COMPREHENSIVE DISTRICT AGRICULTURE PLAN (C-DAP)

DISTRICT BHAVNAGAR






सत्यमेव जयते

Department of Agriculture & Co-operation
Government of Gujarat
Gandhinagar

COMPREHENSIVE DISTRICT AGRICULTURE PLAN BHAVNAGAR DISTRICT

JUNAGADH AGRICULTURAL UNIVERSITY
JUNAGADH-362 001

AUGUST, 2012

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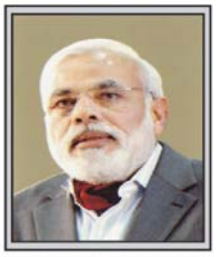

Narendra Modi
Chief Minister, Gujarat State

Dt. 01-08-2012

MESSAGE

Gujarat agriculture has recorded the fastest growth about 11 per cent amongst all Indian states, since 2000, which is more than three times agricultural growth at all India level (2.9 per cent per annum during 2000-01 to 2007-08). In the last decade the agriculture income of state farmers increased from Rs. 9,000 cores to Rs. 80,000 cores. Agriculture in Gujarat is a success story for other states to emulate. An important question facing Indian policy makers at the centre as well as states is how to promote faster and more inclusive agricultural growth. Due to significant regional disparity in agricultural growth across the state, it became imperative to prepare micro level planning and understand the drivers of this high growth in agricultural sector in Gujarat.

In spite of increase in cropping intensity, crop production and productivity in the post green revolution period, there exists ample scope to enhance the production by interventions of modern technologies and capacity building of the farmers. Planning receives equal importance in the process of development with that of investment and execution. An appropriate planning has several advantages such as adequate capital investments, less gestation period, better flow control and farmers friendly. Therefore, ways and means need to be planned at micro level to augment the resources is highly essential to increase crop productivity and farm income. Hence, in order to implement the State and Central Government schemes by formulation of action plans and utilizing the resources efficiently, the **Comprehensive-District Agriculture Plans** (C-DAP) have been prepared for each district of Gujarat State.

The task of preparing the C-DAP of all districts of Gujarat state has been given to State Agricultural Universities of Gujarat. In this context, **Junagadh Agricultural University, Junagadh** has prepared the plans for seven districts of Saurashtra region. I appreciate Dr. N. C. Patel, Vice Chancellor and the team of Junagadh Agricultural University for putting their inclusive efforts in preparing the C-DAP.

In my opinion, these Comprehensive District Agriculture Plans are unique Endeavour for reducing the yield gap in important crops and increase production and productivity in agriculture and allied sectors through focused and holistic initiatives. The C-DAPs also suggesting way forward to various government agencies working for the benefit of the farmers in using the resources judiciously to enhance farm productivity and income.

(Narendra Modi)

To,
Dr. C. J. Dangariya, The Research Director,
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Narendra Modi
Chief Minister, Gujarat State

Minister for Agriculture, Co-operation,
Animal Husbandry, Fisheries,
Cow-breeding, Prison, Law and Justice,
Legislative and Parliamentary Affairs
Government of Guajarat.

Date : 31 JUL 2012

Dileep Sanghani

Message

In India, with the green revolution period from the mid-1960s to 1991, the agricultural sector grew at 3.2 per cent, but despite the changes in the macro-economic policy frame work and trade liberalisation, Indian agricultural sector did not experience any significant growth subsequent to the initiation of economic reforms in 1991; nor has the new macro-economic policy frame work resulted in accelerating agricultural growth. In fact, Gujarat agriculture has a record growth of about 11 per cent since 2000 in spite of 2.9 per cent per annum growth at all India level and in last decade the agricultural income of state farmers' increased by ten times, which has presented a role model for others to follow.

Government of Gujarat has launched various innovative schemes to accelerate the growth in the agriculture and allied sectors and to implement this, formulation of action plans by means of developing Comprehensive-District Agriculture Plans (C-DAP) have been undertaken. Junagadh Agricultural University, Junagadh has prepared the C-DAP for seven districts of Saurashtra region, which comes under its jurisdiction. I convey my hearty congratulations to Dr.N.C. Patel, Vice Chancellor; Dr.C.J. Dangariya, Director of Research and Dean, P.G.Studies and their team for their deterministic approach in preparing the C-DAP.

Comprehensive District Agriculture Plans will become a torch bearer for the implementing agencies in the field of agricultural education, research and programme execution by utilizing the resources effectively. Saurashtra agriculture sector will get faster and more inclusive agricultural growth, which helps in increasing farm income and up gradation of livelihood of the farmers in the region.

Dileep Sanghani

(Dileep Sanghani)

To,
DR. N. C. PATEL
Vice-Chancellor,
Junagadh Agricultural University
JUNAGADH-362 001.

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A. K. JOTI, *IAS*
Chief Secretary

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Message

The Gujarat government envisages agricultural production through focused and innovative agricultural development programmes which resulted in extra ordinary average agricultural growth rate of above 10 per cent during last decade and presented a role model in the field of agricultural development in India. However, instead of saying how much Gujarat has done, we shall see how much remains to be done. We are at important stage of agricultural transformation and looking at 12th plan as an opportunity for making appropriate change and formulate winning strategy to make agriculture more rewarding and remunerative.

As per directives of the National Development Council, the State agricultural plan should be based on district plans, subject to all available resources from its own plan and adding those available from the Central Government, aimed at achieving the State's Agricultural growth objective, keeping in view the sustainable management of natural resources and technological possibilities in each district. Accordingly, Gujarat has prepared micro level planning in the form of a document entitled Comprehensive District Agriculture Plan (C-DAP). During the last decade a silent agricultural revolution has emerged in Gujarat, with a shift from traditional subsistence to modernized/ mechanized farming, which stove to inject technology lead diversification within agriculture. The major areas of focus in the C-DAP are integrated development of major food crops, agricultural mechanization, strengthening of market infrastructure and marketing development, activities relating to enhancement of horticultural production and popularization, micro irrigation systems and development activities in sector of animal husbandry and fisheries. The State Agricultural Universities (SAU) of Gujarat have worked as nodal agencies for preparation of the C-DAPs. For seven districts of Saurashtra region, Junagadh Agricultural University, Junagadh has prepared the plans. I complement the efforts made by JAU to come up with C-DAP of districts having potential to transform Gujarat agriculture towards sustainable and remunerative agriculture.

I am sure that the forward looking approach and proposed strategies presented for each district of Saurashtra by Junagadh Agricultural University would bring a substantial change in agriculture to further accelerate the agricultural growth of Gujarat.

(A. K. Joti)

Vice Chancellor
Junagadh Agricultural University
Junagadh

Date: August 9, 2012

Message

Gujarat has recorded the highest decadal agricultural growth rate of 10.97 % in the period 2000-01 to 2009-10. Gujarat has the highest productivity in the country for the crops grown in Saurashtra such as cotton and castor and second highest productivity in groundnut and bajra. To enhance the agricultural productivity further, a comprehensive planning is required. The task of preparing the Comprehensive-District Agriculture Plan (C-DAP) for 7 districts of Saurashtra region had been given to Junagadh Agricultural University, Junagadh by the Government of Gujarat. The C-DAP focused on integrated development of major food crops, cereals, oilseeds, fiber crops, horticultural crops, vegetables and spices. It also included the agricultural mechanization, use of micro irrigation systems, watershed development activities, protected cultivation, infrastructure and development in animal husbandry & fisheries sector, market infrastructure & marketing development.

I am extremely glad to see the well content Comprehensive-District Agriculture Plan prepared for Bhavnagar District. It is an outcome of fruitful discussions and criticism; I convey my hearty congratulations to Dr. C.J. Dangariya, Director of Research and Dean, P.G. Studies, I U. Dhruj, Dr. P. Mohnot, Dr. P. K. Kapadiya and all the members of committee of Agri. Res. Station (Fruits), JAU, Mahuva who have contributed for preparing the Comprehensive District Agriculture Plan (C-DAP) of Bhavnagar district. These plans will become the guidelines for the scientists, officials and executers of line departments of agriculture and allied sector. By proper execution of C-DAP in 12th five year plan, the Saurashtra region of Gujarat will take the advantage to increase its crop production, productivity and ultimately the farmers' income.

(N. C. Patel)

Dr. C. J. Dangaria
Director of Research & Dean, P. G. Studies
Junagadh Agricultural University
JUNAGADH - 362 001

FOREWORD

The District Agriculture Plan indentifies the problems, needed interventions and the financial requirement for the developments in Agriculture and allied sectors viz. Horticulture, Agricultural Engineering, Animal husbandry, Fisheries and Agricultural marketing and Agricultural business. The plan documents have identified the major thrust areas in agriculture and allied sectors for achieving the envisioned growth in the district and also in Gujarat state. The task of preparing the Comprehensive-District Agriculture Plan (C-DAP) for seven districts of Saurashtra region had been given to Junagadh Agricultural University, Junagadh by the Government of Gujarat. The Saurashtra area is divided in four agro climatic zones *viz*. North Saurashtra Agro-climatic zone, South Saurashtra Agro-climatic zone, part of North-West Agro-climatic zone and part of Bhal & Coastal Agro-climatic zone.

State level meeting of SAUs of Gujarat was held at AAU, Anand under the chairmanship of Shri R. K. Tripathi, IAS, Principal Secretary, Department of Agriculture & Co-operation, Government of Gujarat who provided valuable guidance and direction in bringing out this plan document. Subsequently several meetings were held at Junagadh Agricultural University during the last few months. Coordination committee, district plan preparation committee and plan finalizing team of JAU made concerted efforts in shaping up the District Agriculture Plans. Hon'ble Vice Chancellor, Junagadh Agricultural University, Dr. N. C. Patel has played active role in the sensitising the meetings held at JAU.

I congratulate Dr. P. K. Kapadiya, Dr. I. U. Dhruj, Dr. P. Mohnot, the members of committee and all the scientists of Agri. Res. Station (Fruit Crops), Junagadh Agricultural University, Mahuva who have contributed for preparing the Comprehensive District Agriculture Plan (C-DAP) of Bhavnagar district. I appreciate the officials from line departments for extending the help to the university scientists in bringing out the valuable action plans for each district. The C-DAP document narrates key challenges and opportunities in making the agriculture more remunerative and sustainable and provides solid basis of appropriate strategies to articulate role of all the stakeholders in achieving sustainable agricultural growth. It is envisaged that all the stakeholders, viz., line departments, government institutes, co-operatives, private sectors, NGOs and farmers will implement the plan with zeal and required thrust to achieve a still better growth in agriculture and allied sectors during XII plan in Gujarat State.

