

**CHAPTER 1**

*Introduction and  
Research Methodology*

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**INTRODUCTION AND RESEARCH METHODOLOGY**

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## CHAPTER – 1

# INTRODUCTION AND RESEARCH METHODOLOGY

### 1.1 Role of Agriculture in Indian Economy:

Agriculture plays an important role in Indian economic development. Indian agriculture in the pre-independence period can be correctly described as a subsistence occupation. It was only after the advent of planning (and more precisely, after the advent of green revolution in 1966) that, some farmers started adopting agriculture on commercial basis. After the initiation of planning in India, the share of agriculture has persistently declined on account of the development of secondary and tertiary sectors of the economy. From 59.2 percent in 1950-51, the share of agriculture in GDP at factor cost declined steadily to 27.4 percent in 1999-2000 (at 1993-94 prices). At 1999-2000 prices the share of agriculture in GDP at factor cost was 27.3 percent and 21.7 percent in 2005-2006.

Agriculture is the main source of livelihood. It is the largest employment providing sector. In 1951, 69.5 percent of the working population was engaged in agriculture. This percentage fell to 66.9 percent in 1999 and, to 56.7 percent in 2001. Most of the under developed countries exhibit this heavy dependence of working population on agriculture e.g. 57 percent in Bangladesh was engaged in agriculture, in 1999, this percentage was 68 in China and 48 in Pakistan. The percentage engaged in agriculture is very much less in developed countries e.g. in Japan and France 4 percent, in USA and UK 2 percent was engaged in agriculture in 1999.

Agriculture sector provides food surplus to the expanding population, because of the heavy pressure of population in labour surplus economies like India and its rapid increase the demand for food increases at fast rate. Also agriculture contributes to capital formation. It makes

available resources for investment. This contribution is more significant because without it no capital formation can take place. Unless the rate of capital formation increases to a sufficiently high degree, economic development cannot be achieved.

Before the middle of the 19<sup>th</sup> century, Indian farmers cultivated their lands mainly to satisfy the need of their own families. They were not required to produce cash crops for selling in the open market, but at the beginning of 20<sup>th</sup> century Indian farmers started producing cash crops like cotton, jute, sugarcane, oilseeds, fruits and flowers.

Fundamentally, agricultural produces are classified in various categories as food grains, oilseeds, pulses, fruits and flowers.

Moreover, a large number of industries in developing countries are agro-based and they draw materials from agriculture. Therefore, the steady supply of raw material from agriculture becomes an important prerequisite for the expansion of such industries. Further, agricultural development can contribute substantially to capital formation, which is an indispensable pre-requisite for general economic development. Also, foreign exchange resources are contributed largely by agricultural exports and are of critical importance for the import of capital goods and technical know-how for initiating and sustaining the process of industrialization. Besides these, agriculture is the main sector for creating new employment opportunities. It supplies labour to the other sectors along with wage goods. Thus, for a developing economy, development of agriculture is an essential pre-requisite for economic growth with stability

## **1.2 Importance of Maize Crop:**

Maize is one of the most important cereals of the world than any other cereal. Maize is of American origine having been domesticated about 7000 years ago. Maize provides nutrients for humans and animals and serves as a basic raw material for the production of starch, oil and protein, alcoholic beverages, food, sweeteners and more recently fuel. Maize is high yielding, easy to process, readily digested and costs less than other cereals. It is also a versatile crop, allowing it to across a range of agro-economical zones, every part of the maize. Plant has economic value; the grain leaves, stalk, tassel and cob can all be used to produce large variety of food and non-food products.

Corn grown is mainly of three types.

- 1) Grain of field corn.
- 2) Sweet corn used mainly as food.
- 3) Popcorn.

There are four types of Grain corn –

- 1) Dent corn has a pronounced depression or dent at the crown of the Kernel.
- 2) Flint Corn has the hard starch layer entirely surrounding the outer part of the kernel.
- 3) Flour or soft corn contains almost entirely soft starch, with only a very thin layer of hard starch.
- 4) Waxy corn has a wax-like endosperm.

Popcorn has a very high proportion of hard starch. When heated, moisture in the kernel expands rapidly, resulting in an explosive rupture of the epidemis. The size of the kernel increases from 15 to 35 times, after popping. Maize in India is an important cereal, and both its area and production have steadily increased during the past two decades. Maize

has varied usages from food preparation to poultry feed. In India, it is mainly used in poultry feed manufacturing.

