# A STUDY ON FARMERS BUYING BEHAVIOUR TOWARDS TOMATO SEEDS IN COIMBATORE DISTRICT

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**TAMIL NADU AGRICULTURAL UNIVERSITY**

**COIMBATORE – 641003**

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Thesis submitted in partial fulfilment of the requirement for the award of the degree of

**MASTER OF BUSINESS ADMINISTRATION**

to the Tamil Nadu Agricultural University, Coimbatore - 641003


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# CERTIFICATE

This is to certify that the project report entitled **"A Study on Farmers Buying Behaviour towards Tomato Seeds in Coimbatore District"** submitted in part fulfilment of the requirement for the Degree of **MASTER OF BUSINESS ADMINISTRATION** to the Department of Agricultural and Rural Management, Tamil Nadu Agricultural University, Coimbatore is a record of bonafide research work carried out by **Miss. S.PAVITHRA** under my supervision and guidance and that no part of the thesis has been submitted for the award of any degree, diploma, fellowship or other similar titles and that work has not been published in part or full in any scientific or popular journals or magazine.

Place: Coimbatore

Date:

**(Dr. N. VENKATESA PALANICHAMY)**
Chairman

**APPROVED BY**

**Chairman : (Dr. N. VENKATESA PALANICHAMY)**

**Members : (Dr. SURESH KUMAR)**

**(Dr. P. BALAJI)**

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**(S.PAVITHRA)**

*Didicated to*

*Mother, Father,*

*Guru and God*

# *Abstract*

# ABSTRACT

**A study on Farmers Buying Behaviour Towards**

**Tomato seeds in Coimbatore District**

By

**S. PAVITHRA**

**Degree : Master of Business Administration**

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The overall objective of the study was to analyze the buying behavior of farmers towards tomato seeds in Coimbatore district of Tamil Nadu. The specific objective of the study were to identify the factors influencing the purchase of tomato seeds, to study the preference of farmers towards varies brand and brand switching behaviour among farmers, and to examine the constraints in purchase of tomato seeds by the farmers.

The study was conducted in Coimbatore District. Based on the maximum area under tomato crop, two blocks are selected from the Coimbatore district at the first stage and six villages were selected from each block (second stage). From each village 10 farmers were selected at random (third stage), making the total sample size as 120 farmers.

To collect the required information, a well structured pre-tested interview schedule was prepared for the farmers. The data required for the study were collected by personally interviewing the farmers. Secondary data for the study was collected from secondary sources like government institutes, government publications, other publications and annual reports. Statistical tools like Marko chain analysis, Factor analysis, Multi dimensional scaling technique, Garrett's ranking technique and conventional analysis were used to analyze the data.

Results of the study revealed that majority of the sample farmers had 20 years of farming experience and among them 94 per cent of them had more than 10 years of farming experience in tomato cultivation. Most of their lands were of red soils which is good for cultivating tomato and their major source of irrigation was both bore well and open well. Most of the sample respondents were small farmers has they had two hectares of land for cultivation.

The preference level of farmers was measured using multi dimensional scaling technique. The attributes measured were brand, easy availability, stress tolerance and yield for Sygenta, Rasi, Mahyco, Namdhari and Indo American. These firms were preferred due to different attributes such as Sygenta and Mahyco were preferred because of their brand image followed by Rasi for easy availability, Indo American and Namdhari for stress tolerance.

To analyze the brand switching behavior of farmers' Markov chain analyses was used and found that Syngenta was found to be the stable brands preferred by the farmers with retention probability of 76 per cent. Next to Syngenta, other brands and Rasi, Mahyco retained 53 per cent and 20 per cent of farmers. The most unstable brands Namdhari and Indo American are with zero percent retention. The major reasons for higher stability of Syngenta are the positive response of Farmers to the firm's major important promotional programmes and also the higher level of performance of attributes of farmer's preference.

The major factors influencing the buying behavior of the hybrid seeds were advertisements campaign followed by reference from fellow farmers, past experience, Insistence of retailer and demonstration by the MNC's.

The constrains faced by the farmers in the cultivation of hybrid tomato were ranked by using garrett ranking technique and results found were high seed cost, marketing problems, climatic changes, low yield, non availability of credit and poor germination.

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## CHAPTER I

# INTRODUCTION

India is the second largest producer of vegetables that account for 16 per cent of the world production. More than 40 kinds of vegetables belonging to different groups, namely cucurbits, cole crops, solanaceous, etc are grown in different agro climatic situations of the country. Major vegetables grown in India are potato, onion, tomato, cauliflower, cabbage, bean, egg plants, cucumber, gherkin, frozen peas, garlic and okra. In India, the area under vegetables accounted for 94 lakh ha and with a production of 16.2 crores metric tonnes in the year of 2013-14. Export of vegetables has increased from Rs. 4138.76 crores in the year of 2010-11 to Rs. 5462.93 crores in the year of 2012-13. The major importing countries of Indian vegetables are U.A.E, Pakistan, Sri Lanka, Nepal and Bangladesh. Adoption of high yielding cultivars namely $F_1$ hybrids along with advanced production technologies has resulted in increased production and productivity. Per capita consumption of vegetables per person has also increased from 293 grams to 363.2 grams per day.

**Tomato (***Lycopersicon esculentum***)** typically constitutes an essential part of the daily diet in India and it has great demand round the year. The commercial value of tomato in terms of direct consumption, processing as well as trade has risen substantially in recent years. Their economic importance has also increased by hybrid tomato replaced the open pollinated varieties. Hybrids produce higher yields, mature earlier with uniformity and which resulted in better fruit quality and resistant to disease. With all these advantages, majority of the farmers prefer to cultivate hybrids in spite of higher seed costs. Therefore, the market share for tomato seeds has also increased over the years.

The top ten countries producing tomato are China, India, USA, Turkey, Italy, Egypt, Spain, Iran, Brazil and Mexico of the world area and production. China ranks first in an area with 10 lakh hectares and the annual production of 5 crore metric tonnes followed by India which ranks second in an area with 8.8 lakh hectare and the annual production of 1.8 crore metric tonnes.

With intensive cultivation of hybrids, the average yield under open field condition in India has steadily increasing and the yield difference with developed countries was

getting narrower. The consumers were benefited by better quality of hybrids, in terms of eye appeal, keeping quality and all-important nutritional value. Realizing the benefits that accumulate in terms of productivity and the possibility of enhanced income, hybrid cultivation has become more popular in traditional tomato cultivable land belts.

**1.1 Indian Seed Industry**

Indian agriculture has come a long way since the Green Revolution of the late 1960s. India presents an interesting scenario where both GDP and food grain production in the country has risen faster than the growth in population over the last 50 years. But now the situation is becoming alarming as the agricultural growth was 1.9 per cent in 2013-14. The enormity of the problem is indicated by the fact that the during the 10 year period 1997-98 to 2006-07, our food grain production has grown at an average annual growth rate of only one per cent. Interestingly, while the nation rejoices at the recovery in food grain production at 263 million tons in the year of 2013-14, the fact remains that the production has increased by of 29 million tons over the production of 233.88 million tons in the year of 2008-09. It has been estimated that total demand for food grains will touch 280 million tons by 2020. To achieve the foregoing amount of production a growth rate of 4 per cent in agricultural sector has to be maintained over next 15 years. It is very important that the economic growth fosters social equity. For this agricultural growth should be in the forefront of our national GDP growth.

The focus on ensuring food and nutritional security to the Indian populace especially below poverty line population constitutes for about 28 per cent. No more additional land for farming and depletion of the agricultural land, this miracle is not easy to achieve. Science and technology play a big role and high productive seeds, private sector involvement and expenditure on long stalled irrigation schemes are the keys to achieve higher production. Hence a second green revolution that maximizes productivity, and generates income and employment opportunities for the rural population is need of the hour. Among the critical farm inputs in agricultural production, seed holds the key for increased productivity coupled with biotechnology and other crop improvement technologies, seeds offer tremendous opportunity for improving the productivity of Indian agriculture.

Indian seed industry is one of the most mature and vibrant one in the world, which stands VI position with nearly Rs 13,500 crore turnover. During the past 5 years the

Indian Seed Industry has been growing at a CAGR of 12 per cent compared to global growth of 6-7 per cent. In value terms the major growth has come from the increased adoption of Bt cotton and hybrid vegetables. The volume growth has mainly come through increased seed replacement rate in crops like paddy and wheat and also rising income and profitability. Indian seed industry is undergoing wide ranging transformation including increased role of private seed companies, entry of MNCs, joint ventures of Indian companies with multinational seed companies and consolidations. New biotech traits will further boost the seed market value.

**1.2 Vegetable seed production**

India is one of the top three vegetable seed producing countries in Asia requiring hand pollination, others being China and Thailand. In India, commercial seed production for export on a commercial scale was organized during the 1970 by two private companies. A number of medium and small sized companies have begun to operate now in this venture covering seed production in most of the solanaceous and cucurbitaceous crops for domestic and exports. This includes Namdhari Seeds, Mahyco, Indo American Hybrid Seeds, Golden Seeds, Rasi Seeds, Dow Seeds, Oriental Biotech, Unicorn Biotech, etc. Custom production for export was mainly for companies in US, Europe and Japan.

India is endowed with several advantages making it competitive for production of hybrid vegetable seeds for foreign companies and meeting international seed quality standards. Seeds production areas have been identified and developed. Seed villages were organized on a professional scale; the main reason for India’s success in hybrid seed production includes availability of skilled labour (pollinators and growers) at low cost, skilled supervisors and favorable climatic condition for production of major crops like tomato and cucurbits over an extended production season. The government has been supportive for export-oriented activities.

It was estimates that the total employment generation was over seven lakh man days per annum in this sector. This was one of the most significant achievements of this agricultural activity leading to improved per capita income and quality of life among the agricultural workers. Hard work and diligence of the farm workers involved have helped in meeting the international seed quality standards, which in turn has led to continued growth of

the business. Availability of quality technical expertise, increased production and productivity of hybrid seeds of international standards, reduced risks and at low costs have helped to make custom seed production a viable opportunity for foreign companies in India.

### 1.3 Tomato production in India

In India, Tomato is cultivated in an area of 8.8 lakh hectare with an annual production of 1.8 crore metric tonnes and the major varieties of tomato cultivated in the country are Pusa Ruby, Pusa Early Dwarf, Arka Abha, Arka Alok, Pant Bahar, Pusa hybrid-1, Pusa hybrid-2, MTH-6, Arka Vardan etc. Among the Indian states, Andhra Pradesh ranks first in an area of 1.6 lakh hectare and with the total production of 33 lakh metric tonnes. The other major tomato growing states are Odissa, Karnataka, Maharashtra, Tamilnadu and Bihar. On an average about 4.26 lakh tonnes of tomatoes are exported annually from India (APEDA 2014). The major importers of Indian tomatoes are Bangladesh, Pakistan and UAE, etc.

**Table 1.1 Area, production and productivity of tomato in India**

| Year | Area (in'000 ha) | Per cent of Total veg. area (units) | Production (in '000 MT) | Per cent of total veg. Production (units) | Productivity (in MT/ha) |
|---|---|---|---|---|---|
| 2001-02 | 458.1 | 7.4 | 7462.3 | 8.0 | 16.3 |
| 2002-03 | 478.8 | 7.9 | 7616.7 | 9.0 | 15.9 |
| 2003-04 | 502.8 | 8.0 | 8125.6 | 8.7 | 16.2 |
| 2004-05 | 505.4 | 7.5 | 8825.4 | 8.7 | 17.5 |
| 2005-06 | 546.1 | 7.6 | 9820.4 | 8.9 | 18.0 |
| 2006-07 | 596.0 | 7.9 | 10055.0 | 8.7 | 16.9 |
| 2007-08 | 566.0 | 7.2 | 10303.0 | 8.0 | 18.2 |
| 2008-09 | 599.0 | 7.5 | 11149.0 | 8.6 | 18.6 |
| 2009-10 | 634.4 | 7.9 | 12433.2 | 9.3 | 19.6 |
| 2010-11 | 865.0 | 10.2 | 16826.0 | 11.5 | 19.5 |
| 2011-12 | 907.1 | 10.1 | 18653.3 | 11.9 | 20.6 |
| 2012-13 | 879.6 | 9.6 | 18226.6 | 11.2 | 20.7 |
| 2013-14 | 882.0 | 9.4 | 18735.9 | 11.5 | 21.2 |

(Source: National Horticulture board, 2014)

## 1.4 Tomato production in Tamil Nadu

Among the Indian states Tamil Nadu ranks ninth place in the production of tomato and it is cultivated for about 0.25 lakh hectares with an average yield of 30-40 tonnes per hectare and an annual production is about 3 lakh tonnes. The major tomato producing districts in Tamil Nadu are Coimbatore, Dharmapuri, Erode, Salem, Krishnagiri, Theni, Dindigul and Vellore.