Junagadh
July 31, 2012

(C. J. Dangaria)

PREFACE

The Comprehensive District Agriculture Plan (C-DAP) of Bhavnagar district is brought out for the developments in Agriculture and allied sectors viz. Horticulture, Animal husbandry, Fisheries, Forestry, Agricultural marketing and Agricultural business based on the details provided by the scientists of Agriculture Research Station (Fruit Crops), Junagadh agricultural University, Mahuva and the line department officials of the Bhavnagar district. The Government sponsored various on-going schemes and programmes in the development of agriculture have also been dovetailed in the preparation of plan. Keeping in view, the Government of Gujarat approach of Apno Taluko Vibrant Taluko (ATVT), the taluka-wise plans were prepared and subsequently, a Comprehensive District Agriculture Plan (C-DAP) was prepared by integrating these taluka plans.

My sincere thanks and profound gratitude are due to Shri R. K. Tripathi, I.A.S., Principal Secretary, Department of Agriculture and Cooperation, Government of Gujarat, Gandhinagar who is instrumental in integrating the multi-level functionaries and providing valuable directives and guidance in bringing out this plan document. It is my privilege to express the deep sense of gratitude to Dr. N. C. Patel, Hon'ble Vice Chancellor, Junagadh Agricultural University, Junagadh for his valuable guidance and wise advice for the completing this work successfully. I express my thanks to Dr. B. R. Shah, Director of Agriculture, Dr. B. S. Patel, Director Department of Horticulture and Dr. A. J. Kachhiyapatel, Director Department of Animal Husbandry, GoG, Gandhinagar for supplying the required information for the district plan. I express my deep sense of gratitude to Dr. T. P. Singh, Director BISAG, Gandhinagar and his colleagues for providing the thematic maps and other geo-information support for the plan.

I am thankful to the District Collector, Bhavnagar, who has been instrumental in providing the felt needs of the farmers and other stakeholders. The help and full cooperation rendered by District Development Officer, Zilla Panchayat Bhavnagar and the line department officials of Agriculture, Horticulture, Animal Husbandary, Fisheries, Statistics, DRDA, ATMA, FTC, Forestry, Watershed and Lead Bank, SBI etc. of the district is highly appreciable. Without their assistances, the formulation of the plan would not have materialised.

My sincere thanks to Dr. C. J. Dangaria, Director of Research and Dean, P.G. Studies, both ADRs Dr. I. U. Dhruj & Dr. P. Mohnot, Dr. V. V. Rajani, Dr. B. B. Ramani as well as all the professors and research scientists of Junagadh Agricultural University for their technical support, supply of needed inputs without which the time schedule in preparing the document could not have been adhered to. Sincere thanks to all the Principals and Deans of the colleges, Agriculture, Veterinary Science & Animal Husbandry, Fisheries, Agril. Engg. & Tech., and PG Institute of Business Management, Junagadh Agricultural University for their cooperation and valuable support in preparation of plan documents.

Special thanks are due to Shri. R. L. Chitroda and Shri. H. J. Senjaliya Member Secretary and all committee members of C-DAP district Bhavnagar Shri. K. H. Ribadiya, Shri. H. P. Ponkia, Shri. A. S. Kotiya, Shri. P. R. Tank and Er. H. N. Dalsania, Agri. Res. Station (Fruits), JAU, Mahuva for their sustained support in the preparation and documentation of the taluka and district plans.

Date: 25.08.12
Place: Mahuva

(Panchabhai K. Kapadiya)
Convener & Research Scientist
Agriculture Research Station (Fruits)
Junagadh Agricultural University, Mahuva

EXECUTIVE SUMMARY

In India during the pre-green revolution period, from independence to 1964-1965, the agricultural sector grew at annual average of 2.7 per cent. This period show a major policy thrust towards land reform and the development of irrigation. With the green revolution period from the mid-1960s to 1991, the agricultural sector grew at 3.2 per cent during 1965-1966 to 1975-1976, and at 3.1 per cent during 1976-1977 to 1991-1992. But despite the changes in the macro-economic policy framework and trade liberalization, India's agricultural sector did not experience any significant growth subsequent to the initiation of economic reforms in 1991. In fact, except for a short period 1991-92 to 1996-97, when because of a highly favourable international climate, agricultural exports rose sharply, the agricultural sector has not derived the expected benefits from trade liberalization. Nor has the new macro-economic policy framework resulted in accelerating agricultural growth. In fact, when compared with the immediate pre-liberalization period 1980-81 to 1990-91, agricultural growth in India recorded a visible deceleration during the post-liberalization period 1990-93 to 2003-06. keeping above in view, The National Development Council (NDC) has resolved that a special Additional Central Assistance Scheme, named National Agriculture Development Programme (NADP) or Rashtriya Krishi Vikas Yojana (RKVY) be launched to overcome the slow growth in the agriculture and allied sectors. To implement this, formulation of action plans by means of developing District Agriculture Plans (DAP) is recommended. Subsequently, a comprehensive State Agriculture Plan (SAP) would be prepared by integrating these DAPs.

To prepare the comprehensive District Agriculture Plan (C-DAP) for Bhavnagar district the major areas of focus were integrated development of major crops like Cotton, Groundnut, wheat, coarse cereals, minor millets, pulses and oilseeds; Farm mechanization; Strengthening of Market Infrastructure and Marketing Development; Activities relating to enhancement of Horticultural Production; Popularization of Micro Irrigation Systems; Animal Husbandry and Fisheries Development activities.

Several meetings were held at various Taluka of Bhavnagar district to discuss the various components of the District Agriculture Plan in the presence of stakeholders viz. Taluka Panchayat Officials, line department officials, Panchayat leaders and progressive farmers. The feedback received in the Meetings was incorporated before finalization of the District Agriculture Plan.

District Agriculture Plan for Bhavnagar District

Geographically, the Bhavnagar district is in agro climatic zone VI (South Saurashtra), VII (North Saurashtra) and VIII (Bhal and Coastal area) sub region of Gujarat. Bhavnagar is located near the Gulf of Cambay in the Arabian Sea, a part of Saurashtra peninsula, in central part of Gujarat under seismic zone III. Proximity of Bhavnagar with commercial districts of Ahmedabad, Rajkot, and Amreli has made the district an important industrial location. The district has 11 talukas for administrative purpose out of that major ones are Bhavnagar (District Headquarter), Shihor, Talaja, Mahuva, Botad, Palitana, Ghogha and Vallabhipur.

The average annual rainfall (2001-2010) receives from 517 to 836 mm, however scantly and erratic and uneven rainfall pattern is not uncommon. The total geographical area of the district is 8.19 lakh ha. out of which 69.23 % (5.67 lakh ha.) is net sown area. The district had little area (3.6 % and 0.20 lakh ha.) under forestry. National sanctuary for Black buck is in Bhavnagar district.

The Cultivable waste, current fellow and other fellow lands which are present in the district to the extent of 9.0 per cent (0.73 lakh ha.) of the total geographical area have to be reclaimed so that the net sown area could be increased. The 3.6 % area (0.20 lakh ha) of the district is under forest and could be increased if area under pasture land utilized for the same. There is a need to improve the pastures along with social forestry in the district, which occupies about 7.39 % of the total area.

Strategies to Achieve the Objectives of DAP for Bhavnagar District

Development of suitable technologies such as varietal improvement, input management supported by a strong institutional arrangements for the supply of inputs like seed, fertilizers, plant protection chemicals, credit, etc, price support system favourable to farmers and market infrastructure for major crops like groundnut, cotton, wheat, bajra, sorghum, sugarcane, horticultural crops, vegetables, spices and fodder crops.

- Development of minor irrigation with drip irrigation system.
- Mechanization of farms with tractor operated – combined harvester, cotton slicer, etc.
- Strengthening water harvesting structures like farm ponds and check dams.
- Reclamation of problematic saline/alkaline and fallow / degraded lands.
- Training and exposure visit to the farmers, traders, and other stakeholders on grading, post harvest technologies, value addition and market intelligence.
- Strengthening the extension machinery for effective dissemination of technology.
- Strengthening of rural markets with storage facilities.
- Strengthening of farmers' market with additional storage facilities.
- Establishment of cool chains for better distribution of milk.
- Establishment of cattle feed units.
- Inland fisheries development in major tanks and reservoirs.
- Processing units for marine fish (catch).

District Agricultural Plan

In order to dovetail the components and magnitude of the ongoing schemes implemented by the line departments as far as agriculture was concerned, in Part I scheme, schemes like Procurement of groundnut, wheat, cotton, Millet seeds, Pulses, green manure seeds, Biological Control in Groundnut and Coconut, Integrated Cotton Development, Increasing the Production of Oilseeds, Production and distribution of Micro Nutrient mixtures and Bio-fertilizers were taken up. Under Part II Schemes, schemes like conducting Crop Cutting Experiment, kits for Taluka level, strengthening of Pesticide Testing Laboratories and infrastructure at government coconut nurseries were taken up. Under centrally sponsored schemes, purchase of breeder seeds, subsidizing foundation and certified seeds, conducting demonstration and farmers' training, distribution of bio fertilizers and bio control agents and Seed Village Programme were taken up.

Agricultural development of a district can be well represented by composite indices which are used as yardsticks not only to gauge the development of each district but also to compare its

performance in relation to other districts. The analysis was performed to highlight the Strength, Weakness, Opportunities and Threats (SWOT) of Bhavnagar district.

Bhavnagar city, the Head-Quarters of Bhavnagar District, is well connected by rail and bus routes to major towns of the neighboring states. A variety of agricultural and horticultural crops are grown round the year. Mahuva taluka of Bhavnagar district is known for the presence of Onion dehydration industries. Because of industrialization and migration of people, resulted in a great shortage of agricultural labourers.