Maize has continued to be the leading crop in terms of production and area on which it has been produced during the last decade. It is much significant crop in the American countries like rice and wheat in Asia. Maize has a wide variety of usage too. United States of America is a major corn producing country. The states in US like Iowa, Illinois, Nebraska, Minnesota, and Indiana contributes to over 80% of the total production. The production of maize was 614.3 million tones in 2003 and was still rising in the later years. Consumption of corns is also on an increasing level. USA and China are the major maize consuming countries.

As USA is the largest corn producing country. It is also the largest exporter of Maize to the rest of the world. Argentina and Brazil comes on the second and third place. On the other hand the major share of maize imports is constituted by – Japan, Korea, Taiwan, Mexico, Egypt, Malaysia, European, Union, Colombia.

#### **Climate Requirement for Maize Crop:**

Maize crop is grown in warm weather condition and it is grown in wide range of climate conditions. About 85% of the total acreage under maize is grown during monsoon because of the fact that the crop stops growing if the night temperate falls below 15.60 C or 600 F.

#### **1.3 Country wise Maize Production in the World:**

Maize is an important staple food in many countries of the world and the acreage and production of maize in the world have been increasing continuously. Though the acreages have not been so erratic, the production has been a bit volatic mainly due to the variations in the yield. The area under the maize is continuously increasing over the years.

The variations in production are due to factors like weather during crop, growth pest and disease attack technological advances and development of new hybrids and varieties.

Following table shows the Maize production in all over the world in 2005

**Table No. 1.1**  
**Production of Maize in the world (M.T.)**

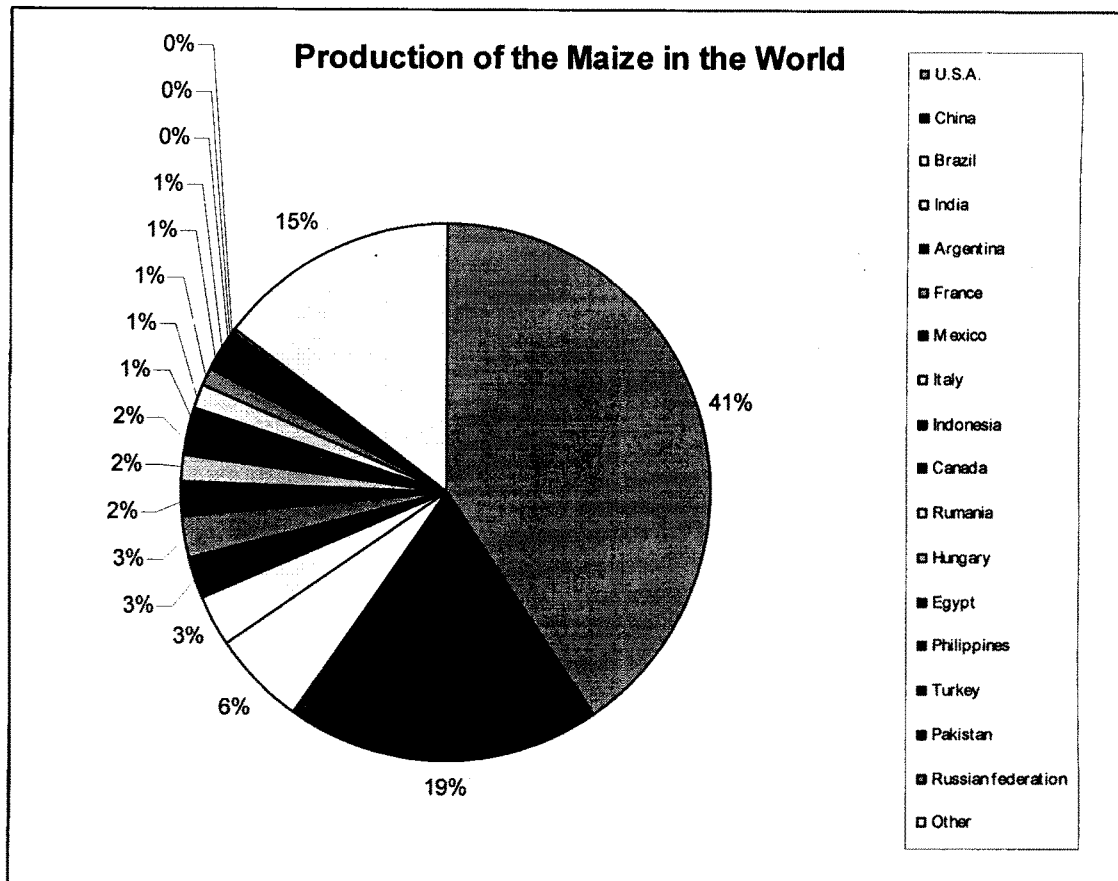
<b>Sr. No.</b>	<b>Country</b>	<b>Total Production (M.T.)</b>	<b>% share</b>
1.	U.S.A.	2,44,296	40.5
2.	China	1,16,757	19.3
3.	Brazil	35,109	5.8
4	India	17,960	3.0
5.	Argentina	15,967	2.6
6.	France	15,224	2.5
7.	Mexico	11,486	1.9
8.	Italy	10,248	1.7
9.	Indonesia	9,324	1.5
10.	Canada	8,053	1.3
11.	Rumania	7,778	1.3
12.	Hungary	6,606	1.1
13.	Egypt	6,356	1.1
14.	Philippines	4,540	0.8
15.	Turkey	2,166	0.4
16.	Pakistan	1,632	0.3
17.	Russian Federation	1,133	0.2
18.	Other	88,179	14.7
	<b>World</b>	<b>6,02,814</b>	<b>100</b>

