Impact of Small - Scale Agro Based Industries in Rural Areas: A case of Karjan, Vadodara district

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by

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CERTIFICATE

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The contents presented in this Thesis represent my original work and it has not been submitted for the award of any other Degree or Diploma anywhere else.

Kuldeepsinh Vikramsinh Rana

This Thesis is submitted in partial fulfilment of the requirements for the

Degree of Master of Urban and Regional Planning

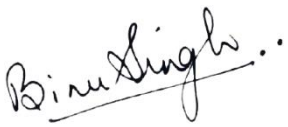
at the Department of Architecture

Faculty of Technology and Engineering

The Maharaja Sayajirao University, Vadodara, Gujarat, India

The present work has been carried out under our supervision and

guidance and it meets the standard for awarding the above stated degree.



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Abstract

The agro based industries assume great significance in the Indian economy, where agriculture is backbone of the Indian economy through providing employment opportunities to more than 60% population & lively hood to majority of the people according to case study of ghodawat group agro based industry. In India more than 70% of the people are living in rural area. Hence there is a need of rural development for accrediting overall economic development.

This research is to understand the agro based small-scale industries & its linkages with rural development. Rural development can only possible through establishment of agro based industries in rural area which help for the development of agriculture & rural economy. Hence it is necessary to focus on contribution of Agro based industries in rural economy.

Industrial development not only depends on innovation and capital outflow in a country, but also it needs availability of raw materials and adequate physical infrastructural facilities. Agriculture is one of the major raw material providing sector for major industries like paper, sugar, textile, fertilizers, chemical, edible oil, etc., Agro-based industries can play an important role to a large extent in solving the problem of poverty, unemployment and inequality in India and can significantly contribute to the overall development of the economy by efficiently utilizing the local raw materials which consequently may result in increase of gainful employment opportunities to poor people mainly landless, marginal and small farmers.

“Agriculture is locomotive of our economy and a prosperous rural economy based on agriculture will ultimately make the nation prosperous”

Sardar Vallabhbhai Patel

Dedication

"I dedicate this project to our Parents, Teacher and to each group member".

Because;

- Whatever we are it's because of my parents.
- My teacher makes us able to face different challenges and achieve those challenges.
- Last but not least group members, who support me a lot and contribute their full effort to make this work possible.

Acknowledgments

In successfully completing this project, many people have helped me. I would like to thank all those who are related to this project.

It is a genuine pleasure to express my deep sense of thanks and gratitude to my guides and mentors, Dr. Binu Singh and Mr. Pradeep Rajput. They have been an ideal teacher, mentor, and thesis supervisor, offering advice and encouragement with a perfect blend of insight and humour. Timely advice, meticulous scrutiny, scholarly advice and planner approach have helped me to a very great extent to accomplish this task. I would like to show immense gratitude to our HOD Prof. S. Bhawana Vasudeva & other faculty members who were always supportive with dynamic academic and professional approach.

I would like to thank my reviewers for supporting me giving their valuable inputs at every stage of my dissertation.

I would like to thank M.S.U., Vadodara for giving me an opportunity to work on this directed research project. Along with, I would also like to thank the Hansa Mehta Library for providing information for carrying out the dissertation.

I owe a deep sense of gratitude & thankful to Mr. Virat Darji (Jilla Panchayat, Vadodara) & J B Patel (Vistran Adhikari, Talka Panchayat, Karjan) for sharing all kind of required information and data for my work. It would not have been possible without support from various Govt. Agencies that provided the required secondary data regarding various facts and fundamentals. We would also like to thank each and every people who participated in Primary Survey.

Most importantly, I am grateful for my family's unconditional, unequivocal, and loving support.

Last but not the least I thank the Group members and friends who made it possible.

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Abbreviations

APMC	Agricultural Produce Marketing Committee
GCA	Gross Cropped Area
MSMEs	Micro, Small & Medium Enterprises
GCF	Gross Fixed Capital Formation
GDP	Gross Domestic Product
GSDP	Gross State Domestic Product
NSDP	Net State Domestic Product
WTO	World Trade Organization
PPAs	Participatory Poverty Assessments
SSI	Small Scale Industries
GoG	Government of Gujarat
Ha/ha	Hectare
R&D	Research & Development
GSFC	Gujarat State Fertilizers & Chemicals Ltd.
AERC	Agro-Economic Research Centre
MAFW	Ministry of Agriculture & Farmers Welfare
DARE	Department of Agriculture Research & Education
GAIC	Gujarat Agro Industries Corporation
GSSCL	Gujarat State Seeds Corporation Ltd.
MCG	Main Crop Group
CSC	Common Service Centre
MOFPI	Ministry of Food Processing Industry
FTC	Farmer Training Centre
AAU	Anand Agriculture University
IJSSR	International Journal of Social & Scientific Research, India

Chapter 1: Introduction

1.1: Development

Change law of nature. Society, pouty, economy, geography and culture all undergo a ceaseless press of change. All structural categories like caste, family and mark and cultural categories like customs, traditions, values, ideologies, art and artefacts come under this process. Development, progress and evolution are different concepts to denote different modes of change. Some changes are self-propelled and perfunctory and others intended, planned and pursued. Changes in the structure and culture of society are largely of evolutionary nature.

However, the traditional normative patterns are not completely displaced. Factors of change in society are both endogenous as well as exogenous. The changes other than the planned and intended ones are essentially value-free and their direction and nature are self-determined. Changes in the structural domains like caste, family, polity and bureaucracy and the changes in cultural domains like style of life, values and attitudes towards rituals and religious practices, nation and nationality, traditions and customs are examples of socio-cultural changes in society. Development on other hand, is a planned change in the material conditions & related social-cultural milieu.

1.1.2: How to define Development?

Defining development is not an easy task. It is so primary because of the fact that the concept of development impregnated with social, cultural, political and economic dimensions intertwined with one another and also because of many paradigms changes this process has undergone so far. Its composite and multidimensional nature has made it really difficult for the scholars to formulate one all-encompassing definition of development. It can be explained only in terms of material and non-material changes viewed as betterment through history and in the contexts of different ramifications of such changes.

1.1.3: Modernization & Development

Modernization & Development, due to historical & contextual similarities, are so close to each other that those are often used interchangeably. Modernization refers to change in attitude and orientation of people towards such a pattern of life, the outcome of working on those lines is called development.

The early writings on modernization had two basic theoretical orientations: one, economic and technological development brings about change in culture and social structure as it happened in the West; and two, there has been the effect of innovation, technology and development of the West on the non-industrialized societies.

1.2: Participatory Development

What is Participatory Development?

“It`s a process through which stakeholders can influence and share control over development initiatives, and over the decisions and resources that affect themselves” (ADB, 1996).

It is the process to engage local populations in development projects. It aims at achieving a localized capital accumulation process based on the skills development and local resources generation. It gives strength to civil society and the economy by empowering groups, communities and organizations. It enhances the efficiency, effectiveness and sustainability of development programmes.

Participation at the micro level of projects such as project planning and design decisions, project implementation, monitoring and evaluation and at macro level, for instance, participatory poverty assessments (PPAs) are designed to influence policy particularly in relation to development and poverty reduction strategies (Norton et al., 2001).

Participatory Rural Appraisal used to enable people so that they can express and analyse the realities of their lives and conditions, to plan themselves, what actions to take, and to monitor and evaluate the results.

Key Elements of Participatory Development:

Process: Growth of consciousness and group identity. The realization of the creative potential of the poor.

Empowerment: The process of reconstructing a group identity, raising consciousness, acquiring new skills and upgrading their knowledge base.

Participation: Power to break the vicious circle of poverty.

1.2.1: Participatory Approaches to Rural Poverty Alleviation

Research and extension, innovation, knowledge:

The research and development consist of process to identify needs and opportunities, to create new information and innovation, consolidate them with existing practices, and then translate them into learning objectives and activities for enhanced performance.

Natural resource management:

Its development is a main area of application of participatory approaches to help poor people in managing the natural resources are available to them.

1.3: Agriculture & It`s Technological Development

Agriculture is the science or practice of farming. Agriculture also called farming or husbandry, is the cultivation of animals, plants, fungi and other life forms of food, fibre, biofuel and other products used to sustain and enhance human life. Farming is an important and key factor for the economy of developing countries. Agricultural development is an integral part of overall economic development. Agriculture has undergone significant developments since the time of the earliest cultivation. Involvement of revelation of plants and animals in agriculture was developed around 10,000 B.C.E.

Technology is the scientific knowledge used in practical ways. It is the making, modifying, usage and knowledge of tools, machines, techniques and methods of organisation, in order to solve the problems, improve existing solutions, archive a goal, or perform a specific function. The use of technology is increasing day by day. We all depends upon technology and we use various technology to accomplish specific tasks in our life.

So, it is better to stay up-to date with new emerging technologies. Technology has played an important role in development of the agricultural. It`s innovations have modernized the agricultural fields. Various machineries & tools have helped the farmers of our country to play a vital role in developing the economy.

Major technologies used in agriculture:

- Pre & post harvesting technology
- Mechanization technology
- Bio technology
- Energy saving technology
- Environmental protection technology
- Information & communication technology
- GIS & RS technology
- Internet technology, etc.

Commonly used agricultural machineries:

Tractor: - The most commonly used vehicles on farms. The farm tractor is used for pulling or pushing agricultural machinery or trailers, for plowing, tilling, disking, harrowing, planting, and similar tasks. Specifically designed to deliver a high tractive effort (or torque) at slow speeds, for the purposes of hauling a trailer or machinery used in agriculture.

Cultivator: - A cultivators any of several types of farm implement used for secondary village. One sense of the name refers to frames with teeth (also called shanks) that pierce the soil as they are dragged through it linearly. Another sense refers to machines that use rotary motion of disks or teeth to accomplish a similar result. Cultivators were originally drawn by draft animals (such as horses, mules, or oxen) or were pushed or drawn by people. Cultivators stir and pulverize the soil, either before planting to aerate the soil or after the crop has begun growing to kill weeds.

Drip irrigation: - It's also known as trickle irrigation or micro irrigation or localized irrigation, is an irrigation method that saves water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing, and emitters. It is done through narrow tubes that deliver water directly to the base of the plant.

Milking machine: - Milking machines are used to harvest milk from cows when manual milking becomes inefficient or labour intensive. Milking machines work in a way that is different from hand milking or calf suckling. Continuous vacuum is applied inside the soft liner to massage milk from the teat by creating a pressure difference across the teat canal. Vacuum also helps keep the machine attached to the cow.

Use of Machines on Farms: - In agriculture, time & production are so important; you have to plant in time, harvest in time & deliver to stores in time. Now a farmer can cultivate on more than 2 acres of land with less labour. The use of planters & harvesters makes the process so easy.

Modern Transportation: - It helps in making products available on markets in time from the farm. With modern transportation, consumers can have fresh crops available very easily. It also helps farmers to easily transport fertilizers & other farm products to their farm. It also speeds the supply of agro-products to market.

Digital agriculture: - Digital agriculture is the use of new and advanced technologies, integrated into one system. It helps the agriculture value chain to improve food production. digital agriculture holds profound impact on the crop yield enhancements, by empowering the formers with required scientific knowledge to implement good agricultural practices as shown below in figure no. 1-2.

Figure 1-1: Digital Technologies in Agriculture

Source: Google Image.

The user interface system used in digital agriculture provides opportunity to the formers to share their ideas. This also helps them to get knowledge about different kind of cultivation procedures.

1.4: Introduction of Agricultural Industries

Industry dealing with the supply, processing, and distribution of farm products. It mainly depends on agricultural products as raw materials Ex: cotton textile industries use cotton as raw material and then process them to make use full. Agriculture Industry plays a vital role in India's economy.

Industrial development not only depends on innovation and capital outflow in a country, but also it needs availability of raw materials and adequate physical infrastructural facilities. Agriculture is one of the major raw material providing sector for major industries like paper, sugar, textile, fertilizers, chemical, edible oil, etc., Agro-based industries can play an important role to a large extent in solving the problem of poverty, unemployment and inequality in India.

Types of Agricultural Industries:

Based on the type of industries has with input and output of agriculture, it can be of two types:

1. Processing industries (Agro-based industry)
2. Input supply industries (Agro industries)

According to RBI the agencies supporting agriculture by way of designing and manufacturing of inputs generally termed as agro-industrials are somewhat different from those supported by agricultural products which are known as agro-based industries.

1.4.1: Agricultural Industries

Agricultural industry can help stabilize and make agriculture more beneficial. Create employment opportunities both at the production and marketing stages. Helps in processing agricultural products such as field crops, tree crops, livestock and fisheries and converting them to edible and other usable forms.

Role and Importance:

- Strengthening industrial and agricultural linkages
- Increase the value of crops of poor farmers and thus yield higher returns
- Expand marketing opportunities
- Improve livelihoods of people
- Extend shelf-life of commodities
- Improve palatability of commodities
- Enhance food security
- Overcome seasonality and perishability constraints

1.4.2 Agro Industries Vs Agro-Based industry

- According to RBI the agencies supporting agriculture by way of designing and manufacturing of inputs generally termed as agro-industrials are some what different from those supported by agricultural products which are known as agro-based industries.

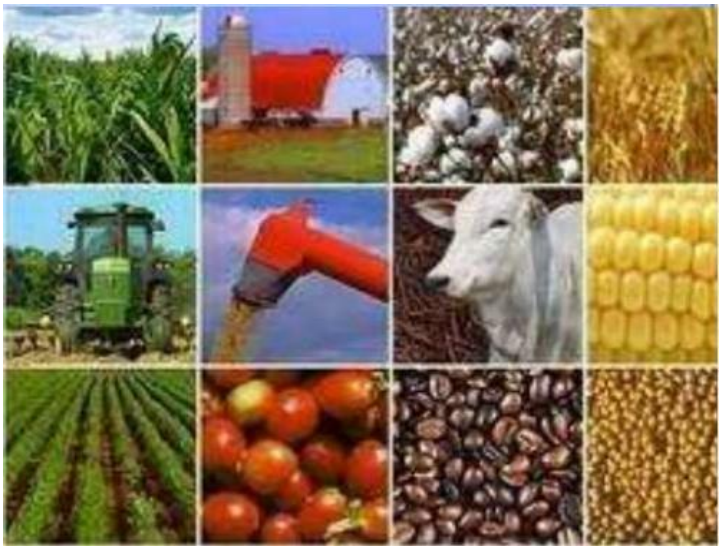


Figure 1-2: Agro Production

- Figure 1-2, shows different agro production & their process in farm unit.

Agro Industries	Agro based Industries
➢ Agricultural implements ➢ Seed industries, ➢ Pumpsets ➢ Fertilizer and ➢ Pesticide units	➢ Food products ➢ Beverages ➢ Tobacco products ➢ Textiles ➢ Leather Products ➢ Paper & Paper Products

Table 1-1: Different Industry Product

1.4.3: Agro based Industries

Agro-based industries into food processing, tobacco, textiles and textile products, leather and leather products, and paper and paper products industries, etc.

1. Agro-produce processing units

They merely process the raw material so that it can be preserved and transported at cheaper cost. No new product is manufactured. Ex: Rice mills, Dal mills etc,

2. Agro-produce manufacturing units

Manufacture entirely new products. Finishing goods will entirely different from its original raw material. Ex: sugar factories, Bakery, Solvent extraction units, Textile mills etc,

3. Agro-inputs manufacturing units

Industrial units which produce goods either for mechanization of agriculture or for increasing productivity come under this type Ex: Agriculture implements, Seed industries, Pumb set, Fertilizer and pesticide units etc,

4. Agro service centre

Agro service centre are workshops and service centre which are engaged in repairing and servicing of pump sets, diesel engines, tractors and all type of farm equipment.

Below figure 1-3 shows different agricultural products which can be used as raw material in agro based industries, as sugarcane, cotton, thread, storage units, etc.

Figure 1-3: Agricultural raw materials

Source: Annual survey industries (2013-14).

Agro based Industry which dealing with the supply, processing, and distribution of farm products. It mainly depends on agricultural products as raw materials Ex: cotton textile industries use cotton as raw material and then process them to make use full. As par the Agro-Economic Research Centre, Gujarat is the one of the fastest growing states of India. The state has adopted a novel pattern of progress with the strategic development of the key sectors like energy, industry and agriculture. According to the annual survey industries (2013-14) agro based Industry plays a vital role in India's economy. India is 2nd larger producer of agriculture product.

1.5: Need for Research

Need of Agro Based Industries:

- For upliftment of rural economy.
- To solve the problem of unemployment.
- To generate income and increase standard of living.
- To encourage balanced growth between agriculture and industry.
- To solve the problem of exploitation of farming community.
- To avoid wastage of agricultural products.
- To prevent migration of rural people.

