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A Study on Organic Tomato Cultivation in Palamedu Panchayat, Madurai District

By Dr. Mrs. D.Fatima Baby

Department of Economics, Fatima College

Introduction - The main idea behind organic farming is 'zero impact' on the environment. The motto of the organic farming is to protect the earth's resources and produce safe and healthy crop. Organic farming is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local condition, rather than the use of inputs with adverse effects. Organic farming combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved. Organic farming is being practiced in 130 countries of the world. The ill effects of chemicals used in agriculture have changed the mindset of some consumers of different countries who are now buying organic with high premium for health. Policy makers are also promoting organic farming for restoration of soil health and generation of rural economy apart from making efforts for creating better environment. The global organic area is 26 million hectare roughly along with 61 standards and 364 certification bodies roughly. The world organic market is now \$26 billion.

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A Study on Organic Tomato Cultivation in Palamedu Panchayat, Madurai District

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I. INTRODUCTION

The main idea behind organic farming is 'zero impact' on the environment. The motto of the organic farming is to protect the earth's resources and produce safe and healthy crop. Organic farming is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local condition, rather than the use of inputs with adverse effects. Organic farming combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved. Organic farming is being practiced in 130 countries of the world. The ill effects of chemicals used in agriculture have changed the mindset of some consumers of different countries who are now buying organic with high premium for health. Policy makers are also promoting organic farming for restoration of soil health and generation of rural economy apart from making efforts for creating better environment. The global organic area is 26 million hectare roughly along with 61 standards and 364 certification bodies roughly. The world organic market is now \$26 billion. The organic area in India is 2.5 million hectare including certified forest area. (Ramesh, 2005)

a) Concept of organic farming

Organic farming is not new to Indian agriculture community. Several forms of organic farming are being successfully practiced in diverse climate, particularly in rain fed, tribal, mountains and hill areas of the country. Among all agriculture systems, organic farming is gaining wide attention among farmers, entrepreneurs, policy makers and agricultural scientists for varied reasons such as it minimizes the dependence on chemical inputs (fertilizers, pesticides, herbicides and other agro-chemicals) thus safe guards and improves the quality of resources, and it is labour intensive and provides an opportunity to increase rural employment and achieve long term improvements in the quality of resource base. (Mohan, 2002)

b) Organic farming at global level

According to the 2007 survey almost 31 million hectares are currently managed organically by more

than 600000 farms worldwide. This constitutes 0.7 percent of the agriculture land of the countries covered by the survey. The continent with most organic land is Oceania with almost 11.9 million hectares, followed by Europe with almost 7 million hectares, America 5.8 million hectares, Asia almost 2.9 million hectares, North America 2.2 million hectares and Africa 0.9 million hectare. (Jeyakumar, 2010)

c) Organic farming in India

In Indian agriculture, organic manures have been used since Sir Albert Howard. A British agronomist way back in 1900 started the organic farming. The commercial organic farming, as practiced today, is still at a nascent stage. According to a survey of International Federation of Organic Agriculture movement and Stiftung Oekologie und Landbou (SOEL) February 2005 India has about 76,326 hectare land under organic management. Which is only 0.05 per cent of total agricultural land According to this survey; there are about 5,147 certified organic farms in India. The Indian organic farming industry is estimated at us\$20 million and almost entirely export oriented. According to Agricultural and Processed food Products Export Development Authority (APEDA 2005), agency involved in promoting Indian organic products with a worth of rupees 72 million are being exported from India. (Ramesh, 2005)

Organic farming is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs. This is accomplished by using, where possible, agronomic, and biological and mechanical methods, as opposed to using synthetic materials to fulfill any specific function in the system.

d) How to Grow Organic Tomatoes?

The important considerations while growing organic tomatoes include variety selection, crop rotation, soil fertility, pest control and weed control.

e) Variety of Tomatoes

The variety selection should be governed by market demand, nutritional value the resistance to

Author α : Assistant professor, Department of Economics, Fatima College.

diseases offered by various varieties. Suitability to the climatic conditions and the production technique should also be considered. The type of seed selected for organic tomato crop is very important.

f) Crop Rotation

For efficient organic tomato production, rotate tomato with non-solanaceae crops. Solanaceae group of plants include tobacco, morning glory, potato, pepper, and tomato. So don't rotate tobacco, morning glory, potato and other solanaceae plants with tomato.

g) Soil Fertility

Maintain a fertile soil by adding organic matter to it regularly. Rotate tomato with legumes once in a few years so that the soil is rich in nitrogen. Add compost, barnyard manures and poultry litter to further enrich the soil.

