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A Study of Chemical and Organic Farming Practices among Farmers of Nishti and Naxi Villages, Bhiwapur, Nagpur District, Maharashtra, India

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Abstract

Agriculture is an important source of livelihood for rural communities and plays a major role in food security. The present study was conducted to understand the farming and nutrient-management practices followed by farmers in Nishti and Naxi villages of Bhiwapur, Nagpur District, Maharashtra. A field survey was carried out among 30 farmers using direct interaction, a structured questionnaire, and field observations. The study mainly focused on the use of chemical fertilizers, organic inputs, and farmers' awareness of sustainable farming practices. The results showed that 24 farmers (80%) mainly used chemical fertilizers, while 6 farmers (20%) used chemical fertilizers along with organic inputs. None of the surveyed farmers practiced exclusively organic farming. The findings indicate that chemical fertilizers are the major source of plant nutrients in the study area, while some farmers are gradually adopting organic inputs. The study highlights the need for balanced fertilizer use, soil testing, compost, farmyard manure, green manure, and biofertilizers to promote sustainable nutrient management. Further studies with larger sample sizes and soil and crop-yield analysis are recommended.

Keywords: *Chemical fertilizers, organic farming, organic manure, integrated nutrient management, soil health, sustainable agriculture, farmers, Nishti, Naxi, Bhiwapur.*

Introduction

Agriculture is closely connected with rural livelihoods, food production, employment and the local economy. Crop productivity depends on several factors, including soil fertility, availability of water, climatic conditions, crop variety and nutrient management. Among these factors, proper nutrient management is particularly important because plants require essential nutrients for healthy growth and development.Farmers use different sources of nutrients to maintain crop production. Chemical fertilizers are widely used because they provide nutrients in readily available forms and are generally considered convenient for crop production. Common fertilizers used in agriculture include urea, diammonium phosphate (DAP), NPK fertilizers and potassicfertilizers.Organic nutrient sources, on the other hand, include farmyard manure, compost, vermicompost, crop residues, green manure and biofertilizers. These materials add organic matter to the soil and may support soil biological activity and nutrient cycling. Organic amendments have also been associated with improvements in several aspects of soil microbial diversity and functioning.Modern sustainable agriculture does not necessarily require farmers to make a complete choice between chemical and organic nutrient sources. Integrated nutrient management, in which organic sources are combined with appropriate and balanced fertilizer application, can provide an alternative approach. Such an approach may help maintain crop productivity while improving soil condition.

However, the suitability of any farming practice depends on local conditions such as soil type, crop, climate, availability of organic materials, farm size, cost and farmers' knowledge. Therefore, understanding actual farming practices at the village level is important before suggesting changes in nutrient management.The present study was conducted in Nishti and Naxi villages of Bhiwapur, Nagpur District, Maharashtra, with the aim of documenting farmers' fertilizer and manure practices and understanding their awareness regarding organic farming and sustainable nutrient management.

Study Area

The study was conducted in **Nishti and Naxi villages of Bhiwapur, Nagpur District, Maharashtra, India**. The selected villages represent rural agricultural communities in the Bhiwapur region.

Farmers from both villages were approached for information regarding their farming practices, fertilizer use, manure use and awareness of organic farming. The study was designed as a field-based survey based on direct interaction with farmers and recording of their responses.

Materials and Methods

1. Study Design

The present study was carried out to understand the nutrient-management practices followed by farmers in Naxi and Nishti villages. The study mainly focused on the use of chemical fertilizers, organic manures, and other organic inputs used for maintaining soil fertility and improving crop production.

A descriptive field survey was conducted during the study period. The survey involved direct interaction with farmers in their agricultural fields and homes. Information was collected regarding the types of fertilizers and manures used, the frequency of their application, farmers' awareness of organic farming, and their views about the use of chemical and organic nutrient sources.

The field-based approach was adopted to obtain information directly from farmers and to understand the actual nutrient-management practices followed at the local level.

2. Selection of Farmers and Sample Size

A total of 30 farmers were selected for the survey from the two villages. Out of the total respondents, 18 farmers were from Naxi village and 12 farmers were from Nishti village.

Farmers were selected based on their willingness to participate in the survey and provide information about their agricultural practices. The respondents represented farmers following different nutrient-management practices in the study area.

3. Data Collection

Primary data were collected directly from the selected farmers through personal interaction, a structured questionnaire, field observations, and informal discussions. The questions were designed to obtain information about the nutrient sources used by farmers and their understanding of different farming practices.

