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Constraint analysis on utilization bio stimulants bio control products in Palnadu district, Andhra Pradesh

[1]J Sushma, [2]CH Srilatha Vani, [3]Y Prabhavathi and [4]P Lavanya Kumari

[1]MBA. (AB) Student, Department of Agribusiness Management, Tirupati, Andhra Pradesh, India

[2]Principal Scientist, Agricultural Extension, RARS, Lam Farm, Guntur, Andhra Pradesh, India

[3]Assistant Professor & Head, Agribusiness Management, Agricultural College, Tirupati, Andhra Pradesh, India

[4]Assistant professor, Department of Statistics and Computer Applications, Bapatla, Andhra Pradesh, India

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Corresponding Author: J Sushma

Abstract

Agriculture is a cornerstone of India's economy. While pesticides have played a crucial role in enhancing agricultural productivity, their adverse effects on non-target organisms, including humans, have raised significant concerns. Organic farming, covering 2.78 million hectares in India, has gained popularity due to its health benefits, driving demand for bio-pesticides and bio-stimulants. This study focuses on understanding the challenges faced by farmers in Palnadu district, Andhra Pradesh, regarding bio-pesticides and bio-stimulants utilization. Data were collected from 100 farmers in Gurazala and Sattenapalli divisions using a purposive sampling technique. The data pertaining to constraints of farmers for utilizing bio pesticide and bio stimulant inputs were collected by personally interviewing the respondents using a pre-structured schedule. Statistical tool like Garret ranking technique were employed to analyze the data. The empirical findings of the study revealed that the majority of the constraints faced by consumer while utilizing bio pesticides and bio stimulants was the lack of awareness followed by lack of quality of bio-input.

Keywords: Constraint analysis, bio-stimulants, bio-control products, bio-pesticides

Introduction

The world's rapidly growing population has intensified the need for effective crop pest management to ensure global food security. In India, where agriculture forms the backbone of the economy, employing over 70% of the population and contributing one-third of the nation's income, the pressure to sustain and increase agricultural productivity is immense. The Green Revolution of the 1960s marked a significant milestone in India's agricultural history, focusing on increasing crop yields through high-yielding varieties, intensive farming techniques, and the use of chemical inputs such as fertilizers and pesticides.

Andhra Pradesh has seen a roughly 55% decrease in the use of pesticides. The amount of pesticides used fell from about 4050 metric tons in 2014-15 to 1808 MT (55%) in 2021-2022(TOI 2023). The use of bio-pesticides, bio-stimulants, organic farming, altered cropping patterns, integrated pest management techniques, and other factors are cited by state agriculture officials as the reasons for the decline over time. As global awareness of the negative impacts of conventional farming practices on biodiversity, human health, and the environment grows, there has been a noticeable shift towards sustainable agricultural practices. This shift is particularly evident in the increasing adoption of bio-pesticides and bio-stimulants incorporate in farming methods, which offer viable alternatives to chemical inputs. It is well known that these bio-based inputs can increase crop yields, improve soil health, and reduce the environmental impact of farming operations. This tendency is reflected in the bio-pesticide and bio-stimulant global market, which is expected to increase significantly in the next years

In Andhra Pradesh's Palnadu district, a predominantly agricultural region, there has been a decrease in the use of chemical pesticides, attributed to the growing adoption of bio-pesticides, bio-stimulants, and integrated pest management techniques. This shift highlights the district's commitment to sustainable agriculture and the potential for bio-based inputs to play a central role in the region's farming practices. So, through this research, we aim to gain valuable insights into the constraints faced by farmers while utilizing bio pesticides and bio stimulants inputs. By doing so, we can recognize the actual barriers to bio-input product penetration into the market.

Methodology

The study used an ex-post facto research design and was carried out in the Palnadu area of Andhra Pradesh in 2024. The Andhra Pradesh district of Palnadu was specifically chosen for the research. Out of the 28 mandals, five mandals—Rentachintala, Durgi, Dachepalli, Gurazala, and Karempudi—were purposefully chosen based on the

mandals that used the most bio-inputs. Ten villages—Adigoppala, Mutukuru, Cherlagudipadu, Pallegunta, Oppicherla, Chintapalli, Nadikudi, Madinapadu, Tummurugodu, and Rentala—were chosen at random from these mandals. For the survey, ten farmers were chosen at random from each hamlet, for a total sample size of 100.