h) Pest Control

It has been observed that organic tomato plants have fewer pest and insect problems than the conventional chemically grown tomato plants. Moreover, if crop rotation is practiced, the lifecycle of insects and pests is broken and the pest menace can be minimised. Trap crops are also effective in controlling pests. An example of a trap crop is sweet corn. Sweet corn attracts tomato fruit worm and thus protects the tomato crop when inter-planted with it.

i) Weed Control

Weeds are a big nuisance as they take up the nutrients in the soil and can also harbor insects and diseases that cause harm to tomatoes. These weeds start growing four to five weeks after transplanting the tomato saplings. Hence focus on extensive weed control during this period and don't let the weeds grow in numbers. Organic weed control can be achieved by using organic matter and mulches as these restrict weed growth. Crop rotation, sanitation, and shallow tilling also help in controlling the weeds.

j) Organic Tomatoes Fetch a Higher Premium

Organic tomatoes fetch 10 per cent to 30 per cent higher price than conventional tomatoes do. This is a big incentive for any farmer to switch to organic farming of tomatoes. Tomato is one of the highest pesticide sprayed vegetable in the world. Hence, growing organic tomatoes gives farmers a satisfaction that they are not using harmful chemicals for growing the crop. But what concerns farmers are - normally organic food produce is little less than conventional food produce. Hence, will the organic tomato production in their farm be as much as the chemically grown produce? Yes, if efficient organic tomato farming techniques are employed, the production is comparable to that of chemically grown tomatoes.

k) Organic tomatoes are healthier

Organic tomatoes really are healthier than their conventionally grown counterparts, new research suggests. Despite being smaller, they are packed with higher amounts of vitamin C and compounds that may combat chronic diseases, the findings show. The reason for the difference is down to the organic plants' tough upbringing, it is claimed. Organic tomatoes are healthier. Tomatoes grown on organic farms were 40% smaller than those produced conventionally. However, their concentrations of vitamin C were up to 57% higher, and ripe fruits contained well over twice the quantity of phenolic compounds. Plant phenols, such as falconoid, are largely responsible for the health-giving properties attributed to many fruits and vegetables. They help the body fight oxidative stress - a form of chemical damage linked to chronic conditions such as heart disease, cancer and dementia.

l) Favorable effects of organic farming on environment

Organic farming is much better for the environment than conventional farming. One of the greatest environmental problems today is energy consumption and organic farming. As a matter of fact, energy efficiency is around seven percent greater for the organic farming system. Other positive environmental aspects of organic farming include the use of much less fertilizer, and the complete avoidance of synthetic fertilizers, which are harmful to soil, water, animal and people. Also, the nitrate content of organic fields is significantly lower than on conventional farms due to the absence of soluble fertilizers. Organic farming focuses on preserving the habitats of all species and their surrounding environments, including the air and water. Organic farming releases much less carbon dioxide than does conventional farming. Carbon dioxide is the leading greenhouse gas that causes global warming.

II. LITERATURE REVIEW

Dr. Somnath Chakrabartha (2010) did a study on "Consumer purchase behavior of organic food in Delhi NCR region". To develop an understanding about the correlation between the numbers of brands purchased in the category with affective commitment score and to highlight factors limiting more organic food among regular buyers in India. Primary data was used for this study and correlation technique was applied. The study found the need for the marketers to develop a detailed understanding of the affective commitment of regular buyers and to plan a proper marketing campaign for them. The study highlight that perceived high price and limited availability are the main reasons for the slow place of expansion of organic food in India.

K. Guruswamy and K. Balanaga Guruna (2010) have done a study on "SWOT Analysis of organic

farming management in India”, to analyze the internal environment and identifying external opportunities. SWOT analysis of organic farming ,reveals that organic farming practices provide number of valuable benefits like poison less food, harmless water, soil restoration to the natural condition, creating friendlier environment and total employment for farmers.

S.S. Nagarajan (2010) in his article on “growing brinjal in the organic way” had highlighted that attempted to describe the cultivation of brinjal in the organic way. He discussed the produce is harvested when they are still tender and when they have attained a good size and when the surface is bright and glossy. He find that organic agriculture is an economically viable proposition and farmers can earn more income through the premium price for organic produce and they need fewer inputs to manage return.