Coimbatore is the second largest tomato producing district of Tamil Nadu in terms of area and production. In Coimbatore district, tomato is cultivated in Alandurai, Karamadai, Mettupalayam, Kinnathukadavu, Velandhavaalam, Pollachi, Nachipalayam, Arisipalayam, Thrimalayampalayam, Chettipalayam etc. In Coimbatore market, more than 65% of the hybrid tomato is transacted. Hybrid tomatoes are most preferred among the market functionaries because of its longer shelf life.

## 1.5 Nutritional Benefits of Tomato

Tomato is a major vegetable crop that has achieved tremendous popularity over the last century. It is grown in practically all over the world in open fields, green houses and net houses. The tomato plant is very versatile and the crop can be divided into two categories; fresh market tomatoes, which is used for consumption and processed tomatoes, which we are used for the canning industry and it is mechanically harvested. In both cases world production and consumption has grown quite rapidly over the past 25 years.

Tomatoes are the good source of vitamins A and C. Vitamin A is important for bone strength, cell division and it also helps for regulation of immune system and maintaining surface linings of eyes, respiratory, urinary and intestinal tracts. Vitamin C is important in forming collagen gives structure of bones, cartilage, muscle and blood vessels. It also helps to maintain the capillaries, bones, teeth and aids in the absorption of iron.

Tomatoes are also an excellent source of lycopene which is a very powerful antioxidant that to prevent the development of many forms of cancer. Tomato and their products are the best source of lycopene because when it is cooked the lycopene is released from the tomato. And also the raw tomatoes have about 20 per cent of the lycopene content. However, raw or cooked tomatoes are considered the best source for this antioxidant.

Currently, tomato has a higher consumption rate in developed countries and is often referred to as a luxury crop. In Israel, the tomato is an important part of the food basket, which is used when calculating the consumer price index. In other words, scarcity of tomatoes can cause the CPI to rise and influence the inflation rate.

**1.6 Problem focus**

India ranks second in world tomato production and is steadily increasing to meet the needs of growing population and industry demand. Several tomato seeds and hybrids are released by various seed companies and widely cultivated in major tomato growing areas of India and Tamil Nadu. The buying behavior and preference of these tomato seeds by farmers vary from region to regions depending upon the suitability, yield parameters, availability of seeds in time and technical guidance to raise the crop. Seed producing firms need consistent periodical feedback information about the buying behavior and preference of their seed by the farmers. Such studies of the preference of seeds would help to reorient the product strategy by the seed firms and develop new hybrids suit to the region. With this background, the broad objectives of the study was designed to analyze the buying behaviour aspects of tomato seeds by the seed producing firms, with the following specific objectives.

**1.7 Objectives**

The overall objective is to study the buying behavior of farmers towards tomato seeds in Coimbatore district.

The specific objectives of the study are,

1. To analyze the buying behavior of farmers towards tomato seeds.
2. To identify the factors influencing the purchase of tomato seeds.
3. To study the farmers preference towards various brands and farmers switching behavior on tomato seeds.
4. To examine the problems faced by the farmers in obtaining quality tomato seeds from various suppliers.

## 1.8 Scope of the present study

With the technological advancement and the modernization of Indian agriculture, the agricultural inputs firms were gaining strategic importance in the country. The strategy and product development of any business is based on the demand and the market potential for their products. To realize the potential, the input firms may have adequate information on the farmer's preference, awareness, acceptance and buying behavior of their products. This study will give information on buying behavior of farmers for the tomato seeds. The results of the study will give a feedback to the seed firms on the popularity of their products and the effectiveness of their promotional activities.

## 1.9 Limitations of the study

The study was confined to Coimbatore district and hence, extrapolation of the results may not be possible as there is a wide difference in farmers' preference, behavior and the factors like socioeconomic, demographic and psychographic parameters across region. The study was totally farmers oriented and data collection was done by personal interview method. Hence, there is every chance of recall bias in the information given by the respondents. However, attempts have been made to minimize the error at every facet of the study right from defining the problem, incorporation of common terminologies in the interview schedule to final expression in questioning the farmers, analysis of results and interpretation of data.

## 1.10 Organization of the Thesis

The study is organized in the following chapters

Chapter I Introduction: It includes introduction, problem focus, hypothesis, objectives, scope and limitations of the present study.

Chapter II Concepts and Review: In this chapter, a detailed review of important concepts used in the study along with a brief review of related past studies are presented.

Chapter III Design of the Study: It specifies the sampling design, method of investigation and tools of analysis used in the conduct of research and analyzing the data.

Chapter IV Description of study area: in this chapter, description of the study area showing geographical features, biological importance and socio economic features are presented.

Chapter V Results and Discussion: The results obtained in the study are presented and discussed along with the inferences drawn.

Chapter VI Summary and Conclusion: It summarizes the findings and policy implications drawn from the findings.

# *Concepts and Review of Literature*

## CHAPETER II

# CONCEPTS AND REVIEW

Any systematic and scientific research requires precedent information. The main objective of this chapter is to review the concepts related to the studies and empirical information available from the similar studies conducted in the past. Concepts and the results of past research pertaining to the present study were reviewed for better exposition and are presented in two different sub heads viz., review of concepts and the past studies.

### 2.1 Review of Concepts

Following concepts related to the study were explained in this section.

- Seed
- Hybrid seed
- Brand
- Market
- Marketing
- Seed marketing
- Consumer Preference
- Adoption
- Consumers Attitude
- Consumer Perception
- Buying Behavior

#### 2.1.1 Seed

According to **Desai (1996)** seeds are essentially young plant life activities are going on at a minimum rate. Seeds formed by the combination of mature male and female gametes, coming from the stamen and pistol of the flower respectively in a process known as fertilization.

**Krishnasamy (2004)** defined seed as a mature fertilized ovule consisting the embryonic axis, food reserves and an outer covering and has the potential for growth and development into an adult plant.

**Subirsen and Nabinananda (2006)** referred seed as a mature ovule; the essential part is the embryo contained within the integuments, but it may be used less critically to describe as planting material.

**Agarwal (2006)** defined seed as a fertilized ovule consisting of embryo, stored materials and protective coats.

For the present study, seeds referred as mature ovule resides inside the ovary and has protective coat consisting of outer testa and integuments, embryo and stored food materials and also has the ability to germinate and rise to new seedlings.

### 2.1.2 Hybrid Seed

According to **Somani (1994)** a plant resulting from a cross between parents that were genetically unlike was known as a hybrid seed.

**Douglas (1998)** hybrid seed meant first generation seed of a cross, produced by controlling the pollination of and by combining (i) two or more inbred lines, (ii) one inbred or a single cross with an open pollinated variety, and (iii) two varieties or species except open pollinated varieties of maize. The second generation or subsequent generation from such crosses, would not be regarded as hybrids.

**Dale (2002)** defined hybrid was the resultant offspring of the interbreeding of two genetically distinct varieties of plants. Hybrid plants (F1 hybrids) frequently were found to be more vigorous than their parents.

In the present study, hybrid seed was considered as the biological input in agriculture which gives maximum yield and return to the farmers.

### 2.1.3 Brand

**Wood (2000)** gave an integrated definition of brand as a mechanism for achieving competitive advantage for firms such as in terms of revenue, profit, added value of market share, through differentiation.

**Kotler (2001)** defined a brand as a name, term, symbol, or design or a combination of them, which is intended to identify the goods and services of one seller and to differentiate them, from those of the competitors.

In the present study brand refers to the name, term, symbol, or design that is used to identify a particular tomato hybrid seed from the farmers.

### 2.1.4 Market

**Acharya and Agarwal (1994)** referred market as a social institution, which performed activities and provided facilities for exchanging commodities between buyers and sellers.

**Mike Moffatt (2001)** defined market as any place where the sellers of a particular good or service can meet with the buyers of that goods and service where there is a potential for a transaction to take place. The buyers must have something they can offer in exchange for there to be a potential transaction.

**Kotler and Armstorng (2001)** defined market as a set of all actual and potential buyers of a product or service.

**Lamb *et al.*, (2002)** stated that market consists of people or organization with needs or wants and with the ability and the willingness to buy.

**Ellen (2004)** defined market as an area in which buyers and sellers negotiate the exchange of a well-defined commodity.

**Kotler (2006)** opined a market consists of all the potential customers sharing a particular need or wants and might be willing and able to engage in exchange to satisfy that need or want.

**Yarshney and Gupta (2007**) referred market as a place where the buyers and sellers personally interact and finalize deals.

**Kotler (2007)** referred market as sellers sending goods, services and communication (ads, direct mail), in return they receive money and information (attitudes, sales data).

For the present study, market was considered as a place where buying and selling of tomato hybrid seeds takes place among the farmers.

### 2.1.5 Marketing

**Kotler (2001)** defined marketing as a social and managerial process by which individuals and groups obtain what they need and want through creating and exchanging products and value with other.

**Basotia (2001)** defined marketing as a recent branch of management activity which deals with making goods and services available to the consumer in such a way as to satisfy his requirements in the best possible manner.

**Peelings (2004)** defined marketing as the process of anticipating and creating consumer's needs and wants and of organizing all the resources of the company to satisfy them.

**Keegan (2005)** defined marketing as the process of focusing the resources and objectives of an organization on environmental opportunities and needs. It is a set of concepts, tools, theories, practices and procedures and experiences. Together, these elements constitute a teachable and learnable body of knowledge.

For the present study, marketing is considered as a set of activities designed to plan, price, promote and distribute the tomato seeds by the seed companies in order to satisfy the needs of farmers.

### 2.1.6 Seed marketing

**Desai (1996)** defined the seed marketing as a process in which seed would move from grower to cleaner, buyer , broker, packager, wholesaler, retailer and finally to the farmers.

**Gurdev and Asokan (1997)** defined seed marketing as the performance of activities like assembling of seed, processing, packing and making it available to the farmers for sowing at competitive prices at places well in advance of sowing season.

**Douglas (1998)** defined seed marketing as the systematic determination of farmer need of seeds, storage of seed and services to satisfy those needs, communication of information about the availability of seed, services and distribution of seeds to farmer.

**Subirsen and Nabinananda (2006)** defined seed marketing included all activities involved in the flow of seeds from production to consumption.

For the present study, seed marketing referred to all activities such as distribution, market promotion, selling of tomato seeds etc., which enable movement of tomato seeds from producers to farmers.

### 2.1.7 Consumer preference

**Singh and prabhakar (1987)** defined consumer preference is an attempt to create a unique may be for the products an image that enables them to achieve an advantage over their competitor's product.

According to **Varshney and Gupta (2000)** preference was a person's feeling of pleasure or disappointment resulting from comparison of the products perceived and actual performance to his or her expectations. Hence, consumer preference was treated as a function of the consumers' perception about the products preference and the consumers' expectation.

**Connor (2004)** did research related to consumer attitudes and preference for organic produce and concluded that health conscious consumers have positive attitude and high preference towards organic food.

**Munavur (2005)** reported that the primary attribute responsible for influencing customer preference were found to be product range, shelf display and regular price updation.