During the field visits, information was collected on the following aspects:

- Type of fertilizers used by farmers.
- Use of chemical fertilizers such as urea, DAP, and other fertilizers.
- Use of organic inputs such as farmyard manure, compost, vermicompost, crop residues, and other locally available organic materials.
- Whether chemical fertilizers and organic inputs were used together.
- Farmers' reasons for selecting particular nutrient sources.
- Frequency and general method of fertilizer and manure application.
- Farmers' awareness of organic farming practices.
- Farmers' perceptions regarding the advantages and limitations of chemical fertilizers.
- Farmers' awareness of the possible benefits of organic inputs for maintaining soil fertility.
- Farmers' willingness to adopt or increase the use of organic farming practices.

Field observations were also recorded wherever possible to support the information provided by the farmers.

4. Survey Procedure

The survey was conducted through direct communication with the selected farmers. Before collecting the information, the purpose of the study was explained to the respondents. Farmers were encouraged to provide information based on their actual farming practices.

The questionnaire contained both general and practice-based questions related to fertilizer and manure use. Additional discussions were conducted whenever clarification was required. The responses were recorded systematically and later organized according to the type of nutrient-management practice followed by each farmer.

The information collected from Naxi and Nishti villages was separately organized to facilitate a comparison between the two study locations.

5. Classification of Farming Practices

Based on the reported nutrient-management practices, the farmers were grouped into three categories:

1. Farmers mainly using chemical fertilizers
2. Farmers using chemical fertilizers along with organic inputs
3. Farmers mainly practicing organic farming

The survey recorded farmers in the first two categories. No farmer in the sample reported practicing exclusively organic farming.

6. Data Analysis

The collected information was summarized using frequencies and percentages.

The percentage was calculated using the following formula:

$$\textbf{\textit{Percentage}} = \frac{\textbf{Number of farmers in a category}}{\textbf{Total number of farmers}} \times \textbf{100}$$

Results

A total of 30 farmers were surveyed from Nishti and Naxi villages. Among them, 18 farmers (60%) were from Naxi and 12 farmers (40%) were from Nishti.

The survey showed that chemical fertilizers were the predominant nutrient source in both villages. Out of the 30 farmers, **24 farmers (80%) mainly used chemical fertilizers**, while **6 farmers (20%) used chemical fertilizers together with organic inputs**. No farmer reported practicing completely organic farming.

Table 1. Village-wise distribution of surveyed farmers

Village	Number of farmers	Percentage
Naxi	18	60.00%
Nishti	12	40.00%
Total	**30**	**100.00%**

The village-wise distribution of farming practices showed that chemical fertilizer use was higher in Naxi than in Nishti. In Naxi, 15 out of 18 farmers (83.33%) mainly used chemical fertilizers, whereas 3 farmers (16.67%) used chemical fertilizers along with organic inputs. In Nishti, 9 out of 12 farmers (75.00%) mainly used chemical fertilizers, while 3 farmers (25.00%) followed a mixed practice.

Table 2. Distribution of farmers according to farming practice

Farming practice	Naxi (n=18)	Nishti (n=12)	Total (n=30)
Mainly chemical fertilizers	15 (83.33%)	9 (75.00%)	24 (80.00%)
Chemical fertilizers + organic inputs	3 (16.67%)	3 (25.00%)	6 (20.00%)
Mainly organic farming	0 (0.00%)	0 (0.00%)	0 (0.00%)
Total	**18 (100%)**	**12 (100%)**	**30 (100%)**

The proportion of farmers mainly using chemical fertilizers was somewhat higher in Naxi (83.33%) than in Nishti (75.00%). In contrast, the proportion of farmers using both chemical and organic inputs was higher in Nishti (25.00%) than in Naxi (16.67%). Despite this difference, the overall pattern was similar in both villages, with chemical fertilizers being the predominant nutrient source.

Use of Chemical Fertilizers

During the field interaction, farmers reported that chemical fertilizers were mainly used to supply nutrients to crops and support crop growth and productivity. All 30 surveyed farmers reported using chemical fertilizers either as their primary nutrient source or in combination with organic inputs.

The commonly reported agricultural inputs and their general purposes are presented below.

Table 3. Common agricultural inputs and their main purpose

Sr. No.	Agricultural input	Main purpose
1	Urea	Supplies nitrogen and supports vegetative growth
2	DAP	Supplies nitrogen and phosphorus and supports crop development
3	NPK fertilizer	Supplies major nutrients required for crop growth
4	Potash/MOP	Supplies potassium and supports crop development and quality
5	Insecticide	Used for the management of insect pests
6	Herbicide	Used for weed management and reducing competition with crops

The survey indicates that chemical fertilizers formed an important part of the nutrient-management practices of the surveyed farmers.

