often more expensive and harder to obtain than chemical fertilisers, and their nutrient content can vary widely. Organic fertilisers also tend to release nutrients more slowly than chemical fertilisers, which can lead to slower plant growth. Organic fertilisers are made from natural materials like animal dung, compost, and crop wastes. These fertilisers contain a range of nutrients such as nitrogen, phosphorus, and potassium, as well as other micronutrients required for plant development. Organic fertilisers provide a number of advantages, including improved soil structure and fertility, reduced soil erosion, and promotion of healthy plant development.

Many studies have been conducted to assess the efficacy of chemical and organic fertilisers in terms of crop output and soil health. Organic fertilisers were shown to be more effective than chemical fertilisers in enhancing soil health and boosting crop output in one study done in India. The study also discovered that organic fertilisers helped to prevent soil erosion and preserve soil fertility over time (Sundaram et al., 2013). Another research done in the United States discovered that chemical fertilisers were more successful in enhancing agricultural output than organic fertilisers. The study did discover, however, that organic fertilisers helped to enhance soil quality and minimise water contamination (Drinkwater et al., 1995).

Additional research has revealed that combining chemical and organic fertilisers is more successful than utilising only one type of fertiliser. A Chinese study discovered that combining chemical and organic fertilisers boosted soil fertility and crop output more than using simply chemical or purely organic fertilisers (Gao et al., 2017). Fertiliser use may have a substantial environmental impact, notably in terms of water contamination and greenhouse gas emissions. Chemical fertilisers may pollute water by runoff and leaching, contaminating surface and groundwater with nitrates and phosphates (Jarvie et al., 2012). This can result in toxic algal blooms, fish fatalities, and other detrimental aquatic ecosystem consequences.

Fertiliser usage can potentially contribute to greenhouse gas emissions, especially if chemical fertilisers are manufactured using fossil fuels. Nitrogen fertilisers are particularly hazardous because they may produce nitrous oxide, a strong greenhouse gas (Schipanski et al., 2014). Organic fertilisers can potentially have a harmful influence on the environment if they are not

applied appropriately. Inadequate manure application, for example, might result in nutrient runoff and pollution of surrounding water sources.

Chemical fertilisers can have a detrimental influence on soil health in the long run. Chemical fertilisers can cause soil acidification, which can diminish soil fertility and lead to harmful metal accumulation (Liang et al., 2013). Chemical fertilisers can also deplete organic matter in the soil, which is crucial for soil structure, water retention, and nutrient cycling. Organic fertilisers, on the other hand, have the potential to increase soil health by boosting organic matter and microbial activity. This has the potential to increase soil structure and water retention, minimise soil erosion, and improve nutrient cycling (Bremner and Mulvaney, 1982). Organic fertilisers can also assist to improve soil biodiversity, which is essential for a healthy and resilient environment.

Availability, affordability, perceived effectiveness, and knowledge regarding fertiliser usage are all variables that impact farmers' fertiliser choices and adoption. Access to fertiliser is a key hurdle to adoption in many impoverished nations. Chemical fertilisers are frequently more widely accessible and less expensive than organic fertilisers, making them the preferred option for many farmers (Giller et al., 2009). Another crucial consideration in farmers' fertiliser selection is perceived efficacy. Many farmers employ chemical fertilisers because they believe they will increase crop output quickly. Unfortunately, this might result in an overuse of chemical fertilisers, which can harm soil health and the ecosystem (Drinkwater et al., 1995). Other farmers, on the other hand, may be suspicious of the usefulness of organic fertilisers, especially if they are unfamiliar with their application.

Fertiliser knowledge is also an essential aspect in farmers' fertiliser selection and adoption. Farmers who are better knowledgeable about fertiliser use, including the advantages and disadvantages of various types of fertilisers, are more likely to apply sustainable fertiliser techniques (Giller et al., 2009). Education and outreach initiatives that offer farmers with knowledge about sustainable fertiliser techniques can assist to promote organic fertiliser adoption while decreasing chemical fertiliser misuse. Fertilisers are necessary for agriculture, but the type of fertiliser used can have a substantial influence on soil health, the environment, and crop productivity. Chemical fertilisers are commonly used because they are less expensive and more easily available than organic fertilisers, yet they can have harmful effects on soil health and the ecosystem. Organic fertilisers can increase soil health and lessen environmental consequences, but they are sometimes more expensive and difficult to get than chemical fertilisers.