Bhavnagar district is a drought prone district with erratic and less than normal rainfall recorded during the past several years. Most of the rivers in this district are dry for years together. This has resulted in over exploitation of ground water through open wells and deep bore wells. The area under the waste and fallow lands in the district also was around one – fifth of the total geographical area.

The line departments like Agricultural University, Agriculture, Horticulture, Animal Husbandry, Fisheries, NABARD, DRDA and Agricultural Marketing have proposed the developmental projects to be taken up under various agriculture and allied sectors during XII Plan Period in Bhavnagar district and the financial outlay is given in the table below:

Budget Details for Activities Proposed in the District Agriculture Plan (Rs. in lakh)

Budget proposal head-wise	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Agriculture	13533.02	13555.02	14235.02	14929.52	15747.52	**72000.1**
Horticulture	1284.34	1628.13	1468.69	1418.84	1290.34	**7090.35**
Animal Husbandry	1838.51	998.87	998.41	1002.57	1002.57	**5840.93**
Forestry	121.6	121.6	146.6	121.6	121.6	**633.00**
Fisheries	144	336	266	265	235	**1246**
Employment Generation Activities	2102.58	2119.52	2102.58	2087.58	2092.58	**10504.84**
New Innovative Projects	1804.15	2594.15	1654.95	1489.15	1399.15	**8941.55**
Grand Total (Rs in Lakh)	**20828.2**	**21353.29**	**20872.25**	**21314.26**	**21888.76**	**106256.8**

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CHAPTER I

INTRODUCTION

1.1 General:

India's policies should be shaped to take the full advantage of present emerging realignment of economic power; the slowdown of industrialized countries and gaining weight of emerging market economies, were the directives emerged from the Prime Minister's inaugural address in the National Development Council (NDC) held at New Delhi in 2011. Therefore, our policies in the 12th five year plan must stands to gain on both counts. Seventy per cent of the Gujarat State population is either wholly or significantly dependent for their livelihoods on agriculture, horticulture, animal husbandry or fisheries. The Gujarat Government envisages agriculture promotion through focused agricultural research, and technological interventions. Government of Gujarat has planned several initiatives in the back drop to achieve the current agricultural growth rate of about 11% and have carved a niche in the field of agricultural development in India, when the country's growth rate is less than 3%. Agricultural income of state farmers' risen from Rs. 9000 crores to Rs. 80,000 crores in last 10 years, not denying the fact that the state received normal rains during last decade, which also holds true for most of the states of the country.

As per the agenda- VII of the 5th meeting of Gujarat State Level Steering Committee (SLSC) held on May 26, 2011, it was directed to prepare the Comprehensive District Agriculture Plan (XII five year plan) by the Agricultural Universities for all the districts under their jurisdiction. These plans present the vision for agriculture and allied sectors within the overall development perspective of the district apart from financial requirement and the sources of financing agriculture development plan in a comprehensive way, in order to revive the agriculture during XII plan with a growth rate of more than 4 per cent per annum has to be achieved (as per NDC commitment). The DAP, therefore could integrate multiple programmes that are in operation in the district concerned, include the resources and activities indicated by the state, combine the resources available from the other programmes.

1.2 Objectives and Expected Outcomes:

Keeping above points in view, the present database/information systems were developed with the following objectives:

- Analysis on the existing farming practices to identify the development opportunities and potentialities for employment generation in agriculture and allied sector.
- Collection and analysis of secondary data on agriculture and allied sectors and documentation of existing marketing pattern.
- Identification of production constrains and technological gap for understanding prevailing agricultural and allied situations in the district.
- Formulation of strategies and action plan for different agricultural production systems to increase productivity, production and farm income.

1.3 Agricultural Scenario of Gujarat State:

Gujarat has geographical area of 19.6 M ha, out of which 55.10 per cent is under agriculture land i.e.10.8 Mha. The major Crops grown in the state are wheat, bajra, rice, maize, groundnut, mustard,

sesame, pigeon pea, green gram, gram, cotton and sugarcane. Gujarat is the largest producer of castor, fennel, tobacco and isabgul (psyllium) whereas it is second largest producer of sesame seeds, cotton and groundnut in the country. Gujarat has highest productivity in mustard, castor and cotton, also has second highest productivity in groundnut and bajra, records third highest productivity in gram and guar in the country. Horticultural crops are grown in about 14.04 lakh ha, the major crops are mango, banana, sapota, lime, guava, tomato, potato, onion, cumin, garlic, isabgul and fennel. In the country, Gujarat has highest productivity in guava, potato, onion, cumin and fennel and third highest productivity in banana and isabgul. In 2001, Gujarat produced 23 lakh bales of cotton, but today the figure stands at 123 lakhs bales (one bale equals 170 kg).

Gujarat State Horticulture Mission (GSHM) has been set up for implementation of National Horticulture Mission (NHM) in the state. The area and production of horticultural crops was 14.04 lakh ha (5.1 % of total cropped area) and 180.16 lakh MT respectively in 2010-11. The production of fruits, vegetables and spices & flowers were 74.73 lakh MT, 93.79 lakh MT and 11.64 lakh MT respectively during year 2010-11. Gujarat state is leading in the production of banana, mango, sapota, onion, potato & seed spices (cumin & fennel) in the country. Gujarat ranks 2nd among the states in India, for the export of banana with exports of 1430 tonnes to Middle East in April-June 2009. In social forestry Gujarat has achieved a benchmark of 14 trees per hectare.

Gujarat has total livestock of 199.39 lakh with cattle population of 67.49 lakh. It has 72.36 lakh poultry. In dairy sector, Gujarat has 12 District Milk Producers' Union, 10,725 Milk Cooperative Societies, 20.84 lakh members of milk cooperative. In last decade the Gujarat's milk production has risen by 68 per cent and reached to 150 lakh litres/day. Gujarat has 1600 km long coastal belt and occupies first position in production of marine fish (6.71 lakh MT/year) with a share of 24 % in total quantity of the country. Value of fish production is Rs. 1200 crore per annum and export worth Rs. 390 crore. In inland fisheries katla, rohu, mrigral are the major fish varieties.

In Gujarat, under 'Jyoti Gram Yojna' villages are getting round the clock uninterrupted electricity supply that covers 18,065 villages and 9,680 suburbs. The farmers are getting 8 hour per day assured 3 phase power supply for irrigation. Gujarat is the first state who has issued Soil Health Card to the farmers, till now the soils of 42 lakh farmers have been tested and 31 lakh soil health cards have been distributed, which is a record in itself. The State has strong cooperative credit & marketing structure, along with 213 cold storages having 9.50 lakh MT storage capacities. About 42 Fruit & Vegetable Co-operative Marketing Societies and 197 Agriculture Produce Market Committees (APMCs) dealing with selling & buying of horticulture produce in the State. Gujarat's advancement in the field of solar energy is also coming up; the state has dedicated 600 MW of solar energy to the national grid, while the rest of the country is producing only 120 MW of solar energy. The solar park set up at Charanka will be the Asia's largest, the innovative canal-top solar power project was beneficial in saving about one crore litres of water per kilometre from evaporation annually and would save 16 per cent of electricity and land for farmers.

Gujarat Government has created history in water conservation, by launching a drive for blue revolution, constructing more than 3.5 lakh check dams, boribunds and khet talavadies (farm ponds). The water conservation work was carried out by various state Govt. departments in cooperation with NGOs and the private sector in last 10 years, which has brought up the ground water level throughout the state and increased the Agriculture income by four folds. On behalf of Government of

Gujarat (GoG), GGRC as an implementing agency is aimed to promote Micro Irrigation System (MIS) to the farmers to bring 2nd green revolution. MIS saves water and energy, besides multiple benefits to improve agricultural productivity and farmer's prosperity at large, till now more than 35 lakh ha area is brought under MIS in the state.

For comprehensive development of tribe community, improve their standard of living, empower them through education and social initiatives the State Government has initiated the 'Vanbandhu Kalyan Yojana' and allocated a huge sum of Rs. 15,000 crores, however already Rs. 17,000 crores has been spent in four years and it may reach to Rs. 20,000 crores by the end of five years. There is no parallel scheme to compare in the entire country with these inclusive initiatives.

Hon'ble Chief Minister of Gujarat State Mr. Narendra Modi has initiated a mega event *Krishi Mahotasav* for dissemination of agricultural and allied field technology to the farmers in Gujarat. In a month long *Krishi Mahotasav,* the government officials, agro-scientists and experts from SAUs are visiting all the villages of the state with informative *Krushi Rath* to give helpful information about farming to the farmers. During Krishi Mahotsav-2012, an intensive animal vaccination and animal health camps programmes were launched in all the villages so as to focus on disease management and the rearing of healthy livestock.

Fig. 1.3.1 Hon'ble Chief Minister, GoG Shri Narendra Modi inaugurated month-long Krishi Mahotsav-2012 at Manavadar Taluka in Junagadh district.

1.4. Saurashtra region of Gujarat State:

The total geographical area of Saurashtra is 6.43 million hectares representing 32.82 per cent area of the state out of which 3.70 million hectares (61%) is cropped area. The Saurashtra area is divided in two agro climatic zone viz. North Saurashtra Agro-climatic zone (Bhavnagar, Jamnagar, Surendranagar, part of Amreli and Rajkot) and South Saurashtra Agro-climatic zone (Junagadh, Porbandar, part of Bhavnagar, Amreli and Rajkot). It is flanked by Arabian Sea on the south and west side, the Gulf of Kutch in the north and Gulf of Khambhat in east. The total population of Saurashtra

region is 15.44 million as per 2011 census with a density of 240 people per km^2 living in 4767 villages spread over in seven districts. The overall literacy percentage in the Saurashtra is 77.17. Saurashtra receives precipitation through the south west monsoon with average annual rainfall varies widely from 400 mm in the northern part to 1000 mm in the southern part. In Saurashtra region, the major field crops are groundnut, cotton, wheat, bajra, sesame & cumin, while mango, coconut, citrus, sapota, guava & ber are the major fruit crops, and onion, brinjal, okra, tomato & cluster bean are the major vegetable crops. Among the major crops, oilseeds (groundnut, sesame and castor) occupy 47.42 per cent of the gross cropped area followed by cotton (31.64%) and total food grains (20.28%). Other important crops grown in the region are spices (1.96%), fruits (mango 0.66% & sapota 0.17%) and vegetables (brinjal 0.50% & okra 0.24%).