Role of Agro Based Industries:

- Agro industry can help stabilize and make agriculture more beneficial.
- Create employment opportunities both at the production and marketing stages.
- Increase the value of crops of poor farmers and thus yield higher returns.
- Expand marketing opportunities.
- Improve livelihoods of people.
- Extend shelf-life of commodities.

Research Idea:

- Agro-based industries are those industries which depend on agricultural products as raw materials. Ex: cotton textile industries use cotton as raw material and then process them to make dresses & in between the thread industries can be small scale industries which can cater the need of rural people as specially women.
- Agro-based SSI are comparatively easy to establish & increasing farmers farm income with less investment (around Rs.10 lakh but not exceeding Rs.2 Crore) by effective and efficient utilization of local agricultural raw materials. Mechanization in agro-based industries would create employment avenues for the farmers in general and women in particular.

Figure 1-4: Women Empowerment

Source: - Google image

Purpose of the study:

- This research is to understand the agro based SSI processing units & its linkages with rural development in Karjan. Rural development can be possible through establishment of agro based industries in rural area which help for the development of agriculture & rural economy. Hence it is necessary to focus on contribution of Agro based industries in rural economy.

Source: - Google image

Figure 1-5: Agro food Processing

1.6: Research Problems

1.6.1: Problem Identification

- Identifying gap between agro based SSI & agricultural development.

1.6.2: Problem Statement

- Impact of agro based small-scale industries in rural areas of Karjan Taluka.

1.6.3: Research Question

- What are the gaps between land and Agro-based business?
- What are the planning perspectives which can be designed to link the agro based industries (small scale) & the farmers (small & middle farmers)?

1.7: Aim & Objectives

Aim: -

Provide additional income generation to the farmers by delivering value addition to their produce.

Objectives: -

1. Low cost in processing.
2. Minimise the losses of agriculture produce.
3. Encourage the growth of Agricultural Small-Scale Industrial sector.
4. Promoting economic opportunities of agriculture products.
5. Increase the small farmers income.

1.8: Scope & Limitation

1.8.1: Scope

- Provide rural population an opportunity for employment.
- Generate income and thereby improve economic condition of people.
- Avoid wastage of perishable agricultural products.
- Help to develop backward areas based on their suitability for setting up Agro Industries.
- Prevent the flow of people from rural to urban areas.

1.8.2: Limitations

- Study only for small-scale industries.
- In small-scale industries this study is on agro based industries only.
- Area of study is only for rural areas (small & middle farmers).

1.9: Conceptual Frame – Work

1.9.1: Research Frame – Work

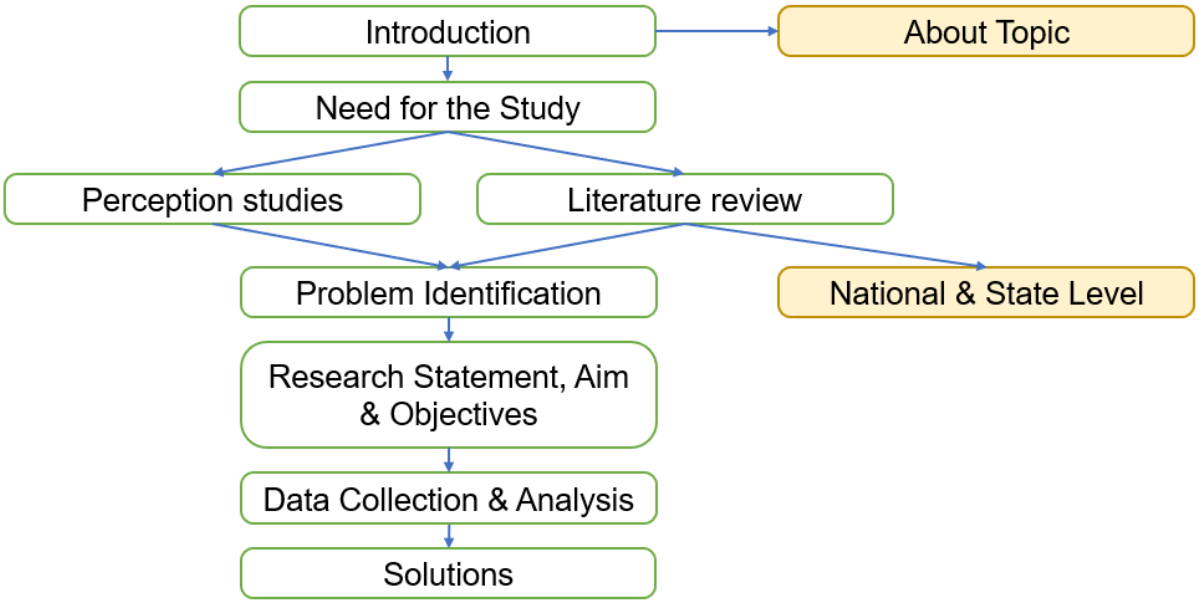


Figure 1-6: Research Frame – Work

1.9.2: Thesis Methodology

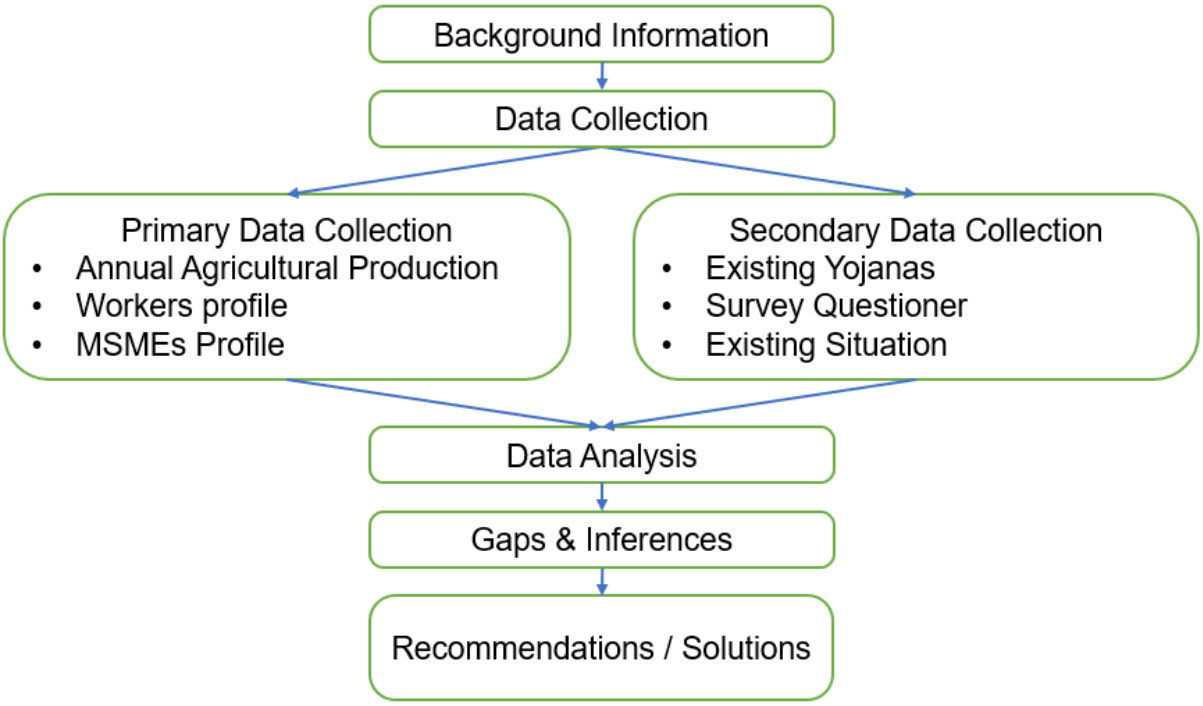


Figure 1-7: Thesis Methodology

Chapter 2: Review of Literature

1. **Agro- Based Processing Industries in Rural Development in India _by Vijay R. Bhosale (2016)**

Keywords: Agro-based Industries, Rural Development, Employment, Income

Take Away: This paper is examining the priority given to agro industries in India in the context of their role in rural and small farmer development. The features and constraints of agroindustry are examined to assess their real and potential contribution and challenges faced. Institutional and organizational models that have been tried or proposed in India are evaluated from the point of view of performance and contribution to rural and small farmer development.

2. **Performance of agro based industries in India _by Vasant Gandhi (2001)**

Keywords: Agro industry, farm income, employment, economic development

Take Away: This research paper is delivered that agro industry have been given significant priority in economic development in India. The agro industrial sector in India contributes a large share of overall employment in industry as well as value addition and income generation. Its continued role in promoting development, and reducing poverty, will depend on its capacity to contribute to small farm income and rural employment, particularly among the landless poor. Managerially, one of the major challenges lies in organizing sustained production and procurement from large numbers of small farmers.

3. **Problems and prospects of small scale agro based industries: an analysis of Patiala district _by Dr. Pawan Kumar Dhiman & Ms. Amita Rani (2011)**

Keywords: Agro based industries, challenges ahead

Take Away: They talk about the agro based industry is regarded as the sunrise sector of the Indian economy in view of its large potential for growth and likely socio-economic impact specifically on employment and income generation. Some

estimates suggest that in developed countries, approximately 14 per cent of the total work force is engaged in agro-processing sector directly or indirectly. However, in India, only about 3 per cent of the work force finds employment in this sector revealing its underdeveloped state and vast untapped potential for employment. There is no denying that India has to live with the problem of unemployment for many years to come. Therefore, need arises to make all over development among all sections of the society especially in rural agro based industrial units.

4. **Agro and Food processing Industry in India: Status, Opportunities & Challenges _by Prof. Ajay Shukla, Prof. Vandana Sharma & Prof. Hetal Bhinde**

Keywords: Food Processing, Agriculture development, Competitive Analysis

Take Away: They examine Agriculture and industry have traditionally been viewed as two separate sectors both in terms of their characteristics and their role in economic growth, however over as few decades agro and food process has rapidly expanded as an organized industry with a bright role to be played in socio-economic development of a country. Their paper endeavours to put an insight on the status and evolution of this industry in India, encompassing the Govt. reforms, subsidiaries, Incentives, technological development, R&D, export potential, growth trajectory, constraints, competition etc by interviewing various related Entrepreneur in the field with a focus to get a hawk eye view from the horse's mouth. Based on which their propose to come up with an industry-oriented action plan to foster the growth and advancement of the Industry and people attach to it.

5. **Performance of MARKFED and agricultural sustainability _by Mandeep Kaur (2016)**

Keywords: Sustainable Development, Performance, MARKFED, Agricultural Sustainability

Take Away: He found that in a country like India importance of agriculture is not likely to decline due to different aspects of food security and employment to rural

poor. Emphasis of different five-year plans is on self-sufficiency and self-reliance in agricultural production and efforts have also resulted in sustainable increase in production and productivity. Measurement of sustainability has becoming a challenge for the corporations seeking to evaluate their efficiency and effectiveness. Different state corporations play important role in the development of agricultural sector.

6. **Performance of agro based industries in India _by Dr. C Paramasivan & R Pasupathi, November (2016)**

Keywords: Agro based industry, Agriculture, Small farmers, Labour intensive, Capital savin

Take Away: This paper discussed that industrial development not only depends on innovation and capital outflow in a country, but also it needs availability of raw materials and adequate physical infrastructural facilities. Agriculture is one of the major raw material providing sector for major industries like paper, sugar, textile, fertilizers, chemical, edible oil, etc., Agro-based industries can play an important role to a large extent in solving the problem of poverty, unemployment and inequality in India and can significantly contribute to the overall development of the economy by efficiently utilizing the local raw materials which consequently may result in increase of gainful employment opportunities to poor people mainly landless, marginal and small farmers.

7. **Agroindustry for Rural and Small Farmer Development: Issues and Lessons from India _by Vasant Gandhi, Gauri Kumar & Robin Marsh**

Keywords: Agro industries, Rural development, Small farmer

Take Away: They examine the priority given to agro industries in India in the context of their role in rural and small farmer development. The features and constraints of agro industry are examined to assess their real and potential contribution and challenges faced. Institutional and organizational models that have been tried or proposed in India are evaluated from the point of view of performance and

contribution to rural and small farmer development. The article then draws policy and managerial implications.

8. **Doubling farmers' income options and challenges in Gujarat: a review _by Priyanka Changela & Ganga Devi (2018)**

Keywords: Farmers' income, past trend, major thrusts, options and approach, challenges

Take Away: They study on doubling farmers' income options and challenges in Gujarat. The goal of doubling farmers' income (DFI) is required identification of sources of income growth and enabling condition for harnessing their growth potential. In Gujarat farmers' income is more diversified as compared to India. Past trends reveal that though during 2002-03 to 2012-13 farmers' average income at nominal prices grew at 11.44 per cent and the real growth at 5.61 per cent per annum in Gujarat as compare to India it is in nominal prices 11.76 per cent and in real prices 5.20 per cent. As per this growth rate required time for DFI in Gujarat is at nominal prices 6.40 years and in real prices 12.69 years as compared to India its required in nominal term 6.24 year and in real term 13.56 year. For achieving goal of DFI requires a new approach at the national level and the ground level.

This is a major challenge and all the government programs are tuned to achieve this objective, which may require about 10.46 per cent growth in the real income level. Presently, only 15 per cent of the loan in the state is disbursed as investment credit and yield rates of all major crops are only 50 per cent to 75 per cent of their potential yields. The available farm power is only about 1.20 kW/ha in Gujarat and more than 85 per cent small and marginal farmer are major challenges.

9. **Empowerment of tribal women of south Gujarat through agricultural by-products _by Khyati M. Patel, Mukesh Chaudhary & Mahendra Chaudhary (2018)**

Keywords: women participation, tribal women empowerment, agricultural by products

Take Away: They talk about empowerment of tribal women of south Gujarat through agricultural by-products. They explain that women play a critical and potentially transformative role in agricultural growth. Women participation in agriculture sector is very crucial because women are major player in production, processing and distribution of forest products across the globe. In south Gujarat region, Tribal peoples living in forests and depending on forests for livelihood. In the subsistence sector women spend the greatest time in collecting fuel, fodder water, looking after livestock and kitchen gardening. Poverty deprives women of the opportunities to have equal access to participation in development programs, mobility and decision making.

The major areas of women participation including crop production, fisheries farming, value addition, agro-processing, agro-forestry products, marketing of poultry, dairy and other agricultural products in local and informal. Women of South Gujarat region generated income from value added bamboo products and finger millet products. They have little access to education, health and nutrition, opportunities.

10. Role of ICT in extension strategies to facilitate doubling of farmers income _by Krunal C. Kamani, Yogesh R. Ghodasara & Pankaj S. Parsania (2018)

Keywords: digital agriculture, information technology, smartphone

Take Away: They examine the role of ICT in extension strategies to facilitate doubling of farmers income. They explain that in today's world Information and Communication Technology (ICT) is revolutionizing and has the potential to provide far reaching benefits to every section of the society. At present Indian agriculture is passing through difficult times and even drought have been observed in several parts of nation resulting into wide spread distress among farmers. Although there are several strategies of government to provide benefit to farmers but many of them cannot be fully implemented without the use of ICT as it has become integral part of life of people as well as farmers. ICT at present can be used as a tool to empower rural youth to realize their full potential, farmers to increase their profitability by accessing equitable markets and rural businesses to offer value added services.

Chapter 3: Overview of Agro based SSI

3.1: Scenario of Agricultural Development in India

In India, agriculture started around 9000 BCE as a consequence of early farming of plants, crops along with animals' domestication. Almost immediately people established life with the implication of practices developed for agriculture. Barley, wheat and jujube were cultivated in the Indian subcontinent by 9000 BC. Varieties of tropical fruit like muskmelon and mango were indigenous to the Indian subcontinent. The Indians also domesticated hemp and rice which was cultivated in the Indus Valley Civilization. The development of irrigation was made in the Indus Valley Civilization about 4500 B.C. Due to the development of irrigation prosperity grew in Indus valley civilization and eventually these leads to more settlement of make use of drainage and sewers. In high middle Ages (200 - 1200 CE) for sustained agriculture methodical ploughing, weeding, manuring, irrigation and crop safeguard was implemented. Water storage systems were also developed during this era. A dam named Kallanai was built during (1st - 2nd century CE) on river Kaveri during this period, and it is considered as one of the oldest water regulation structures in the world still in use.