**Kotler (2007)** explained that consumers' satisfaction or dissatisfaction would decide the consumers' preference for the product and if he was satisfied with the products, then he would exhibit a higher probability of purchasing it again.

**Taneja and kaushika (2007)** reported that responsiveness, discounts, physical evidence, core services, tangibility and promotional activity influenced the satisfaction level of consumer and concluded that there is a significant relation between the family income and preference of retail formats.

In this study, farmer preference referred as that character of a farmer which, when the product preferred by him or her was not available with one shop, made him or her to walk to other shop for the same product.

### 2.1.8 Adoption

**Kotler (2005)** defined adoption as an individual's decision to become a regular user of a product.

In the present study, adoption meant the decision made by the farmer to make full use of an innovation available in the market.

### 2.1.9 Consumers Attitude

**Ajzen (1998)** the attitudes were the first determinant of behaviour intention. In consumer behaviour context attitude was considered as a learned predisposition to behave in a consistently favourable or unfavourable way with respect of a given object. There was a general agreement that attitudes are learned. This means that attitudes relevant to purchase behaviour are formed as a result of direct experience with the product, word-of-mouth information acquired from others, or exposure to mass media advertising, internet etc.

**Solomon *et al.*, (2006)** Most research agree that attitude consist of three components: Affect (consumers emotions and feelings about the attitude object), Behaviour (intention to do something with regard to an attitude object) and cognition (beliefs a consumer has with an attitude object).

Consumer's attitude acts as the initiator of consumers' behaviour. Hence, in the present study it is defined as the attitude, the farmers have towards the purchase of tomato seeds which increases or decreases their intention of future purchase.

### 2.1.10 Consumer Perception

**Narayanan (1990)** described perception as a psychological process whereby people selected, organized and interpreted sensory stimulations into meaningful information about their environment.

**Bhave (2001)** reported that better understanding of consumer perceptions enabled companies to determine the actions required to meet the customers' needs. They

identified their own strength and weakness, where they stood in comparison to their competitors, charted out future path for progress and improvement. Customer satisfaction measurement helped to promote an increased focus on customers' outcome and stimulate improvements in the work practices used within the company.

**Aswathappa (2004)** defined that perception included all those processes by which an individual received information about his environment – seeing, hearing, feeling, tasting and smelling.

**Kotler (2005)** stated that perception was the process by which an individual selected, organized and interpreted information inputs to create a meaningful picture of the world. Perception dependent not only on the physical stimuli but also on the reaction of the stimulus to the surrounding field and on the conditions within the individual. Perceptions varied widely among individuals exposed to the same reality.

**Robins (2005)** defined perception as a process by which an individual organized and interpreted their sensory impressions in order to give meaning to their environment.

Consumer perception was defined as a psychological process which selected organized and interpreted sensory impressions. According to the author, perception varied among individuals exposed to same reality.

In this study, perception was considered as the process by which the individuals interpreted their views about the purchase of tomato seeds.

### 2.1.11 Buying Behaviour

**Schiffman and Kanuk (2004)** consumer behaviour focused on how individuals made decisions to spend their available resources on consumption related items. That included what they buy, why they buy, when they buy, where they buy, how often they buy it, how often they use it, how they evaluated it after they purchased and the impact of such evaluations on future purchases, and how hey disposed it.

**Solomon (2006)** referred to consumer behaviour as a study of the processes involved when individuals or group select, purchase, use or dispose of products, services, idea or experiences.

Consumer was a complex pattern and sophisticated understanding for marketing researches, but simply defined; study of psychological, social and physical actions when people buy, use and dispose products, services, ideas and practices**.(Solomom, 2006; Blackwell et al., 2001; Peter and Olson, 1999)**

**Olson and Peter (2008)** consumer behaviour consisted of ideas, feelings, experiences and actions of consumers with additional environmental factors like ads, prices and commends. Furthermore, consumer behaviour was a dynamic process, because of the continuous change in ideas. Perceptions and activities of consumers as an individual or in a group.

Consumer behaviour was defined as a dynamic process which involved psychological, social and physical actions in need recognition, information search, selection, purchase and use/disposal of a product.

In the present study, consumer behaviour is defined as the series of processes (from information search to consumption/disposal of the product) that the consumer/ farmers undergo before, during and after purchase of tomato seeds.

## 2.2 REVIEW OF PAST STUDIES

### 2.2.1 Buying Behavior

In this globalized world, knowing customer is very important. Historically, understanding consumer behavior has always been a big challenge for the marketers, but those who succeed in it, they are able to sustain themselves for a long time. Study of consumer behavior is a complex process **(Baumgarter, 2002)** and may be defined as mental, emotional and physical activities that people in choosing, buying, evaluating, and disposing of products and services, which ultimately fulfill the needs and desires of customers **(Belch & Belch 2004)**. The profound implication of consumer behavior is not only important for managers, but also for the strategy makers. The modern concept of consumer behavior is that people mostly buy products not for what they do, but for what they stand for **(Rabolt & Solomon, 2004)**

**Acebron *et al.*, (2000).** The aim of the study was to analyze the impact of previous experience on buying behaviour of fresh foods, particularly mussels. In their

studies the authors used structural equation model in order to identify the relationship between the habits and previous experience on the consumer buying decision. Their findings show that personal habits and previous experience on of the consumers have a direct impact on the consumers' purchase decision in the example of purchasing fresh mussels. They also found that the image of the product has a crucial impact on the purchasing decision of the consumer and further recommended that the product image should continuously be improved in order to encourage the consumers towards purchasing.

**Sun and Wu (2004)** little attention has been paid to rural consumer behavior. Rural consumers are different from the urban consumer. However, the rural consumers are now more brand loyal and have a good knowledge about the branded products. They not only give importance to quality, but also to value for money, which highly affects their buying behavior, the rural consumers have become more rational and cleaver and the advertisement gimmicks do not work. So, the companies have to design new options for the core of low income consumers, and they must understand that low income customers to have ambitions for a better life.

**Kuhar and Juvancic (2004)** prepared a country wide survey releated to purchasing behaviour of organic and integrated fruit and vegetables for Slovenia. An ordered profit model of consumer choice was developed on the basis of survey results to quantify various determinants of purchase frequency for organic and integrated fruit and vegetables. Results show that purchase of analysed categories was most significantly influenced by their in retail outlets. Other significant determinants were household income, health and environmental considerations and perceived importance of produce visual attractiveness. Results of the study support implementation of effective distribution strategies, but also targeted knowledge and awareness raising activities.

**Srivastav (2005)** in his study on consumer buying behavior in relation to Nestle Maggi noodles found that being a convenience food and preferred by children were the factors influenced the purchase of noodles. The choice of particular flavor of noodles was influenced by the taste and eating habits of the consumers. His study also revealed that

the buying frequency was increased with the introduction five rupee pack as it for felt to be affordable and majority of them were motivated by promotion and giving offers given to noodles.

**Kabilar (2008)** This study focused on the awareness and adoption of the farmers towards the hybrid cabbage seed variety, Tekila. They found that with the technological developments and the modernization of Indian agriculture, the agricultural input firms are gaining strategic importance in the country. To realize the potential the input firms should have adequate information on the preference, awareness, acceptance and buying behavior of their products.

**Abdul Brosekhan *et al.*, (2000)** This paper aims to identify different streams of thought that could guide future consumer research. The objective is to achieve a better understanding of consumer behavior with no specific intent to influence consumer processes. Consumer buying behavior has become an integral part of strategic market planning. In order to develop a framework a set of dimension can be identified, positive and non positive paradigms. The positive paradigm encompasses the economic, behavioral, cognitive, motivational and situational perspective and the non positive paradigm envelops the interpretive perspective.

**Khushdeep Dharni *et al.*, (2011)** Buying behavior of agri inputs consumers of organized rural outlets has been explored in this study. Results from the study indicate that major items purchased from rural retail outlets included implements, seeds and fertilizer. Quality and trustworthiness were the major reasons for making a purchase from the organized rural outlets as compared to their options. Price was the most important consideration at the time of purchasing agri inputs followed by packaging and branding. Fair billing and home delivery were considered relatively less important.

**Kumar and Gogoi (2011)** examined that consumer buying behavior and brand loyalty with regard to processed liquid packed milk in Guwahati. They found that consumer buying behavior is complex process, as it involves not only the economic factors, but also the emotional factors. However, marketers need to study consumer behavior, as it helps them to position their products better and develop effective

marketing strategies. Consumer buying behavior is also influenced by culture and subculture. Habits, likes and dislikes of people belonging to a particular culture or subculture can affects the marketing effects of a firm to a great extent. The social class to which the individual belongs tells about the products the individual prefers. Other factors that influence the buying behavior are social factors like motivation, perception and attitude of the customers.

**Kotler and Keller (2012)** It is worth noting that consumer buying behavior is studied as a part of the marketing and its main objective it to learn the way how the individuals, groups or organizations choose, buy use and dispose the goods and the factors such as their previous experience, taste, price and branding on which the consumers base their purchasing decisions.

### 2.2.2 Brand Preference and Promotion

**Ramaswamy and Chandrasekharan (1990)** identified the factors influencing the purchase of cotton seeds and buying behavior of farmers. The purchasing decision of farmers were influenced by the distance traveled by the farmer to purchase cotton seeds, source of purchase, varietal performance, seed quality, source of information about supply of cotton by different agencies and brand preference. Dealers with a credit sale facility, availability of seed at lower prices and premises located nearer to the farmer's locality attracted the farmers.

**Saravanan (1995)** concluded that product quality, dealer's recommendation and promotion by sales representative were the major factors that influenced the brand preference of the farmers during purchase of micronutrients.

**Sivakumar (1995)** analyzed the factors influencing the farmers in purchasing a particular brand by scoring each factor in a four point continuum scale. He found that the quality of the preferred brand, advertisement and price of the brand had significantly influenced the farmers in purchasing that brand.

**Low and lamb (2000)** in their study on the measurement and dimensionality of the brand associations came out with an interesting conclusion that well known brands tend to exhibit multi-dimensional brand associations, consistent with the idea that

consumers have more developed memory structures for more familiar brands. Consumers might be willing to expand more energy in processing information regarding familiar brands compare to unfamiliar brands.

**Srinivasan *et al.*, (2000)** proposed that brand awareness could play a dominant role in brand choice if the customer has strong awareness of some brands but not of other brands, in part because brands with little awareness were unlikely to be considered for purchase. In addition to be a powerful driver of brand purchase, a high level of brand awareness in a product market will encourage the traders to stock the brand, leading to high brand availability and in turn, high brand choice probability.

**Dayalane (2001)** analyzed the factors influencing pesticide preference by dealers in which product efficiency was ranked first followed by profit margin, company campaign, company image, product price and credit facilities.

**Anselmsson (2008)** examined brand preference and liking for consumer packaged food in Swedish market. This study emphasis that a strong brand can emerge on different levels: globally or nationally, within a category or across the whole market. Surely occupy the lead positions globally due to their strong brand. Their global presence generates huge sales volumes at the global level. At the same time, brands such as Coca-Cola and Kellogg' s are not as strong when compared to domestic brands if the analytical level is at the national market . This distinction between different levels of analysis is important to have in mind when comparing brands.

**Lee and Liao (2009)** studied on the effects of consumer preferences and perceptions of Chinese tea beverages on brand positioning strategies. The study reveals that Chinese tea beverage brands pursue various goals, such as quenching thirst, attractive advertising, or reliable quality, to develop their positions. Brand positioning implies that consumers remember particular information conveyed by the brand. The study illustrates consumers' brand awareness attributes, potential market demand, and brand competition conditions.

**Palanivel (2009)** has identified that all the hybrid seed firms in Southern Tamil Nadu gave more emphasis on promotional activities like supply of free sample, dealers meeting, demonstration, advertisements, cash discounts and less emphasis on jeep campaigns, good dealer margin, credit limit and special incentive.

**Jianying *et al.*, (2011)** studied the farmers' brand perception toward agricultural machinery in China The research results show that farmers have different perception toward domestic and foreign brands of agricultural machinery. The information channels of brand are mainly from friends, relatives and neighbors and word of mouth spreading is very important for a brand.