Source – website or FAO [www.fao.org](http://www.fao.org).

If we take in to consideration the production of maize it shows that the total production of maize all over the world was 6,02,814 M.T. In which U.S.A. having largest production of maize that was 2,44,296 M.T. In terms

of percentage it 40.5% on the other hand Russian Federation having the lowest production of maize which was 1,333 M.T. In terms of percentage it is 0.2% only. While India was having Fourth position in maize production and it contributes 17,960 M.T. in total maize production, which is 3.0% of the total maize production. This is explained by following Pie Chart.

**Graph No. 1.1**



#### **1.4 State wise Maize Production in India:**

India produces around 10.14 million tones of maize annually. This contributes about 3% of the total world production. Maize in India is generally produced as “Kharip” crop. Which means that it is usually produced in the summer. Most of the corn produced in India comes from the southern Corn Belt states of Karnataka and Andhra Pradesh.

With the early onset of the southwest monsoon maize sowing was started little earlier than normal planting period. According to Union



Ministry of Agriculture as on 10<sup>th</sup> July 2006 area under maize in India was 35.22 lakh hectares and from 27.36 lakh hectares planted during the corresponding period last year. Higher acreage under the crop raise the hopes of higher production this year. Following table shows the statewise maize production in India during 2000-01 to 2006-07.

**Table No. 1.2**  
**Production of Maize in India (M.Tone)**  
**(From 2000-01 to 2006-07)**

Sr. No.	State	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
1	Andhra Pradesh	1581.0	1457.0	1486.0	2477.0	2064.0	3038.0	2086.0
2	Arunachal Pradesh	52.3	52.5	56.4	54.5	55.0	57.9	-
3	Assam	-	-	-	-	-	13.7	14.0
4	Bihar	1497.2	1488.3	1349.8	1473.5	1465.7	1361.1	1193.0
5	Chhattisgarh	-	-	-	-	-	106.2	104.0
6	Gujarat	-	-	-	-	-	560.0	462.0
7	Goa	-	-	-	-	-	0.5	-
8	Haryana	-	-	-	-	-	34.0	44.0
9	Himachal Pradesh	-	-	-	-	-	543.1	488.0
10	Jammu & Kashmir	-	-	-	-	-	453.1	512.0
11	Jharkhand	113.9	209.2	241.0	300.0	286.0	238.5	397.0
12	Karnataka	2135.7	1451.7	1343.0	1209.9	2512.0	2728.0	2386.0
13	Madhya Pradesh	-	-	-	-	-	1249.0	1048.0
14	Manipur	-	-	-	-	-	7.9	-
15	Meghalaya	-	-	-	-	-	24.1	-
16	Mizoram	16.4	16.7	14.9	20.3	15.7	22.7	-
17	Maharashtra	303.0	587.0	744.0	752.0	753.0	996.0	1042.0
18	Nagaland	-	-	-	-	-	92.9	-
19	Orissa	68.9	46.7	42.4	78.8	106.0	101.9	100.0
20	Punjab	-	-	-	-	-	40.30	46.40
21	Rajasthan	1015.8	1480.9	871.1	2070.5	1262.6	1102.1	1098.0
22	Sikkim	-	-	-	-	-	56.5	-
23	Tamilnadu	139.0	118.0	191.6	251.0	294.7	241.2	417.0
24	Tripura	-	-	-	-	-	2.2	-
25	Uttar Pradesh	1473.0	1516.0	836.4	1318.5	1494.0	1054.3	1264.0
26	Uttaranchal	-	-	-	-	-	44.0	40.0
27	West Bengal	88.3	86.4	55.3	126.5	139.6	128.4	168.0
28	Andman & Nikobar	-	-	-	-	-	0.1	-
29	Delhi	-	-	-	-	-	0.1	-
30	Other	-	-	-	-	-	N.A.	235.0
	India	12043.2	13160.2	11151.7	14984.3	14172.0	14709.7	13562.0