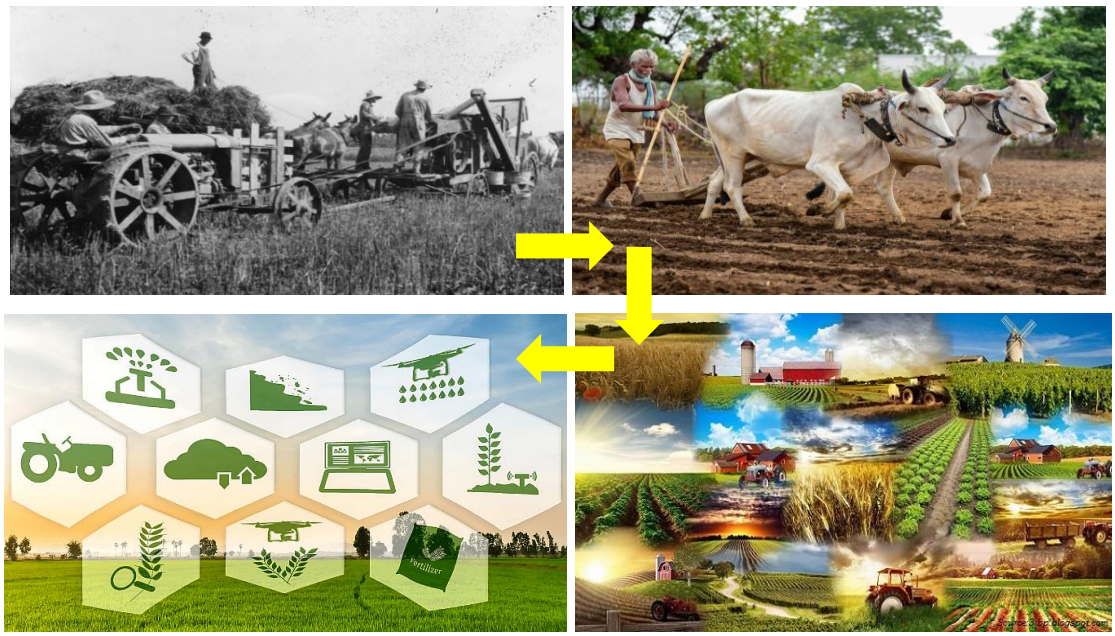


Figure 3-1: Trend in Agriculture

Source: Google Image.

In India, agriculture was the main source of national income and occupation at the time of Independence. According to **INDIAN COUNCIL OF FOOD & AGRICULTURE,** agriculture and allied activities contributed nearly 50 percent to India's national income. Around 72 percent of total working population was engaged in agriculture. These confirm that Indian economy was a backward and agriculturally based economy at the time of Independence. Since independence India has made much progress in agriculture. Indian agriculture, which grew at the rate of about 1 percent per annum during the fifty years before Independence, has grown at the rate of about 2.6 percent per annum in the post-Independence era. After 61 year of Independence, the share of agriculture in total national income declined from 50 percent in 1950 to 18 percent in 2007- 08. But even today more than 60 percent of workforce is engaged in agriculture. Expansion of area was the main source of growth in the period of fifties and sixties after that the contribution of increased land area under agricultural production has declined over time and increase in productivity became the main source of growth in agricultural production. The situation of agriculture turned adverse during post WTO (World Trade Organisation) period and this covered all the sub sectors of agriculture. The growth rates in output of all crops decelerated from 2.93 percent to 1.57 percent. The livestock declined from 4.21 percent to 3.40 percent. The fisheries declined from 7.48 percent to 3.25 percent. Only, forestry witnessed a sharp increase from 0.09 percent to 1.82 percent.

Traditional agriculture: - The evolution of traditional farming was over the foremost 10,000 years of agriculture. Traditional agriculture is basically sustainable and steady farming system that has been employed for a number of generations and is able to produce the material required by its producers. Through traditional farming a production of incredible variety of household crops and livestock, and systems of farming was made possible. Several conventional farmers in the developing world are still employing these farming methods that are in equilibrium with the nearby ecosystems, steady, sustainable and highly organized. Farming system of this type is distinguished above all by a high degree of biodiversity.

Organic farming system: - Organic farming is a method of crop production that involves much more than choosing not to utilize pesticides, fertilizers, genetically modified organisms, antibiotics and growth hormones. It works in agreement with nature and involves using techniques to get good crop yields without harming the natural environment. Organic farming, evolved on the basic theoretical expositions of Rodale in the United States, Lady Balfour in England and Sir Albert Howard in India in the 1940s, has progressed to cover about 23 million hectares of land all over the world. In modern times, the general population is more aware about environmental benefit that's why organic farming is gradually getting popularity throughout the world.

Genetically modified crops (GM Crops) system:

These crops are crops of which, the DNA has been modified using various genetic engineering techniques. The aim of making GM crops is to set up a new characteristic to the plant which does not occur in nature in particular plant species e.g., in food crops various pest resistant, abiotic stress resistant, spoilage resistant, chemical resistant genes have been incorporated along with those genes which have improved the nutrient profile of the crop. In India this system is not very popular because of serious socio-economic reasons but the system is getting attention at the level of research for various factors.

3.1.1: Globalization of Agricultural Industries

Globalization is the process of international integration arising from the interchange of world views, products, ideas, and other aspects of culture. Globalization is associated not only with an increasing cross border movement of goods, services, capital, technology, Information and people, but also with an organization of economic activities which straddles national boundaries.

Globalization Involves:

- Fast growth of trade in goods and services
- Higher growth in international financial transactions
- Fast growth in foreign direct investment
- Deeper form of internationalization resulting from production network of multinationals
- Emergence of global markets
- Rapid diffusion of knowledge and technology globalised transport and communication network
- Changes in the thinking and modes of operation of international institutions.

Majorly impact of Globalization on Agriculture:

- Unemployment
- Disparity in income
- Food problems
- Rural poverty and peasant’s debt trap
- Farmer’s migration
- Sale of kidneys
- Flesh trade and ultimately suicides are some of the maladies are faced by the Indian farmers.

A recent government study estimated that 32 percent of India's rural population is illiterate, compared to 15 percent in urban areas. For farmers, that percentage may be even higher. It's not surprising, then, that dealing with the modern challenges of agriculture proves to be difficult for many Indian farmers. It’s not surprising, then, that dealing with the modern challenges of agriculture proves to be difficult for many Indian farmers. Limited access to information (frequently caused by low literacy rates) directly translates into low-efficiency, low-productivity crops, trapping many farmers in a vicious cycle of poverty.

Impact of globalization on Indian agriculture are as:

1. **Use of new technologies:** Increased use of various technologies such as pesticides, herbicides, and fertilizers as well as new breeds of high yield crops were employed to increase food production. These technologies included modern implementations in irrigation projects, pesticides, synthetic nitrogen fertilizer and improved crop varieties developed through the conventional, science-based methods available at the time. Use of High Yielding Verities like IR8 a sem-dwarf rice variety, dubbed as “Miracle Rice".

2. **Increase in agricultural production and productivity:** The green revolution had many effects on Indian economy. Due to adoption of HYV technology the production of food grains increased considerably in the country. The production of wheat has increased from 8.8 million tons in 1965-66 to 184 million tons in 1991-92. The productivity of other food grains has increased considerably. It was 71% in case of cereals, 104% for wheat and 52% for paddy over the period 1965-66 and 1989-90. Though the food grain production has increased considerably but the green revolution has no impact on coarse cereals, pulses and few cash corps. In short, the gains of green revolution have not been shared equally by all the crops.

3. **Increase in National Income**: Receiving the international market for the agricultural goods of India, there is an increase in farmer’s agricultural product. New technology, new seeds, new agriculture practices etc. helped to grow the agricultural product. From the monetary point of view the share of agriculture sector in the economy is at 14.2% of the GDP (2010-11).

4. **Increase in Employments**: While exporting agricultural products it is necessary to classify the products, its standardization and processing, packing etc. The industries depending on agriculture are stored and it made an increase in employments. Agriculture is the biggest unorganized sector of the Indian economy accounting for more than 90% share in the total unorganized labour force. The share of agriculture in total employment stands at 52.1%.

5. **Increase in the export of agricultural goods:** The prices of agricultural goods are higher in the international market than Indian markets. If the developed countries reduced grants, they have to increase in the prices. So, there will be increase in the export in Indian market and if the prices grow, there will be profit. Agricultural products account for 10.23% of the total export income of the economy, while agricultural imports account for just 2.74% of the total imports.

6. **Reduction in poverty**: It is also true that globalization is commonly characterized as increasing the gap between the rich and the poor, but it is a matter of looking at poverty in relative terms. India's prior concern is of absolute poverty, which is worse than death, and if India makes efforts, globalization can be a key to get rid of it. Moreover, the percentage of people below the poverty line has been decreasing progressively, from 36 percent in 1993-94 to 26 percent in 1999-2000.

Source: Joginder, Research Scholar, Dept. of Sociology, M.D. University, Rohtak - ISSN: 2278-6236, Impact Factor: 6.284.

3.2: Performance of agro based industries in India

According to annual survey industries (2013-14) the total number of agro-based industries has there are 86915 agro based industries in 2011-12 with 0.38 per cent growth rate. The manufacture of food products and beverages accounts for more than half of the total output of agro-based industries in India. Under this category, the manufacture of grain mill products, starches and starch products and prepared animal feeds is playing a prominent role with a share of 53 per cent. The number of textile manufacturing units has the highest percentage next to food products and beverages, put their number has decreased slightly from 2006-07 to 2011-12, due to the continuous decrease in spinning, weaving and finishing of textiles from 27.25 per cent in 2006-07 to 26.68 per cent in 2011-12.

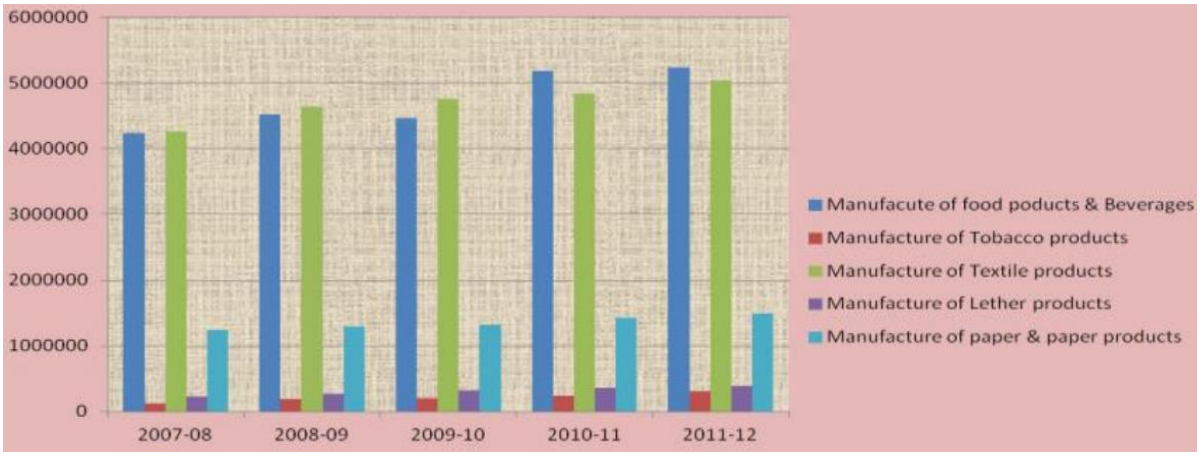


Figure 3-2: Category-wise Agro-Based Industries in India

Description	Industries	Productive Capital Rs. in lakh	Workers
Food products	35346	21979802	1232679
Textiles	18645	24860635	1267670
Rubber and plastic products	13147	10079179	466790
Tobacco products	3294	1310788	425799
Beverages	2103	3881305	121346
Paper and paper products	6810	5415903	193026
Cotton ginning, cleaning and bailing, Seed processing for propagation	3301	1474036	73096
Wood and products of wood and cork, except furniture	4269	891952	60034
Total	86915	69893600	3840440

Table 3-1: Agro based Industries in India 2013-14

Source: Annual Survey Industries 2013-14.

Above table no. 3-1 shows that, as per the annual survey of industries 2013-14, there are 86915 agro based industries with 3840440 workers and its productive capacity amounted to Rs.69893600 lakhs. Agro based industries can provide increasing employment opportunities to the poor and rural peoples.

Industry Group	2009-10	2010-11	2011-12	2012-13	2013-14
Food products & beverages	133.5	142.9	164.8	169.5	167.7
Tobacco products	102	104.1	109.7	109.2	110.2
Textiles	127.4	135.9	134	142	148.3
Wood & products of wood and cork, except furniture, manufacturing of articles of straw	160.1	156.5	159.2	147.9	144.6
Paper & paper products	121.1	131.4	138	138.7	138.6
Rubber and plastic products	167.4	185.2	184.6	185	181.1
Total	811.5	856	890.3	892.3	890.5

Table 3-2: Agro based Manufacturing Industries Production Growth Rate

Source: Economic survey report India (2014-15)

Above table no. 3-2 shows that, agro based manufacturing industries production growth rate in the year 2009-10 was 811.5 and it has been increased to 890.5 in the year 2013-14. Agro based industries has been growing in India during the year 2009-10 to 2013-14.

Major crops in Seasons: - Kharif and Rabi

There are two major agricultural seasons in India: Kharif and Rabi. Kharif season lasts from April to September (summer) – rice (paddy) is the season's main crop.

Rabi season lasts from October to March (winter) – wheat is the season's main crop. As of August 2019, total area sown with kharif crops in India reached 92.6 million hectares.

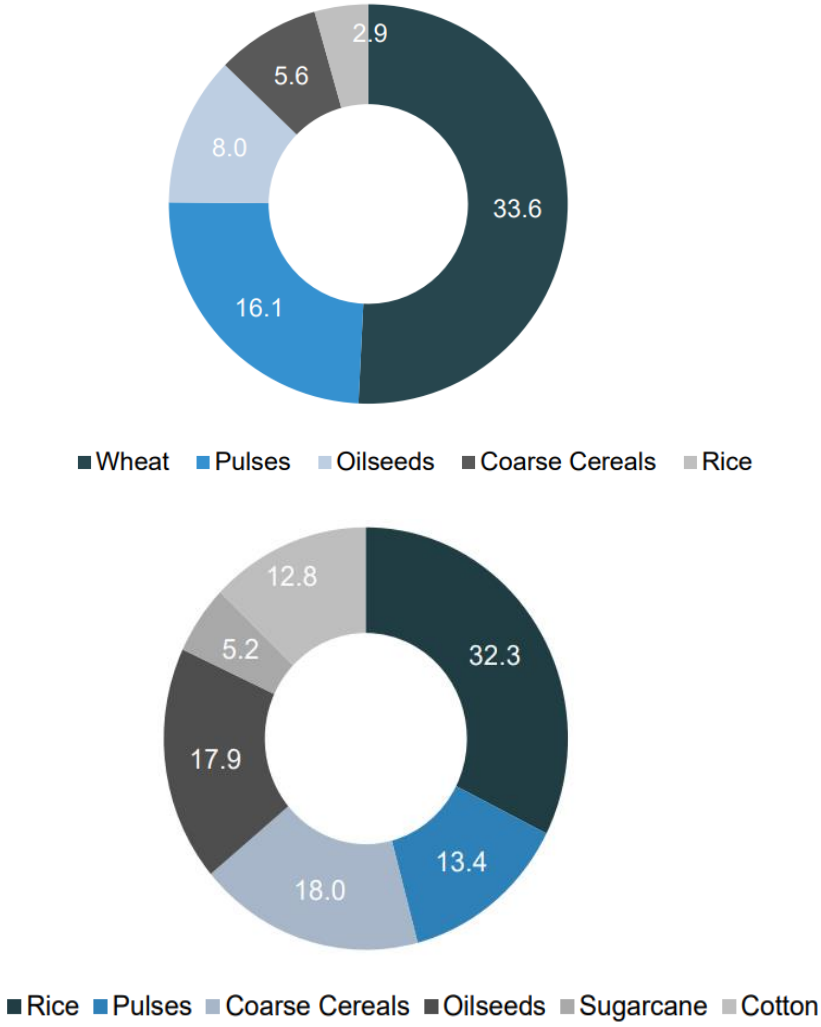


Figure 3-3: Seasonal Crops

In above charts;

- 1st chart sown Rabi Area in 2019-20 (million hectares) (as on January 31, 2020)
- 2nd chart sown Kharif Area in 2019-20 (million hectares) (as on September 27, 2019).

Crop	2017-18	2018-19	2019-20
Rice	112.76	116.48	117.47
Wheat	99.87	103.67	106.21
Total Cereals	259.60	263.14	268.93
Total Pulses	25.42	22.08	23.02
Total Foodgrains	285.01	285.21	291.95
Total Oilseeds	31.45	31.52	34.18
Sugarcane	379.90	405.41	353.84
Cotton (million bales of 170 kg each)	32.80	28.04	34.89
Jute & Metsa (million bales of 180 kg each)	10.03	9.82	9.81

Table 3-3: Crops Production (MT)

Source: Ministry of Agriculture and Farmers' Welfare.