Use of Organic Inputs

Six farmers, including three from Naxi and three from Nishti, reported using organic inputs along with chemical fertilizers. These farmers had not completely replaced chemical fertilizers with organic sources. Instead, they incorporated organic materials into their existing farming practices.The commonly reported organic inputs and their purposes are summarized below.

Table 4. Organic inputs and their main purpose

Sr. No.	Organic input	Main purpose
1	Farmyard manure (FYM)	Adds organic matter and supports soil fertility and structure
2	Compost	Adds organic matter and improves soil condition
3	Vermicompost	Provides nutrients and supports soil biological activity
4	Green manure	Adds organic matter and nutrients to the soil
5	Biofertilizer	Supports nutrient availability through beneficial microorganisms

The farmers who used organic inputs showed awareness of the importance of organic materials in maintaining soil fertility. However, awareness did not result in complete adoption of organic farming. The farmers continued to use chemical fertilizers as they considered them important for maintaining crop productivity.

Overall, the results show that organic farming awareness was present among a smaller group of farmers, but adoption was mainly in the form of a **mixed or integrated approach** rather than complete replacement of chemical fertilizers.

Discussion

The present study found that chemical fertilizers were the predominant nutrient source among the surveyed farmers of Nishti and Naxi villages. Eighty percent of the farmers mainly depended on chemical fertilizers, while 20% used chemical fertilizers along with organic inputs.

One possible reason for the continued use of chemical fertilizers is the farmers' perception that they provide nutrients quickly and help maintain crop growth and productivity. However, the present study was based on a descriptive survey and did not include quantitative measurements of fertilizer doses, crop yields or soil nutrient

status. Therefore, the study cannot establish that chemical fertilizers produce higher yields than organic or integrated practices.

An important observation from the study was that six farmers were already combining chemical fertilizers with organic inputs. This indicates that some farmers are adopting a form of integrated nutrient management rather than depending entirely on a single nutrient source.

Organic materials such as farmyard manure, compost, vermicompost and green manure can add organic matter to agricultural soils. They may also support soil biological activity and nutrient cycling. However, the benefits of organic amendments can depend on their quality, quantity, method of application, soil characteristics and crop requirements.

Similarly, organic farming should not automatically be considered suitable for every crop and every farming situation. Crop productivity under different nutrient-management systems can vary according to soil, climate, crop type, management practices and availability of inputs.

Therefore, the findings of the present study support a practical approach based on **soil testing, balanced fertilizer application, appropriate use of organic inputs and farmer awareness**. Instead of assuming that one farming system is suitable for all farmers, nutrient management can be adapted according to local soil and crop requirements.

The presence of farmers already using organic inputs provides an opportunity to promote practices such as composting, farmyard manure application, vermicomposting, green manuring and appropriate use of biofertilizers. Demonstration plots and farmer training programmes may also help farmers understand how organic and inorganic nutrient sources can be used effectively.

Conclusion

The present study provides a preliminary assessment of farming and nutrient-management practices among 30 farmers from Nishti and Naxi villages of Bhiwapur, Nagpur District, Maharashtra.The survey showed that **24 farmers (80%) mainly relied on chemical fertilizers**, while**6 farmers (20%) used chemical fertilizers together with organic inputs**. No farmer in the surveyed group reported practicing exclusively organic farming.Chemical fertilizers therefore remain the major nutrient source among the surveyed farmers. At the same time, the use of organic inputs by six farmers indicates an interest in incorporating organic materials into existing farming practices.

The findings suggest that greater emphasis should be placed on **integrated nutrient management,** in which suitable chemical fertilizers are combined with organic manures, compost, vermicompost, green manure and biofertilizers according to crop and soil requirements. Soil testing and balanced fertilizer application should also be encouraged.Farmer education and practical demonstrations may help improve understanding of organic inputs and sustainable nutrient management. However, larger studies are needed before drawing broader conclusions about farming practices in the Bhiwapur region. Future research should include a larger number of farmers, quantitative data on fertilizer use, crop yield measurements, soil analysis and economic assessment.

Yes. I would make the reference section **one continuous numbered list**, remove the duplicate "References" heading, correct the formatting, and keep the recent 2024–2025 papers together with the earlier literature.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of thesis paper.

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