Kuldeep Sharma, and Sudhir Pradhan (2011) in their article on “Organic farming: problems and prospects” mainly focused on problem in adopting large scale organic farming in a country like India. The factors like lack of awareness, marketing problems, shortage of biomass, inadequate supporting infrastructure, high input costs, lack of financial support and inability to meet the export demand had highly affected the Organic farming. Measures like inclusion of organic farming in the curriculum of under graduate and post graduate programmes at different agricultural universities and research institutes, standardization of mechanism for organic farming practices and dissemination of information were suggested to propagate organic farming.

S.Jeyakumar (2011) did a study on “organic agriculture – a good quality of life for all” to develop a sustainable agriculture system for guaranteed adequate food production and self-sufficient agriculture system, alternative strategy over chemical agriculture primary data was used for this study. The study found organic agriculture is a production system that sustains the health of soils ecosystems and people. It relies on ecological processes, biodiversity and cycles

Y.V.Singh and Dinesh Kumar (2011) in their article on “organic farming vis-a-vis Human Health and Environment” mainly focused on organic agriculture seems to be viable alternative because it enlivens the soil, strengthens the natural resource base and sustains biological production at different levels. Export market can also be, tapped by the prospective farmers by growing organic crops. If organic agriculture is given the consideration on its merits, it has the potential to transform agriculture as the main tool for nature conservation they conclude farmers get premium price of their produce as the end result is healthier and more environment ally friendly food and it is well worth the higher price tag.

a) *Statement of the Problem*

Inorganic farming affects the environment in multiple ways. Pesticides sprayed on crops not only destroy pests and contaminate the crops but also kill beneficial insects. The residue of these pesticides affects the health of human being. Organic farming on natural resources favours interactions with in the agro ecosystem that are vital for both agricultural production and nature conservation. Ecological services derived include oil farming and conditioning, soil stabilization and waste recycling. Organically grown food is dramatically superior in mineral content. So, a study on organic farming with special reference to tomato cultivation in Palamedu, Madurai district is undertaken.

b) *Objectives of the Study*

- To find out the cost and return of organic tomato cultivation.
- To study the motivational factors behind organic tomato cultivation.
- To identify the problems faced in tomato cultivation under organic farming.

c) *Scop of the Study*

This study would help the common people to understand the importance of organic farming. Study may also help the tomato cultivators to take up appropriate steps to increase their income by the application of various programmes given by the horticultural development board. This study would help the agricultural department and policy makers to understand the problems faced by the farmers who use organic farming, there by programmes can be designed by the Government to minimize the problem of the farmers.

III. METHODOLOGY

a) *Sample design*

Primary data required for this study were collected from selected sample farmers through personal interview method. The data was collected at Palamedu Town Panchayat in Madurai District, where there are 200 organic tomato cultivators. Fifty respondents were chosen from the list, using systematic random sampling method for in depth study

b) *Tools of analysis*

The collected data were analysed by using the statistical tools like cost and return and Garret ranking technique.

IV. RESULTS AND DISCUSSION

a) *Distribution of area under organic tomato cultivation*

Land is the basic requirement for farming. Distribution of area under organic tomato cultivation is shown in Table No: 1.1

Table No 1.1 : Distribution of area under organic tomato cultivation

Area Under tomato cultivation (cents)	No. of Respondent	Percentage
0 -50	25	50
50 – 100	12	24
100 – 150	10	20
150 – 200	3	6
TOTAL	50	100

Source : Primary data

It is evident from Table No: 1.1 that the area under tomato cultivation was 0-50 cents for 50 per cent of the respondents, 50-100 cents for 24 per cent of them, 100-150 cents for 20 per cent of them and 150-200 cents for 6 per cent of the respondents. Of the total respondents 36 per cent of them were owners and 64 per cent of them were tenants. The study reveals that majority of the respondents were tenants.

b) Sources of Finance

Finance is the life blood of any activity. The sources of finance is shown in Table No: 1.2

Table No 1.2 : Sources of finance of the respondents

Sources of finance	No of Respondent	Percentage
Own money	9	18
Money lender	21	42
Commercial Bank	15	30
Co – operative credit society	5	10
TOTAL	50	100

Source: Primary data

It is clear that out of the total respondents 42 per cent of them borrow money from the money lender, 30 per cent of them get money from the commercial bank, 18 per cent of them used their own money and 10 per cent of the respondents had borrowed from the co-operative credit society.

c) Sources of irrigation of the respondent

It is observed from the data that 40 per cent of the respondents were using bore well with oil engine, 26 per cent of them were using bore well with electric motor. 20 per cent of them depend upon the river water for irrigation and 14 per cent of them were depending on all the sources of irrigation.

d) Educational Qualification of the respondents

Education is an indicator of social and economic status of an individual. Out of the 50 respondents, 40 per cent of them were illiterate. 24 per

cent of them had completed primary level and only 16 per cent of the respondents had completed higher secondary level. Majority of the respondents (40 per cent) were illiterate.

e) Cost and return of organic tomato cultivation (per acre)

The cost includes the amount of money spent on ploughing, bio-fertilizer, bio-pesticides, irrigation, sapling, rent on land, marketing, plucking cost and land tax.