Since 2010, production as well as yield of both major crops - rice and wheat have increased significantly. As per the fourth advance estimates, production of rice is estimated at record 116.48 million tonnes (MT) while production of wheat is estimated at 103.67 MT during 2018-19 crop year. India ranks second in global production of fruits and vegetables and is a leading exporter of mangoes and bananas.

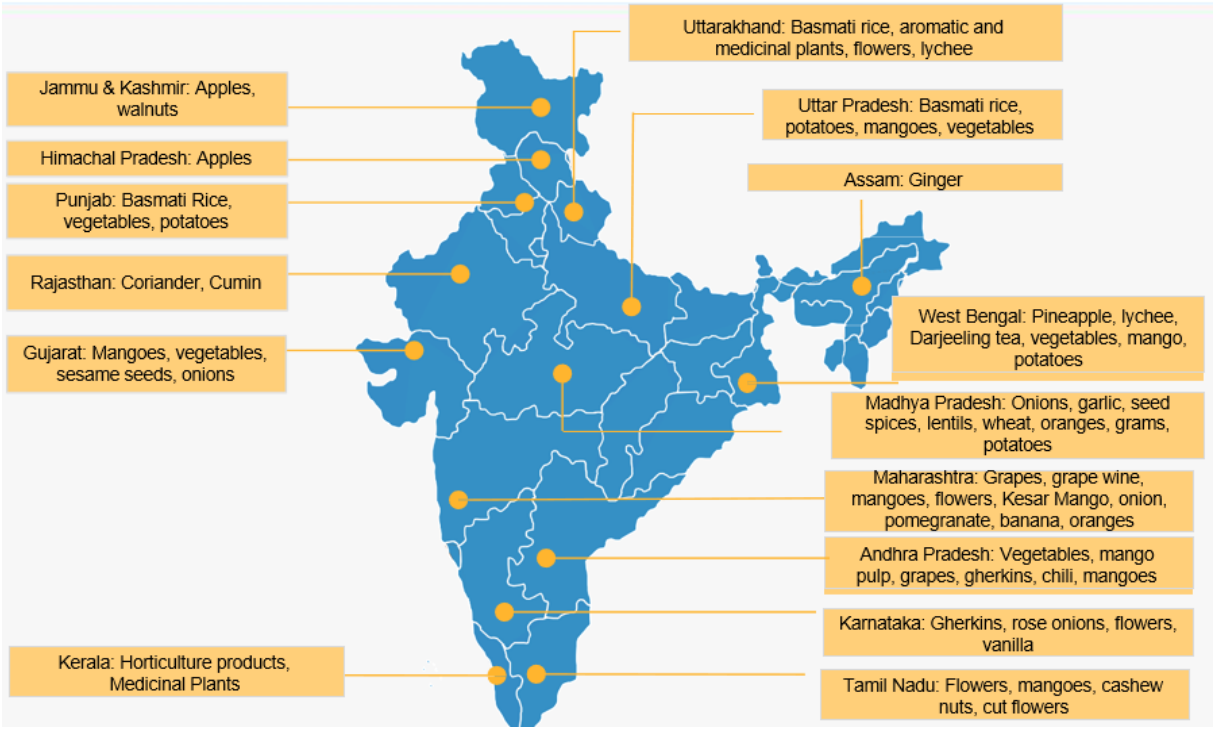


Figure 3-4: Agri Export Zones in India – 2016

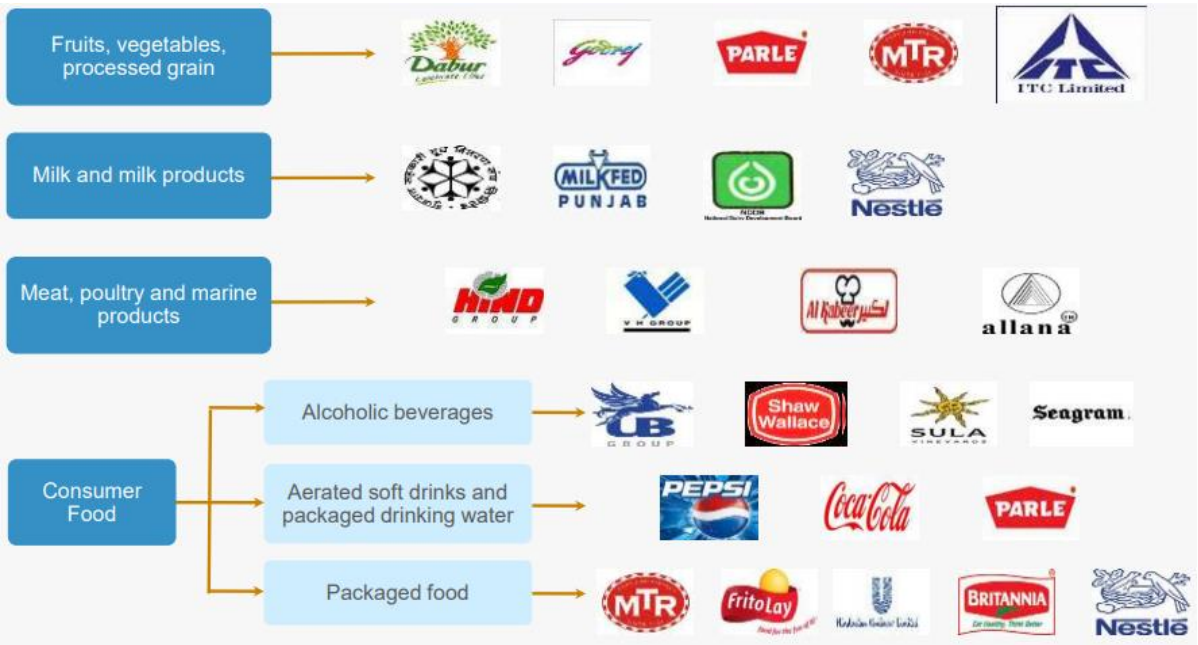


Figure 3-5: Food Processing segments and private players

Source: APEDA, TechSci Research, www.ibef.org

3.2.1: Indian Agricultural Scenario in 21st Century:

Agriculture and allied sectors like forestry and fishing accounted for 17 percent of total Indian Gross Domestic Product and employed about 228.3 million of the country's workforce. Agricultural products which are having significant economic contribution comprises of cereals, paddy, wheat, jowar, maize, etc. (figure no. 3-6).

As per the Second Advance estimate for 2016–17, the gross value added by agriculture, forestry & fishing in India is estimated to be 1,687,064 crores, recording an increase of 4.4 percent over previous year.

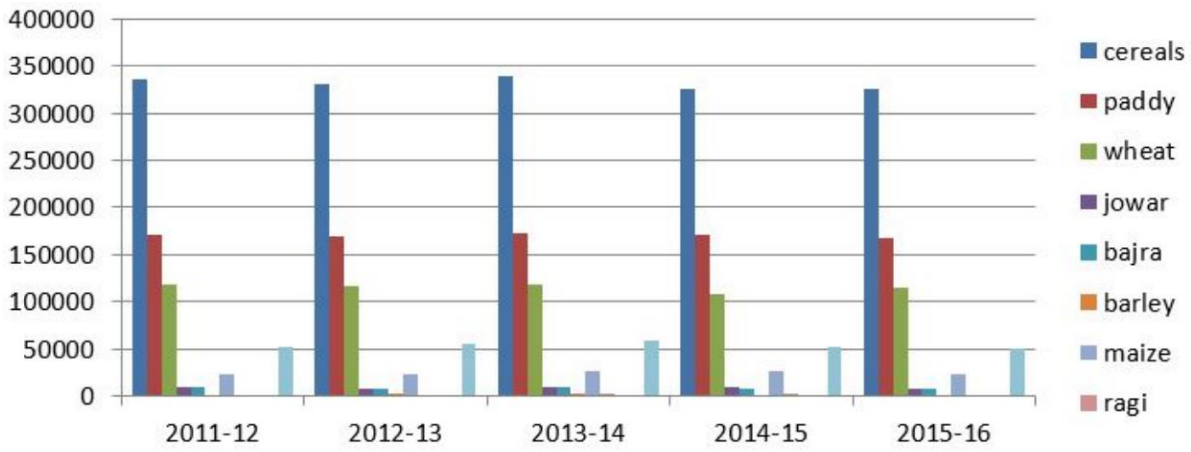


Figure 3-6: Crop Wise value of Output (2011-2016)

Source: Ministry of Statistic and Programme implementation, Government of India.

Production and Exports Trends:

The Prime Minister, Atal Bihari Vajpayee had taken the bold and historic decision regarding commercial use of Bt cotton and that decision has pushed production and exports of cotton on an increasing trend. It is pertinent to point out that decision had benefited the Gujarat most. This could be testified from the fact that 90 per cent increase in the area under cultivation of Bt cotton by the end of 2014.

In the year 2000-01 the whole India cotton output was 14 million bales and this figure touched upon almost 35 million bales in 2016-17 an increase of more than 2.5 million. Similar trends have been in case of exports of Bt cotton During the year

2000-01 India's exports of Bt cotton was US $ 14 million and this figured has touched a level of US $ 1535 million. These trends have made out India as the second biggest producer and exporter of Bt cotton in the world.

3.2.2: Agriculture of Gujarat State

According to the **Agro-Economic Research Centre** Gujarat is the one of the fastest growing states of India. The state has adopted a novel pattern of progress with the strategic development of the key sectors like energy, industry and agriculture for which it has achieved ambitious double-digit growth rate since 10th Five Year Plan period. The state constitutes about 6.2 per cent of total geographical area and 4.99 per cent of total population of India.

As per Census 2011, about 3.47 crores people of the state live in rural areas forming about 57.4 per cent of its total population (GoI, 2011). About 70.5 per cent of total workers in the state are rural based. Agriculture continues to be the primary occupation for the majority of rural people in the state. About 51.8 per cent of total workers are cultivators and agricultural labourers. Thus, the agriculture in the state has been a major source of labour absorption. Moreover, agriculture provides indirect employment to large portion of population in agro-based occupations. Thus, prosperity and well-being of people in Gujarat is closely linked with agriculture and allied activities.

The State`s NSDP at constant (2004-05) prices has also increased from Rs 197270 crores in 2005-06 to Rs 239253 crores in 2007-08 and further to Rs 309409 crores in 2010-11 (table no. 1-2). Total NSDP at constant prices has grown by 56.85 per cent during the period 2005-06 to 2010-11; whereas the total NSDP at current prices has grown by 113.6 per cent during the corresponding period.

Year	Agriculture		Industries		Services	Total NSDP	Annual Growth Rate (%)	Per Capita Income (Rs)
	Agriculture including animal husbandry	Total Agriculture sector	Manufa-cturing	Total Industries sector				
2005-06	31896	43702	46822	63011	90557	197270	14.5	36102
	(16.2)	(22.2)	(23.7)	(31.9)	(45.9)	(100.0)		
2006-07	31372	43256	52472	69900	100798	213954	8.5	38568
	(14.7)	(20.2)	(24.5)	(32.7)	(47.1)	(100.0)		
2007-08	34750	46581	56893	79475	113197	239253	11.8	42498
	(14.5)	(19.5)	(23.8)	(33.2)	(47.3)	(100.0)		
2008-09	30683	42085	58361	85090	122305	249480	4.3	43685
	(12.3)	(16.9)	(23.4)	(34.1)	(49.0)	(100.0)		
2009-10 (P)	29816	41352	67871	100918	138659	280929	12.6	48511
	(10.6)	(14.7)	(24.2)	(35.9)	(49.4)	(100.0)		
2010-11(Q)	34921	46291	74092	110010	153108	309409	10.1	52708
	(11.3)	(15.0)	(23.9)	(35.6)	(49.5)	(100.0)		

Table 3-4: Gujarat Sectoral Composition of NSDP

Notes: In the table brackets indicate the percentage to NSDP; P- Provisional Estimates, Q- Quick Estimates & rupees in crore.

Source: State of Gujarat Agriculture (2011-12) (AERC report 146)

The per capita income of the state as per the NSDP (at constant prices 2004- 05) has increased by around 46 per cent in 2010-11 over 2005-06, i.e., increased from Rs 36102 in 2005-06 to Rs 52708 in 2010-11. On the other hand, the per capita income as per the NSDP at current prices has increased by around 98.8 per cent (from Rs 37780 in 2005-06 to Rs 75115 in 2010-11) during corresponding years.

Crop Specific Growth in Gujarat: The major crops grown in different parts of Gujarat are bajra, wheat, jowar, maize, cotton, groundnut, rapeseed and mustard, fodder and horticultural crops (figure no. 1-3). As per the cropping pattern in Gujarat, total cereals, pulses, oilseeds, horticultural crops and fodder crops group accounts for about 32.2 per cent, 6.7 per cent, 23.4 per cent, 10.6 per cent and 8.4 per cent of GCA, respectively in 2010-11. Among the cereals, wheat (11.9%), bajra (6.6%), rice (6.1%) and maize (4.3%) are the major crops. Among the oilseeds, groundnut (14.4%), caster (3.7%), rapeseeds and mustard (1.7%), sesamum (1.9%) are the major crops grown during 2010-11.

Figure 3-7: Crop Distribution in Gujarat (2010-11)

Source: State of Gujarat Agriculture (2011-12) (AERC report 146)

3.3: Small scale industries in India

In India, village & small industries sector consists of both the traditional & modern small industries. This sector has 8 sub group which are;

1. Handlooms
2. Handicraft
3. Coir
4. Sericulture
5. Khadi
6. Small scale industries
7. Village Industries
8. Power looms

To appreciate small scale entrepreneurship in India, a basic understanding of the definition and scope of the terminology “small enterprise” is very necessary. In India, the small industry is defined in terms of investment ceiling. Also, the small industry sector enjoys a special reservation policy in terms of items of manufacture.

According to Union Development Commissioner, for small scale industries, all enterprises connected with the processing of agriculture produce and farm waste, Industry related to canning and processing of fruits and also those providing cold storage facilities, Industries producing chemicals needed in the processing operation of plant, fibers, forest produce, and some marine based ventures are categories as agro-base industries.

As per the MSME act 2006 the small-scale industries defined as “the manufacturing enterprises having investment ceiling in plant and machinery is above Rs. 25 lakhs & up to Rs. 5 crores are called small scale industry. Thus, the small scale agro-base industries are defined as those industries which have either direct or indirect links with agriculture having investment ceiling in plant and machinery is above Rs. 25 lakhs & up to Rs. 5 crores.

