

## Study of Chemical Fertilizers and Pesticides Consumption in Mul Region, District Chandrapur

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### Abstract

Chemical fertilizers primarily consist of three essential nutrients: Nitrogen, Phosphorus, and Potassium. The widespread application of these fertilizers globally leads to significant environmental issues, including ozone depletion, deterioration of soil health, and pollution of water bodies, soil areas. According to data, rising global community, between 40 to 60 percent yield cultivated by assistance of fertilizers and pesticides. Duration of study was from August 2023 to May 2025. The area selected for study was Mul region district Chandrapur. The present study was carried out to determine the consumption of chemical fertilizers and pesticides in Mul region on paddy crops. The appropriate amount of chemical fertilizers and pesticides can maintain soil fertility and also helps to overcome the effects of it. Use of vermicomposting, green manure, cowdung, organic farming can reduced the negative effects of this chemical fertilizers and pesticides and also maintaining the soil fertility.

**Keywords:** pesticide, fertilizer, vermicomposting, and Mul.

### Introduction

Fertilizers were created organically in rural areas, which proved advantageous for both land and environment. In an effort to enhance agricultural yield, farmers turned to use chemical fertilizers. These chemical fertilizers primarily comprise main essential nutrients like nitrogen, phosphorus and potassium. The widespread application of fertilizers across the globe has led to significant environmental issues, including ozone depletion, soil degradation, pollution of water bodies and soil areas. Alarmingly, nearly 50 percent community relies on yield for sustenance. Their excessive use compromises soil fertility by elevating acidity levels. Moreover, the application of these fertilizers disrupts the natural water bodies. When harmful substances contaminate lake or river water, they threaten the survival of terrestrial and aquatic life. Numerous birds and animals perish as a result of exposure from harmful substances. Furthermore, after contaminated water consumed by public, can lead to various incurable diseases. Numerous studies have been conducted demonstrating that the overuse of fertilizers poses significant risks to the environmental factors like soil areas, water bodies, and public

health. The improper application of fertilizers contributes to environmental issues [1]. The negative impacts of fertilizers and pesticides on human health, concluding that prolonged exposure to these substances can lead to health complications. They advocated for the use of eco-friendly fertilizers to enhance crop yields [2]. The effects of fertilizers also shown on farmer's health in Bangladesh [3]. Researched the effects of chemical pesticides on human health [4]. Fertilizers lead to the deterioration of groundwater quality [5]. The influence of fertilizers on the degradation of soil quality [6]. Discovered that the overuse of fertilizers adversely affects soil, water, and air quality [7]. Similarly, both pesticides and chemical fertilizers compromise the quality of water and soil [8, 9]. The excessive application of chemical fertilizers can boost crop yields, it simultaneously undermines environmental sustainability. The use of chemical fertilizers leads to the degradation of soil, water, and the quality of food produced [10]. The consumption of chemical fertilizers has risen in developing nations in pursuit of higher yields. These fertilizers are often applied without scientific guidance, and in some cases, banned substances are utilized, resulting in severe damage to ecosystems [11]. The

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application of chemical fertilizers contributes to increased greenhouse gas emissions and a decline in soil quality [12]. The utilization of organic fertilizers for controlling toxicity in soil areas.[13].

**Materials and Method**

**Study Area:**

Mul is a tehsil situated in Chandrapur, Maharashtra, India. This tehsil has a total population of 114,611 individuals. The geographical coordinates of the tehsil are 20.0447°N, 79.6837°E. Mul Tahsil, located in the Chandrapur district of Maharashtra, serves as a significant agricultural hub, primarily recognized for its paddy cultivation and irrigated farming, which benefits from the proximity of the Asola Mendha tank. The area is distinguished by its fertile soils, which include morand (sandy/grey) and, in certain regions, rich black soil, making it suitable for both Kharif (paddy) and Rabi (pulses) crops.

**Methodology:** This research utilizes a mixed-methods strategy to explore the environmental, agricultural, and socioeconomic issues faced by the villages of the Mul region. The methodology combines field data collection, analysis of secondary data, and a suggested digital framework for real-time monitoring and predictive analytics aimed at facilitating sustainability initiatives.

To conduct this analysis, data were collected through individual interviews with variables and questions adapted to the specific respondent category. Through analyzing the content of the interviews, the researchers were able to evaluate the perceptions, thoughts, knowledge, and attitudes of the study population as well as environmental and health risks. Findings from this study were then synthesized with other results from the literature to put them in context.

**Data Collection and Analysis**

Data collection was based on the following tools: An individual interview was conducting a questionnaire for the sampling offarmers. The questionnaire was integrated into an application that not only allows the survey to be conducted without paper but also allows for geo-location of the respondents.

**Result and Discussion**

In present study the chemical fertilizers and pesticides used by farmers in Mul region was investigated. The amount of urea used in the year 2023-24 is 220 kg/he. The amount is reduced to 150 kg/he in the year 2024-25. The use of DAP (Diammonium Phosphate) is 75 kg/he in the year 2023-24. The amount is increased to 85 kg/he in the year 2024-25. The MOP (Muriate of Potash) used by farmers is about 50 kg/he in the year 2023-24. This amount is decreased to 45 kg/he in the next year 2024-25. The amount of NPK (Nitrogen, Phosphorus, Potassium) used by farmers is 150 kg/he in the year 2023-24. The amount is reduced to 125 kg/he in the year 2024-25. [14, 15].