Source: Ministry of Agriculture, Govt. of India, Internet Information

Table No. 1.2 shows the statewise maize production in India during the period of 2000-01 to 2006-07. There are twenty-nine states in India, which had taken production of maize. In 2000-01 the total production of maize in Andhra Pradesh was 1581.0 M.Tone. In the year 2005-06 production of maize was increased by 3038. 0 M.Tone, means in this year maize production increased by 1457.0 M.Tone. In the year 2006-07 production of maize in Andhra Pradesh was 2086.0 M. Tone. In the year 2000-01 the total production of Bihar was 1497.2 M. Ton. In the year 2003-04 production of maize was 1473.5 M. Tone and in the year 2006-07 production was decreased i.e.1193.0 M.Tone. In the year 2000-01 the production of maize in Karnataka was 2135.7 M.Tone. In the year 2004-05 production increased i.e. 2512.0 M. Tone and in the year 2006-07, the total production of maize was 2386.0 M. Tone. In the Maharashtra the proportion of maize production was low. In the year 2001-02 production was 303.0 M.Tone. In the year 2001-02 to 2006-07, the trend of production was increased continuously in Maharashtra i.e. in the year 2005-06 production was 996.0 M. Tone and next year production was 1042.0 M. Tone. In the year 2000-01 production of maize was 1015.8 M. Tone in Rajasthan and in the year 2003-04 production was increased by 1054.7 M. Tone means this year production was 2070.5 tone. But after 2003-04 production trend was decreased continuously. In the year 2006-07 the total production was 1098.0 M.Tone like in year 2000-01. The production of maize was 1473.0 M.Tone in Uttar Pradesh and in the year 2006-07 total production was 1264.0 M. Tone.

Table shows that the proportion of maize production in Arunachal Pradesh, Zharkhand, Mizoram, Orissa, Tamilnadu, and West Bengal etc. was very low. As well as there was always fluctuation in total production in Andhra Pradesh, Bihar, Karnataka, Maharashtra, Rajasthan and Uttar Pradesh. In India, in the year 2006-07 the maximum production was in

Karnataka and minimum production was in Assam i.e. in Karnataka the total production was 2386.0 M. Tone and in Assam the total production was 14.0 M. Tones; Thus table show that in India, few states are taking the production of Maize.

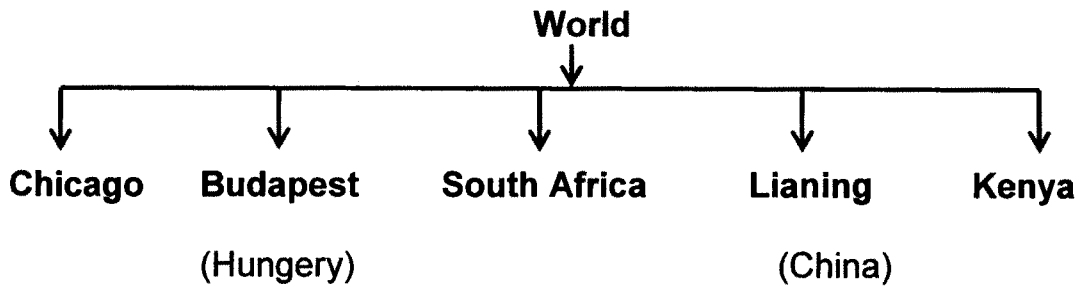
### **1.5 Maize Market in India:**

Maize as a crop needs a vast variety of environment for production. India as a big and agriculture oriented country provides all the basic requirements for it. We have already seen that India is 4<sup>th</sup> largest producer of maize in the world contributing 3% of the global production. In India, maize is grown in all the season. Since maize is rain dependent if mainly grown during 'Kharip' season. India consumes almost all the maize that it produces. About 50% of total Indian produce is consumed by the starch industry, and India maize export fluctuates around 5 lakh tones annually. Mostly, the southwestern countries import maize from India.