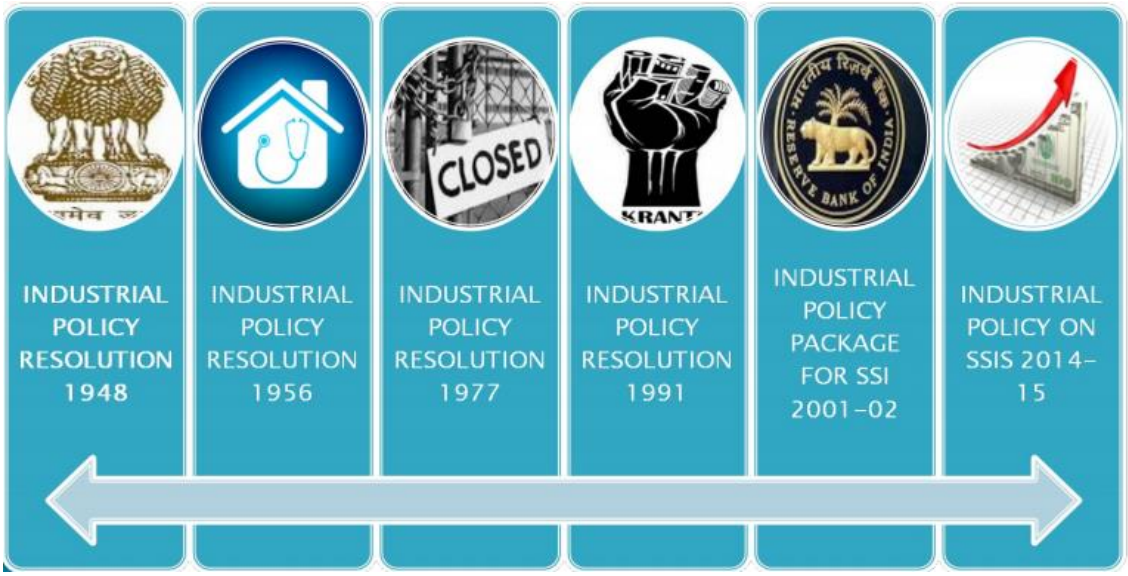


Figure 3-8: Government Polices for SSI

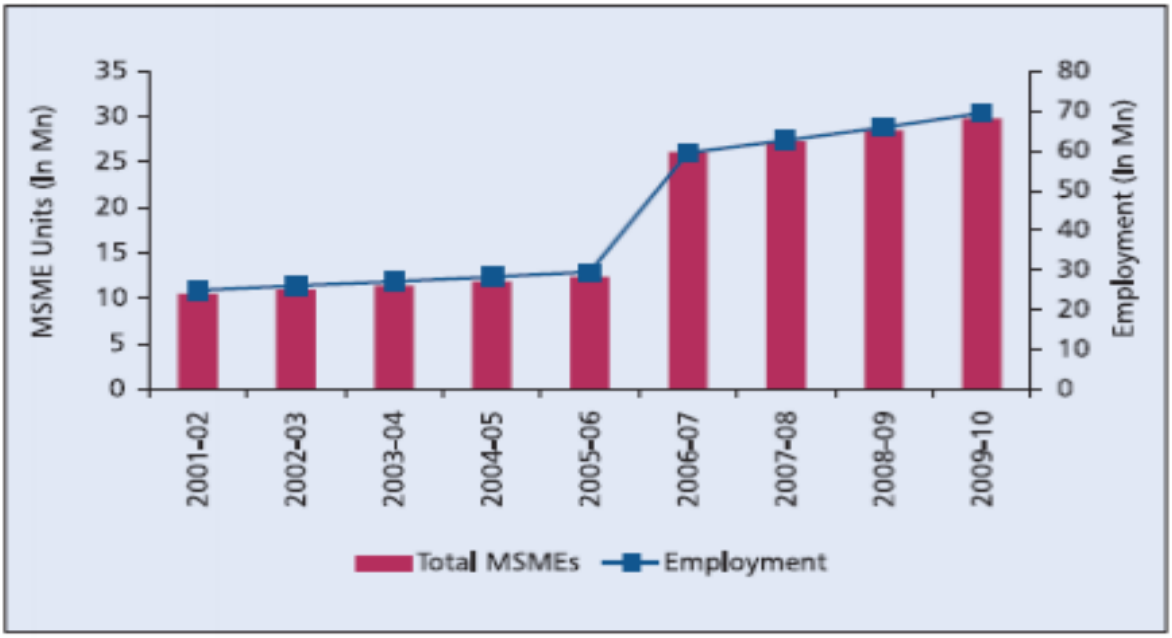


Figure 3-9: Total MSMEs Vs Total Employment

Source: Ministry of MSMEs. GOI.

Rural: - Non-metallic products contributed 22.7% to employment generated in rural areas. Food Products accounted for 21.1%, Wood Products and Chemicals and chemical products shared between them 17.5%.

Urban: - As for urban areas, Food Products and Metal Products almost equally shared 22.8% of employment. Machinery parts except electrical, Non-metallic mineral products, and Chemicals & chemical products between them accounted for 26.2% of employment.

Chapter 4: Introduction of Study Area

4.1 Karjan Taluka

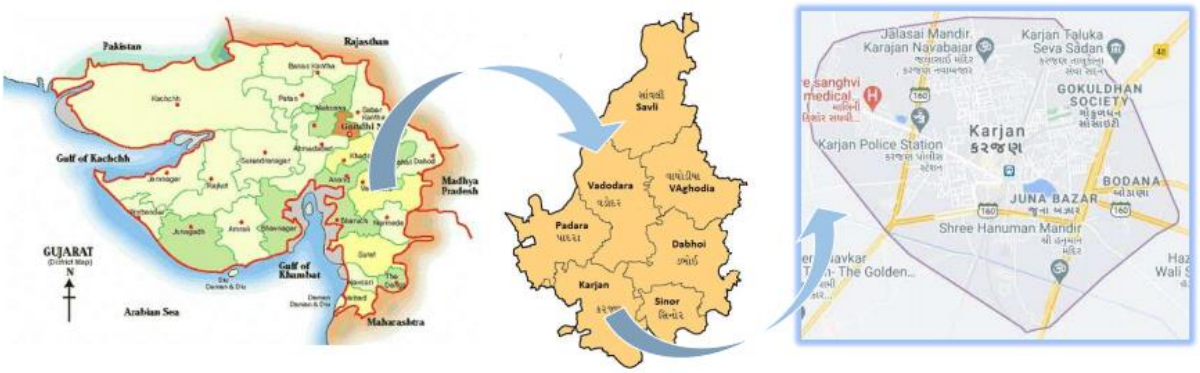


Figure 4-1: Research area, Karjan

Source: Google image

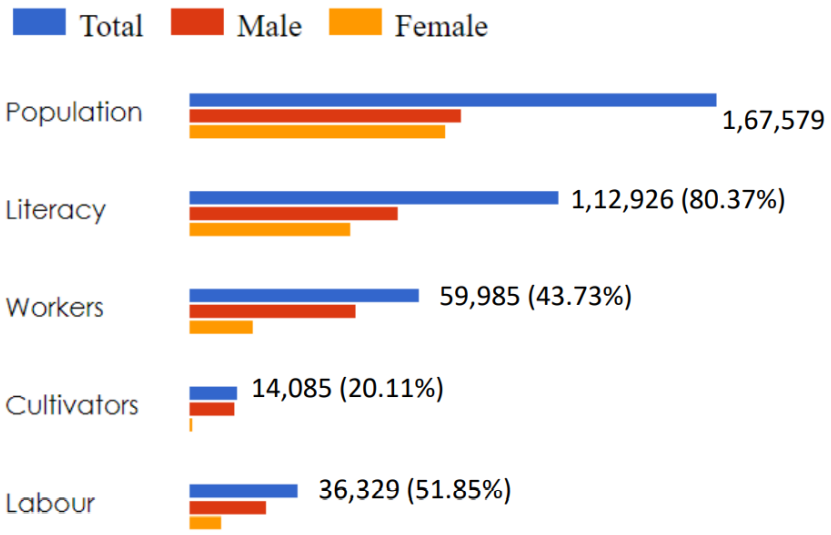


Figure 4-2: Karjan taluka workers

Source: Census 2011

This study area Karjan taluka of Vadodara district located in Gujarat state. Above table 4-1 shows total population 1,67,579. Literacy rate is around 80% same as 43% total workers 20% cultivators & 51% labours as per census 2011.

4.2 Reasons to selection of Study Area

- From being a tribal region once, it has now developed with major industrial companies setting up manufacturing bases in the region. As Cosmo films ltd, TTK prestige, Tbea, Jindal rail, Saurer Textile Solutions Pvt Ltd., etc.
- As par Karjan Nagar Palika report, in Karjan, there are 126.47 Ha. land is used in industrial sector which is around 8.28% of the total area. From that only 28.08 % has been development.
- The main reason to taking this study area Karjan taluka is the scope of investment opportunities of food & agro business, agro based industries & animal-based industries.

4.2.1 Investment Opportunities

Food & Agro business:

- Availability of land for agriculture is around 85%
- processing agricultural products such as field crops, tree crops, livestock and fisheries and converting them to edible and other usable forms
- Dehydration plants
- Horticulture

Agro based Industries:

- Cotton ginning & processing
- Food processing units
- Chemical Manufacturer
- Cold storage facilities

Animal related Industries:

- Poultry, dairy, Cattle feed, etc.

Karjan, agro industries dealers (GAIC):

Name	Products
Agri Business Centre	It`s a leading distributor, supplier of agro fertilizer products as: Urea, dap. NPK, Potas, etc.
Karjan co-op cott. sale Ji. & Pre. Soc. Ltd.	Cotton
Karjan purva vib khedut cott. sale Soc.	Cotton
Narmada agri. Mart	Bio Organic products
Paresh fertilisers - Karjan	Seeds
Shri Krishna Ferti. - Karjan (BRD)	Seeds & agro products
Vardhman Khatar depo - Karjan	Pesticides, Fertilizers and Seeds
Vardhman krushi seva mandal- Karjan	Seeds & supplier of agro fertilizer products as: Urea, dap. NPK, Potas, etc.
Miyagam dudh utp sahakari mandali ltd.	Milk
GSFC Fertilizer depot – Miyagam Karjan	Neem Urea, NPK, Gypsum, Ammonium Phosphate & Sulphate, etc.

Table 4-1: Karjan, agro industries dealers

Source: i-ખેડૂત - Web Portal for Agriculture, Farmers Welfare & Co-operation Department, Government of Gujarat

Figure 4-3: Karjan taluka Base map

Source: - GIS based generated map

4.3 Agricultural Commodities

These below maps (figure 4-4 to 4-6) of Karjan taluka shows seasonal production of agriculture as kharif, rabi & summer.

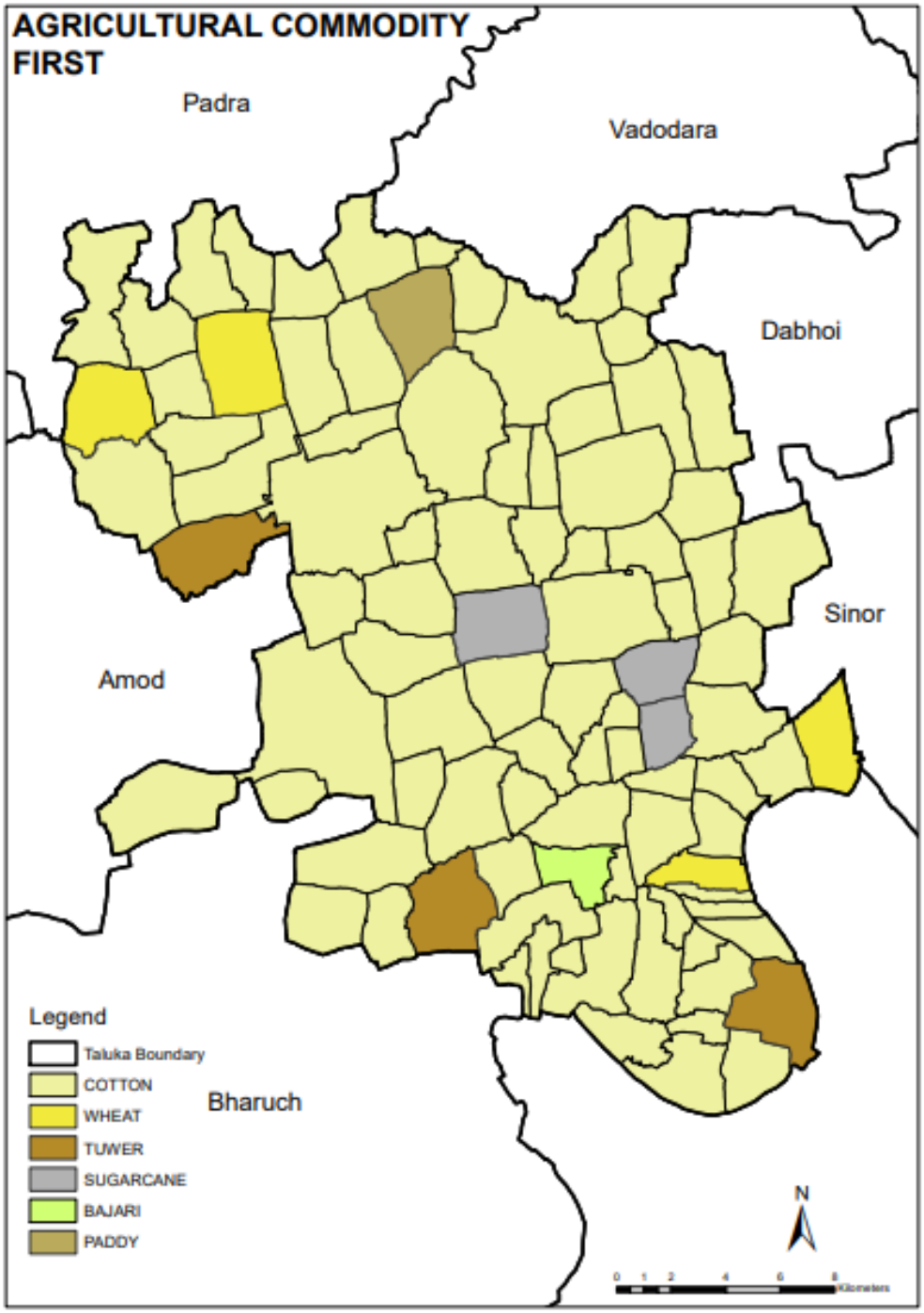


Figure 4-4: Agricultural Commodity first

Source: - Census _Village Directory

In 1st commodity **Cotton** is the majorly produced.

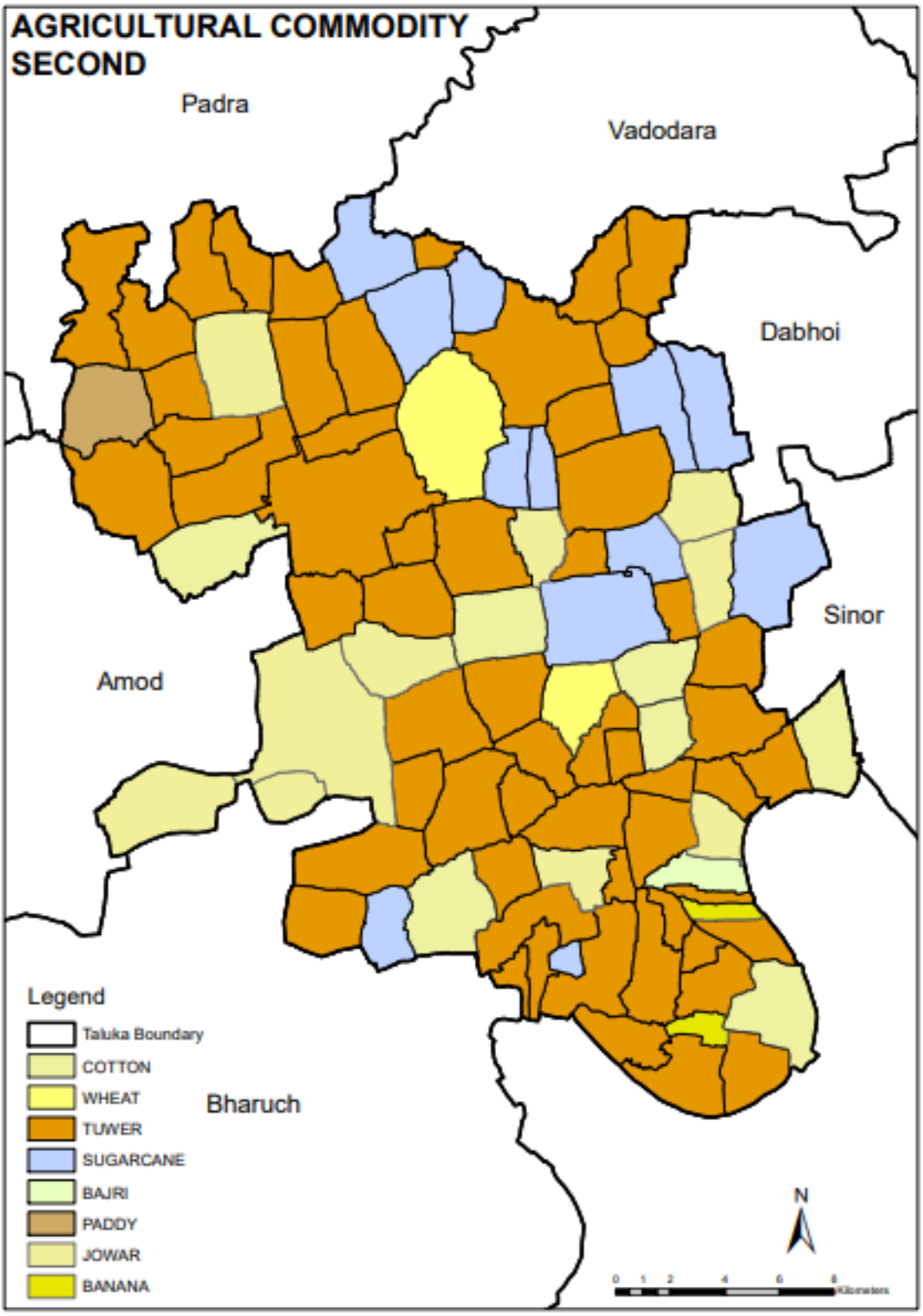


Figure 4-5: Agricultural Commodity Second

Source: - Census _Village Directory

In 2nd commodity **Tuwer** is the majorly produced.