Numerous studies have shown that combining chemical and organic fertilisers is more successful than using only one type of fertiliser. Fertiliser availability, cost, perceived efficacy, and understanding about fertiliser usage all impact farmers' fertiliser selections and adoption. Education and outreach initiatives that offer farmers with knowledge about sustainable fertiliser techniques can assist to promote organic fertiliser adoption while decreasing chemical fertiliser misuse. To support healthy soil, safeguard the environment, and assure long-term agricultural output, a sustainable and balanced strategy to fertiliser use is required.

Objective

To explore the use of fertilizers and choices by farmers

Methodology

In this study 235 respondents were surveyed to know the use of fertilizers and choices by farmers. The study was conducted with the help of structured questionnaire. Also, researcher used a convenient sampling method for collecting the primary data. The data was analysed and evaluated by mean and t-test, after the completion of the fieldwork.

Table 1 The Use of Fertilizers and Choices by Farmers

S. No.	Statements	Mean Value	t value	Sig.
1.	Organic fertilisers provide a number of advantages, including improved soil structure and fertility, reduced soil erosion, and promotion of healthy plant development	4.34	17.248	0.000
2.	Organic fertilisers helped to enhance soil quality and minimise water contamination	4.28	16.580	0.000
3.	Combining chemical and organic fertilisers boosted soil fertility and crop output more than using simply chemical or purely organic fertilisers	3.98	12.896	0.000

4.	Nitrogen fertilisers are particularly hazardous because they may produce nitrous oxide, a strong greenhouse gas	3.86	11.089	0.000
5.	Inadequate manure application might result in nutrient runoff and pollution of surrounding water sources	4.06	13.892	0.000
6.	Chemical fertilisers can cause soil acidification, which can diminish soil fertility and lead to harmful metal accumulation	3.77	9.921	0.000
7.	Access to fertiliser is a key hurdle to adoption in many impoverished nations	3.93	12.096	0.000
8.	Crucial consideration in farmer's fertiliser selection is perceived efficacy	4.09	14.240	0.000
9.	Fertiliser knowledge is also an essential aspect in farmers' fertiliser selection and adoption	3.81	10.455	0.000
10.	Chemical fertilisers are frequently more widely accessible and less expensive than organic fertilisers, making them the preferred option for many farmers	4.16	15.234	0.000

Table above is showing the know the use of fertilizers and choices by farmers. The respondent says that organic fertilisers provide a number of advantages, including improved soil structure and fertility, reduced soil erosion, and promotion of healthy plant development with mean value 4.34, organic fertilisers helped to enhance soil quality and minimise water contamination with mean value 4.28 and chemical fertilisers are frequently more widely accessible and less expensive than organic fertilisers, making them the preferred option for many farmers with mean value 4.16. The respondent also believes crucial consideration in farmer's fertiliser selection is perceived efficacy with mean value 4.09, inadequate manure application might result in nutrient runoff and pollution of surrounding water sources with mean value 4.06 and combining chemical and organic fertilisers boosted soil fertility and crop output more than using simply chemical or purely organic fertilisers with mean value 3.98. The respondent also says that, access to fertiliser is a key hurdle to adoption in many impoverished nations with mean value 3.93, nitrogen fertilisers are particularly hazardous because they may produce nitrous oxide, a strong greenhouse gas with mean value 3.86, fertiliser knowledge is also an essential aspect in farmers' fertiliser selection and adoption with mean value

3.81 and chemical fertilisers can cause soil acidification, which can diminish soil fertility and lead to harmful metal accumulation with mean value 3.77. Further t-test shows that all the statements which are significant (with the value below 0.05).

Conclusion

Farmers' usage of fertilisers is essential for crop development and output. Organic fertilisers are obtained from natural sources and offer various advantages, such as improved soil structure and fertility, long-term sustainability, and reduced environmental contamination. A comparison of chemical and organic fertilisers demonstrates that the latter is more ecologically friendly and sustainable. While organic fertilisers may take longer to apply and may not deliver the same immediate results as chemical fertilisers, they provide considerable long-term advantages for soil health, plant development, and the environment. It is important to remember that a combination of both fertilisers may be required for best plant development and productivity.

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