Case Study of Organic Cultivation Under Protected Condition
Polyhouse condition

Partha Pratim Chatterjee

BSc. (Hons.) Agriculture,
School of Agriculture,
Lovely Professional University
Phagwara, Punjab, India.

Abstract **-- Farmers frequently use small, marginal, and large-scale agricultural production techniques. There is a common misconception that maintaining these farms requires the employment of chemical farming techniques in order to increase quantity and yields. Health-conscious people have looked into and engaged in organic farming as a result of the excessive chemical use involved in the production of inorganic food. The current study focuses on how farmers and consumers accept and perceive viewpoint variances from farm level to end product marketing in terms of aims to maintain the long-term sustainability of their farms, incentive elements to make good decisions, and individual views of agricultural preferences. In order to become "successful farmers" who practise organic farming, it is also imperative for farmers to stand independently, with self-interest and passion. While organic food with enhanced quality and nutrition has seen a good trend, social, cultural, psychological, economic, and personal factors have a negative influence on the consumer market. Yet, there are several drawbacks and barriers to making the transition to organic farming from conventional agricultural systems that farmers generally encounter during the inter-conversion phase. Obstacles in agricultural production might be removed with the right remedies, restoring soil health, food quality, and sustainability. As a result, the current study highlights the difficulties that must be addressed in embracing and making investments in sustainably, while also examining the situation of organic farming now and its possibilities for the future. Sustainability and the Sustainable Development Goals (SDGs) with ecological advantages and nutrient-dense food are required by the organic agricultural method.**

Index Terms- **Organic cultivation, Organic fertilizer, Organic input, Polyhouse, Sustainability**

I.INTRODUCTION

One of the highest kinds of modern agriculture, on which each nation's agricultural growth had been centred, was protected agriculture. Although just 0.5% of the world's total vegetable growing land was used for organic vegetable production, the demand for organic fruit and vegetables made up between 30% and 40% of the overall worldwide demand. Although it was widely agreed that organic farming produced 10%–20% less than conventional farming, it outperformed conventional farming in terms of economic gains, environmental effect, and social gains. Additionally, it performed well in terms of supplying nutrition, coping with climate change, enhancing soil health, safeguarding biodiversity, expanding employment, and developing new economic models.

Certain situations in which organic techniques significantly contribute under polyhouse environments.

II. CONDITIONS AFFECTING POLYHOUSE CULTIVATION:

Highlighting some of the condition that affect cultivation under protected structure.

a) Effects of applying fermented organic fertiliser under a vegetable cycle in a polyhouse on soil N2O emission

One of the primary sources of soil nitrous oxide (N2O) emission is from vegetable fields, although the soil N2O emission from vegetable rotation with combined application of fermented organic fertiliser and inorganic fertiliser in polyhouse has not been adequately assessed. In a study, examined the soil N2O emission in a management system for rotating cabbage and tomatoes using various nitrogen (N) source treatments, such as 100% inorganic fertiliser (IF), 75% IF+25% fermented organic fertiliser (OF), 50% IF+50% OF, 75% IF+25% OF, 100% OF, and no fertiliser (CK). N fertilisation rates for cabbage and tomatoes were 180 kg ha1 and 200 kg ha1, respectively. The findings demonstrated that the soil N2O emission flow peaked between 1-3 days of basal fertilisation for cabbage and gradually declined as the proportions of increased [1].