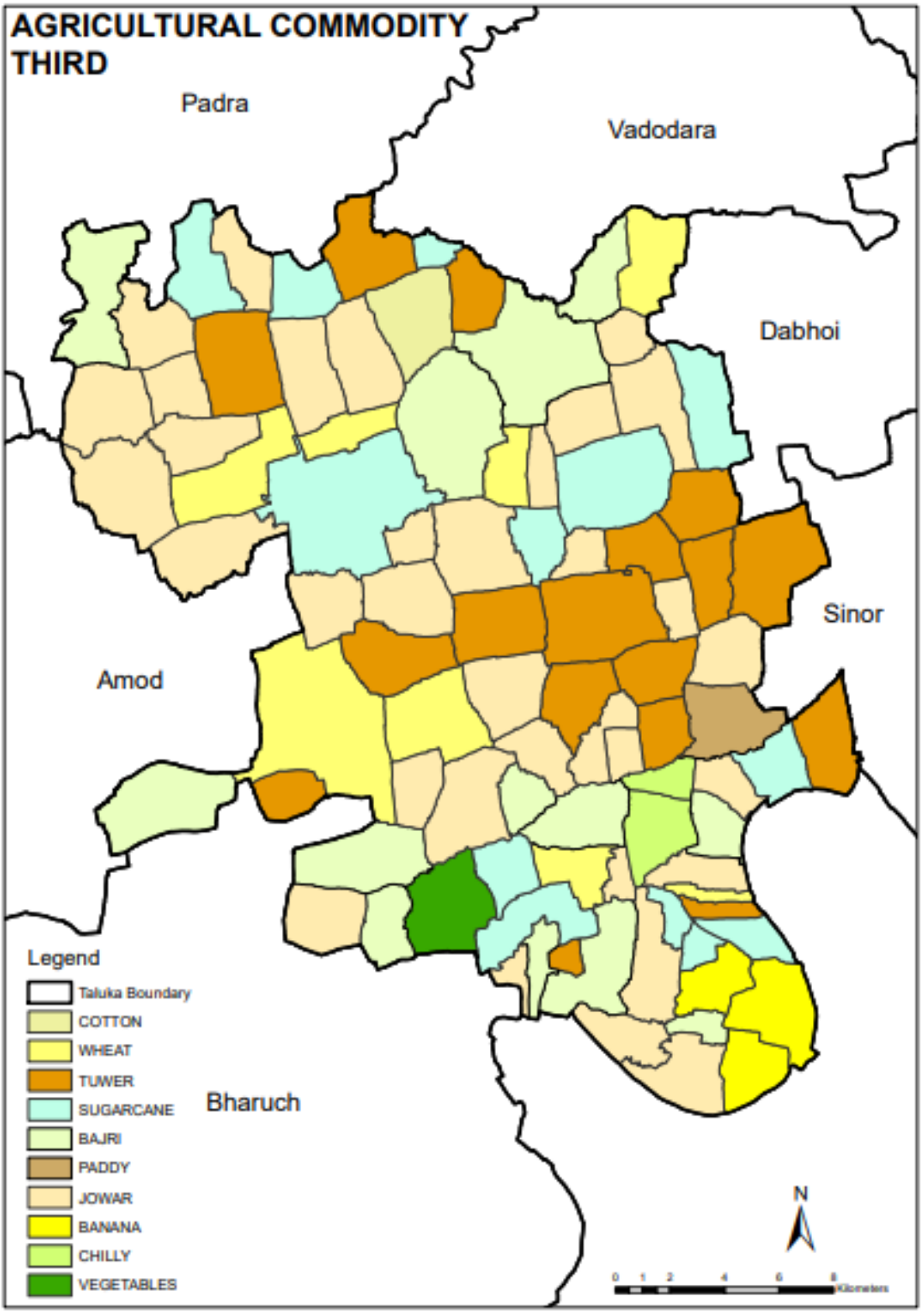


Figure 4-6: Agricultural Commodity third

Source: - Census _Village Directory

In 3rd commodity **Jowar** is the majorly produced.

Apart from that cultivation of wheat, sugarcane, bajri, paddy, chilly & Vegetables are done extensively all over the taluka.

Kharif	Rabi	Summer	Horticultural
Bajra	Wheat	Bajara	Fruits
Jowar	Paddy	Mung	Vegetable
Mung	Tuwer	Jowar	Flowers
Tuwer	Jowar		
Paddy	Sugercane		
Cotton			

Table 4-2: Seasonal Crop _Karjan

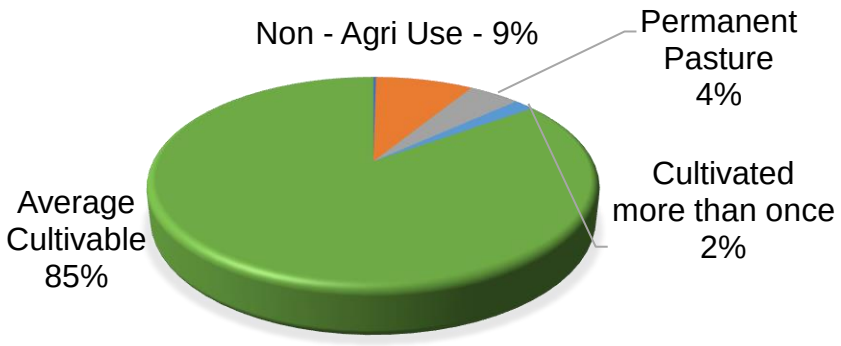


Figure 4-7: Land Utilization Pattern _Karjan

Source: Vadodara MSMEs Report (2016-17)

Available land is 60188 Hector in Karjan taluka. Above pie chart shows land utilization as 85% is used as average cultivable, 9% used as non-agricultural, 4% is use as permanent pasture & 2% is use as cultivated more than once.

4.4.1 Economy Drivers

- SSI sectors such as textiles, electronics and food products, are the supporting pillars of the economy providing direct & indirect employment to over 2300 people in the taluka.
- Major crops include Cotton, Tuwer & Jowar.
- There is an availability of skilled and qualified manpower due to the presence of Industrial training Institute in Karjan.
- The economy of the taluka is basically dependent on agricultural activities as 60.04% workers are engaged in agricultural work.

4.5 Transportation _Karjan

- Karjan is well connected to all major locations, such as Delhi (1037 km) and Mumbai (380 km) through N.H. 48.
- N.H. 48 & western railway also connects Karjan with Vadodara (37 km), Ahmedabad (150 km), Ankleshwar (56 km) and Surat (118 km)- the major industrial centres of Gujarat.

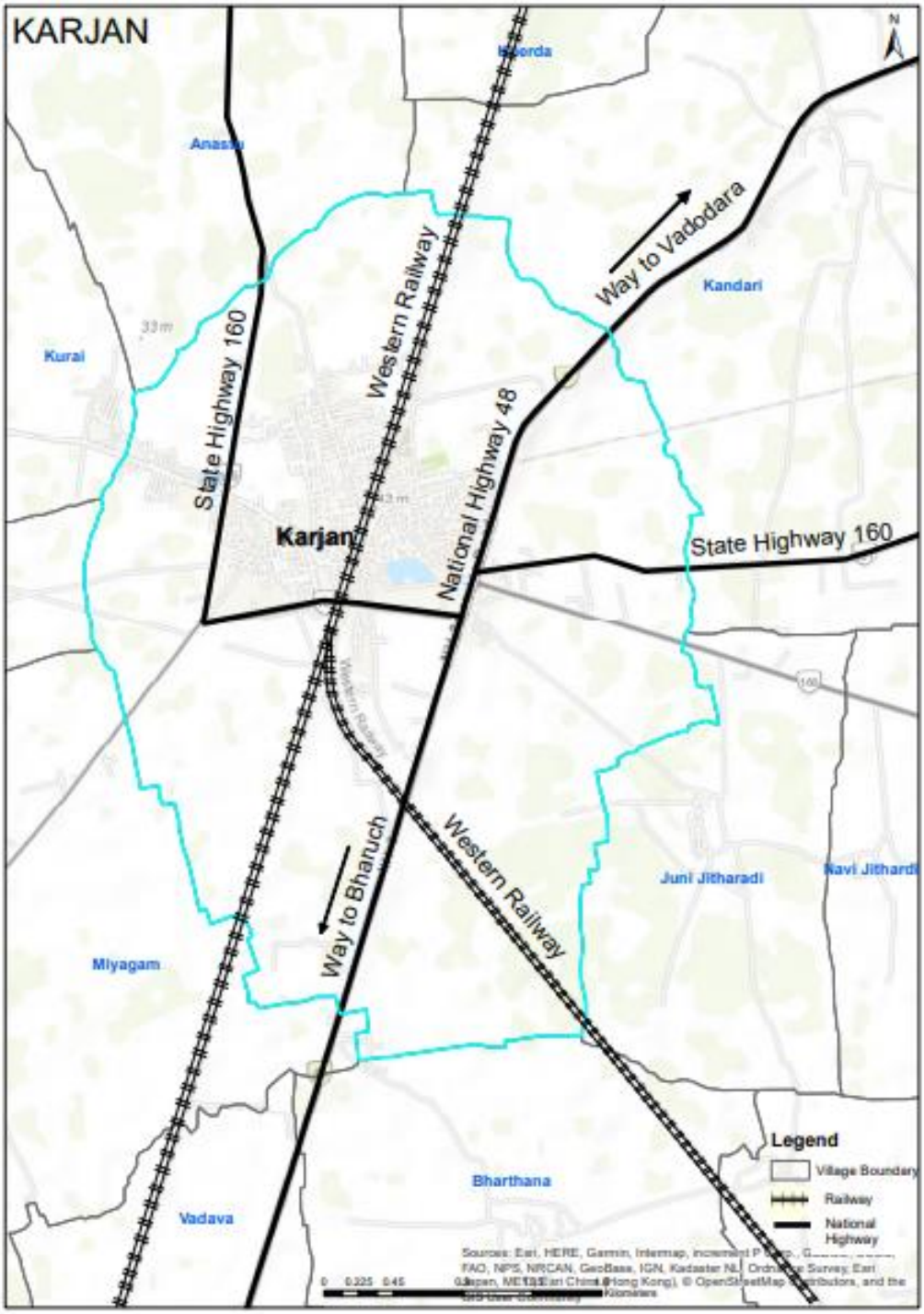


Figure 4-8: Transportation _Karjan

Source: Vadodara MSMEs Report (2016-17)

Area	Road Network (Length in km)			Railway
Karjan Taluka	Pacca	kachha	Total	Western Railway
	26.98	10.64	37.62	13

4.6 Karjan Industrial Development

From being a tribal region once, it has now developed into an industrial hub with major industrial companies setting up manufacturing bases in the region. Cosmo films ltd, TTK prestige, Tbea, Jindal rail, Saurer Textile Solutions Pvt Ltd.

As par Karjan Nagar Palika report, in Karjan, cotton & ginning factories has been developed but, accept of that there is a negligible development of the industrial sector. In Karjan there are 126.47 Ha. land is used in industrial sector which is around 8.28% of the toral area. From that only 28.08 % has been development. So, it`s important to development of industrialization. Karjan has broad gauge railway & it`s located at N.H. 48. From that south – west side land is declared as industrial development which is between the railway & highway. From last five years in Karjan Jindal company & Tbea has planted successfully.

Small Sectors in Karjan taluka:

Name	Products
Ashapuri agro seeds	Organic fertilizer, Organic bio-pesticides, Fungicide etc. Seeds like cotton, castor, tuver and other vegetables also.
G.S.F.C. fertilizers DEPO	Neem Urea, NPK, Gypsum, Ammonium Phosphate & Sulphate, etc.
Maruti agro	Agro And Tractor Parts
Mukesh fertilizers	Pesticides, Fertilizers and Seeds
The Karjan cooperative Cotton sale ginning	Cotton
Ruchi foods LLP	Freeze & dried ingredients and productions of fruits, vegetables, herbs, flowers, dairy products, etc.

Table 4-3: Small Sectors in Karjan taluka

Source: - Fertilizer Dealers in India (napanta.com)

Chapter 5: Data Collection & Analysis of the Study

5.1 Case Study

5.1.1 - Santosh Food Products, Ahmedabad – Gujarat State

- Established in the year 2015.
- "Santosh Food Products" are a leading Manufacturer of a wide range of Seasoning Powder, Tomato Powder, Caramel Colour, etc.
- It`s Manufacturer, Exporter and Supplier of Dehydrated Products and mango pulp, Dehydrated Vegetables, Dehydrated Vegetable Powder, Dehydrated Onion Flakes, Dehydrated Tamarind Powder.

Source: https://www.indiamart.com/santosh-food-products.html

5.1.2 Ghodawat Group – Maharashtra State

GHODAWAT Group: Successful agro based industry in rural area, Chipri (Jaysingpur) – Maharashtra State

1. Ghodawat Agro is India's No. 1 in the field of greenhouse-based supply of flowers production. Ghodawat Agro currently supplies more than a quarter of a million stems of flowers each day from approximately 60 hectares under greenhouses. Ghodawat Agro's offerings such global favourites as Roses, Gerberas, Lilies, Carnations, Gladioli, Bird of Paradise, Gypsophilla and many more to be launched.

Figure 5-1: Ghodawat Floriculture & Selling

Source of image: Google

2. Ghodawat Consumer Products: 'STAR' brand of consumer products are significant players in their markets today and enjoy tremendous consumer loyalty and preference. Ghodawat Consumer Products is on the cusp of explosive growth into other products and regions and aims to become one of the largest consumer brands on the sub-continent. The ISO 9001: 2000 accreditation has contributed to the acceptance of the 'STAR' brand by consumers across the Country. The Group currently produces more than 1000 MTPD of edible oils and supply triple refined, extra free flow, white crystalline, dirt-free salt conforming to IS: 7224 standards and mosquito repellents across the region. The group offerings Edible Oils - Soya, Sunflower, Groundnut and Cotton Seed, Salt and Mosquito Repellents.

Figure 5-2: Ghodawat Consumer Products

Source of image: Google

Sanjay Ghodawat Group has its presence in almost every field including agriculture, renewable energy and chemicals. A person starting from scratch and scaling great heights is not always a Bollywood story. Sanjay Danchand Ghodawat who heads the well-known Sanjay Ghodawat Group based in Jaysingpur, Kolhapur district has done it in real life. Rural development can only possible through establishment of agro based industries in rural area which help for the development of agriculture & rural economy & Ghodawat Group is a Successful Agro Based Industry in Rural Area.

For more information: - http://www.ghodawat.com/

5.2 Data Collection

Agriculture and its allied activities are the main occupation in the taluka. The main crop as followed by Cotton, Jowar, Castor Seed, Tuwer & Bajra.

Commodity	Annual Production	Average Daily Arrivals	Crop Season	Peak Season
Cotton	60000	500	Sept. to June	Dec. to March
Castor Seed	1700	50	Dec. to May	Jan. to April
Tur	1600	30	Dec. to March	Jan. to March

Table 5-1: Commodity wise annual Production

Source: https://agmarknet.gov.in/MarketProfile/MarketProfile.aspx

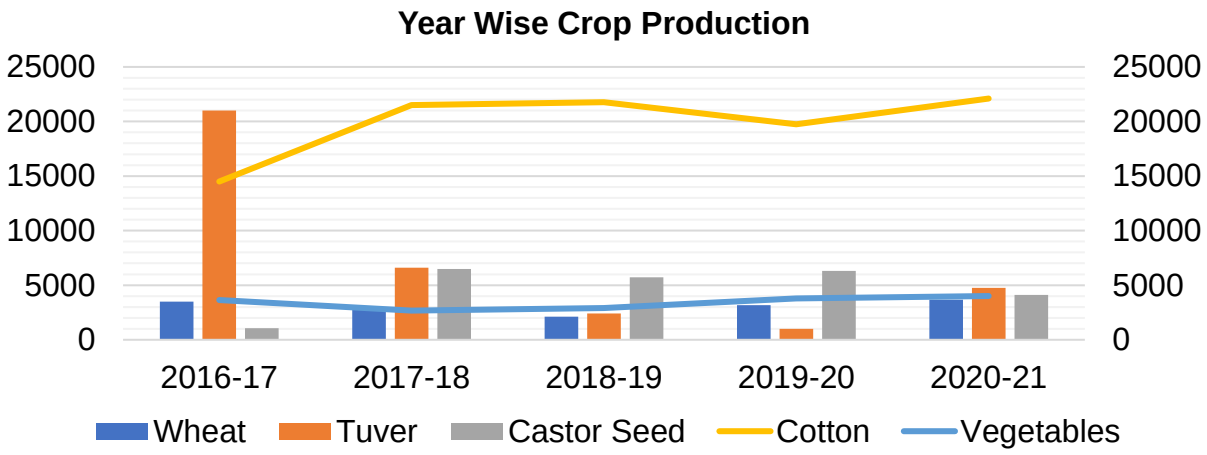


Figure 5-3: Year Wise Crop Production, Karjan Taluka

Source: Jilla Panchayat _Vadodara

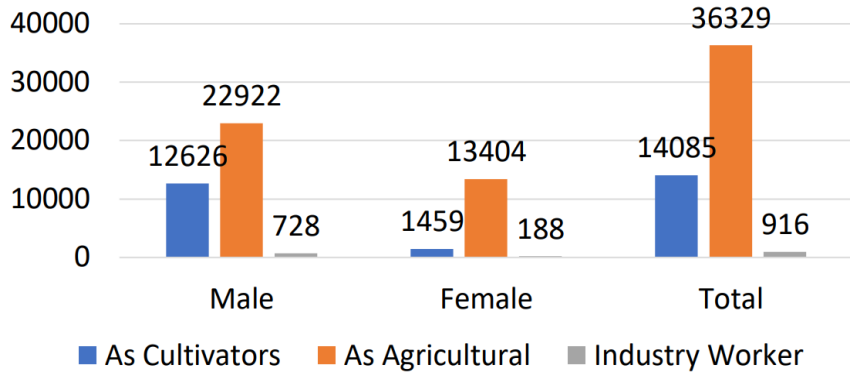


Figure 5-4: Workers Profile

Source: District Handbook _Vadodara

Take Aways:

- Non-Worker: 97536 (58.20%).
- Scope of agriculture due to availability of 85% cultivable land.
- Male are more engaged then female & Industry workers are less comparing to agriculture & cultivators.
- Few products like Cotton & Wheat are increasing, while Tuver, Castor seed are decreasing yearly.