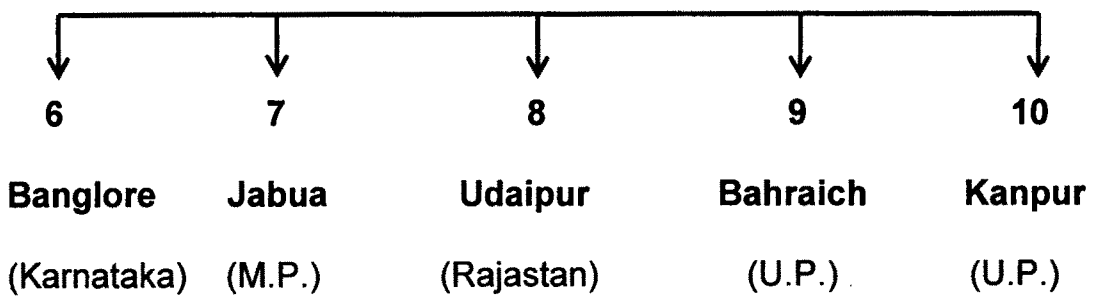
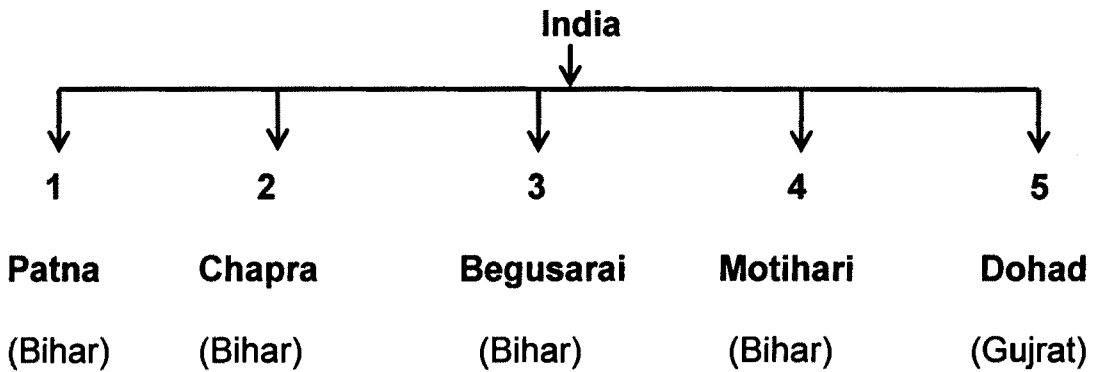
The following factors are responsible for influencing the market.

1. Whether of the area is which it is produced and natural calamities like floods, droughts, etc.
2. Changes in the Government policies relating to the minimum support prices.
3. Cheaper prices of the substitute products.
4. Changes in the seasons.
5. Technological changes and improvements.

### Major Trading Centers of Maize



In India, Maize is traded at –



Maize Area, production and yield in India have seen a phenomenal growth over the last five decades and India has emerged from being a net importer to levels of self sufficiency. In the last five decades, India's maize production has increased from less than 3 million tons to 15 million tons today. This is because of growth in technology coupled with rising demand for the produce. Diversified uses of maize also prompted higher production in the country. Presently, in India, maize is mainly used for preparation of poultry feed and extraction of starch. Out of total arrivals to the mandis nearly 75% of the produce is purchased by the poultry feed manufactures and 20% is purchased by the starch extractors.

## **1.6 Review of Literature:**

In the following paragraphs an attempt is made to give a brief account of the studies made so far on various aspects of maize.

John J. Finan in his work 'Maize in the Great Herbals (1950) examines is a plant of such overwhelming importance to the people who have grown it that its history is of special significance. He also deals there are so many kinds of maize, however and it has been grown by 50 many people and for so long that its history complex and difficult to piece together. The literature regarding it is scattered and fragmentary and mostly without illustration. Beginning about a half century after the discovery of America and extending through the 17<sup>th</sup> century, the plant is discussed in detail in the great European herbals.