The study was conducted in Palnadu district of Andhra Pradesh during the year 2024 and ex-post facto research design was followed for the study. Palnadu district of Andhra Pradesh was purposively selected for the study. Among the 28 mandals, five mandals were selected purposively based on the highest usage of bio-inputs *i.e.*, Rentachintala, Durgi, Dachepalli, Gurazala, Karempudi. From these selected mandals, a total of 10 villages were selected randomly *viz.*, Adigoppala, Mutukuru, Cherlagudipadu, pallegunta, Oppicherla, Chintapalli, Nadikudi, Madinapadu, Tummurugodu, Rentala. Ten farmers from each village were randomly selected for the survey thus making the total sample size of 100. Based on exhaustive review of literature, interaction with bio-input adopting farmers and by taking expert's opinion, a total of 11 statements were listed and farmers were asked to rank their opinions on these statements The constraints were prioritized by adopting Garret's ranking technique. Suggestion was operationally defined as the requirements expressed by the bio-input utilizing farmers in order to fulfil their needs.

Garrett's Ranking Technique

To find out the major constraint faced by the respondent; Garrett's ranking technique was used. The prime advantage of this technique over simple frequency distribution is that the constraints are arranged based on their severity from the point of view of respondents. Hence, the same number of respondents on two or more constraints may have been given different rank.

Garrett's formula for converting ranks into percent is:
Percentage position = 100*(Rij - 0.5) / Nj

Where,
R_{ij}= Rank given for ith statement by jth consumer.
N_j = Total number of constraints ranked

After calculating percentage positions their corresponding Garrett values are taken from the Garrett"s ranking table for each rank. Then, for each item the total score and mean score have been calculated based on frequency of rank given to each factor and total number of members. Total score is calculated by multiplying the number of members ranking each constraint by their respective table values. Mean score is calculated by dividing the total score by the number of members. Based on highest mean score, the ranks were given for each item. Garret's ranking scale was used to measure the ranking of constrains faced by farmers in utilization of bio pesticides and bio stimulants in the study.

Results and Discussion

Constraints faced in utilization of bio-pesticides and bio-stimulants by sample farmers

Table 1: Constraints faced in utilization of bio pesticides and bio stimulants by sample farmers (n=100)

S. No	Constraints	Total score	Garrett's mean score	Rank
1	Lack of awareness	5860	58.60	I
2	Lack of good quality	5471	54.71	II
3	Low effectiveness	5245	52.45	III
4	Lack of knowledge	5228	52.28	IV
5	Lack of financial support/Subsidy	4990	49.90	V
6	Shorter shelf life	4786	47.86	VI
7	Lack of patience	4726	47.26	VII
8	Slow results	4702	47.02	VIII
9	Limited availability	4526	45.26	IX
10	Less convenience	4455	44.55	X
11	Regulatory issues	4417	44.17	XI

The results of Table 1. indicated that the major constraint faced while utilization of bio-pesticides and bio-stimulants is the lack of awareness with the garrett's mean score of 58.60, followed by lack of awareness, Lack of good quality, low effectiveness, lack of knowledge, lack of subsidies, shorter shelf life, lack of patience, slow results, limited availability, less convenience with mean scores, 54.71, 52.45, 52.28, 49.90, 47.86, 47.26, 47.02, 45.26, 44.55 respectively. The least ranked parameter is regulatory issues with Garrett's mean score 44.17.

Suggestions

- Since there are still not many organic farmers and organic input firms, the government should support these industries by creating subsidiaries under programs and initiatives and encouraging organic farming and organic bio inputs.
- The number of bio input retail stores needs to be enhanced in the local areas as the number of synthetic retail stores was higher in the village level than that of bio input retail stores.
- Although farmers' understanding of bio control products is growing, it is still in the medium range, which makes using organic inputs more beneficial.
- Since farmers are not proficient in application techniques, the government must set up technical help programs for them through extension agencies.
- Producers should do research on bio control products to increase their shelf life, as the shelf life of these products was shown to be inadequate when compared to synthetic pesticides.
- The key to raising awareness is promotion, hence using media like television, newspapers, flyers, and advertisements to promote bio products

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