In agriculture and its allied activities in the taluka as about 73% of the total workforce is engaged in it. Above table 5-2 shows different sectors wise working population. Whereas majorly population shows in agricultural workers as 36,329 & industrial workers are 916 & total workers are 51,330.

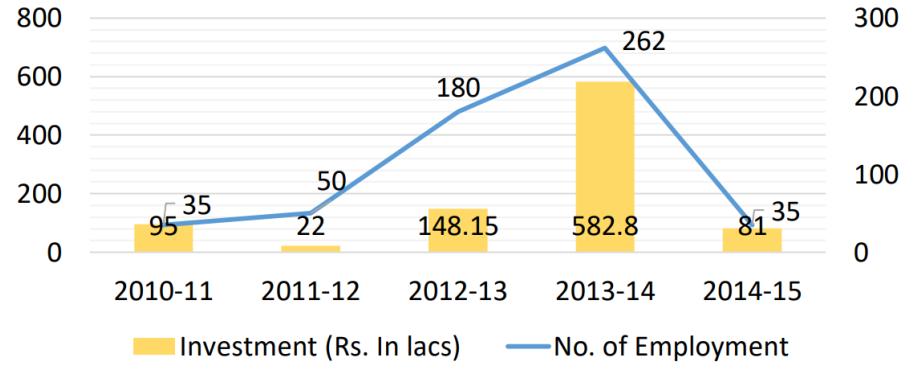


Figure 5-5: Micro enterprise acknowledge registered

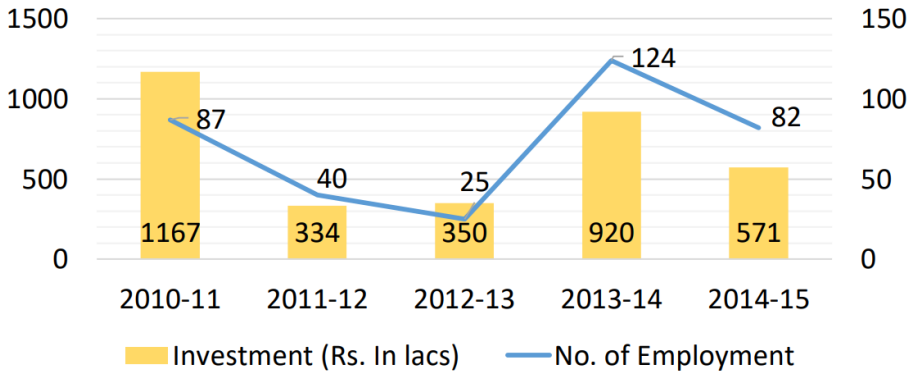


Figure 5-6: Small enterprise acknowledge registered

Source: Vadodara MSMEs Report (2016-17)

As per above shown year wise micro & small enterprise acknowledge registered so, we can say that in 2013-14 maximum industries were registered & maximum investment was made & in 2014-15 it falls down. So, it is inevitable need to again growing them up.

Take Away:

As investment increasing no. of employment also increasing.

5.3 SSI across the Karjan Taluka

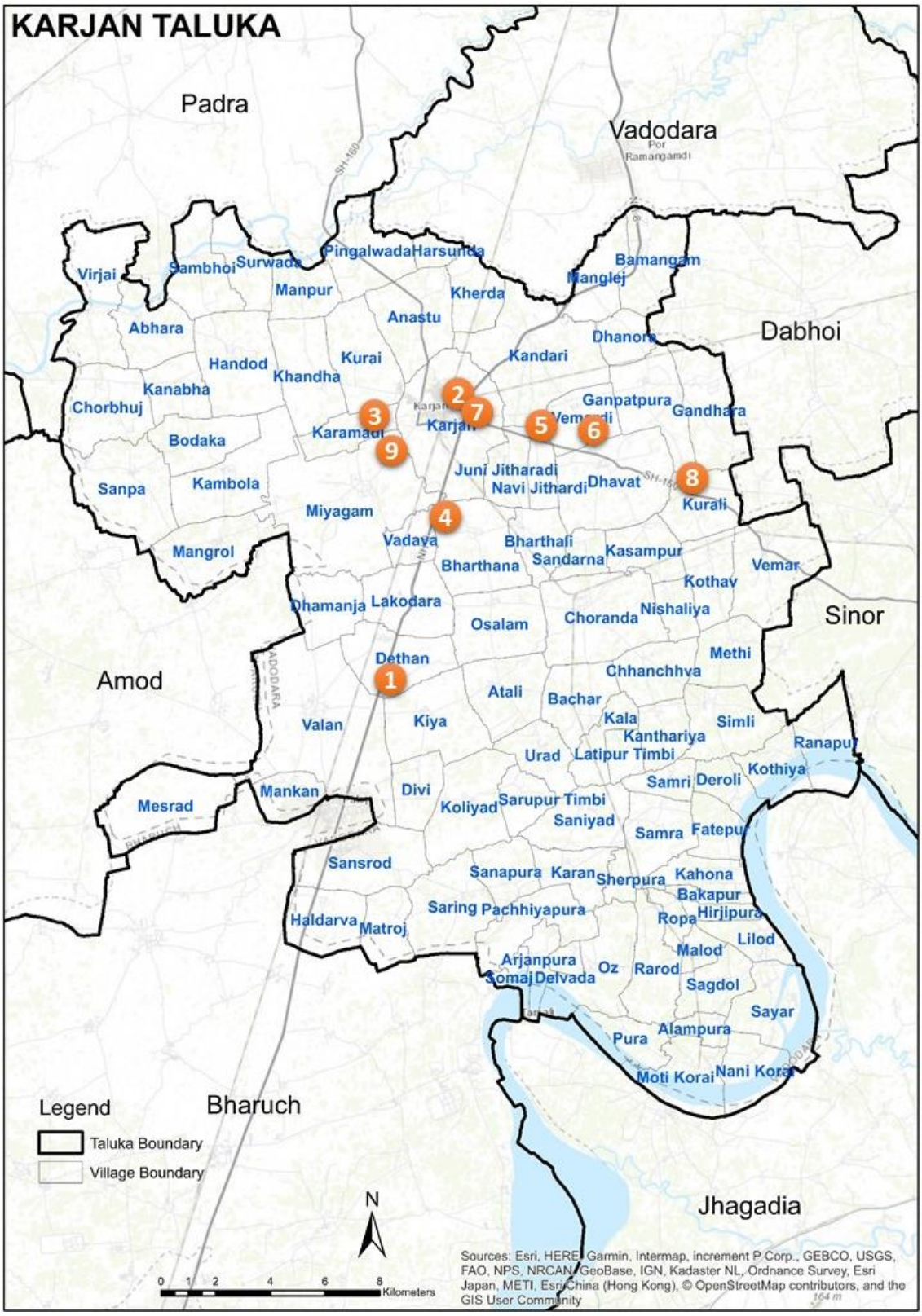


Figure 5-7: SSI Location _Karjan

Source: Taluka Panchayat _Karjan

Above map (figure 5-6) shows different numbers of SSI units in taluka. Their majorly productions are as tuver dal, wheat flour, grain cleaning, packaging of vegetables, sulphur powder, fruit jams, pickles etc. Below table shows SSI & its productions.

No.	Name of the SSI Units	Village	Production
1	Shree Agro Industry	Dethan	Tuver Dal processing
2	Rudra Agro	Karjan	Wheat Flour
3	Vikas Sahkari Mandali	Karamadi	Wheat & Tuver Cleaning
4	Ganesh Dal Mill	Bharthana	Tuver Dal, Grain processing
5	Act Agro Chemical Pvt. Ltd,	Navi Jithardi	Sulphure Powder
6	ICPL (Innovative Cuisine Pvt. Ltd.)	Vemardi	Manufacture of grain mill products, Starches & Starch products & Animal feeds
7	Kishan Green Mill	Karjan	Wheat & Tuver Cleaning
8	Madhav Agro Food Pvt. Ltd.	Kurali	Fruit Jams, sauces, Pastes, Pickles, Spice Mixes
9	Thakur Ago Processing	Miyagam	Wheat & Tuver Cleaning

Table 5-2: SSI across the Karjan Taluka

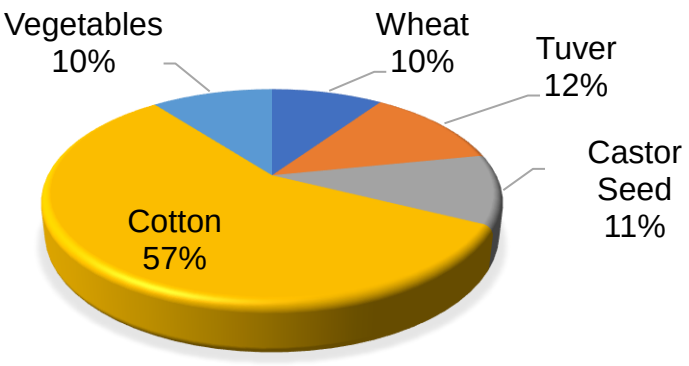


Figure 5-8: Agriculture Production – 2020

Processing Products by Agro Based SSI:

Wheat, Tuver, Vegetables

Take Away:

There is an absence of cotton & castor seed related SSI. Which grows majorly in Karjan taluka.

5.4 Interdependency of SSI, Karjan

Below figure 5-3 shows connectivity Karjan to other talukas & districts as Vadodara (37 km), Ahmedabad (150 km), Ankleshwar (56 km) and Surat (118 km)- the major industrial centres of Gujarat.

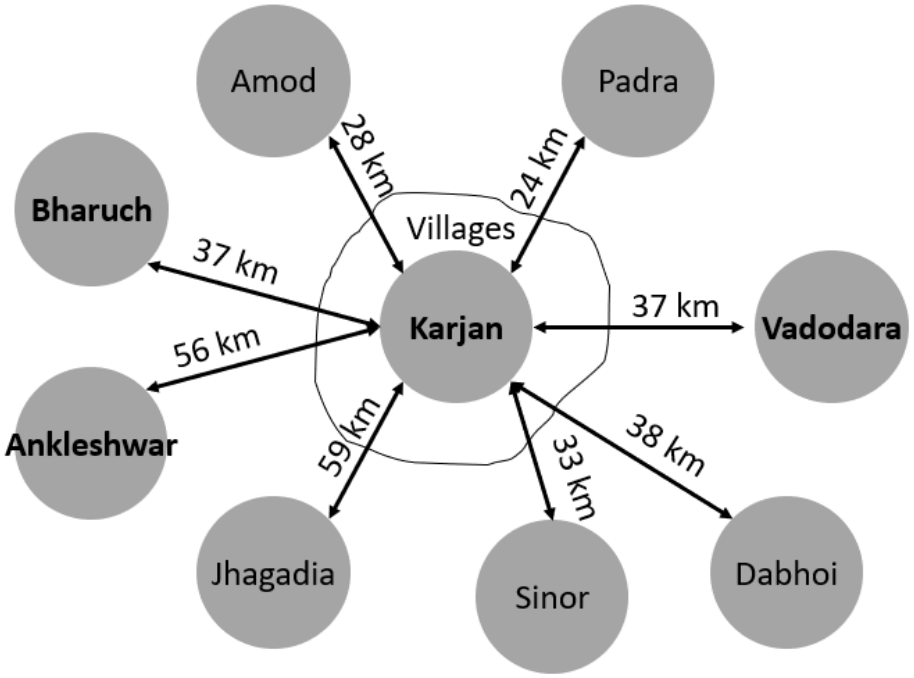


Figure 5-9: Connectivity to other Talukas & District

Agri production packaging export to the surrounding talukas as Vadodara, Padra, etc. From Karjan processed wheat are sell in the Karjan market & surround villages. Karjan import bio organic products used in farming from the Padra & Vadodara & sell to the Karjan taluka`s villages.

Food processing units import agriculture product from surrounding villages & after processing it export to the surrounding talukas of the main market. In Karjan, import of agricultural seeds from Vadodara & other agro units to store it & sell it & surrounding villages.

Below map (figure 5-9) shows interdependency of different SSI units in taluka.

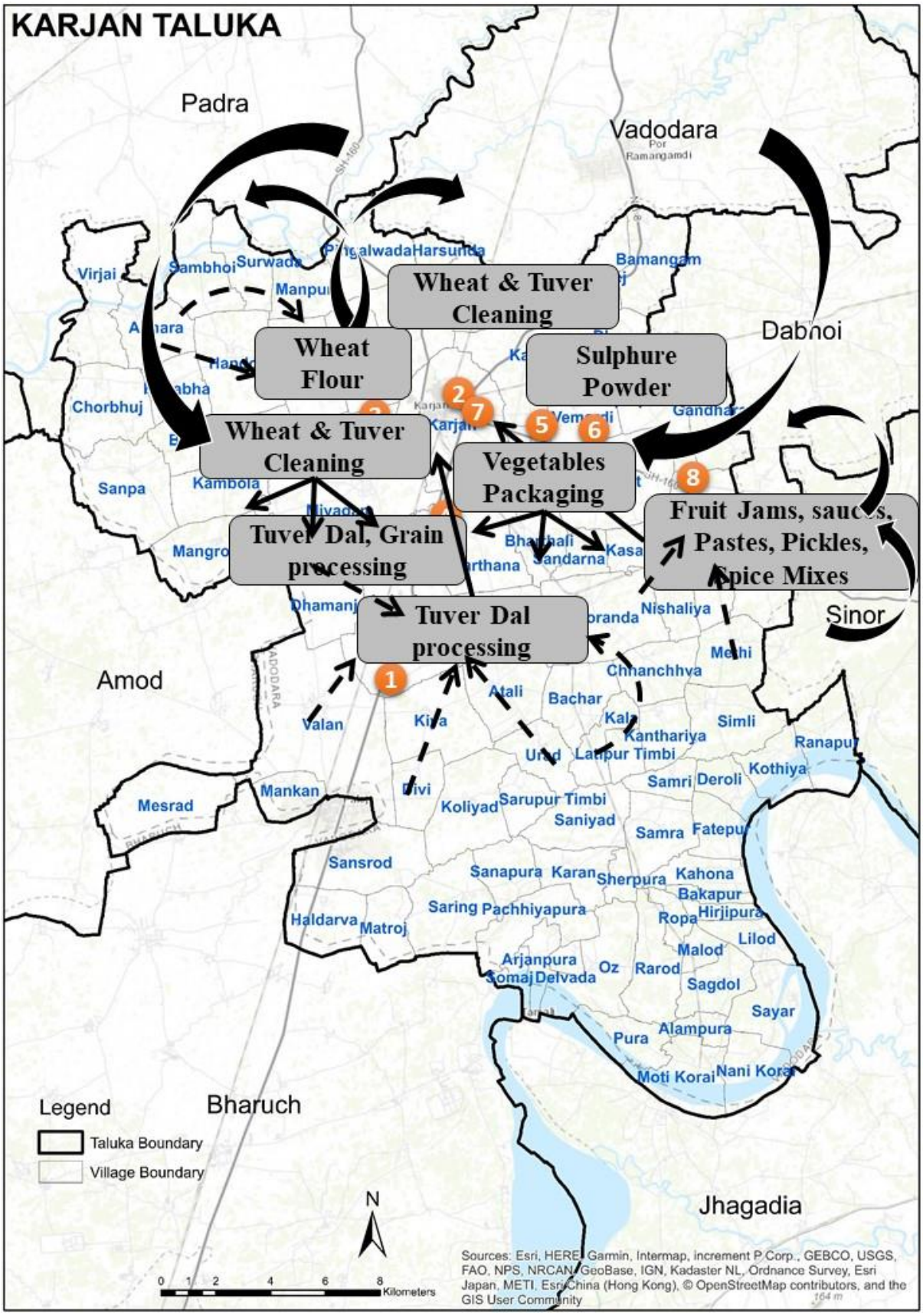


Figure 5-10: Interdependency of SSI

Source: primary Survey

5.5 Agro processing unites – Schemes & Yojanas

Name		Criteria	Status
Primary & Secondary Processing Unit		Large land holder farmers get 75% of the cost or 6 lakhs whichever is less. Medium land holder farmers get 50% of the cost or 4 lakhs whichever is less. Once in a 5 Year	Not used
Processing equipment		Farmers get 25% of the cost or 1 lakh whichever is less & S.C., S.T. farmers get 50% of the cost or 2 lakhs whichever is less.	Used by 2 farmers only
Cold Storage Unit	Chamber > 250 M. ton & Single temp. zone with max. capacity is 5000 M. ton	Unit cost – Rs. 8000 / M. Ton 35% of the total cost or max. Rs. 3500 / M. Ton	Not used
	> 6 Chamber & < 250 M. ton & basic equipment with max. capacity is 5000 M. ton	Unit cost – Rs. 10000 / M. Ton 35% of the total cost or max. Rs. 3500 / M. Ton	Not used
	Storage unit with more control atmosphere technology	Unit cost – Rs. 10000 / M. Ton 35% of the total cost or max. Rs. 3500 / M. Ton	Not used
Green house or Tissue Lab Elec. Rate		25% of electric bill or max. Rs. 1 lakh at 5-year max.	Not used
Cropping system-based training		Rs. 3500 / Session & for each training Rs. 14000 (4 session per training)	Not used