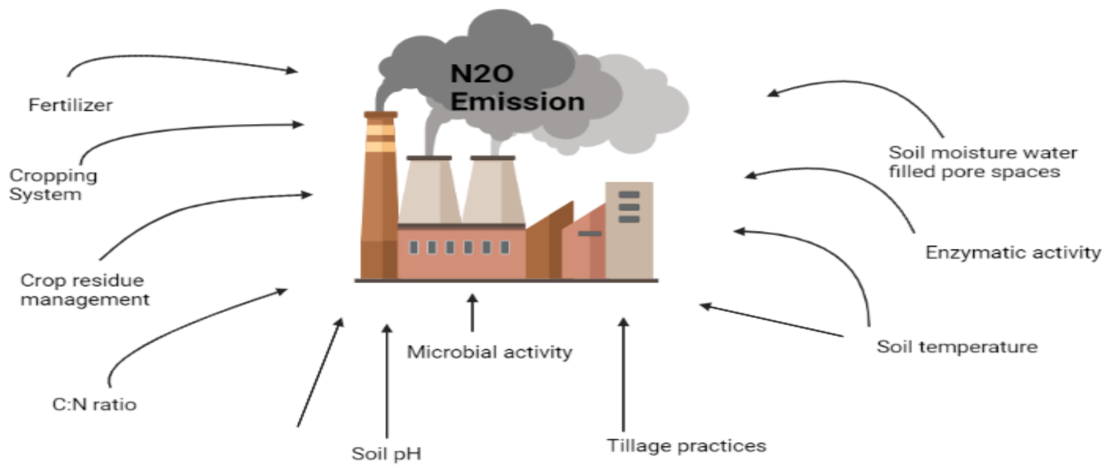

Figure 1 Effects of applying fermented organic fertiliser under a vegetable cycle in a polyhouse on soil N2O emission

b) Assessment of organic oils for the control of Meloidogyne incognita, a fungus, and root-knot nematodes infesting cucumber in polyhouse circumstances

One of the main obstacles to protected culture of cucumbers is the root-knot nematode, Meloidogyne incognita, and Fusarium oxysporum f. sp. cucumerinum disease complex. The comparative effectiveness of organic oils from neem, mustard, and jatropha at 10 and 20% v/w as seed treatments against root-knot nematode, Meloidogyne incognita, and F. oxysporum f. sp. cucumerinum disease complex on cucumber was investigated in polyhouse research. Chemical checks with carbosulfan were also kept, 25 EC @ 3% a.i v/w, in addition to untreated checks. Nematode alone, fungus alone, and nematode plus fungus injected concurrently were the three primary treatments used. According to the statistics, shoot length in all of the treatments—nematode alone (80.3 cm), fungus alone (85.1 cm), and control—was considerably superior than in untreated inoculated checks [2].

c) Effects of organic and inorganic fertiliser sources on the productivity, profitability, and energetics of pepper plants as well as the soil characteristics in naturally ventilated polyhouse

At the Vivekananda Parvatiya Krishi Anusandhan Sansthan in Hawalbagh, Almora, Uttarakhand, beneath the mid-hills of the north-western Himalaya, a field experiment was carried out in the summers of 2009 and 2010 to examine the effects of farmyard manure and fertilisers on fruit yield, economics, the energetics of pepper (Capsicum annuum L.), and the chemical properties of the soil. In comparison to other combinations, the greatest level of farmyard manure (20 t ha1) and 125% of the suggested NPK (125, 27.5, and 52.1 kg N, P, and K ha1) produced a much greater fruit production (33.9 t ha1). The number of fruits per plant, average fruit weight, plant height, fruit length, and fruit diameter were all considerably raised by both farmyard manure and inorganic fertilisers. At 20 t of FYM and 125% of the target, the maximum net returns (4520 $ ha1) were attained [3].

d) Effect of different organic inputs on tomato (Solanum lycopersicum L.) cv. GS-600 growth and its characteristics in polyhouse conditions

During the 2017–18 Rabi season, a study was conducted in the Research Field, Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, to evaluate the impact of different organic inputs on tomato development and characteristics under polyhouse conditions. Ten treatments were reproduced three times, and the experiment was set up using a randomised block design. The treatments included various mixtures of FYM, vermicompost, and poultry manure, all of which are organic manures.