Table No 1.3 : Cost and return of organic tomato cultivation (per acre)

COST	MEAN VALUE (Rs)
COST (A)	
a)Ploughing	2000.00
b)Bio – Fertilizer	1546.20
c)Bio – Pesticides	1250.10
d) Irrigation	2517.70
e) Sapling	3051.40
f) Rent on land	3440.00
g)Marketing	4380.00
h) Plucking Cost	7492.00
Total Cost A	25677.4
COST C	
Land tax	735.36
Total Cost	26412.76
YieldPerAcre (Tonnes)	25.80
Rs Per Kg	12.00
Gross return	36977.86
Net return	10565.1

Source: Primary Data

Out of the total cost, cost A constituted Rs 25677.4 i.e 97.1 per cent of the total cost and cost C was Rs 735.36 (2.9 per cent). Among the cost items, plucking cost was the major component, accounting for Rs 7492 (28.3per cent) of the total cost. Farmers were plucking the tomato once in 5 days. For one cent of land 10 labourers were engaged in the work. Both male and female labourers were engaged in the field, male labourers receive RS 75 per day while the female labourers received Rs 35 per day. The labourers work for 4 hours per day in the field. The marketing and rent on land cost accounted for second and third largest share of 16.6 per cent and 13 per cent respectively of the total cost. The farmers get sapling from agricultural department for Rs 4 per sapling. The percentage share of bio fertilizers, bio-pesticides, irrigation, sampling, rent on land and ploughing cost were Rs 1545.20 (5.9 per cent), Rs 1250.10 (4.7 per cent), Rs 2517.70 (9.5per cent), Rs 3051.40 (11.5per cent), Rs 3440 (13per cent) and Rs 2000 (7.6 per cent) respectively. Bio-fertilizers application and earthen up done on the first and second

month after transplanting; bio-fertilizer should be compulsorily applied by the farmers once in 15 days in order to save the plant from the insects. If necessary, the farmers were using bio-pesticides once in 20 days. Irrigation was done at an interval of two or three days. Ploughing was done twice before planting the sapling. Farmers were using tractor for ploughing.

Cost C, the land tax was Rs 735.36 (2per cent). Total cost was Rs. **26,412.76**. Yield per acre was 25.8 tonne per acre and it was sold on an average for Rs 12.00 per Kg. Gross return was Rs. 36977.86 and Net return was Rs.10,565.10 per acre. The farmers normally sell the tomatoes through commission agents and contractors. During harvest season due to more availability of tomatoes, normally the price will be low. But during festival and rainy season demand for tomato increases and consequently its price also increases.

f) Motivational Factors

The second objective of the study was to find out the motivational factors behind the use of organic farming. Exhaustive ranking technique has been used. The factors which motivated the farmers to adopt organic methods to cultivate tomato in the study area are given in Table No.1.

Table No1.4 : Motivational factors

Motivational Factor	No.of Respondents	Rank
For better health	8	III
To protect the environment	11	II
Less expensive	7	IV
Availability of bio-fertilizers with in the village	3	VII
Better price for the product	4	VI
Easy preparation of bio fertilizers	5	V
To protect the fertility of the soil	12	I
TOTAL	50	

Source: Primary data

It is observed from Table No: 1.4 that 12 respondents were motivated towards organic tomato cultivation "to protect the fertility of the soil" (I Rank)., 11 respondents "to protect the environment" (II Rank), 8 respondents "for better health" (III Rank),5 respondents by the factor "Easy preparation of Bio - Fertilizer" (V Rank)..4 respondents by "better price of the product"(VI Rank) and 3 respondents were motivated by the factor "Availability of bio-fertilizers within the village" (VII Rank).

h) Sources of Motivation

The tomato growers in the study area were influenced by various sources to venture into organic farming. The sources of motivation are listed in Table No: 1.5

Table No.1.5 : Sources of Motivation

Sources of motivation	No of Respondents	Rank
Media	12	II
Agriculture department	20	I
Friend	3	V
N G O	5	IV
Agricultural exhibition	10	III
TOTAL	50	