**Sardar (2012)** conducted study on brand preference of packaged drinking water in Maharashtra. Results revealed that no significant relation between the age, marital status of the customer and brand preference for packaged drinking water. Also, there exists no significant association with income and purchase behavior of drinking water.

**Sharma (2013)** studied that standardization of products and consumer satisfaction in India with special reference to FMCG'S. Every customer in the market has his/her own Brand Preferences. Customers will be looking for certain attributes before purchasing the products i.e., FMCG. The satisfaction level of customers towards the company products revealed the customer needs and the quality of the product they require. Majority of the customers give more preference towards the quality of the product followed by the price, design, sales and service etc.

### 2.2.3 Factors influencing the buying behavior

**Aloyce *et al.*, (2000)** found that availability of extension services, on-farm field trials, variety characteristics and rainfall were the most important factors that influenced the extent of adopting improved maize seeds and the use of inorganic fertilizer for maize production. Farmers preferred those varieties which minimize yield loss rather than maximizing yields. Also state that extension services, yield difference between improved and local varieties and geographical characteristics significantly influenced the adoption process of improved maize seeds and inorganic fertilizers.

**Sivakumar (2002)** reported that farmer's preference of Bt cotton. Results suggest that Farmers felt the hybrids were costlier when compared to varieties and hence the cost is ranked as important factors.

**Vait and Schimdt (2006)** analysed the factors that most influenced consumers' decision to purchase pesticides safe vegetables in Thailand using logistic regression. The

results showed that most important factors that influenced were income, awareness of pesticides, adverse health impact, vegetarian diet, education and age.

**Gracia and Magistris (2007)** aimed to explain factors that influenced organic food purchase of urban consumers in the south of Italy. To achieve this goal, a multivariate limited dependent variable model was specified to simultaneously analyze consumers organic food purchase, the intention to purchase organic food products and the level of organic knowledge. Results indicated that consumers who were more willing to buy organic food products were more likely to buy a larger amount of those products. The intention to purchase depended on attitudes and organic products knowledge. Moreover, consumers' attitudes towards health and environmental benefits provided by organic foods were the most important factors explaining, both, the intention to purchase and the final decision. Finally, income and knowledge on organic food products positively influenced the final decision to buy organic food products.

**Renu verma (2008)** this study proposed that the factors like price, durability, resale, Brand, Agent approach are the main factors that influence to buy the tractor and there is a vast untapped potential market of tractors in India, tractor manufacturing and selling companies have a golden opportunity to expand their business in India. The key of marketing lies in understanding the needs, perception and behavior of the customers.

**Chaniotakis *et al.*, (2009)** identified the factors that affect consumers' intention of buying private label frozen vegetables. They developed a research model and tested the model using quantitative data from a consumer sample I Greece. The field research was carried out in Athens and the sample comprised 282 consumers. Data analysis was preferred using Structural Equation Modelling. The results confirmed that, consumers' intention of buying private label frozen vegetables was directly affected by consumers' attitude towards this type of products. Consumers' attitudes private label frozen vegetables were directly affected by the perceived benefits and indirectly affected by consumer trust and perceived economic situation.

**Kulikovski and Manjola (2010)** in their thesis studied and measured the effects of several factors on the behavior if the consumer who purchased organic food products in Greece. They particularly investigated the purchase behaviour in the light of seven

variables i.e., health consciousness, perceived quality and value, concern over food safety, ethical concerns, price premium and trust in labelling. A quantitative survey launched electronically and questionnaires examined Greek consumers' consumption of organic food. Behaviour was mainly influenced by quality, food safety and overall perceived value. On the other hand health, ethical concern, price premium and trust in labelling appear to have a non significant influence on those who purchase organic food. Organic food was generally looked upon as an alternative to conventional food for consumers who are concerned about food safety and quality.

**Oraman and Unikitan (2010)** examined the influence on the purchasing decisions of fruit and vegetables consumers and presented findings from a survey conducted with 385 respondents living in urban areas in Istanbul, Turkey. It uses a binary logistic model to estimate factor effects in organic fruits and vegetables purchasing in Turkey. The results indicated that concern for the human health and safety was a key factor that influenced consumer preference for organic food.

**Jabir Ali *et al.*, (2010)** this paper is to develop a marketing strategy for a modern food/grocery market based on consumer preference and behaviour. From this study they proposed that the preference of the consumer clearly indicate their priority and factors are cleanliness/freshness of food products followed by price, quality, packaging, and non-seasonal availability and also largely depends on convenience in purchasing at the market place along with the availability of additional services, attraction for children, basic amenities and affordability. Results suggest that most of the food and grocery items are purchased in loose form from the nearby outlets. Fruits and vegetables are mostly purchased daily or twice a week due to their perishable nature, whereas grocery items are less frequently purchased.

**Kumaresh K (2011)** analyzed the market share, market potential of the Syngenta Sunflower and maize Hybrid seeds. Sufalam had been major player in sunflower hybrid seed sales in the study area with a market share of 28.57 percent, followed by Syngenta (19.64 percent), JK seeds (16.07 percent), Spic (8.90 percent) and Nuziveedu (8.90 percent). Factors that influence the selection of hybrid sunflower seeds among the various brands for non-user class was dealer's recommendation followed by lower seed rate,

availability in time. Most preferable character for selecting the Syngenta hybrid sunflower seeds among the various brands for user class was dealer's recommendation followed by better seed weight and seed yield.

**Claudia bazzani *et al.*, (2013)** this paper aims at giving a forecasting scenario of the fresh tomato industry in Italy and in Germany. The Delphi method was applied in order to obtain judgments of different experts regarding the driving force of fresh tomato industry, through this analysis of different drivers which influence the trends of the fresh tomato market. From the result it is conclude that the services in the products will mostly influence the trends of the fresh tomato industry; this includes marketing, communication, quality certification, special packaging.

**Dharmraj Solanki (2013)** This paper aims to identify the factors that affect consumers purchasing behavior towards Agriculture inputs like fertilizer, seeds, agrochemicals, oils and lubricants etc. Buying behavior refers to the act of consumers obtaining and using goods and services and the decision process that determines these acts. Buying decision is a set of many decisions which may involve a product, brand, style, quality, dealer, time, price and mode of payment. Price is the most important consideration at the time of purchasing agriculture inputs followed by packaging and branding, fair billing and home delivery are considered relatively less important.

**Gyan Prakash *et al.*, (2014)** this paper focused on the important factors that affect the rural purchase behavior of FMCG products. The finding of this study indicate that price, brand name, quality, availability, packaging, and so forth were the important factors influencing the rural consumers purchase decisions and also focused on the important aspects such as the effective modes of communication, reasons for switching level among the rural cosumers.

### 2.2.4 Consumer Preference towards buying decision

**Srinivasan and Elagovan (2000)** examined the consumer preference towards processed fruits and vegetables among the consumers of Tamil Nadu, India and reported that consumer with higher educational level were found to consume more processed products. The quantities of processed fruit and vegetables products were consumed more in high income group. The increase in price resulted in discontinuance of the use of processed product. Consumers preferred processed because of convenience of ready to eat form.

**Cavard and Moreau (2003)** undertook the survey to study the behaviour of French consumers' purchase of fruits and vegetables. They reported that weekly purchase was more prevalent. Regarding place of purchase, supermarkets came first, followed closely by city market. In terms of modes of purchase, the self service with assisted weighing was the preferred option. Consumer expectations concerned better control of labelling and quality on the selling place, with an indication of consumed by date.

**Schiffman and Kanuk (2004)** acknowledged that formation of consumer attitudes was strongly influenced by personal experience, the influence of family and friends, direct marketing and mass media. Authors tried to connect the current health concerns to above factors that have direct impact on attitude formation.

**Padmavathy (2005)** in her study on consumer perception on store brand of food world found that high income households preferred modern supermarket and middle income households preferred local grocery store for purchasing food and grocery items.

**Verbeke (2005)** examined the influences on consumer decision- making process towards fresh meat. The hierarchy of effects indicated the difference mental stages that consumer went through when making buying decision and responding to marketing or non-commercial messages. In their instance, where the attitude and preference object was food safety and quality, plus taking into account that food safety and quality as low involvement product, the low involvement hierarchy of effects occurred.

**Emilio (2005)** analyzed consumer preference for fruits and vegetables, by using time series data with socio-econometric characteristics of households. The results showed positive effects of quality difference on the normalized price for the group of products through own-quality flexibilities, and the negative effects between fresh and processed products.

**Rokka and unsitalo (2008)** in their paper analysed the relative importance of green packaging when compared with other relevant products attributes among Finland consumers. The empirical study was based on choice-based conjoint analysis of preference. Their choice-based approach on environmental behaviour brought new insights to previous research, which predominantly relied on attitude models. Results indicated that consumer's difference in their preference for packaging, brand, price and convenience of

use of daily products. In addition, various distinctive consumer segments can be identified on the market. Contrary to several previous studies, they found that the largest consumer segment, one-third of consumers, favoured environmentally labelled packaging as the most important criteria in their choice.

**Sankumchaliang and Huang (2012)** in their research drew the respondents to explore perceptions and attitudes of consumers. Results indicated that the main reasons for purchasing organic products were healthier expectation, and environmental friendly. In addition, consumers trust and price are also affected. Findings provided more evidence on consumers underlying purchase motivations and to establish appropriate market strategies to develop the future demand.

**Julia sibiya *et al.*, (2013)** found that number of varieties grown in the study area is limited and most popular was landrace (Natal-8-row or *IsiZulu*). The low adoption of hybrids and improved Open Pollinated Varieties in the area was attributed mainly to the high cost of seed and inputs. The modern varieties lacked the traits the farmers preferred mainly taste, and tolerance to acid soils and low N that are a problem in the area. One key and significant observation was that the farmers still preferred high yielding varieties and were thus willing to grow hybrids, but only if their preferred traits were incorporated. This helps the breeder to improve the variety and adoption also is possible.

### 2.2.5 Constraints

**Senthil kumar (2010)** used Rank Based Quotient to rank the constraints in using Bt cotton hybrid seeds by the sample farmers. Results indicated that major constraints are poor quality of seeds, picking problem, increasing cost of cultivation, non availability of labour, soil and agro climatic conditions, not a stability price, not available on time and no credit facility.

A link between a food hazards and consumer risk perception has been identified through these studies. Likewise, a link between consumer risk perception and purchase behaviour has also been confirmed by the perceived risk theory in the context of consumer purchase behaviour **(Bauer, 1967; Roselius, 1971; Mitchell and Greatorex, 1988; Tse, 1999).** A linkage among food hazards, risk perception and purchase behaviour however, remains unexplored at present. This linkage is very relevant to food safety issue.

# *Design of the Study*

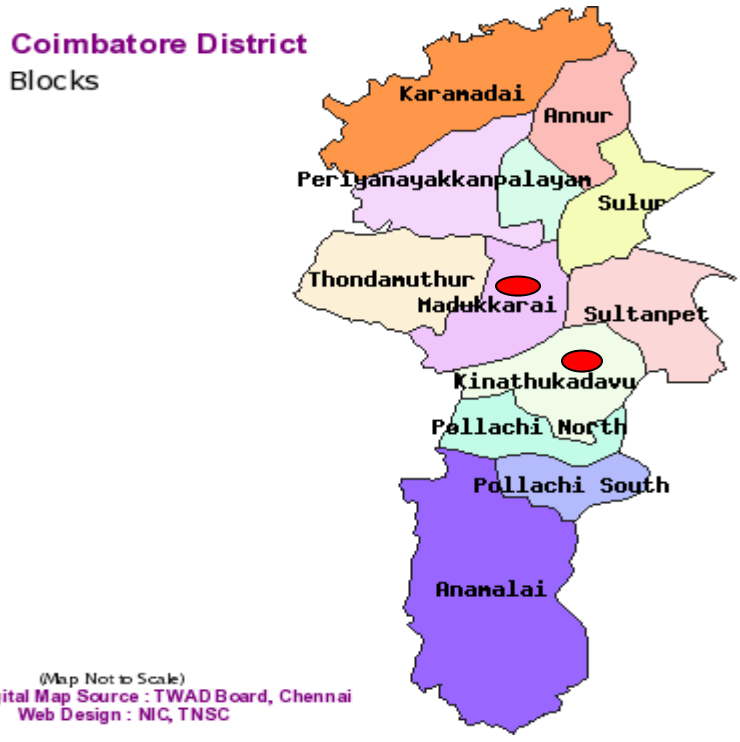
## CHAPTER III

# DESIGN OF THE STUDY

An appropriate research design is necessary for the conduct of research and applicability and utility. Designing and application of suitable method of sampling for collection of data and tools of analysis used are highly important before conduct of the study in order to draw meaningful conclusions and reliable policy implications. The details on study area, sampling design, method of collection of data and various tools of analyses used are presented and discussed in this chapter.