Five randomly chosen plants from each treatment were used to collect the data, which was then statistically analysed. The findings showed that, of the 10 treatments tested, treatment T6 (vermicompost 50% + poultry manure 50%) performed the best across the board and achieved its maximum plant height measurements at 30, 60, 90, and 120 days (56.68cm,94.99cm and 250.31 cm respectively) [4].

e) Research on the Quality and Biochemical Properties of Strawberry (Fragaria ananassa Duch.) Grown in a Naturally Ventilated Polyhouse

In 2019–20, a study was conducted to determine how organic manures affected strawberry vegetative development, yield, and yield-attributing attributes. one of theMaximum biochemical features of fruits, including Total Soluble Solids (8.030oBrix), Ascorbic Acid (58.749 mg100 g-1), and Vitamin C, were examined for treatments. Acid ratio: 9.240; total sugars: 7.568; total chlorophyll content: 2.679; chlorophyll-a: 1.910; chlorophyll-b: 0.769; shelf life: 3.52; fruit growth rate: 0.192cm day-1. The application of Vermicompost + Jeevamruth @ 500 ml per pot + Beejamruth seedling treatment resulted in the minimal Titratable acidity (0.819%). The results of this study indicate that applying vermicompost together with jeevamruth at a rate of 500 ml per pot and treating seedlings with beejamruth is preferable (fruit yield per plant 350.79 g) followed by application of FYM+ Jeevamruth @500 ml per pot + Beejamruth seedling treatment [5].

f) *Impact of organic and inorganic nutrient sources on bell pepper (Capsicum annuum L.) growth, production, and quality when grown in a polyhouse*

The polyhouse at the Department of Agriculture, Mata Gujri College, Fatehgarh Sahib, Punjab, India, was the site of the present study, "Impact of Organic and Inorganic Nutrient Sources on Growth, Yield, and Quality of Bell Pepper (Capsicum annuum L.) Grown under Polyhouse Conditions," which was conducted in 2015. Three replications of the experiment were set up in a randomised block design. RDF (100% NPK @125:75:30 kg ha-1), 50% RDF + Azotobacter, 75% RDF + Azotobacter, 50% RDF + Vermicompost, 75% RDF + Azotobacter + Vermicompost, 50% RDF + Azotobacter + Vermicompost, and 75% RDF + Azotobacter + Vermicompost were the different treatments. Several fertiliser applications in conjunction with organic manures and biofertilizers dramatically improved the quality, production, and development of the capsicum plant. The maximum plant spread, height, and days to 50 % flowering [6].

g) *An Economic Study of Tomato Production in a Polyhouse Environment*

In the Hi-Tech Unit, Department of Horticulture, Rajasthan College of Agriculture, MPUAT, Udaipur, a study was carried out to determine the impact of various nutrient sources on tomato growth in naturally ventilated polyhouses. Eight treatment combinations with four replications each make up the study's eight treatment combinations, which were all randomly assigned. The goal of the current experiment was to determine the expenses and profits associated with growing tomatoes in polyhouses using low-cost natural ventilation. Tomato polyhouse growing is gaining popularity as a specialised production technique to combat biotic and abiotic pressures during the off-season and guarantee year-round output. Since tomato provided the highest gross return (Rs. 266200.00/1000 m2 area), net return (Rs. 188420.00) and net return on investment per rupee (2.42) and was also shown to be superior in terms of high-quality goods. [7].

CONCLUSION

The range of farmer behaviour is often depending on their interests, the nature of economic returns, advantages, and other concerns pertaining to their way of life. The majority of farmers are members of an active, illiterate group of small- and marginal-landholders who are subject to peer pressure and lack knowledge of technical know-how and various technological innovations. They also lack awareness of the dangers of chemical cultivation, excessive pesticide use, and other negative effects of conventional farming systems. the farmers' openness to adjusting to different phases of learning about and being aware of organic agriculture and the technologies associated with it. This causes people to develop favourable or bad opinions on organic farming, and ultimately decide whether to use it or not. Due of the rapid fluctuations in weather, polyhouse output is severely constrained. One of the main productivity barriers in polyhouses was nematode and whitefly infestation, expensive fertiliser and seed costs. High weather variability, apprehension about technological failure, ignorance of the most recent package of techniques, and weed infestation significantly impacted polyhouse performance.Absence of a minimum support price, significant price swings, ignorance of market information, high transportation costs, improper weighing techniques, inadequate packaging supplies, and significant market losses of vegetables were the major problem of marketing.

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