Source: Primary data

It is evident from Table No.1.5 that 20 respondents were motivated by the programme conducted by "Agricultural Department"(I Rank),12 respondents through media like TV, Radio, Newspaper (II Rank),10 respondents by the "Agricultural exhibition" (III Rank),5 respondents by "NGO" (IV Rank)and 3 respondents were motivated by their friends (V Rank).

i) Problems faced in organic tomato cultivation

To study the third objective of the study namely the problems faced in organic tomato cultivation, Garret ranking technique has been used. Problems faced in tomato cultivation under organic farming are lack of irrigation, marketing problem, lack of storage facility, price fluctuation and lack of financial support. It is presented in Table No: 1.6

Table No1.6 : Problems faced in organic tomato cultivation

Problem	Total	Mean Score	Rank
Lack of irrigation	2755.36	55.10	III
Marketing Problem	1526.8	30.5	V
Lack of storage facility	2776.48	55.53	II
Price fluctuation	2644.96	52.89	IV
Lack of financial support	2956	59.12	I

Source: Primary data

g) Sources of Motivation

The tomato growers in the study area were influenced by various sources to venture into organic

It is understood from Table No.1.6 that "Lack of financial support" holds the I Rank. Majority of the farmers are illiterate, so they do not have knowledge to approach the bank for the loan. "Lack of storage facility" holds the II Rank. Tomato is a perishable product which gets spoiled quickly due to absence of storage facility. This affects their price and profit. "Lack of irrigation" holds the III Rank. Due to scanty rainfall and frequent power failure the plants were not watered adequately and on time. The problem of "Price fluctuation" holds the IV Rank and the problem of "Marketing" were ranked V.

V. SUMMARY OF FINDINGS

- The area under tomato cultivation was 0-50 cents for 50 percent of the respondents
- Out of the total respondents 42 per cent of them borrow money from the money lenders only
- Of the total respondents 36 per cent of them were owners and 64 per cent of them were tenants. It is clear that majority of the respondents were tenants.
- It is observed from the data that 40 per cent of the respondents were using bore well with oil engine, 26 per cent of them were using bore well with electric motor, 20 per cent of them depend upon the river water for irrigation and 14 per cent of them were depending on all the sources of irrigation.
- Out of the 50 respondents, 40 per cent of them were illiterate
- Total cost of organic tomato cultivation per acre was Rs. 26412.76. Yield per acre was 25.8 tonne per acre and it was sold on an average for Rs 12.00 per Kg. Gross return was Rs. 36977.86 and Net return was Rs.10565.10 per acre.
- The farmers in the study area were motivated by various factors to adopt organic methods to cultivate tomato. Of the total, 12 respondents were motivated towards organic tomato cultivation "to protect the fertility of the soil", 11 respondents "to protect the environment", 8 respondents "for better health", 5 respondents by the factor "Easy preparation of Bio - Fertilizer", 4 respondents by "better price of the product" and 3 respondents were motivated by the factor "Availability of bio-fertilizers within the village".
- The tomato growers in the study area were influenced by various sources to venture into organic farming. 20 respondents were motivated by the programme conducted by "Agricultural Department", 12 respondents through media like TV, Radio, Newspaper, 10 respondents by the "Agricultural exhibition", 5 respondents by "NGO" and 3 respondents were motivated by their friends.
- Problems faced in organic tomato cultivation are lack of irrigation, marketing problem, lack of storage facility, price fluctuation and lack of financial support.

VI. SUGGESTIONS

- Farmers must be educated to apply the appropriate pesticides at the prescribed level and at the right climatic condition.
- The Government should establish at least one Cold storage centre for each major tomato selling market.
- The power supply should not be interrupted during the time of irrigation.
- Public and Private sectors should collaborate to establish the Research institutes for the research in organic farming.
- Government should conduct the awareness programme about the benefits of organic farming, the subsidies available for agriculture and the loan facilities meant for farmers.
- The farmers can be trained to prepare value added products of tomato like sauce, pickle, and jam etc to increase their profit.

VII. CONCLUSION

Tomato is one of the most important food crops and has wider use. Organic Tomato cultivation gives reasonable profit to the farmers and also provides employment opportunities to the rural people. Organic farming is becoming more popular because consumers are demanding healthy and environment friendly food. Organic farm products are, generally more expensive than inorganic crops. Yields drop sharply during the phase of conversion as it take some time for the soil and plants to reach equilibrium. However, yields rise again, once management systems get established. Organic Tomato cultivation is technically feasible, financially viable and bankable.

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