The book titled "Effect of The Corn Grass Gene on the development of the Maize Inflorescence" (1954) by Watton Galinat gives that the gene has floral development of maize. An understanding of morphological peculiarities of corn grass inflorescences (particularly those of the original

grass like extreme) is useful in interpreting the structural nature of the inflorescences of normal of typical maize.

George F. Carter and Edgar Anderson in the article "A Preliminary Survey of Maize in the South Western United States" (1945) gives a picture of maize as uniquely, variable differences from plant to plant from variety to variety and from region to region are even greater than in other cultivated plants. The Authors have discussed the means of cataloguing this variation most effectively. They have recorded it in detail, character by character, and have described a few of the races and sub-races which are already apparent in our collections. This paper is an attempt to classify the maize of the South Western United States, particularly the varieties grown by the Indians while it is more comprehensive than any previous attempt, we consider this a preliminary report since it raises many more questions that it answers.

"Studies on the structure of The Maize Plant" (1948) by Hugh C. Culter & Marian C, Culter deals that there is a basic pattern for most grasses and this pattern is repeated through out each plant, in reproductive as well as vegetative parts. The main axis of the maize plant bears leaves and buds on opposite sides of successive nodes. This pattern extends to the branches, the tassel and ear the parts and even their arrangements may be modified, but the basic arrangement is still that of the stem of any grass. This can be easily in the lateral branches of the tassel and in ears with only four rows of grain.

W.C. Galinat in his Article "The origin of Maize" (1971) gives an elaborate study of maize crop plants in terms of its agronomy, cytology and genetics, as well as its evolutionary history under domestication. Despite this conflicting views still exist as to its origin. This view polarizes around two hypotheses. The oldest and still persistent one is that primitive maize was selected by man either directly from its closest living relative, teosinte or from ancestor common to both (Weatherwax and Randolph). The

second and more frequently cited view, that cultivated maize arose from an extinct form of wild pod maize, postulate teosinte as a secondary product of maize trip scum hybridization, having nothing directly to do with the origin of maize.

John Deobley and Lanren Hubbard in the paper on “The Evolution of apical dominance in Maize” (1997) gives the domestication of crop plants has often involved an increase in apical dominance (the concentration of resources in the main stem of the plant and a corresponding suppression of axillary branches). The authors have claimed that a striking example of this phenomenon is seen in maize, which exhibits a profound increase in apical dominance compared with its probable wild ancestor, teosinte. Previous research has identified the teosinte branched gene as a major contributor to this evolutionary change in maize. We have cloned by transposon tagging and show here that it encodes a protein with homology to the cycloidea gene of snapdragon.

Kumar R, and Singh N.P. write in their book “Maize production in India: Golden grain in transition” (2003), it is an elaborate study of technological change and performance in irrigated maize based farming systems in India. The project aimed to examine the adoption of new technologies across the maize growing regions of India, the institutional arrangement for promotion of maize, spatial variations in maize based production systems. The greater part of the book is devoted to district level analysis of maize production and yield in different Indian states. Reason why maize yield in India is still low in international terms are examined, and policy implications are discussed.

The Article “Genetic Changes in Farmer – Recycled Maize seed: A Review of the evidence” by Michael L. Morris, Jean Rispolas and David Beck (2004) gives a succinct report what is known about farm level maize seed management practices and reviews theoretical and empirical

evidence regarding the relationship between farmers seed recycling practices and genetic composition (and organic performance) of maize cultivators.

The focus is on farmers in developing countries, many of whom do not replace their seed annually with newly purchased commercial seed but really instead on recycled seed saved from their own harvest or obtained from other farmers.

The book, *Maize among the Hilly people Assam* edited by C.R. Stoner & Edger Anderson examines maize is coicely grown in the orient and is used for a variety of purposes, authorities once quite commonly believed that it originated there, but he demonstration that it was almost universal in the New World in Pre. Columbian times made an American origin seem most likely. From a meticulous investigation of the historical evidence Laufer (1907) concluded that maize did not reach the orient until Post-Columbian times, produced convincing evidence that maize and other new world crops had been carried to the Philippines at an early date by the Spaniards and had been widely spread on the continent of Asia.