### 3.1 Selection of Study Area

The total area covered by tomato in Tamil Nadu is 0.25 lakh ha during 2013-14 out of which Coimbatore district were selected purposively based on maximum coverage of tomato accounted for the area of 3033 ha to study the farmers buying behavior, preference, factors and constraints faced by farmers in obtaining quality tomato seeds from various suppliers.




- Selected Blocks, **Fig.3.1 Coimbatore District map showing the Eleven Blocks**

### 3.2 Sampling Design

Secondary data on the study area regarding agriculture and general information was collected from the offices of the Joint Director of Agriculture of the Coimbatore district and from the website of the government of Tamil Nadu. Other information like location of the study area, soil type, cropping pattern, land use pattern, irrigation sources etc, were collected from the records of Agricultural and Statistical Department of study area.

A multi stage sampling process was resorted to collect the data. Based on the maximum area under tomato, two blocks were selected from the Coimbatore district (first stage) and six villages were selected from each block (second stage). From each village 10 farmers were selected at random (third stage), and the total sample size is 120 farmers. The list of selected blocks, villages and selection of farmers are presented Table 3.1.

**Table 3.1. List of selected villages and No. of Respondents in selected district.**

| S.No | District | Blocks | Villages | No of Farmers |
|---|---|---|---|---|
| 1. | Coimbatore | Kinathukadavu | Muthur | 10 |
| | | | Govindhapuram | 10 |
| | | | Solanur | 10 |
| | | | Varadanur | 10 |
| | | | Kovilpalayam | 10 |
| | | | Devarayapuram | 10 |
| | | Madhukarai | Nachippalayam | 10 |
| | | | Pichanur | 10 |
| | | | Arisipalayam | 10 |
| | | | Seerapalayam | 10 |
| | | | vallukuparai | 10 |
| | | | Maleripalayam | 10 |
| Total | | | | 120 |

### 3.3 Method of Data Collection

The data required for the present study were collected using well structured and pre-tested interview schedule. The data required for the study were collected by personally interviewing the farmers. The data collected from the sample farmers included general characters like age, educational status, family type, experience in farming and tomato farming, land particulars, cropping pattern, different brand seeds used and some of attributes farmers are looking in a hybrid tomato is buying behavior, factors influencing the purchase of hybrid, farmers preference brand switching behavior and constraints faced by farmers for growing quality tomato.

Apart from the primary data from farmers, information from secondary sources like government institutes, government publications, other publication and annual reports were also collected.

### 3.4 Tools of analysis

The collected data were analyzed with reference to the objectives set forth for the study. The analytical techniques employed in this study are explained.

1. Conventional (Percentage) analysis
2. Factor analysis
3. Markov chain analysis
4. Garrett ranking technique
5. Multi dimensional scaling technique

#### 3.4.1 Conventional analysis:

Percentage analysis was carried out to analyze the general characteristics of farmers such as age, education, occupation, family size, farming experience in tomato cultivation, and also for some of the specific variables like buying behavior, mode of purchase, frequency of purchase, source of information, etc.

### 3.4.2 Factor Analysis

Factor analysis is a statistical approach used to analyze interrelationship among a large number of variables and to explain the variables in terms of their common underlying dimension (factor). The statistical approach involves finding a way of condensing the information contained in a number of original variables into a smaller set of dimensions (factor) with a minimum loss of information.

Mathematically, factor analysis makes it possible to describe the set of variables in term of a smaller numbers of factors and hence explain the relationship between the k variables. The formula used for the factor analysis is given below,

General from of a factor is,

$$F=x_1+x_2+\ldots\ldots x_k$$

**Factor loading** = correlation of each variable with the underlying factor

**Factor score** = subject response x factor loadings

To identify underlying constructs and investigate the relationship among the variables that influence consumer to purchase seeds, factor analysis was applied. In this study, 12 variables of various aspects were selected. The consumer asked to indicate on a five point scale whether they were strongly agree, agree, neutral, disagree and strongly disagree (from one for strongly disagree to five for strongly agree). The responses of the consumer were recorded. To analyze the factor analysis, SPSS v16 was used. To test the sampling adequacy, Kaiser-Mayer-Olkin measure of sampling adequacy was calculated. The varimax normalized method is one of the rotation methods that are used frequently to find the new factor that easier to interpret. The variables with commonalities of greater than 0.50 were obtained. The factors with Eigen- value greater than 1.0 were considered and analysis was done.

### 3.4.3 Markov – Chain Analysis

Markov Chain analysis was used to analyze the structural change in any system whose progress through time can be measured in terms of single outcome variable (Dent, 1967). In this study, the brand switching behavior of tomato seeds farmers was analyzed using the Markov Chain model. This analysis involves developing a Transitional

Probability Matrix 'P' whose elements, $P_{ij}$ indicate the probability of brand switching from $i^{th}$ brand to $j^{th}$ brand over a time. The diagonal elements $P_{ij}$ where i = j measures probability of the brand to retain its loyalty position or the loyalty of the farmers to the particular branded seeds in the selected districts.

In this analysis, brand switching was treated as random process with the selected brands the farmers purchase assuming that the average purchase of tomato seeds in the selected districts in any year depends only on the purchase in the previous year and this dependence was same among all the years.

The algebraic representation of the above is expressed as

$$E_{jt} = \sum_{i=1}^{n} ( E_{it} ) P_{ij} + e_{jt}$$

Where

$E_{jt}$ = Purchase of the brand $i^{th}$ by farmers in the districts in year t

$E_{it-1}$ = Purchase of brand to $i^{th}$ by farmers in the districts in year t-1

$P_{ij}$ = Probability that purchase shift brand 'i' to 'j'

$e_{jt}$ = the error term which is statically independent of $S_{it-1}$

n = number of sales firm

The transitional probabilities $P_{ij}$ which can be arranged in a (c*n) matrix, hence the following properties

$$\sum_{i=1}^{n} P_{ij} = I \text{ where } 0 \leq P \leq$$

Hence, the expected purchase of branded seeds in a period t is obtained by multiplying the purchase of the particular branded seeds in the districts in previous period (t-1) with the transitional probability matrix.

The transitional probability matrix was estimated using linear programming (LP) framework by a method referred to as minimization of mean absolute deviation (MAD).

Min $OP^{*}$ + Ie

Subject to

$XP^{*} + V = S$

$GP = 1$

$P^{*} \geq 0$

Where,

P* is a vector of the probabilities $P_{ij}$

O is the vector of zeros

i is an appropriately dimensional vectors of areas

e is the vector of absolute errors

S is the sales volume by each firm in the district

X is a block diagonal matrix of lagged values of S

V is a vector of errors

G is a grouping matrix to add the row elements of P arranged in P* to unity

Prediction of quantity of branded seeds was made by using the Transitional Probability Matrix multiplying with the base year quantity.

### 3.4.4 Garrett's ranking technique

This technique was employed to delineate the problems faced by the farmers in obtaining tomato seeds from various suppliers. The respondent was asked to assign rank to the given problem based on their experience. The order of merit, thus, given by the respondents were converted into ranks by using the following formula.

Percent position = $100(R_{ij} - 0.5) / N_j$

Where,

$R_{ij}$ = Rank given for i $^{th}$ reason by j $^{th}$ individual

$N_j$ = Number of reason by the j $^{th}$ individual.

The percent position of each rank thus estimated was converted into scores by referring the table given by Garrett. Then for each problem, the score of individual respondents were added together and divided by total number of respondent for whom scores were added and the mean score was calculated. The mean score for all the problems were arranged in descending order. The factor with the highest score was considered to be the most influencing one.

### 3.4.5 Multi dimensional Scaling Technique

Multidimensional scaling technique is used to measure the preference of the farmers on a five point scale (Highly satisfied, Satisfied, Neutral, Dissatisfied, Highly dissatisfied), with respect to various attributes like company image, brand image, user preference, efficiency of brand, best packing, high margin and availability at right time. At one extreme of the scale, there is high preference to be given for factors (attribute) and at the other, non consideration and between them lie intermediate points. The scores are summed up and the mean of each attribute is calculated and preference level is compared based on it.

The points were recorded and the scores were added to obtain the mean score towards the preference level of farmers.

The score for each factor responses is given in the below table.

| **particulars** | **Highly satisfied** | **Satisfied** | **Neutral** | **dissatisfied** | **Highly dissatisfied** |
|---|---|---|---|---|---|
| Scale | 5 | 4 | 3 | 2 | 1 |

# *Description of the Study Area*

## CHAPTER IV

# DESCRIPTION OF THE STUDY AREA

Proper description of the study area is the most important to have a better understanding of the research problem and to make an appropriate interpretation of analyzed data, draw meaningful inferences etc. Hence in this chapter, relevant data about the study area such as physical details, social aspects of the area and economic information are discussed.

Coimbatore also known as Kovai is located at 432 m above the mean sea level. Coimbatore is the second largest city of Tamil Nadu and one of the fastest growing cities in India situated at the foot hills of Western Ghats.

### 4.1 Location and Area

Coimbatore district lies between $11^0$ of Northern latitude and $77^0$ of Eastern longitude and elongated from the North to the South. The district is filled with naturally diverse eco-system such as hills, plains, forests, evergreen fields, drought prone areas, river bodies, tanks etc. the district has a geographical area of 4,850 sq. km, which is divided into two revenue divisions, six taluks consisting of 295 revenue villages.

### 4.2 Climate and Rainfall

Coimbatore enjoys an even and pleasant climate throughout the year and it receives rain both in the South-West and North-East monsoon. The city experiences, normally, a minimum temperature of $19.2^0$C in winter and $22.1^0$C in summer and a maximum temperature of $32.2^0$C in winter and $35.3^0$C in summer seasons. Average annual rainfall is 61.22cm and average annual rainy days are 44.5.

### 4.3 Soil Type

The soils of Coimbatore district are classified into 26 series. Black soil covers major area followed by red soil. The black soil found largely in Irugar, Palladam, Periyanaickenpalayam and Manupatty series while red soil found in Somanur, Vellalur and Peelamedu series. These black soils are developed from basaltic rocks and forms deep crack in summer. The depth of soil varies from 15cm to 160cm. Other soil types that

are present are sandy coastal alluvium in patches of Mettupalayam and Palladam, red sandy soil in Avinashi and few parts of Coimbatore North and South, calcareous soil in Palladam, Pollachi, Avinashi and Thiruppur.

### 4.4 Land Use Pattern

The details regarding land use pattern of Coimbatore district are presented in table 4.1. The district has total geographical area of 4,850 sq. km of which net area sown accounted for (43.19 per cent) followed by current fallows (19.44 per cent) and forest (19.13 per cent).

**Table 4.1 Land Use Pattern (In hectares)**

| S. No | Particulars | Coimbatore District |
|---|---|---|
| 1 | Forest | 82,262 |
| 2 | Barren and uncultivable land | 6,584 |
| 3 | Cultivable waste | 6,159 |
| 4 | Pastures and Grazing lands | 408 |
| 5 | Tree crops and Groves | 1,303 |
| 6 | Current fallows | 84,529 |
| 7 | Other fallows | 8,303 |
| 8 | Net area sown | 1,87,931 |
| Total Geographical area | | 3,77,479 |

Source: Records of the Office of Assistant Director of Statistics, Coimbatore.