Table 5-3: Agro processing unites – Schemes & Yojanas

Source: Taluka Panchayat _Karjan

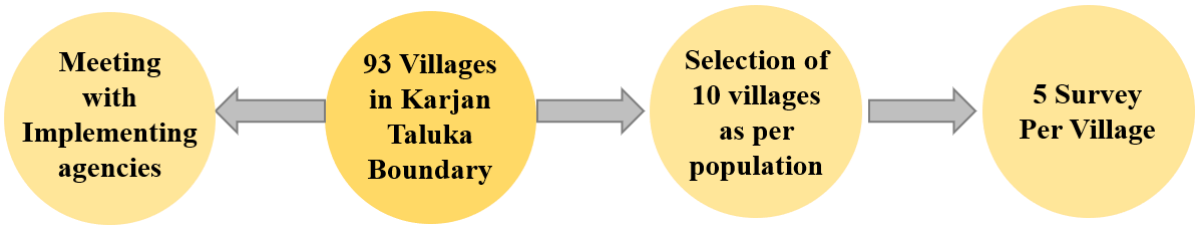
Take Away:

Poor awareness, cannot used by marginal or small farmers due to less land holdings or less income.

5.6 Primary Survey

There are 93 villages in Karjan taluka. Survey done as per selection of 10 villages by deciding criteria based on population. 5 Survey done per village.

- **No. of Villages having SHGs:** 39 out of 93 villages.
- **No. of Villages having Approach road:** 57 out of 93 villages.



Population Range	NO. of Villages
< 300	5
301 - 600	6
601 - 900	18
901 - 1200	19
1201 - 1500	13
1501 - 1800	9
1801 - 2100	9
2101 - 2400	6
2401 - 2700	3
> 2700	5

Table 5-4: Criteria for selection of Survey

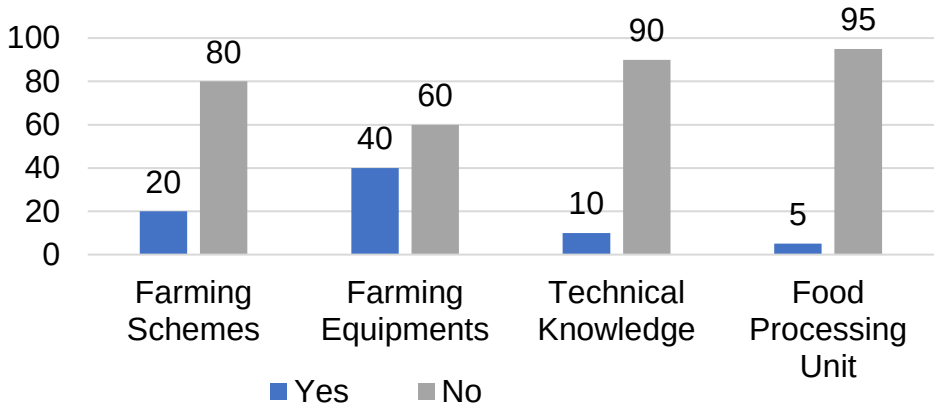


Figure 5-11: Awareness of Rural Farmers

Figure 5-12:Valan village farm

Take Away:

Poor awareness regarding farming schemes, farming equipment, technical knowledge & food processing Unit & there is an also poor existing of transportation.

Chapter 6: Gaps & Recommendation

6.1 Gaps

- Available yojanas not used / known.
- Absence of SSI for few major agro produces.
- Poor awareness of technical knowledge for setup & processing of MSME in authorities & farmers.
- No reserved plots for development of govt. based agro industry.
- Poor assistance in agricultural production to farmers from government & Self-Help Groups.
- Poor infrastructure to aid production, processing & transportation.

6.2 Recommendation

1. Incentives & Support Measures for set-up of agro processing plant.
2. Reservation of plots for government-based SSI through GIS mapping.
3. Provision of technical knowledge, training & awareness programs regarding agro processing small & medium scale industry & equipment.
4. Boosting agricultural production.
5. Proposing SSI for major agriculture productions.

6.2.1 Incentives & Support Measures for set-up of agro processing plant.

- Implementation agency **Agriculture, Farmers welfare & Corporation department**, Government of Gujarat under **"Agri – Implements subsidies".**
- Subsidy as 50% of total cost for setting up small scale agro processing plant.
- Electricity Duty concessions monthly 5%.

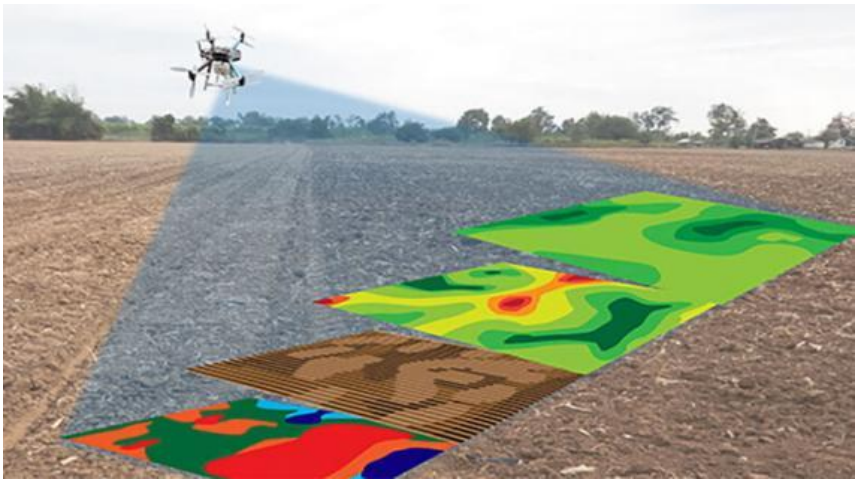
Criteria for allocation of subsidies for SSI:

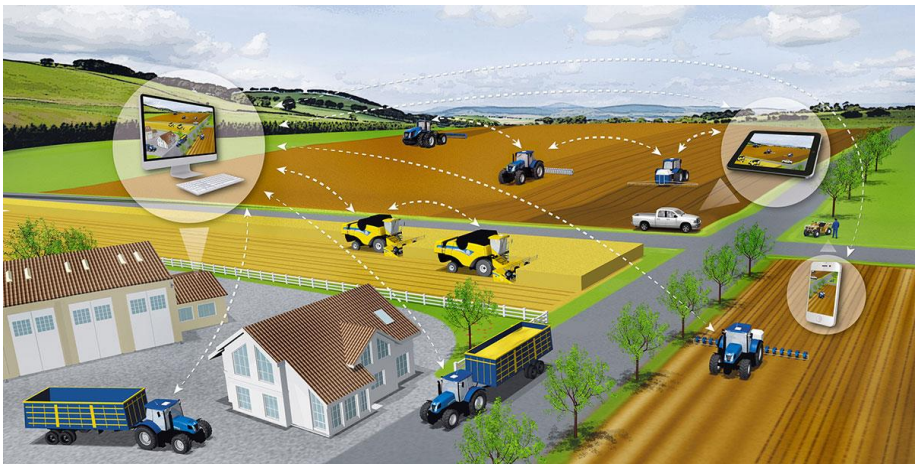
1. For farmers cluster with small land holdings: - One equipment for 8 small agricultural land holders.
2. For farmers cluster with medium land holdings: - One equipment for 4 to 5 medium agricultural land holders.
3. For farmers with large land holdings: - One equipment for 1 or 2 large agricultural land holders.

Note: Equipment/machine type as per need.

6.2.2 Reservation of plots for government-based SSI through GIS mapping.

- Implementation agency **National Informatics Centre**, Government of India under **"GIS and Utility Mapping Services".**





Functions:

- Make a Development Plan for Karjan taluka.
- Identify & allot plots to be reserved for industrial set-up.
- To reserve 10% of reserved plot land for set-up of agro processing plant.
- Medium & Large Scale agro processing plants to be provided.

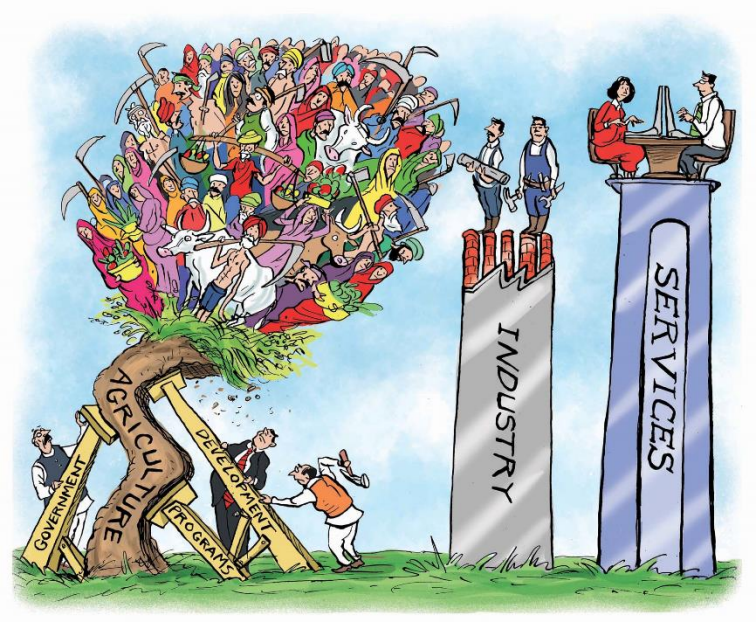
6.2.3 Provision of Technical Knowledge, Training & Awareness Program regarding Agro Processing Small Scale Industry & Equipment

- Implementation agency **Ministry of Food Processing Industries**, Government of India under **`Food Processing Training cum Incubation Centres & Technical & Skill Support`.**
- Training for the proper use of Farm Machinery and its routine maintenance and servicing.
- Offer modular skill training (Modern Farm/Agri. Techniques) opportunities to rural farmers and farm-women, based on local needs.

- Skill Development for efficient use of farm equipment like; Cultivator, Harrow, Trans planter, Baler, Seed drill, Mower, etc.
- A four times a year knowledge drive for sarpanch of each village. A monthly awareness drive for all farmers for promotion of agro based MSMEs.

6.2.4 Boosting agricultural production.

- Implementation agency **Ministry of Agriculture and Farmers' Welfare**, Government of India under `**Department of Agriculture Cooperation And Farmers Welfare`.**
- Many new cooperatives bank need to established by banking sector to provide loan facilities to farmer at low rate of interest.
- Kisan Credit card was introduced for purchasing of inputs required for agriculture like seeds, machines etc.
- Encourage and support to develop small scale technologies at village level.



- Potential applications in agriculture where technology could help improve productivity.
- To encourage the farmers to use modern methods of agriculture, Government provides various subsidies rates for inputs like irrigation, power, fertilizers etc.

MORE PRODUCTION → **MORE PROCESSED PRODUCTS** → **INCREASE IN EMPLOYMENT & ECONOMY**

6.2.5 Proposing SSI for major agriculture productions.

1. Cotton Seed Oil Unit

In that I have mention production targets, machinery equipment cost, total capital investment, & cost of production per annum. So, in total cost of equipment provision of subside as 50% as previous proposal.

Production Targets:

Basis of estimation: 300 Working Days in a Year Single Shift basis 8 hours per shift.

	Cotton Seed Oil
Quantity (Kg)	45000
Value (Rs)	4275000

Total Area	2000 Sq. Ft.
If constructed, constructed value	
If Rented, Rental value (per month)	5000 Rs

Machinery & Equipment:

Description	**Value (Rs.)**
9 Volt Expeller with accessories	1,50,000
Filter Press	
Suitable Boiler	

Steam Kettle	
Weighing Balance	
Hand Tools	
Furniture	
Sales Tax, Freight & Insurance etc.	15,000
Total	**1,65,000**

Total Capital Investment:

Building & Other Civil Works	-
Machinery & Equipment	1,65,000 Rs.
Working capital for one month	3,06,400 Rs.
Total	**4,71,400 Rs.**

Cost of Production (Per Annum):

Total recurring cost per year	36,76,800 Rs.
Depreciation on machinery & equipment	1,65,000 Rs.
Interest on total investment @ 10%	47,000 Rs.
Total	**38,88,800 Rs.**

2. Castor Seed Oil Unit

Implementation schedule for Castor Oil Production Unit:

Purchase of Land	Month
Completion of Building	3 Month
Ordering of Machinery	4 Month
Ordering of Machinery	2 Month
Term / W kg Loan Sanction	3 Month
Installation of Machinery	4 Month
Commissioning of Plant	1 Month
RM/Inputs Procurement	1 Month
Manpower Appointments	1 Month
Commercial Production	1 Month

Manpower requirement for Castor Oil Manufacturing Unit:

Technical Staff 5	5
Adm. Staff	4
Marketing Staff	4
Labour	20
Total	**33**

Castor Oil Manufacturing:

Building and civil works	Rs. 5,00,000
Plant and machinery	Rs. 16,00,000
Misc. Fixed Assets	Rs. 2,30,000
Preliminary and pre-operative expenses	2 Month
Term / W kg Loan Sanction	Rs. 2,20,000
Contingencies and escalation @ 5%	@ 5%: Rs. 1,18,000
Working capital	1,15,000
Total	**27,83,000**

Total investment:

Cotton Seed Oil Unit: 4,71,400/-

Castor Seed Oil Unit: 27,83,000/-

In total cost of equipment provision of subside as 50% as per previous proposal.

Appendix

Survey Questioner

Awareness of rural farmers, Karjan Taluka of Vadodara Dist.

Respected Sir / Madam,

The following is a survey conducted for Thesis of Mr. Kuldeepsinh V. Rana, Masters of Urban and Regional Planning, M.S.U, Vadodara. Survey is a set of very interesting questions to know your awareness about agriculture & their technology.

Please share your valuable few minutes, and specify your views and needs; so that we can understand about your village more precisely and recommend the needed. I assure you the data is used for study purpose and shall be confidential.

For any further queries or questions, please contact:

Department of Architecture & Planning,

M. S. University.

Vadodara - 390002, Gujarat, India

Thank You,

Mr. Kuldeepsinh V. Rana

Contact no: +91 7359177601

Name of Village: -

Name of Respondent & contact no.: -

Awareness about farming equipment: -Yes / No

If yes, what kind of equipments you used in farming.: -

Awareness about farming schemes or yojanas: - Yes / No

If yes, have you used any? - Yes / No

Which Schemes or yojanas you used?

Awareness about technical knowledge regarding farming: - Yes / No

If yes, what kind of techniques you used: -

Awareness about food processing unit: - Yes / No

If yes, what kind of unit you know: -

Presence of Self-Help Group in village: - Yes / No

If yes, what`s the status of SHGs: - Working / Partially working / Non-working

Do you have any recipe recommendations / suggestions?

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