The subject seemed closed and the lack of any evidence for pre-Columbian maize in orient became on the most powerful arguments against any effective trans-pacific communication in pre Columbian times.

Enric Mele and Joaquina Messenguer in their Article "Genetically Modified (GM) Maize" Pollen movement and crop co-existence (2004) gives an elaborate study Genetically Modified (GM) Maize was planted on a total of 15.5 million hectors in 2003. In the EU, GM maize is the only GM crop currently grown commercially. In Spain, the main location where the crop has been planted since 1998, it accounted for about 7% of the total maize area in 2003. Estimates for 2004 planting area are 60,000 hectors. The main subject of current debate about the use of GM crop such as



maize relates to economic and market implications of GM and Non-GM crops being grown in close proximity.

They examines these issues, with specific reference to maize and the extent to which adventitious presence of GM maize may be detected in non-GM maize crops through maize pollen movement and gene flow.

### **1.7 Statement of the Problem:**

India is the fourth largest producer of maize in the world contributing 3% of the global production. There is 20% production of maize out of the total production of cereals in the world. Maize is very comfortable and simple for processing than other crops. That is why we want to study about the maize crop.

Maize is one of the important crop which give high yield and more profit to farmers than other crops like Wheat, Rice, Jowar, Pulses, Sugarcane, Oilseeds etc. Because of the importance of maize crop, the farmers are cultivating maize crop in Shirala Taluka. Before some years there were many problems of farmers to cultivate maize farming i.e. lack of water, lack of Hybrid seeds, lack of information about maize, lack of capital, etc.

But for all these problems, the processing of maize crop a factory was established in Shirala Taluka, which is known as Yashwant Co-operative Glucose Factory Ltd. Siddheshwarnagar. There are major benefits of Glucose factory to farmers, which are Maize development campaign, Subsidy on seeds and fertilizers, Water-supply plan, Generation of bio-gas, Facility of free thrushing machine, Supply of Hybrid seeds and Edible oil etc. as well as this factory is providing the employment especially for male and it is helping to create employment in lower class. That is why; the researcher has selected the topic for

research i.e. "An Economic Study of Yashwant Co-operative Glucose Factory, Ltd. Siddheshwarnagar."

## **1.8 Research Methodology:**

The research methodology of the study is explained as under –

### **1.8.1 Area of the Study:**

The area selected for the study was the Yashwant Co-operative Glucose Factory Ltd. Siddheshwarnagar, which is limited to Shirala Taluka in Sangli District of Maharashtra.

### **1.8.2 Period of the Study:**

The period of the study taken in to considered was from 2002-03 to 2006-07 i.e. five years.

### **1.8.3 Data Collection:**

The selected area was totally depend on secondary data. The secondary data was collected from the published annual reports of the glucose factory, websites. The other information was collected from the concerned authorities of the factory.

### **1.8.4 Use of Quantities Techniques:**

Keeping in view the objective of the study; some appropriate statistical techniques such as growth rate, mean, mode, median, etc. were used.

## **1.9 Objectives of the Study:**

The main objectives of the study were as under –

- 1) To study the significance of maize production in India.
- 2) To study the maize production in Shirala Taluka.
- 3) To analyse the working of Yashwant Co-operative Glucose Factory.
- 4) To find out the role of Yashwant Co-operative Glucose Factory in the development of the farmers in Shirala Taluka.

### **1.10 Limitations of the Study:**

The study has the following limitations:

- 1) The study was limited only to one factory from amongst the co-operative Glucose factory in the Shirala Taluka, therefore the conclusions are based only on the single factory.
- 2) The period of the study was limited to five years (2002 - 03 to 2006 - 07).
- 3) The conclusions will be drawn from the one factory, and they may not be applicable to other factories in the areas.

### **1.11 Chapter Scheme:**

The chapter scheme of the study is as under.

- 1) INTRODUCTION AND REASERCH METHODOLOGY.
- 2) FUNCTIONS AND WORKING OF YASHWANT CO-OPERATIVE GLUCOSE FACTORY.
- 3) FINANCIAL PERFORMANCE OF YASHWANT CO-OPERATIVE GLUCOSE FACTORY.
- 4) PROBLEMS OF YASHWANT CO-OPERATIVE GLUCOSE FACTORY.
- 5) CONCLUSIONS AND SUGGESTIONS.

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