### 4.5 Source of Irrigation

The details regarding source of irrigation and area irrigated by different sources were collected and presented in Table 4.2 the district posses 77 Tanks, 42 Canals and 94,271 wells. The number of tanks was found to be high in Avinashi taluk (29.8 per cent) followed by Udumalpet (18.2 per cent).

**Table 4.2 Source of Irrigation (in numbers)**

| S. No | Name of the Taluk | Tanks | Canals | Wells |
|---|---|---|---|---|
| 1. | Avinashi | 23 (29.8) | 1 (2.4) | 11306 (2.0) |
| 2. | Coimbatore North | 7 (9.1) | - | 5610 (5.9) |
| 3. | Coimbatore South | 14 (18.2) | 8 (19.0) | 6109 (6.5) |
| 4. | Mettupalayam | 3 (3.9) | 7 (16.7) | 5547 (5.9) |
| 5. | Palladam | 9 (11.7) | 1 (2.4) | 14817 (15.7) |
| 6. | Pollachi | 5 (6.5) | 11 (26.2) | 23436 (24.9) |
| 7. | Tiruppur | 2 (2.5) | 1 (2.4) | 8481 (9.0) |
| 8. | Udumalpet | 14 (18.2) | 13 (30.9) | 18965 (20.1) |
| 9. | Valparai | - | - | - |
| 10. | Total | 77 (100.0) | 42 (100.0) | 94271 (100.0) |

Source: Soil Atlas, Soil Survey and Land Use Organization, Coimbatore.
Figures in the parentheses indicate per centage to total.

**4.6 Land Holding**

The particulars regarding distribution of size of landholdings and area covered are presented in the table 4.3. The total numbers of operational holdings in the district were 2.236 lakhs in Coimbatore district. It is obvious from the table 4.3, that marginal farmers have accounted for 39.43 per cent followed by semi-medium farmers 19.03 per cent and small farmers constitute 27.13 per cent of total farm households in the district.

**Table 4.3 Land holdings (in thousands)**

| S. No | Size of holdings (ha) | Type | Numbers |
|---|---|---|---|
| 1. | Below one | Marginal | 88.15 (39.43) |
| 2. | 1.1-2.0 | Small | 60.65 (27.13) |
| 3. | 2.1-4.0 | Semi-medium | 42.55 (19.03) |
| 4. | 4.1-10.0 | Medium | 28.04 (12.54) |
| 5. | Above 10 | Large | 4..18 (1.87) |

Source: Agricultural census, Records of Assistant Director of Statistics, Coimbatore.
(Figure in the parentheses indicate the per centage to the total)

## 4.7 Livestock

Animal Husbandry and agriculture are the twin occupations, which played a significant role in improving the rural economy. Livestock rearing provides meaningful occupation, both full time and part time and provides assured income and ensures better utilization of human resources. It provides employment to a substantial number of rural and urban population, many of them are women, who played a major role in the care and management of livestock. The livestock status of the Coimbatore district is shown in Table 4.4

**Table 4.4 Status of Livestock and Poultry**

| S. No | Name of the Animals | Numbers |
|---|---|---|
| 1. | Cattle | 4,14,957 (11.86) |
| 2. | Buffaloes | 93,895 (2.68) |
| 3. | Sheep | 1,11,469 (3.18) |
| 4. | Goat | 1,96,907 (5.63) |
| 5. | Poultry | 26,83,083 (76.65) |
| Total | | 3,500,311 (100.0) |

Source: Statistical Hand Book, Directorate of Economics and Statistics, Coimbatore.

## 4.8 Socio-economic Aspects of Coimbatore District

### 4.8.1 Demographics

As of statistical handbook 2014, 30.65 per cent were rural and 69.35 per cent urban among the total population. The literacy rate was recorded as 87.51 per cent. Literate male were around 89 per cent with a literate female of 79 per cent. The average size of the household was 4.8.

**Table 4.5 Demographic particulars**

| S. No | Particulars | Coimbatore district |
|---|---|---|
| 1. | Total population (in numbers) | 34,72,578 |
| 2. | Per centage of rural to total population (%) | 30.65 |
| 3. | Per centage of urban total population (%) | 69.35 |
| 4. | Area (in square kilometers) | 4849.89 |
| 5. | Density of population (Per sq. km ) | 716.01 |
| 6. | Average size of household (in numbers) | 4.8 |
| 7. | Literacy rate (in per centage) | 87.5 |

(Source: Statistical Handbook, 2014)

### 4.8.2 Education

There are a number of reputed educational institutions providing different types of courses. Wide range of schools from pre primary to higher secondary and such large number of educational institutions have aided the growth of literacy rate in Coimbatore city.

**Table 4.6 List of institutions**

| S. No | Particulars | Numbers |
|---|---|---|
| 1. | Universities | 7 |
| 2. | Arts and science colleges | 90 |
| 3. | Medical colleges | 2 |
| 4. | Engineering and technology colleges | 54 |
| 5. | Schools of all kinds | 2537 |
| 6. | Institutions for other professional education | 25 |

Source: G-Return of the office of Assistant Director of Statistics, Coimbatore (2014)

### 4.8.3 Distribution of workers

The total population of Coimbatore district, according to Census 2011, was 34.72 lakhs. The total workforce in the district constituted 57 per cent of the total population, while cultivators and agricultural labourers accounted for five per cent and 11 per cent of the total population, marginal worker accounted for four per cent.

**Table 4.7 Occupational Status**

| S. No | Particulars | No. of persons | Per centage to total population |
|---|---|---|---|
| 1. | Cultivators | 1,77,221 | 8.99 |
| 2. | Agricultural labourers | 3,97,614 | 20.19 |
| 3. | Household industry | 70,225 | 3.57 |
| 4. | Other workers | 1,324,252 | 67.24 |
| 5. | Marginal workers | 1,46,511 | 7.44 |
| 6. | Total workers | 1,969,332 | - |
| 7. | Non workers | 1,356,735 | - |

Source: Records of the office of Assistant Director of statistics, Coimbatore (2010-11)

### 4.8.4 Health

Coimbatore district has appreciable levels of health infrastructure facilities. Hospitals / Services providing all streams of medical practices are present in the city. In Coimbatore 1676 hospitals are providing medical care. There are 1572 Allopathic hospitals, 344 Maternity and Child welfare clinic, 117 Homeopathy, 90 Ayurvedic, 24 Unani and also Nursing Homes, Sanitary Centers and Dispensaries presented for to take care of the welfare of Coimbatore people.

## 4.9 Economic Aspects

Coimbatore district primary industry is engineering and textile industry. The district also houses the country’s largest cluster of hosiery and poultry industries.

The city industrial growth started in 1920 s and accelerated after Independence, without any Government assistance or without the entry of external industrial houses. Of late, IT companies have started opening their offshore development centers in the city.

Coimbatore also has a 160,000 square feet trade fair ground built in 1999 named COINTEC to host INTEC (Small Industries Exhibition). The Trade Fair complex, one of the countries largest was built in six months owned by CODISSIA (Coimbatore District Small Industries Association).

### 4.9.1 Major Industries and Small Scale Units in Coimbatore District

**Table 4.8 Industries in Coimbatore District**

| **A.** | **Major units** | **Numbers** |
|---|---|---|
| 1. | Textile Mills | 25 |
| 2. | Ginning Factories | 30 |
| 3. | Waste Cotton Mills | 29 |
| 4. | Rice Mills | 10 |
| 5. | Plastic Industries | 33 |
| 6. | Engineering Industries | 200 |
| 7. | Coffee and Allied Industries | 5 |
| 8. | Automobile Spare Parts | 42 |
| **B.** | **Small Scale Units** | **Numbers** |
| 9. | Button Factories | 4 |
| 10. | Flour Mills | 5 |
| 11. | Metal Rolling Mills | 9 |
| 12. | Cattle Feed Manufacturing Industries and Others | 58 |
| 13. | **Dairy Industries** | |
| 14. | Milk Chilling Plant | 4 |
| 15. | No. of Co-operative Milk Societies | 548 |
| 16. | Milk Production (lakh liters) | Flush season: 485.86<br>Lean season: 342.22 |

Source: The Assistant Director of Statistics, 2014, Coimbatore

The high industrial growth in the city led to emergence of new residential areas, increased number of double income households and growth of the nouveau riche i.e. upper middle class. Fundamental infrastructure and workforce are also adequate. Coimbatore shoppers are great tries, value seekers, as smart or as savvy as his/her counterpart elsewhere in the country. In 2014, Le Meridian an international hotel brand with a European perspective, formerly headquartered in the United Kingdom opened up its $100^{th}$ in Coimbatore. It is an urban resort the first 5 star deluxe hotel of Coimbatore with most exclusive health club in South India. Also the international fast food franchises like Dominoes, Pizza hut, Merry brown, KFC are open up their branches in Coimbatore city to meet out the desires of people of Coimbatore.

### 4.9.2 Transport facilities

Coimbatore district has a total road length of 13735.33 kms of which 44.66 per centage of road was panchayat union and panchayat roads. Eventhough the district was connected with national and state highways, the road in town panchayat and township roads contributed only 13.52 per cent of total road length. Hence, the roads in the town panchayat have to be improved for better connectivity with the nearby towns. This will help the people to have much better access towards varied retail formats (organized and unorganized) dealing with fresh and vegetables trade. In addition, it helps people to procure different kinds of fruits and vegetable. There are two airports in the city.

Coimbatore serves as an entry and exit point to neighbouring Kerala and the ever popular Hill station of Udhagamandalam (Ooty). It is the disembarking point for those who want to take Mountain train that runs from Mevtupalayam, just 35 kms from Coimbatore. There are also regular bus services from Coimbatore to Ooty.

## 4.10 Fruit and Vegetables production in Coimbatore District

In the rain shadow region of the Western Ghats, Coimbatore enjoys a very pleasant climate all the year round, aided by the fresh breeze that blows through the 25 kms long palakkad gap. The major vegetables grown in the district are onion, brinjal and tomato. The fruits that are grown in this district are banana, mango and grapes. All these crops are available for domestic consumption in the district. The area and production

under banana crops has been increasing over years. There are three cold storage godowns in Coimbatore District. This facility led to the storage of fruits and exotic vegetables making its available almost in all seasons.

### 4.11 Supply of Fruits and Vegetables

Coimbatore District has major markets for vegetables at Mettupalayam. The major source of fruits and vegetables is at Nilgiris. The main fruit market of the district is at Ukkadam. All these markets are well connected through roads and rail routes making the supply uninterrupted throughout the year.

Oddanchatram market of Dindigul district is also a major vegetables market which is in close proximity to Coimbatore district. The market in Kinathukadavu is another important vegetable market in the district acting as a main source of vegetable supply. Establishment of cold storage unit in this market has been proposed by the government. The other markets that play a major role in the supply of the fruits and vegetables are the vadavalli market, farmers' shandy, etc. One market complex with cold storage facilities was proposed in tenth five year plan for Coimbatore District. Also the district was identified as a terminal market for fruits and vegetables.

# *Results and Discussion*

# CHAPTER V

# RESULTS AND DISCUSSION

The present study was undertaken to analyze various aspects of buying behaviour of tomato seeds at farmers' level. The data collected from the sample farmers were tabulated and analyzed using appropriate statistical tools with reference to the objectives set forth earlier. The results are presented and discussed in the following sections

5.1 General characteristics of farmers

5.2 Buying behavior of farmers tomato seeds

5.3 Brand Preference of farmers towards different tomato seeds

5.4 Factors influencing of purchasing of tomato seeds

5.5 Brand switching behavior of farmers

5.6 Constraints faced by farmers in cultivation of tomato seeds from various suppliers

## 5.1 General Characteristics of Farmers

The general characteristics of sample farmers may have a significant impact on the purchase of hybrid tomato seeds. Hence the general characteristics of sample farmers such as experience in farming, experience in tomato cultivation, family type, types of soil, sources of irrigation, total cultivable land etc., were analyzed.