As per the 2007 census, there is 238 lakh total livestock population in Gujarat State in which sharing of Saurashtra region is about 26.71 per cent with population of 64 lakh. Saurashtra is the home of famous breed of cattle (*Gir*), buffalo (*Jafrabadi*), goat (*Zalawadi*) and horse (*Kathiavadi*). Saurashtra has a long coastal-line, and the area available for fishing activities extends from Okha to Bhavnagar. Important commercial varieties of fish namely pomfret, jew fish, bombay duck, shrimp, lobster, squid, cuttle fish, silver bar, shark, catfish, mullets, etc. are caught in large quantities in these areas. Some ports like Okha, Sikka, Porbandar, Veraval and Pipavav are located in Saurashtra region.

1.4.1 Major Issues and Areas of Focus:

The major part of the Saurashtra region, falls under semi arid and arid types with varying climatic as well as soil conditions, has been divided into two Agro-climatic zones. The major issues and areas to be focused in the plan are:

i. In Saurashtra about 70 per cent of total area is rainfed, needs an integrated development of crop varieties and cultivation practices for major cereals, food, cash, fruits, vegetables and spices crops.

ii. Activities related to enhancement of soil health, integrated nutrient management, use of organic and bio-fertilizers. Integrated pest management schemes.

iii. In the adjoining areas of 788 km long coastal belt, sea water ingress and inland salinity caused soil health/fertility problems needs integrated watershed development, water harvesting, groundwater recharge and more area to be brought under MIS.

iv. Development of mechanization by introducing improved tractors, machines, implements, equipments and tools. Increasing use of renewable energy i.e. solar, wind and bio energy in agriculture.

v. Activities relating to enhancement of horticultural production, high density cultivation and popularization of micro irrigation systems. Food processing and value addition of produce; cold storage, handling, packaging, transportation and marketing of perishable produce (fruits and vegetables).

vi. Good local breed of cattle (Gir) and Buffalo (Jafrabadi) are reared, but needs breed establishment and increased involvement of various farming communities in animal rearing. Proper clinical care of animals, increased fodder production and feed management for increasing milk production.

vii. Modernization of marine fish processing units and quality control as per HACCP norms for accelerating export at Veraval, Mangrol and Sutrapada. Development of cage culture of commercial marine fauna. Development of inland fisheries by utilizing salt affected land and water by introducing diversified fish and shrimp fauna.

viii. Strengthening of Market Infrastructure and Marketing Development.

ix. Strengthening of infrastructure to promote extension services for farmers.

x. Innovative schemes.

1.5 Methodology Adopted for Preparation of District Agriculture Plan:

The C-DAP was prepared adopting participatory appraisal mode. Junagadh Agricultural University, Junagadh, Gujarat was identified as Technical Support Institute (TSI). The TSI, under the guidance of Director of Research, provided all necessary technical help to planning units and support groups for preparation of this plan through participatory bottom-up process. The TSI trained the Planning Units/ Groups in designed formats for data collection, guided in data collection and analysis and conducted regular workshops and meetings for plan preparation. In coordination with Scientists/ Professors from JAU, Junagadh and officials from Department of Agriculture, Horticulture, Animal Husbandry and Fisheries, District Panchayat, DRDA, BISAG, NABARD, ATMA, PGVCL, Dept. of Disaster Management, Dept. of Irrigation, etc. the task is fulfilled.

1.5.1 Collection of Data:

The preparation of district level plan involved basically collection of base line and bench mark details. So a template is developed to collect these particulars from the different districts under the jurisdiction of JAU, Junagadh. The district level scientist's teams from JAU were formed for the collection and compilation of the information. The Taluka wise information was collected with the help of Taluka Development Officer (TDO) and his team, officers from Animal Husbandry, officers from Agriculture Department, Jilla Panchayat, Taluka Panchayat, Village Panchayat, NGOs, BISAG, NABARD, ATMA, DRDA, Watershed development agency, etc.

1.5.2 Formulation of District Planning Unit:

To facilitate the involvement of local representatives in the preparation of plans, planning units in each district was formulated. The composition of the district planning units is as follows:

a) Director of Research & Dean PG studies, Dean, College of Agricultural Engg., Dean College of Agriculture, Dean College of Veterinary Sciences, Dean College of Fisheries and one scientist for every 2 talukas.

b) Coordinating staff from Directorate of Research.

c) Officials of Line Departments from Agriculture, Horticulture, Animal Husbandry, Fisheries, District Panchayat and DRDA.

Numbers of meetings were held at state and University level with authorities and concerned officials of C-DAP. The current priorities discussed with scientists of the JAU, officers of the line departments, NGOs and farmers. During the meetings of stakeholders discussed about the proposed design, trials, Front line demonstration (FLDs) and other activities in a farming system approach. The group identified the farmers' needs and constraints and subsequent changes proposed in management practices. The time frame of various activities and expected out comes of five year plan were incorporated. The following meetings were arranged.

Sr. No.	Date	Meeting
1	12-11-11	To discuss the guideline of C-DAP
2	27-01-12	Review meeting to prepare C-DAP
3	28-03-12	Regarding to prepare C-DAP of seven districts of Saurashtra
4	April, 2012	Various stakeholders meeting at different talukas
5	05-04-12	Presentation of Report at AAU, Anand
6	10-04-12	To discuss the future line of action for collection of Talukawise information
7	04-05-12	Review of C-DAP under the chairmanship of the Vice Chancellor, JAU, Junagadh.
8	23-05-12	Discuss future planning regarding various aspects of C-DAP with HoDs of the university and committee members of C-DAP
9	13-07-12	A meeting with Taluka leader to prepare taluka level plan
10	07-07-12	C-DAP presentation at JAU, Junagadh
11	19-07-12	Presentation of final report at Gandhinagar
12	27-7-12	Final meeting with all concerns to modify the report as per the directions of Gandhinagar's meeting

1.5.3 An indicative outline for the preparation of C-DAP:

1: A brief introduction to the District, its location, features, etc.
2: Main points of SWOT of the District
3: Areas/ Sectors which need to be addressed in the district
4: Various on- going programmes in the district- a brief contextual gist
5: The District Plan at a Glance.

CHAPTER II

GENERAL DESCRIPTION OF BHAVNAGAR DISTRICT

2.1 Brief history of district:

Bhavnagar (Gujarati: , Hindi: **भावनगर**) is a city in the Indian state of Gujarat. Founded in 1723 by Bhavsinhji Gohil (1703–1764), the city was named after its founder and ruler. It has been the capital of Bhavnagar State, which was a princely state before it was merged into the Indian Union in 1948. It is now the administrative center of the Bhavnagar district. Bhavnagar is situated 228 km from the state capital Gandhinagar and to the west of the Gulf of Khambhat. Bhavnagar is the fifth largest city of Gujarat, and the second largest city in the Saurashtra region. It is also known as the Cultural capital of Saurashtra. The old town of Bhavnagar was a fortified town with gates leading to other important regional towns. It remained a major port for almost two centuries, trading commodities with Africa Mozambique, Zanzibar, Singapore, and the Persian Gulf.

2.2 Location of Bhavnagar District:

The district lies between 21.05^0 to 22.10^0 North latitude and 71.03^0 to 72.09^0 East longitude situated at 25-300 m above mean sea level. The district has 11 talukas for administrative convinces out of that major ones are Bhavnagar (District Headquarter), Shihor, Talaja, Mahuva, Botad, Palitana, Ghogha and Vallabhipur. The location of Bhavnagar district is depicted in the maps (Fig. 2.2).

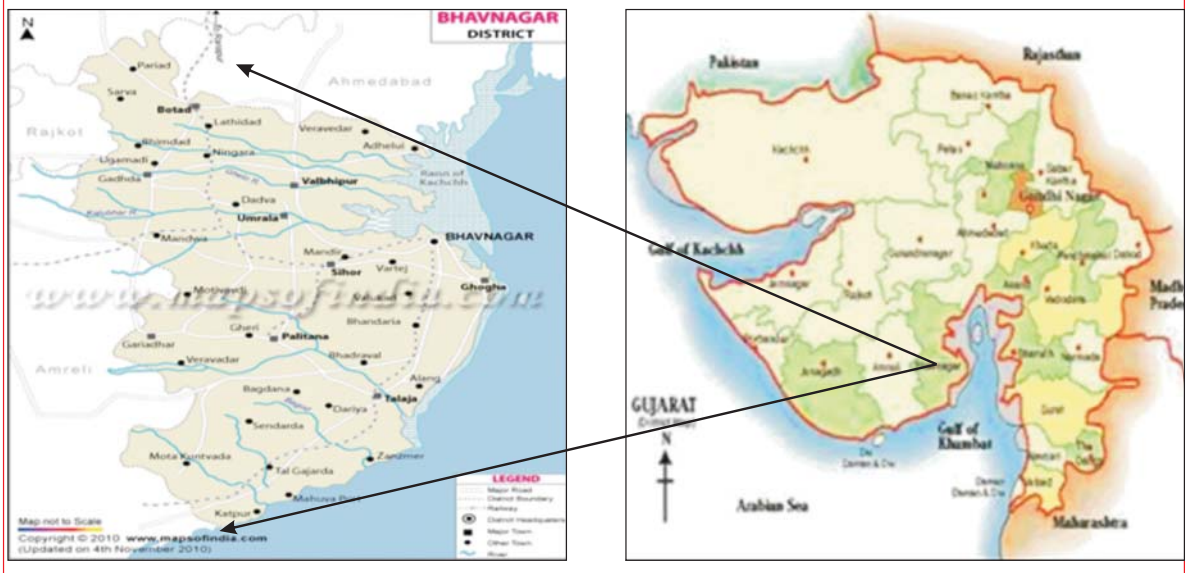


Fig 2.2: Location map of Bhavnagar district

2.3 Bhavnagar District at a Glance

2.3.1 Geographical Location

Geographically, the Bhavnagar district is in agro climatic zone VI (South Saurashtra), VII (North Saurashtra) and VIII (Bhal and Coastal area) sub region of Gujarat. The region of Saurashtra is a geologically active part of West India, and falls in the seismic zone 3 of the Zoning Map of the Bureau of Indian Standards. The region as a whole and the area around Bhavnagar in particular has been tectonically unstable. According to historical records, an earthquake of magnitude 7 occurred near Bhavnagar in February 1705. Earthquake swarm activity also occurred in and around Paliyad (60 km north of Bhavnagar) during July-August 1938 for about two months, with four earthquakes of magnitude greater than or equal to 5 and a maximum magnitude of 6.0.