In present study, pesticides like Chlorpyrifos 50% + Cypermethrin 5% was used by farmers for to control stem borers and leaf folders on paddy crop. The use of pesticides was 450 ml/acre in the year 2023-24. This amount was increased to 500 ml/acre in the year 2024-25. The pesticide Lambda-Cyhalothrin 4.9% was used to controls rice stem borer, leaf folder, and green leaf hopper. The used of this pesticide was 175 ml/acre in the year 2023-24. This amount was increased to 187 ml/acre in the year 2024-25. The Dinotefuran 20% SG was used by farmers to control aphids, thrips, white fly and jassid. The used of pesticide was 60 gm/acre. This amount was increased to 75 gm/acre in the year 2024-25. Thepesticide like Cartap Hydrochloride 4%GR (Granules) was used to control stem borers leaf folders and whorl maggots. The used of pesticide was 8.5 kg/acre in the year 2023-24. This amount was increased to 8.9 kg/acre in year 2024-25. The most common pesticide used by farmers was Coragen (Chlorantraniliprole) was used to controls yellow stem borer, rice leaf folder, thrips and termites. The used of pesticides was 55 ml/acre in the year 2023-24. This amount was increased to 65 ml/acre in the year 2024-25. Similar study was noted that, in the year 2019-20, Bihar exhibited the highest fertilizer consumption per hectare, with Pondicherry, Punjab, and Haryana following in that order. In contrast, during the previous year, 2018-19, Telangana recorded the highest consumption, succeeded by Bihar, then Punjab and Haryana. Overall in India, the usage of fertilizers has shown a consistent increase year after year in recent time's [16], [17], [18]. India ranks third in global fertilizer consumption, following China and Brazil. The United States, Australia rank after india. In the country of China, the amount of fertilizers exceeds 300 kg per hectare. Over past two decades, fertilizer usage in India has demonstrated a positive trend [19, 20]. Chlorpyrifos is frequently found as a contaminant in urban streams (U.S. Geological Survey, 1999). The application of these pesticides has led to a rise in water pollution, and even at low concentrations, they can severely impact the ecosystem[21].

Table 1.1: Fertilizers consumption in Mul region District Chandrapur per kg/he

Year	Urea (kg/he)	DAP (kg/he)	MOP (kg/he)	NPK (kg/he)
2023-24	220	75	50	150
2024-25	150	85	45	125

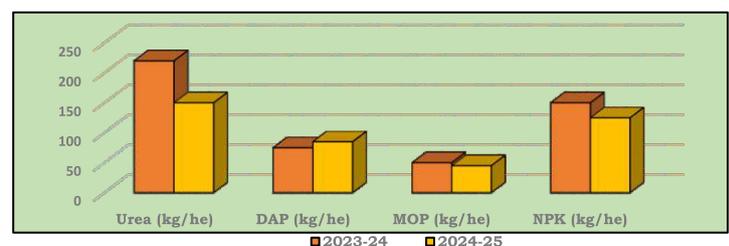


Figure 1.1: Fertilizersconsumption in Mul region, District Chandrapur per kg/he

Table 1.2: Pesticides consumption in Mul region, District Chandrapur

Year	Chlorpyrifos 50% + Cypermethrin 5% (ml/acre)	Lambda-cyhalothrin 4.9% (ml/acre)	Dinotefuran 20% SG (kg/acre)	Cartap Hydrochloride 4%GR (Granules) (kg/acre)	Coragen (Chlorantraniliprole) (ml/acre)
2023-24	450	175	60	8.5	55
2024-25	500	187	75	8.9	65

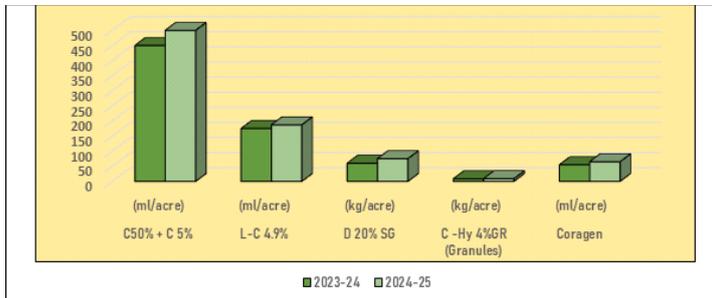


Figure 1.2: Pesticides consumption in Mul region, District Chandrapur

## Conclusion

Above study was for knowing the chemical fertilizers and pesticides consumption in Mul region, district Chandrapur. Chemical fertilizers and pesticides was increasing highly day by day and reduce the fertility of soil. The appropriate amount of chemical fertilizers and pesticides can maintain the soil fertility and also helps to overcome the effects of it. The use of vermicomposting, green manure, cow dung and organic farming can reduce the negative effects of chemical fertilizers and pesticides. The approach of Integrated Pest Management (IPM) is advocated to diminish dependence on chemical substances and enhance the application of bio-pesticides. Effective management of fertilizers is crucial, necessitating strategic planning to minimize or substitute the use of detrimental fertilizers. Development encompasses not merely economic advancement, but it must also be sustainable. To address these issues, it is essential for everyone to possess an understanding of environmental matters and ethical considerations, by choosing organic farming practices, it can foster a healthy natural environment as well as promote human health.

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