### 5.1.1 Farming Experience

It could be observed form the Table 5.1 that, for about 52.50 per cent of the farmers had farming experience of more than 30 years followed by 21-30 years with 31.67 per cent, 10-20 years with 11.67 per cent and less than 10 years of experience with 4.17 per cent. On the whole majority of farmers in the sample had vast experience in farming.

**Table 5.1 Farming Experience**

| District | Farming Experience (Years) | | | | Total No of Farmers |
|---|---|---|---|---|---|
| | <10 | 10 to 20 | 21 to 30 | >30 | |
| Coimbatore | 5 (4.16) | 14 (11.67) | 38 (31.67) | 63 (52.50) | 120 (100.00) |

(Figures in the parenthesis indicate percentage to total)

### 5.1.2 Farming Experience in Tomato cultivation

It could be observed from the Table 5.2 that, among the sample farmers 43.33 per cent of them had 10-15 years of farming experience in tomato cultivation, followed by 30 per cent with 16-20 years, 20.83 per cent of them had more than 21 years where as only 5.83 per cent of them had less than 10 years in the cultivation of tomato.

**Table 5.2 Farming Experience in Tomato cultivation**

| District | Farming Experience in Tomato cultivation (Years) | | | | |
|---|---|---|---|---|---|
| | <10 | 10 to 15 | 16 to 20 | >21 | Total No. of Farmers |
| Coimbatore | 7 (05.83) | 52 (43.33) | 36 (30.00) | 25 (20.84) | 120 (100.00) |

(Figures in the parenthesis indicate percentage to total)

### 5.1.3 Family Type

It could be inferred from the Table 5.3 that, 70 per cent of sample farmers belonged to nuclear family and 30 per cent of them belongs to joint family.

**Table 5.3 Family Type**

| District | Family Type | | Total No. of Farmers |
|---|---|---|---|
| | Nuclear | Joint | |
| Coimbatore | 84 (70.00) | 36 (30.00) | 120 (100) |

(Figures in the parenthesis indicate percentage to total)

### 5.1.4 Soil Type

Soil types of farm holding decide the types of crops to be grown. Most of the sample farmers 74.17 per cent had red soil for cultivation followed by black soil with 21.67 per cent and both combined accounted for about 4.17 per cent. Thus most of cereals, pulses and commercial crops were grown in these soils.

**Table 5.4 Soil Type**

| District | Soil Type | | | Total No. of Farmers |
|---|---|---|---|---|
| | Black | Red | Red/Black | |
| Coimbatore | 26 (21.66) | 89 (74.17) | 5 (4.17) | 120 (100.00) |

(Figures in the parenthesis indicate percentage to total

### 5.1.5 Source of Irrigation

Source of irrigation plays a vital role in selection of crops in the farm holdings. It could observed from the Table 5.5 that bore well accounted for 50.83 per cent of the irrigation source followed by combination of both bore well and open well with 35 per cent while open well accounted for 14.17 per cent only. Thus for major source of irrigation is bore well.

**Table 5.5 Source of Irrigation**

| District | Source of Irrigation | | | Total No. of Farmers |
|---|---|---|---|---|
| | Bore Well | Open Well | Both | |
| Coimbatore | 61 (50.83) | 17 (14.17) | 42 (35.00) | 120 (100.00) |

(Figures in the parenthesis indicate percentage to total)

### 5.1.6 Cultivable Land

It could be seen from the Table 5.6 that, 71.67 per cent of the sample farmers had 1-2 hectares of land and 13.33 per cent had less than 1 hectare and 12.50 per cent of them

had 2-3 hectares and followed by 2.50 per cent of farmers were having more than three hectares. Not much variation in size of holding was observed in the Coimbatore district. On the whole majority of farmers were small and medium farmers.

**Table 5.6 Total Cultivable Land**

| District | Total Cultivable Land (ha) | | | | Total No. of Farmers |
|---|---|---|---|---|---|
| | <1 | 1 to2 | 2 to 3 | >3 | |
| Coimbatore | 16 (13.33) | 86 (71.67) | 15 (12.50) | 3 (2.50) | 120 (100) |

(Figures in the parenthesis indicate percentage to total)

## 5.2 Buying Behaviour

### 5.2.1 Awareness among Farmers towards Hybrid Tomato seeds

It could be inferred from Table 5.7 that, most of the sample farmers with 65 per cent had awareness towards hybrid tomato seeds and 35 per cent of them were not aware of hybrid tomato seeds.

**Table 5.7 Awareness among Farmers towards Hybrid Tomato Seeds (ha)**

| District | Awareness | | Total No. of Farmers |
|---|---|---|---|
| | Aware | Not aware | |
| Coimbatore | 78 (65.00) | 42 (35.00) | 120 (100) |

(Figures in the parenthesis indicate percentage to total)

### 5.2.2 Source of information

The farmers were asked to express their source of information of hybrid tomato seeds regarding the awareness level provided by hybrid tomato seed companies. The major choices discussed with farmers were dealers, peer group and media. Their responses were measured and presented in Table 5.8.

**Table 5.8 Source of Information to aware of hybrid seeds**

| District | Source of Information | | | Total No. of Farmers |
|---|---|---|---|---|
| | Dealers | Peer group | Media | |
| Coimbatore | 63 (52.60) | 26 (21.60) | 31 (25.80) | 120 (100.00) |

(Figures in the parenthesis indicate percentage to total)

### 5.2.3 Place for purchase of tomato seeds

Place of purchase plays a vital role in buying of good seeds. It could be observed from the Table 5.9 that retail outlets accounted for 76.06 per cent of the purchase followed by the agriculture centers which contributed 23.03 per cent. Thus, the farmers prefer to buy good quality of tomato seeds in retail outlets than in agri centers due to various reasons like affordability, availability and accessibility.

**Table 5.9 Place for purchase**

| District | Place of purchase | | Total No. of Farmers |
|---|---|---|---|
| | Retail outlets | Agri centers | |
| Coimbatore | 92 (76.70) | 28 (23.30) | 120 (100) |

(Figures in the parenthesis indicate percentage to total)

### 5.2.4 Mode of purchase of tomato seeds

It could be inferred from the Table 5.10 that, majority of the sample farmers (60.08 per cent) use cash as a mode of payment and followed by 39.16 per cent of sample farmers use other modes of payments like card payment, online transaction, etc.,

**Table 5.10 Mode of purchase**

| District | Mode of purchase | | Total No. of Farmers |
|---|---|---|---|
| | Cash | Other modes of payment | |
| Coimbatore | 73<br>(60.80) | 47<br>(39.20) | 120<br>(100) |

(Figures in the parenthesis indicate percentage to total)

### 5.2.5 Source of information to influence to buy tomato seeds

From the table 5.11, it could be seen that majority of the sample farmers (71.06) were influenced by their relatives for buying the tomato seeds followed by shopkeepers (22.05) and friends (5.83). These people influence the purchase decision of farmers as they have good relationship and sharing of information among them.

**Table 5.11 Source of information to buy tomato seeds**

| District | Source of information | | | Total No. of Farmers |
|---|---|---|---|---|
| | Relatives | Shopkeepers | Friends | |
| Coimbatore | 86<br>(71.67) | 27<br>(22.50) | 7<br>(5.83) | 120<br>(100) |

(Figures in the parenthesis indicate percentage to total)

## 5.3 Farmers Preference towards Branded Hybrid Tomato seeds

The farmers were asked to express their preference towards hybrid tomato seeds provided by hybrid companies. The major attributes discussed with farmers were brand, yield, stress tolerance, easy availability, credit and price of seeds. Their response was assessed through multi dimensional scaling techniques and the results are presented in Table 5.12.

**Table 5.12 Farmers Preference towards Branded Tomato Seeds**

| Company | Farmers Preference towards Particular branded Tomato Seeds | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Brand** | **Yield** | **Stress Tolerance** | **Easy Availability** | **Credit** | **Price** | **Company Wise Mean Score** |
| Syngenta | 4.76 | 4.32 | 3.95 | 4.42 | 2.30 | 2.08 | 3.64 |
| Rasi | 4.18 | 3.95 | 3.96 | 4.26 | 2.67 | 1.98 | 3.50 |
| Mahyco | 4.70 | 3.83 | 3.85 | 4.50 | 2.21 | 2.08 | 3.53 |
| Namdhari | 3.81 | 3.39 | 4.51 | 3.59 | 1.98 | 2.44 | 3.29 |
| Indo American | 4.25 | 3.78 | 4.28 | 3.78 | 2.34 | 2.03 | 3.41 |
| **Attribute Wise Mean Score** | 4.34 | 3.85 | 4.11 | 4.11 | 2.32 | 2.12 | - |

It could be inferred from the Table 5.12 that attribute wise mean score indicated that farmers in Coimbatore district prefer branded hybrid tomato seeds with brand (4.14) followed by easy availability (4.05) and stress tolerance (3.88). The farmers expressed satisfaction with regard to yield (3.69), credit (2.32) and price (2.17) respectively. From this it could be seen that brand of a product influence the purchase decision of the buyer.

Company wise mean score indicated that farmers highly preferred hybrid tomato seeds produced by the company's like Syngenta (3.64), followed by Mahyco (3.53) Rasi (3.50) and while just satisfied with regard to Indo American (3.41) and Namdhari (3.29). They prefer sygenta seeds most because of its brand awareness and good quality of seeds.

### 5.4 Brand Switching Behavior of Farmers in Tomato seeds

Markov Chain analyses were used to analyze the structural change in any system whose progress through time can be measured in terms of single outcome variable (Dent, 1967). In this study, the brand switching behaviors of farmers who buy tomato seeds were analyzed using the Markov Chain model. This analysis involves developing a Transitional Probability Matrix 'P' whose elements, $P_{ij}$ indicate the probability of brand switching from $i^{th}$ brand to $j^{th}$ brand over a time. The diagonal elements $P_{ij}$ where i = j

measures probability of the brand to retain its loyalty position or the loyalty of the farmers to the particular branded tomato seed in Coimbatore district.

In this analysis, brand switching were treated as random process with the selected brands of farmers purchase assuming that the average purchase of tomato seed in the Coimbatore district in any year depends only on the purchase in the previous year and this dependence were same among all the years.

Markov analyses were employed to assess the brand switching behavior of farmers of the selected seed company in Coimbatore district. The five years purchase details (2010-2014) of the selected brands were used to estimate the transitional probabilities. The major agri input firms selling tomato seeds in Coimbatore district are Syngenta, Rasi, Mahyco, Namdhari and Indo American

The Transitional Probability Matrix is presented in Table 5.13 which indicates a broad indication of brand switching pattern of tomato seeds of the selected firms in the districts. The row elements in the transitional probability matrix provide the information on the extent of loss in brand preference on account of competing tomato seed brands. The column elements indicate the probability of gains in volume of purchase from other competing brands by the specific seed company and the diagonal elements indicate probability of retention of the previous brands of the respective tomato seed company.