2.3.2 Administrative Units

The district lies between 21.05^0 to 22.10^0 North latitude and 71.03^0 to 72.09^0 East longitude situated at 25-300 m above mean sea level. The geographical area of this district is 8190.85 sq. k.m. There are eleven taluka in the district as given below. The other administrative details of the district are given below:

Taluka	Village	Taluka	Village	Taluka	Village
Bhavnagar	56	Ghogha	42	Talaja	117
Botad	52	Mahuva	131	Umarala	43
Gadhada	76	Palitana	92	Vallabhipur	53
Gariyadhar	51	Shihor	81		

Source: District Statistical Report, Bhavnagar 2011-12

2.3.3 Physiography:

Bhavnagar is located near the Gulf of Cambay in the Arabian Sea, a part of Saurashtra peninsula, in central part of Gujarat under seismic zone III. Proximity of Bhavnagar with commercial districts of Ahmedabad, Rajkot, and Amreli has made the district an important industrial location. Shetrunjay, Ranghola and Kaludhar are the major rivers of the districts. Diamond cutting & polishing, cement & gypsum, inorganic salt-based and marine chemicals, shipbuilding, ship-repairs, oxygen, foundry, re-rolling, ceramics, fabrication and food processing industries are the major industry. World's largest ship breaking yard is at Alang in the district. Velavadar Nationa lpark-Blackbuck sanctuary, Takhteshwar Temple, Gaurishanker Lake, Jain Temples of Palitana and Talaja are the major tourist attractions in the district.

2.3.4 Demographic profile:

The total population of the district is 2469630 as per census 2001 of which 1274920 are male and 1194710 are female. The rural and urban area contributes 1519554 and 950076, respectively. Similarly the population of scheduled caste and scheduled tribe are 142128 and 7292, respectively. The total literacy percentage is only 66.98 per cent comprising 59.41 % and 78.93 % rural and urban population, respectively.

Table 2.3.4.1: General information of the Bhavnagar District 1: Inhebited, 2: Habited

As per Year 2010-11						As per Year 2001 Census		
Taluka	**Villages**		**No. of Revenue Villages**	**Area (ha.)**	**No. of G.Ps.**	**Male**	**Female**	**Total**
	1	**2**						
Bhavnagar	53	3	56	103968	56	345487	317193	662680
Botad	50	2	52	74944	50	118332	110159	228491
Gadhada	72	4	76	89789	72	89828	85819	175647
Gariyadhar	50	1	51	48433	50	58497	56956	115453
Ghogha	35	7	42	43785	35	43988	41636	85624
Mahuva	131	0	131	125561	131	190202	185607	375809
Palitana	89	3	92	73474	89	101705	97633	199338
Shihor	78	3	81	72087	78	100080	92659	192739
Talaja	115	2	117	86972	115	142405	127581	269986
Umarala	42	1	43	40733	42	45952	43043	88995
Vallbhipur	51	2	53	59339	51	38444	36424	74868
Total	**766**	**28**	794	**819085**	**769**	**1274920**	**1194710**	**2469630**

Source:Taluka Ankdakiy Ruprekha, Bhavnagar, Year 2010-11 and India Census-2001, 2011

Table 2.3.4.2: Demographic changes in Bhavnagar district from 2001 to 2011.

Description	2001	2011
Actual Population	**2469630**	2,877,961
Male	1274920	1,490,465
Female	1194710	1,387,496
Population Growth	**19.31**	16.53
Area Sq. Km	8,190.85	8,190.85
Density/sq.km	**247**	288
Proportion to Gujarat Population	4.87	4.77
Sex Ratio (Per 1000)	**937**	**931**
Child Sex Ratio (0-6 Age)	881	885
Average Literacy	**66.20**	76.84
Male Literacy	78.00	86.15
Female Literacy	53.70	66.92
Total Child Population (0-6 Age)	**401780**	**369,460**
Male Population (0-6 Age)	213597	195,965
Female Population (0-6 Age)	188183	173,495
Child Proportion (0-6 Age)	**16.27**	**12.84**
Boys Proportion (0-6 Age)	17.53	13.88
Girls Proportion (0-6 Age)	14.20	11.33

Source: Census 2011 from Website

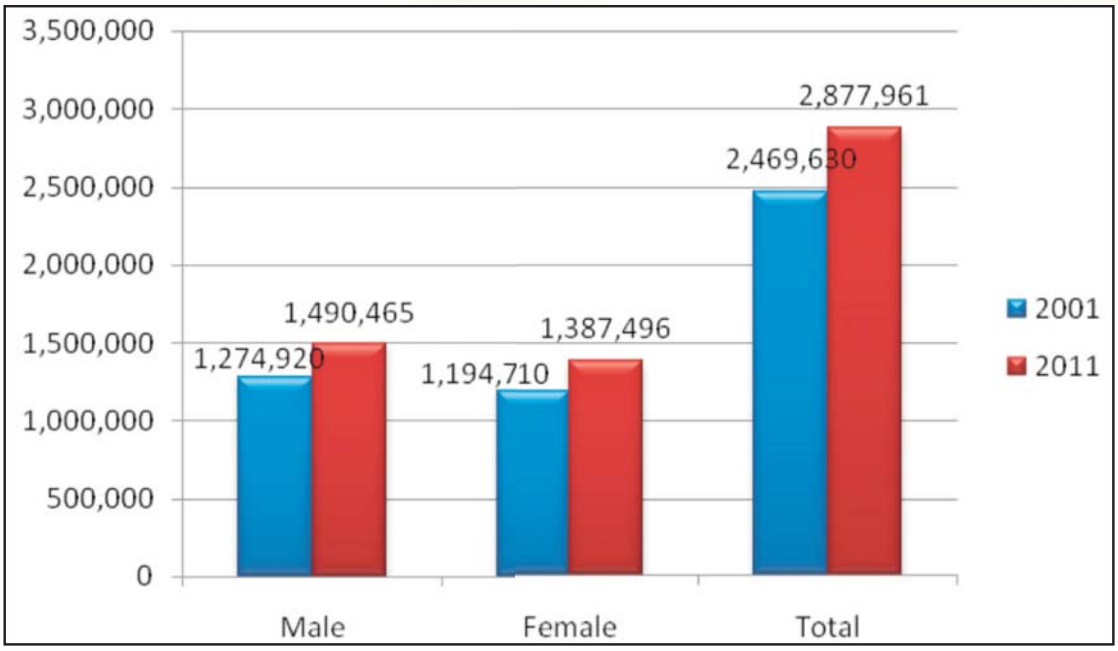


Fig. 2.3.4.1: Population of Bhavnagar district

2.4 Education Facilities

Education has been considered as pivotal to the development of our society. Basic ability to read, write and count is an important goal of any national educational system. As per census 2001, the district has average 66.20 per cent literacy rate, where the male literacy rate is 78.02 per cent and female literacy rate is 53.73 per cent. Further as per census 2011, the district has average 76.84 per cent literacy rate, where the male literacy rate is 86.51 per cent and female literacy rate is 66.92 per cent. This indicates significant improvement in literacy during last decadal growth.

Table: 2.4.1: Taluka-wise educational facility (nos.) 2010-11.

Taluka	Primary school	Secondary school	Higher Secondary	Colleges
Bhavnagar	193	54	51	16
Botad	62	30	20	4
Gadhada	94	21	11	3
Gariyadhar	61	16	5	1
Ghogha	67	12	3	0
Mahuva	188	36	19	4
Palitana	118	26	15	1
Shihor	118	22	9	4
Talaja	150	30	19	2
Umrala	58	9	6	0
Vallbhipur	64	6	5	0
Total	**1256**	**276**	**169**	**50**

Source: District Statistical Report, Bhavnagar District 2010-11

2.4.1 Junagadh Agricultural University and Research Activity

In Bhavnagar district, total three research stations of Junagadh Agricultural University Viz The Agricultural Research Station for Fruit Crops, Dry Land Agriculture and Onion/Garlic are Located at Mahuva, Vallabhipur and Talaja, Respectively. Besides this, the central laboratory; Central Salt and Marine Chemicals Research Institute (CSMCRI) of CSIR (Council of Scientific and Industrial Research) is working at Bhavnagar.

2.5 Agricultural and Allied Sectors

Agriculture sector is the main occupation in the district and alone occupy about 44.80% workers. Thus, the district has, predominantly an agriculture based economy.

Table 2.5.1: Occupational Pattern of the District

Occupation	No. of Workers	Percentage
Total Worker	**944559**	100
Main Worker	**781166**	82.70
Partial Worker	**163393**	17.30
Occupation wise worker		
Cultivators	212513	22.50
Agricultural Laborers	210277	22.30
Workers: Manu. & Production in HH Ind.	42504	4.50
Workers in other service	479265	50.50

Source: District Statistical report, 2008-09, Bhavnagar

Table 2.5.2: Taluka wise Land Utilization Statistics (preceding 3 years average)

Taluka	G.A.	F.A.	N.A.U.	C.W.	P.P.	C.F.	O.F.	N.S.A.
Bhavnagar	103968	1135	1915	3329	3300	2215	0	47207
Botad	74944	903	2312	2674	5672	4892	0	54146
Gadhada	89789	2715	5622	4042	5830	4042	0	66958
Gariyadhar	48433	73	700	813	5886	813	0	38436
Ghogha	43785	828	4858	197	3316	734	53	29818
Mahuva	125561	2639	64	10584	10430	1242	351	96107
Palitana	73474	3916	2557	8352	7070	8258	94	41000
Shihor	72087	4603	2325	5402	6407	1951	150	48317
Talaja	86972	2356	1169	5791	6121	4466	250	63925
Umrala	40733	87	1511	585	3213	335	50	32376
Vallbhipur	59339	1135	1915	1114	3300	1022	0	48400
Total	**819085**	**20390**	**24948**	**42883**	**60545**	**29970**	**948**	**566690**

G.A.: Geographical Area, F.A.: Forest Area, N.A.U.: Land Under Non- Agril. Use, C.W.: Cultivable waste, P.P.: Permanent pastures, C.F.: Current Fallows, O.F.: Other Fallows (Barren Land), N.S.A.: Net sown area

Source: Taluka Statistical report of respective taluka, 2010-11, Bhavnagar

Table 2.5.3: Land Holdings (Agriculture Census 2001) (Area in ha.)

Taluka	Marginal Farmers		Small Farmers		Semi-med. to large Farmers		Total	
	No.	Area	No.	Area	No.	Area	No.	Area
Bhavnagar	4403	2914	5087	7399	5717	25738	15207	36051
Botad	4859	3193	8761	13024	10400	42387	24020	58604
Gadhada	4418	2921	9392	14132	13039	50239	26849	67292
Gariyadhar	4442	3077	7722	11408	7439	26156	19603	40641
Ghogha	2244	1519	3398	4972	4698	23153	10340	29644
Mahuva	11019	7617	16139	23508	15113	64526	42271	95651
Palitana	5972	4040	8938	13005	6756	26710	21666	43755
Shihor	5962	4003	8505	12385	7085	29960	21552	46348
Talaja	9336	6221	11441	16600	10877	43416	31654	66237
Umrala	2656	1734	4955	7295	5970	23626	13581	32655
Vallbhipur	1835	1200	4384	6549	8465	39726	14684	47475
Total	**57146**	**38439**	**88722**	**130277**	**95559**	**395637**	**241427**	**564353**

Source: Agriculture census 2005-06, part-1, Report on operational holding, page no. 59

2.5.1 Agriculture:

The Bhavnagar is agriculture dominated district. About 80% of population is engaged in agriculture and allied activities. Groundnut, cotton, wheat, bajra, Onion, sesame, pulses and sorghum are the major field crops grown in the district. The major field crops cultivated in *Kharif* season are groundnut, cotton, pulses, bajra, and sesame. Wheat, gram, Cumin, onion and other vegetables are the important *Rabi* crops of the area, in summer the major crops grown are groundnut, pulses and sesame.

The district is poor in farm mechanization with little availability of farm machines. The farmers are still using bullock drawn traditional implements and the hand tools used are also traditional. Recently the use of medium horse power tractors as well as low horse power tractors (mini tractors) is increasing. The farmers have adopted micro irrigation system to save the scarce water resources. Still there is long gap in development of agricultural engineering in the district.

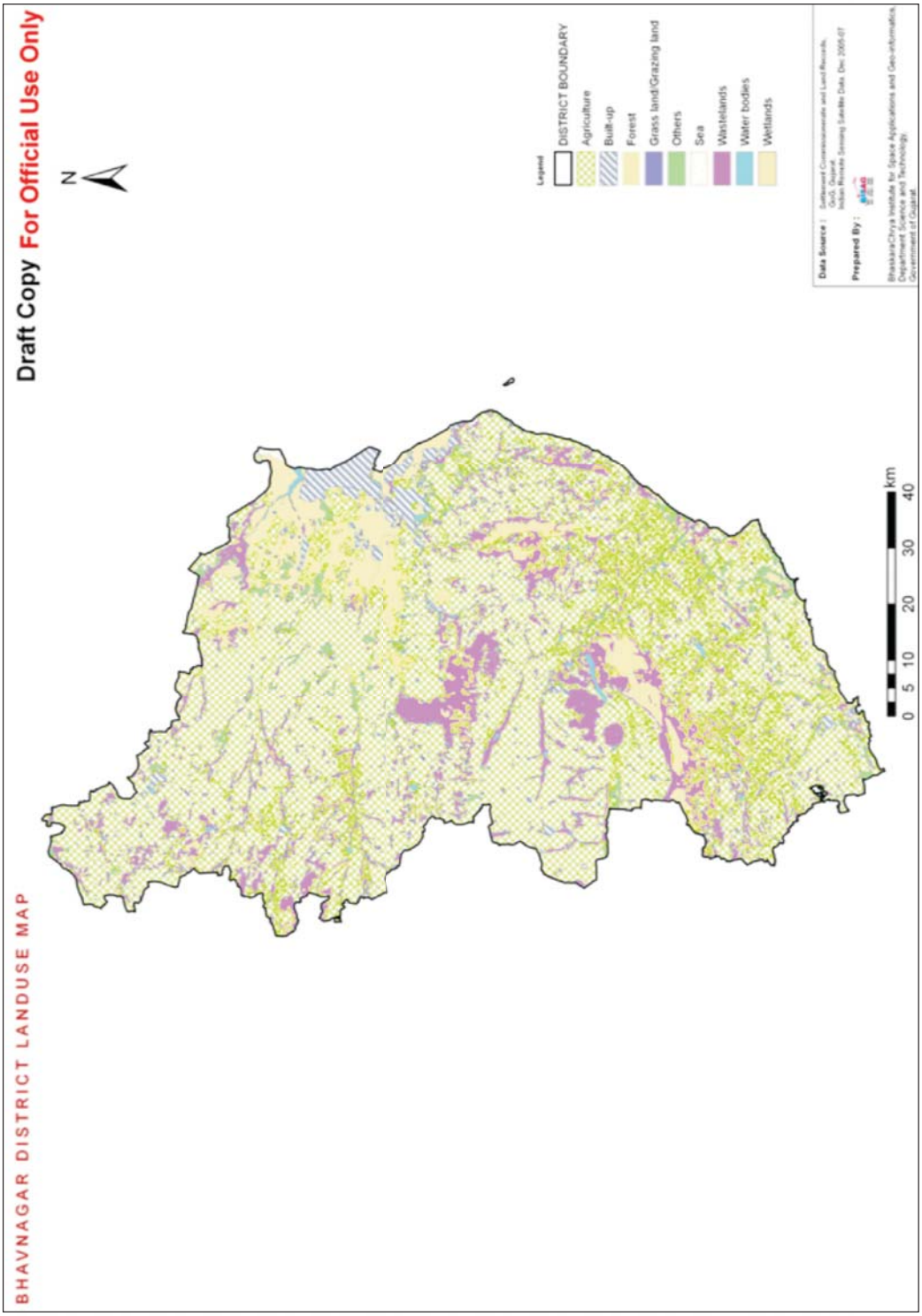


Fig 2.5.2: Land use map of Bhavnagar District

Table 2.5.1.1: Area under important crops in Bhavnagar District (2010-11)

Crop	Cotton (Hybrid)	G'nut	Vegetables (kharif)	Wheat	Onion	Cumin	Vegetables (Rabi)
Taluka	**Area (ha)**						
Bhavnagar	12600	7800	550	90	600	60	200
Botad	53137	1145	295	250	25	400	200
Gadhada	54750	205	140	922	50	200	175
Gariyadhar	-	-	-	350	75	100	250
Ghogha	8100	10100	430	300	1400	5	200
Mahuva	45961	31203	748	5650	9800	225	1178
Palitana	20000	11000	200	910	1800	50	180
Shihor	21500	6500	490	450	540	40	200
Talaja	24066	18231	679	700	12000	5	850
Umrala	31800	0	35	370	50	20	50
Vallbhipur	52140	280	310	310	10	50	50
Total	**324054**	**86464**	**3877**	**10302**	**26350**	**1155**	**3533**

Source: Report of Central Ministerial Team Visiting Bhavnagar, 2010-11.

2.5.2 Horticulture:

Total 30605 ha. of land was under fruits crops with total production of 484127 MT during 2010-11 in the district. Maximum area is under Citrus cultivation, i.e. 6375 ha. with production of 73630 MT. followed by mango with total production of 42742 MT. The other major fruit crops in the district are Coconut, Guava, Sapota, Custard apple and Banana.The majority of coconut plantation is confired to the costal belt of the district i.e. Mahuva, Talaja and Ghogha region.

Total area under Vegetables is about 42655 hectares with total production of 889406 MT. among which onion plays a significant role. Mahuva and Talaja are the major onion growing region. A total of 5644 hectares is under Spices with total production of 14783 MT. in which cumin plays a dominant role with 4500 ha. The total area under Floriculture is only 467 with total production of 2509 MT of different flowers. Rose and Marigold are the dominant flower crops.

There is a need to motivate and encourage the farmers for horticulture and plantation crops. Farmers are not interested to grow horticultural crops due to inadequate infrastructure and marketing facilities. Hence the existing marketing infrastructure also needs to be strengthened with market yard and godowns. There is also the need to teach the farmers about protected cultivation like net house, shed house and glass house.

Table 2.5.2.1: Area (ha) and production (MT) of major fruit and Vegetable crops

Fruit crops	2010-11		Vegetables	2010-11	
	Area	Prod		Prod	Area
Mango	6080	42742	Onion	29800	655600
Sapota	2730	38220	Brinjal	3600	75600
Citrus	6375	73630	Cabbage	1400	30800
Ber	1450	18850	Okra	1900	20900
Banana	1600	88000	Tomato	1800	41400
Guava	3750	67500	Cauliflower	820	18860
Pomegranate	450	2700	Clusterbean	810	5670
Papaya	1550	85250	Cowpea	410	3280
Custard apple	1750	21875	Cucurbits	1400	28000
Coconut	3820	40110	Others	715	9295
Others	1050	5250	**Total**	**42655**	**889405**
Total	**30605**	**484127**			

Source: Deputy Director of Horticulture, Year: 2011-12

Table 2.5.2.2: Area (ha) and production (MT) of Spice and Flower crops.

Spice crops	2010-11		Flowers	2010-11	
	Area	Prod		Area	Prod
Cumin	4500	3600	Rose	190	1216
Fennel	12	24	Marigold	195	1072
Chilly	800	8000	Lilly	12	6
Garlic	60	240	Mogra	30	24
Coriander	160	320	Others	40	191
Turmeric	2	48	**Total**	**467**	**2509**
Fenugreek	35	76			
Ajawan	75	75			
Total	**5644**	**14783**			

Source: Deputy Director of Horticulture, Year: 2011-12

2.5.3 Animal Husbandry:

The livestock population (Cow, Buffalo, Sheep, Goat and Drought animals) of Bhavnagar district was 1059684 during year 2010-11. The total no. of milch animals (cow and buffalo) are 334921 and 298486, respectively. Total 1142833 poultry are in the district. Comparatively higher no. of cattle and buffalo are found in Mahuva Talaja and Botad.