**Table 5.13 Transitional Probability Matrix for Tomato seeds Purchase in Coimbatore district (2010-14)**

| Firms | Coimbatore District | | | | | |
|---|---|---|---|---|---|---|
| | **Syngenta** | **Rasi** | **Mahyco** | **Namdhari** | **Indo American** | **Others** |
| **Syngenta** | **0.5029** | 0.4319 | 0.0000 | 0.0000 | 0.0652 | 0.0000 |
| **Rasi** | 0.1928 | **0.2153** | 0.0638 | 0.4709 | 0.0572 | 0.0000 |
| **Mahyco** | 0.0000 | 0.2447 | **0.0000** | 0.0000 | 0.0000 | 0.7553 |
| **Namdhari** | 0.0000 | 0.0000 | 1.0000 | **0.0000** | 0.0000 | 0.0000 |
| **IndoAmerican** | 1.0000 | 0.0000 | 0.0000 | 0.0000 | **0.0000** | 0.0000 |
| **Others** | 0.0000 | 0.0000 | 0.0974 | 0.2926 | 0.0000 | **0.6100** |

It is inferred from Table 5.13 that Syngenta were the most stable brand among the major tomato seeds brands in the Coimbatore district as reflected by its probability of retention of 50.29 per cent of the previous share. This is plausible as the Syngenta and other firms promptly undertaken the major three promotional programs, advertisement campaign, retailers meeting and posters and banners. The most unstable brands among the tomato seeds are Mahyco, Namdhari and Indo American care with zero per cent retention. Next to Syngenta, other brands and Rasi retained 21.53 per cent and 61 per cent of previous share in the Coimbatore districts respectively. In terms of gains, Syngenta brand gained 100 per cent of Indo American previous market share and simultaneously lost 43 per cent of its previous share to Rasi. Similarly other firms gained 75 per cent from Mahyco and lost 29 and 10 per cent to Namdhari and Mahyco respectively.

### 5.5 Factors Influencing the Buying Behaviour of Branded Tomato seeds

Farmers were asked about the factors influencing by the purchase decision of hybrid tomato seeds in Coimbatore district and the results are presented in Table 5.14.

**Table 5.14 Factors Influencing Buying Behaviour of Branded Tomato seeds**

| Company | Factors Influencing the buying behavior of Branded Tomato seeds | | | | | |
|---|---|---|---|---|---|---|
| | Past Experience | Reference From Fellow Farmer | Insistence of the Retailer | Advertisement Campaign | Demonstrations | Number of Farmers |
| Syngenta | 9 (22.50) | 14 (35.00) | 9 (22.50) | 5 (12.50) | 3 (07.50) | 40 |
| Rasi,pio | 6 (30.00) | 6 (30.00) | 3 (15.00) | 3 (15.00) | 2 (10.00) | 20 |
| Mahyco | 6 (30.00) | 6 (30.00) | 4 (20.00) | 2 (10.00) | 2 (10.00) | 20 |
| Namdhari | 2 (10.00) | 4 (20.00) | 4 (20.00) | 7 (35.00) | 3 (15.00) | 20 |
| Indo American | 3 (15.00) | 3 (15.00) | 5 (25.00) | 6 (30.00) | 3 (15.00) | 20 |

(Figures in the parenthesis indicate percentage to number of farmers in each row)

It could be inferred from the Table 5.14 that the factors like reference from fellow farmer (35.00 per cent), past experience (22.50 per cent) and insistence of retailers (22.50 per cent). In case of Rasi seeds, the farmers are influenced by reference from fellow farmers (30.00 per cent), past experience (30.00 per cent), and insistence of the retailers (15.00 per cent). Mahyco influenced by following factors such as insistence of retailers (20.00 per cent), reference from fellow farmer (30.00 per cent) and past experience (15.00 per cent). In case of Namdhari seeds farmers are influenced by advertisement campaign (35.00 per cent), reference from fellow farmers (20.00 per cent) and insistence of the retailers (20.00 per cent). Finally, Indo American seeds farmers are influenced by advertisement campaign (30.00 per cent), insistence of the retailers (25.00 per cent) and reference from fellow farmers (15.00 per cent). It could be seen that advertisement campaign by the seed companies influences the buying behavior of tomato seeds followed by reference from fellow farmers, past experience, insistence of retailers and demonstration.

Advertisement from the seed companies influences the purchase decision of the farmers because of their attractive discounts, offers and other promotional activities. Reference from fellow farmers has also influences them because of their mutual understanding and good trust among them. Experience gained from using the tomato hybrid seeds from different companies followed by demonstrations like pilot testing, village exhibition, etc and instance of the local retailers influences the purchase decision of branded hybrid tomato seeds.

**5.6 Constraints Faced by Farmers in cultivation of Hybrid Tomato seeds**

A number of constraints were reported to be faced by farmers in cultivation of hybrid tomato. They were identified and the relative importance of the major factors as perceived by the farmers was assessed and the results are presented in Table 5.15.

**Table 5.15 Constraints Faced by Farmers in cultivation of Hybrid tomato**

| S. No | Particulars | Score | Rank |
|---|---|---|---|
| 1 | High seed cost | 84.96 | I |
| 2 | Poor germination | 75.39 | II |
| 3 | Climatic changes | 72.60 | III |
| 4 | Low yield | 57.08 | IV |
| 5 | Non availability of credit | 49.17 | V |
| 6 | Marketing problems | 36.83 | VI |

It could be observed from the Table 5.15 that the majority of the sample farmers stated the high seed cost was a major constrain faced by farmers in cultivation of hybrid tomato seeds followed by poor germination was another major constrain. Climatic changes also one of the constrains faced by the farmers in producing hybrid tomato seeds the next major reason followed by the low yield. Few farmers also reported that they were not satisfied with the non availability of credit and some marketing problems like advertisements and campaigns.

# *Summary and Conclusion*

## CHAPTR VI

# SUMMARY AND CONCLUSION

This chapter deals with the summary part of the research study and its findings in a brief manner. The study highlights the existing scenario of hybrid tomato seeds market in the study area. The objectives of research, methodology used, results obtained and the conclusions are dealt here. The overall objective is to study the buying behavior of farmers towards tomato seeds in Coimbatore district. The specific objectives of the study were:

- ✓ To analyze the buying behavior of farmers towards tomato seeds.
- ✓ To identify the factors influencing the purchase of tomato seeds.
- ✓ To study the farmers preference towards various brands and farmers switching behavior on tomato seeds.
- ✓ To examine the problems faced by the farmers in obtaining quality tomato seeds from various suppliers.

Coimbatore district were purposively selected for the study because of the predominance of tomato cultivation to know the buying behavior of farmers, brand preference of farmers towards different tomato seeds, factors influencing of purchasing of tomato seeds, brand switching behavior of farmers and constraints faced by farmers in Coimbatore district in hybrid seed marketing as well as cultivation of hybrid tomato. Based on the maximum area under tomato crop, two blocks are selected at the first stage. From each block six villages were selected at the second stage. Further from each village 10 farmers were selected at random (third stage), making the sample size 120 farmers.

The primary data required for the study were collected through personal interview method with the help of a pre-tested interview schedule. Secondary data about the study area regarding agriculture and general information were collected from the offices of the Joint Director of Agriculture, Assistant Directors of Agriculture, Agricultural development officers, and from the web sites of the government of Tamil Nadu, other information like location of the study area, soil type, rainfall pattern, cropping pattern, demography, land use pattern, irrigation sources etc, were collected from the records of Agriculture and

Statistical Departments of Coimbatore district. The primary and secondary data collected were tabulated, processed and subjected to statistical analysis to draw meaningful conclusions.

### 6.1 General Characteristics of Farmers

Overall 85 per cent farmers had experience of more than 20 years in farming and nearly 94 per cent of farmers had more than 10 years experience in tomato farming in Coimbatore district. More than one third of sample farmers land is of red soil and the rest is both black and red. Bore well and combination of bore well and open well (85 per cent) and open well (15 per cent) constitute the major share of irrigation. About 71 per cent of the sample farmers were having 1-2 hectares of land followed by 12 per cent of the farmers with 2-3 hectares and only 3 per cent of farmers having more than 3 hectares.

### 6.2 Buying Behaviour of Farmers towards Hybrid Tomato seeds

Most of the sample farmers (65 per cent) have awareness among hybrid tomato seeds in Coimbatore district and nearly 52 per cent of the farmers got information to know about hybrid tomato seeds through dealers. Retail outlets (76 per cent) constitute the major place for purchase. About 60 per cent of farmers prefer mode of purchase through cash. Relatives (71 per cent) are the major source of information to influence to buy tomato seeds.

### 6.3 Farmers Preference towards Particular brand of hybrid Tomato seeds

The multi dimensional scaling technique was used to measure the preference level of the farmers. Farmers ranked top four attributes viz., brand, easy availability, stress tolerance and yield for Syngenta, Rasi, Mahyco, Namdhari and Indo American seed firms. Brand was ranked top for Syngenta, and Mahyco. Rasi were preferred because of easy availability. When farmers are demanding the seeds, if dealers don’t have that seed in their stock, there is a chance of brand switching of farmers. Indo American and Namdhari preferred because of stress tolerance.

### 6.4 Brand Switching Behavior of Farmers

The markov chain analysis results showed that Syngenta was found to be the stable brands preferred by the farmers with retention probability of 76 per cent. Next to Syngenta, other brands and Rasi, Mahyco retained 53 per cent and 20 per cent of farmers.

The most unstable brands Namdhari and Indo American are with zero per cent retention. The major reasons for higher stability of Syngenta are the positive response of farmers to the firm's major important promotional programmes and also the higher level of performance of attributes of farmer's preference. Wide fluctuations in purchase of farmer's unstable brands are due to inconsistency in undertaking the promotional programmes coupled with less performance of farmers preference attributes. Besides every brand has its own salient feature in terms of cob filling and yield, (Syngenta), stress tolerance (Rasi), higher germination and early emergence (Mahyco) etc., and dealer's response to various promotional programmes of the seed firms. Besides the productivity differences among hybrid seeds are low hence farmers may switch over to other brands frequently.

### 6.5 Factors Influencing Farmers for Purchasing Hybrid Tomato seeds

Major factors influence the purchasing of different firm seeds are reference from fellow farmer, past experience, insistence of the retailer, advertisement campaign and demonstrations, respectively. However the order of rank of these attributes varied from different firms seeds. In these Syngenta, Rasi, Mahyco seeds farmers are highly influenced by fellow farmers and past experience. Advertisement campaign was found to be the major factor influencing purchase of Namdhari and Indo American.

### 6.6 Constraints Faced by Farmers in cultivation of Hybrid Tomato seeds

The major constraints faced by the sample farmers were high cost of seeds, poor germination, climate changes, low yield, non availability of credit and marketing problem. As hybrid tomato cultivation require a significant credit, majority of farmers could not get credit from the official agencies and they have to depend on non-institutional sources. Periodical drought and inadequate rainfall in this district force the farmers to reduce their area under cultivation.

About 67 per cent of farmers reported the wide fluctuation in tomato seed price hence unable to realize the reasonable return. Non-availability of credit, coupled with poor germination of seeds of certain firm may contribute for low yield as pronounced by 50 per cent farmers. Thus major constraints are high seed cost, poor germination, climatic challenges, low yield, non availability of credit and marketing problems respectively.

## 6.7 Suggestions

Bases on the above findings the following strategies are suggested under 4Ps

### Product

- Farmers ranked brand, easy availability, stress tolerance and yield as the major attributes for the preference. However the brands of seeds supplied by the farmers have single unique features viz., cob filling and yield, excellent root strength, higher germination and early germinance and stress tolerance. Research and development may be initiated to develop a seed having a combination of above features.

### Price

- Higher cost of seeds was expressed as one of the major constraints. The price varied from Rs 130 – 260 kg of seeds of multiple brands of the firm based on the attributes of the seed. It is suggested to develop a seed combing all desirable attributes and fix a reasonable price for the seed.

### Promotion

- The important attributes of dealers preference viz., farmers preference, company image and brand performance even though had significant impact on the performance of leading brands, it is evident that best packing and labeling, availability at right time, longer credit period and higher dealers margin are also important which may be the major part of promotion to be taken care for achieving consistent performance. Promotional activities like advertisement, retailers meeting and posters and banners are to be strengthened to promote the products. Besides the trials and demonstration and supply of free samples are to be resorted to by assessing the potential of the products in the specific region.
- Despite the reference from fellow farmer, past experience, insistence of the dealer are found to be the major factors influencing the purchasing decision, advertising campaign and demonstration is found to be the major factors which must be strengthened with sufficient budget allocation.

**Place**

- Supply of adequate seeds well ahead of the season and proper incentive mechanism to the insistence of cash and carry for the seeds supplied may be devised.

Results of brand switching behavior analysis emphasis the need for optimum combination of 4Ps.

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