The development of Livestock as an economic activity. It is important to focus on intensive management of dairy animals *viz*. cattle (indigenous and crossbred) and buffaloes in the district.

Table 2.5.3.1: Talukawise Information on Livestock

Sr.	Taluka	Cows	Buffalo	Sheep	Goat	Poultry	Drought Animals
1	Bhavnagar	33220	40015	13988	21935	7142	373
2	Botad	42826	24290	19912	23973	611	544
3	Gadhada	36289	20255	13051	21462	623	363
4	Gariyadhar	20158	14248	5980	7614	163	179
5	Ghogha	12439	22062	19522	19543	1891	200
6	Mahuva	58194	62813	70489	22159	1064360	448
7	Palitana	33242	29153	30235	23146	22185	552
8	Shihor	36598	277	N.A	N.A	N.A	181
9	Talaja	31103	67965	64792	29062	45738	428
10	Umrala	12576	9123	3074	5909	53	76
11	Vallbhipur	18276	8285	2054	4940	67	93
Total		**334921**	**298486**	**243097**	**179743**	**1142833**	**3437**

Source: Bhavnagar District Statistical Report, Year: 2010-11,

Veterinary Institutes and Services:

In Bhavnagar district the veterinary institutes and centre/sub centers under various development schemes 2010-11 are;, 1 poly clinic, 33 Veterinary dispensaries/Branch Veterinary dispensaries, 1 MADLAV cum Veterinary dispensaries, 23 first aid veterinary centers, 2 RPVHC, 1 animal disease investigation office, 36 sub centers under Intensive Cattle Development Project, 19 Sub centre under Intensive Sheep Development Project, 3 centre under IPDP-DEC and 1 mobile unit. There is no any LSSBF centre, Migratory flocks centre, goat breeding centre and Key Village Schemes.

Looking at the growth of the industry, it is necessary to strengthen the existing veterinary services with manpower in the district. Department is also planning to introduce the Gopal Mittra schemes in the villages for first aid veterinary service where there is no veterinary support in a radius of 20 Kms. At present only one mobile veterinary services exits in the district. Looking to the animal population of the district there should one mobile veterinary serves in each taluka for quick veterinary help in emergency.

Dairy development:

The Bhavnagar district offers bright scope for dairy development. The milk procurement per day was 1.40 lakh lit. during 2010-11. With large urbanization in the nearby district, this district can supplement the milk production requirement which may grow at 10% every year. With financial support for purchase of cows/buffaloes, mini commercial dairy units, milk testing machines and support to grow fodder the potential can be made many folds. Beside Dairy there is also potential for sheep, goat and poultry rearing in the district.

Table 2.5.3.2: Institutes for Livestock rearing and animal hospitals

Taluka	SWDC	AI	PC	VLC	AH	LPHC
Bhavnagar	1	7	1	0	2	3
Botad	2	3	0	0	3	2
Gadhada	3	4	0	0	3	2
Gariyadhar	1	1	0	0	2	2
Ghogha	1	1	0	0	2	2
Mahuva	4	7	1	0	6	3
Palitana	2	3	0	0	2	2
Shihor	2	4	0	0	5	1
Talaja	3	2	0	0	5	2
Umrala	0	2	0	0	2	1
Vallbhipur	**0**	**2**	**0**	**0**	**2**	**3**
Total	**19**	**36**	**2**	**0**	**34**	**23**

SWDC: Sheep & Wool Distribution Center, AI: Artificial Insemination Centre, PC: Poultry Centre, VLC: Village Level Centre, AH: Animal Hospital LPHC: Livestock Primary Health Centre
Source: Bhavnagar District Statistical Report, Year: 2008-09.

2.5.4 Fisheries:

The district sea coast is confined only to Bhavnagar, Talaja, Mahuva and Ghogha Taluka. Inland fisheries or capture aquaculture is developing in Bhavnagar, Mahuva, Palitana, Botad and Shihor Talukas.

Table: 2.5.4.1: Information regarding Marine Fisheries

Taluka	Fish Production (Ton)	No. of fishermen	No. of member related to fish industries		Other fish industries	No. of Fish vehicles		
			Full time	Partial		Non mech.Boat	Mech. Boat	No. of fish net
Bhavnagar	1200	2872	653	263	1242	0	19	9961
Botad	-	340	53	8	103	10	0	133
Ghogha	-	1412	433	15	660	0	53	6758
Mahuva	5530	1226	298	14	463	0	33	7634
Palitana	1340	1613	293	41	577	10	0	1863
Shihor	-	153	25	4	50	0	0	134
Talaja	1450	2018	375	131	708	0	74	10770
Total		**9634**	**2130**	**476**	**3803**	**20**	**179**	**37253**

Source: District Statistical Report, Bhavnagar, Year: 2008-09

Table: 2.5.4.2: Information regarding inland Fisheries

Taluka	No. of fishermen	No. of member related to fish industries		Other fish industries	No. of Fish vehicles		
		Full time	Partial		Non mech.Boat	Mech. Boat	No. of fish net
Bhavnagar	428	0	129	0	10	0	203
Botad	340	53	8	42	0	0	55
Mahuva	1226	298	14	251	0	0	0
Palitana	1613	293	41	253	10	0	363
Shihor	153	25	4	21	0	0	45
Total	**3760**	**669**	**196**	**567**	**20**	**0**	**666**

Source: District Statistical Report, Bhavnagar Year: 2008-09

2.5.5 Forestry:

Forest in Gujarat constitutes 9.66% of the total geographical area. In Bhavnagar only 3.13 per cent of the district land is forest land during 2008-9. Looking at the area covered with the forest land resources, the district should be granted with watershed programme through different govt. department agencies. There is a need for massive time bound programme in afforestation of wasteland.

2.5.6 Soils:

As the geographical formation of Saurashtra is of volcanic origion, the soils are generally derived from basalt rock known as Daccan trap. In many parts, they have flat top features and hence, are also known as plateau basalt. The trap rocks which occupy a large portion of western coast of India is also covering Bhavnagar district. The most common colour of the trap rock in the district is dark grey. On weathering, trap rock forms a ferruginous gravelly material known murrum, which under-lie-soil formed in situ. Soils, thus derived are brown red in colour or the black soil. The soils are shallow to moderately deep. Based on the information, area of the district have been classified into medium black and flat, black soil, deep balck and rocky/hilly soil.

Medium black and flat soils:

The major portion of Botad, Gadhada and Umrala taluka are covered under medium black flat soils. These residual soils have basaltic trap parent material. They are very dark grey brown to light grey in colour. The surface of the soils is skeletal in nature at many places and depth varies from 30 cm to 60 cm or more at few places. They are calcareous in nature. A layer of murrum is generally found in sub soil layer.

Black soils:

The major portion of Mahuva and Talaja are covered under medium black soils.

Deep Black soils

These soils are found in Bhal area of Bhavnagar districts like Vallabhipur and some part of Bhavnagar. These soils have typical characteristics as it has higher content of clay and free from sand and posess very high water holding capacity. Because of this wheat, sorghum and gram crops are taken without irrigation in winter.

Hilly soils

This soil occurs in major area of Sihor and Palitana taluka. Because of steep slope and erosion, the profile is not developed. These soils are developed because of weathering of parent materials existing basalt trap and lime stone. These soil are shallow. The texture varies from loamy sand to clay loam to clay. These soils are placed in to ustorthents and those near foot hill are comparatively deeper and can be classified as ustochrepts and can be placed under Entisole and Inceptiso order.

Saline sandy loam and low lying black Soils:

These are extensively disturbed on the inlands and costal belt. These soils are located part of Bhavnagar, Vallabhipur (Bhal area) Gariyadhar, Mahuva, Palitana and Ghogha talukas. These soils are originated as a result of higher water table, low rainfall and high evaporation during summer months resulting into upward movement of salt, poor drainage, use of saline ground water etc. Texturally these soils vary from sandy loam to clay. The degree of salinity and alkalinity is also highly variable.

Table 2.5.6.1: Information on soils of the District (Area in ha.)

Taluka	Black	Red	Sandy	Sandy loams	Saline	Others
Bhavnagar	-	25830	-	3846	-	-
Botad	72069	-	-	-	-	-
Gadhada	12045	-	-	-	-	-
Gariyadhar	37677	-	-	-	-	507
Ghogha	23798	26987	-	-	6800	-
Mahuva	3500	-	1500	-	5900	500
Palitana	24410	-	-	-	-	-
Shihor	1500	-	-	500	-	9327
Talaja	64999		-	-	1502	-
Umrala	23133	-	-	-	9230	-
Vallbhipur	8700	-	-	500	12040	-
Total	271831	101112	1500	4846	26242	10334

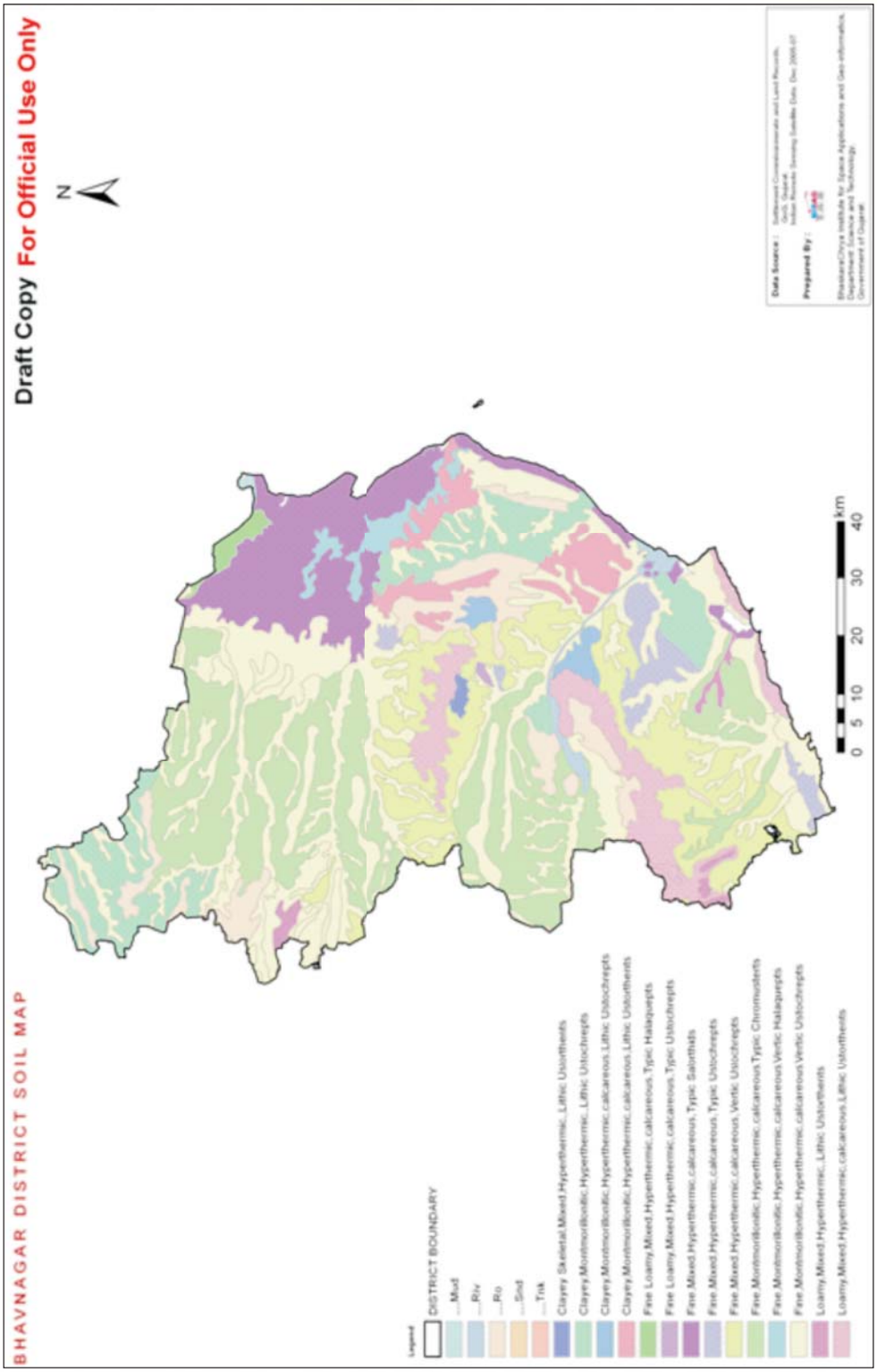


Fig.2.5.6: Soil map of Bhavnagar District

2.5.7 Agro-climatic Zone & major agro ecological situations:

Based on important features of Agro-Climatic Zones and other important aspects like edaphic factors (soil texture, structure and depth), climatic factors at micro level (rainfall, temperature variation and relative humidity), source of irrigation, altitude and topography and existing farming system, the entire district is divided into eight Agri-Ecological Situation (AES).

Table 2.5.7.1: Area under various Agro-Ecological Situation of Bhavnagar district

Taluka	Umrala	Gadhada & Gariyadahr	Botad	Sihor & Palitana	Mahuva Talaja & Ghogha	Mahuva, Talaja & Ghogha	Mahuva, Talaja & Ghogha	Vallabhipur
AES	Medium black soil with low rain fall.	Medium black soil, medium rainfall	Medium black soil with medium rainfall	Hilly soils with medium rainfall	Medium black soil with medium rainfall	Coastal alluvial soil with medium rainfall	Shallow black soil with medium rainfall	Medium black soil with medium rain fall
Soil Texture	Silty clay to clay	Clay loam to clay	Clay loam to clay	Clay loam to clay	Silty clay to clay	Sandy loam to silty clay loam	Sandy clay loam to clay loam	Silty clay to clay
Rainfall (mm)	400-500	500-600	600-700	500-600	750-1000	750-1000	750-1000	500-600
Attitude (m)	75-150	75-150	75-150	150-300	25-75	25-75	75-150	75-150
Principle crop	Groundnut, cotton, Bajra	Groundnut, cotton, Bajra	Groundnut, cotton, Bajra, Sorghum	Groundnut, cotton, Wheat, Sorghum	Groundnut, cotton, Barja and Sorghum	Groundnut, wheat, cotton,sorghum, Bajra, mango	Groundnut, , cotton, Bajra, Onion	Rainfed wheat, cotton, Gram and Sorghum
Special features	-	-	Poor drained soil	Well drained soil	Typical medium black	Problems with saline ground water	Undulating land having problem of erosion	Salty soil with water logging problem

Source: SREP, Bhavnagar District-2010, page No. 7

2.5.8 Land use capability classification:

Land use capability classification is an interpretive groping of soils according to their use potential based on inherent soil characteristics, external land feature and environmental factors. The land use classification aims at classifying the soils according to their potential for maximum utilization of rain water received for sustained and increased food production. Land productivity class-1 shows maximum productive land while class-VII the least productivity. As the category of class increases, the productivity of land decreases.

2.5.9 Climate

The district has semi-arid and arid climate with three distinguished season i.e. kharif (June to September), winter (October to January) and Summer (February to may). The average temperature ranges from 42°C to the minimum of 8ºC. The December and January are the coldest month, while April and May are the hottest month of the year. The summer is very hot and temperature varies from 40º to 45ºC for the couple of days.

2.5.10 Rainfall

The district mainly receives the rainfall through south-west monsoon which normally starts from middle of June, July and August are the richer months of rainfall. The average rainfall (2001-2010) receives from 517 to 836 mm, however scantly and erratic and uneven rainfall pattern is not uncommon.

Table 2.5.10.1: Average rainfall (mm) and rainy days in different Taluka

	A	B	C	D	E	F	G	H
Taluka	**2007**	**2008**	**2009**	**Avg. 2007-09**	**2010**	**Avg. 2001-10**	**2011**	**Days-2011**
Bhavnagar	1012	711	219	647	952	836	687	43
Botad	1079	563	413	685	668	643	575	34
Gadhada	911	586	318	605	800	621	683	39
Gariyadhar	1618	1094	454	1055	618	517	414	43
Ghogha	898	669	491	686	595	700	612	36
Mahuva	831	509	449	596	763	684	585	50
Palitana	884	713	479	692	715	728	667	39
Shihor	1045	690	341	692	865	774	578	43
Talaja	1066	774	362	734	850	671	634	43
Umrala	1123	670	316	703	651	661	465	41
Vallbhipur	1009	722	229	653	882	728	545	46

Source: A,B,C,D: http://swhydrology.gujarat.gov.in/Documents/Meteorological%20Data/Annual Rainfall For 2007-2009.pdf

E: Record of Dist. Collector for Central Ministerial Team visiting Bhavnagar,

F, G, H: Web site State Emergency Operation Centre, Revenue Department, Gandhinagar.

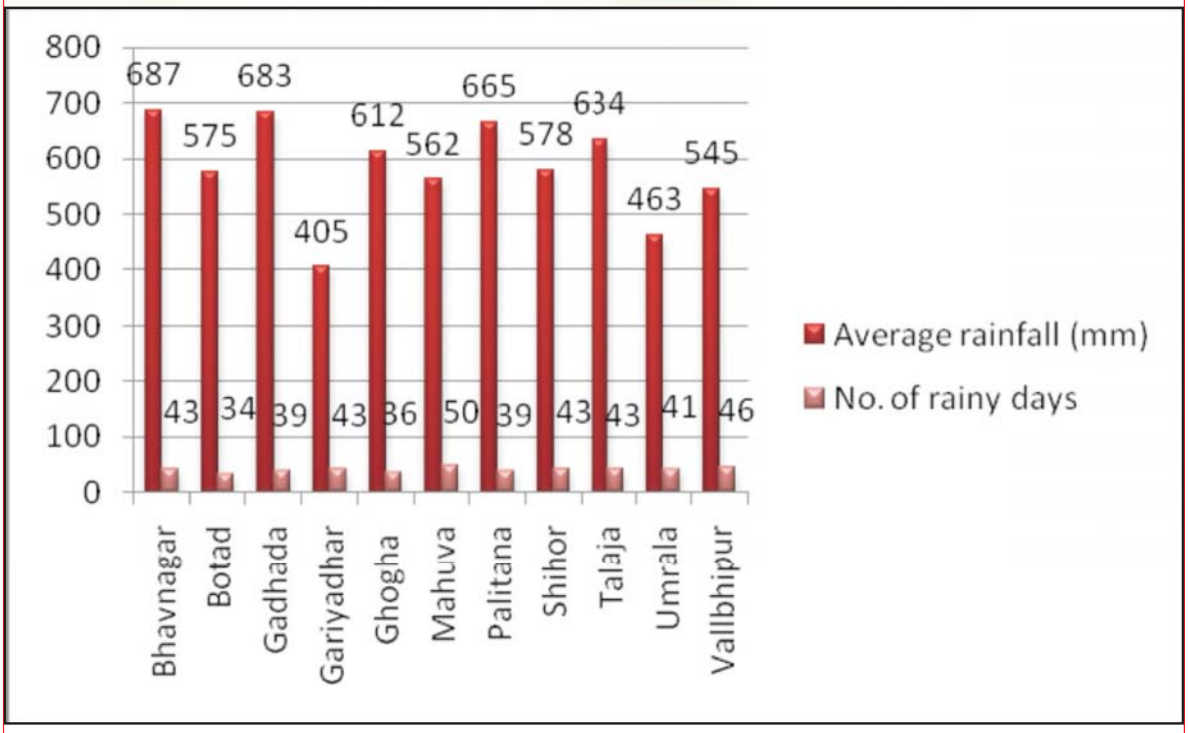


Fig 2.5.10.1: Average rainfall and rainy day

Table 2.5.10.2: Month wise rainfall (mm) in different Taluka (2010-11)

Taluka	June	July	Aug	Sept	Oct
Bhavnagar	0	304	302	81	0
Botad	0	170	326	79	0
Gadhada	0	401	212	70	0
Gariyadhar	9	166	151	88	0
Ghogha	0	229	274	109	0
Mahuva	23	265	238	59	0
Palitana	2	319	243	89	14
Shihor	0	276	219	77	6
Talaja	0	279	242	113	0
Umrala	2	179	214	70	0
Vallbhipur	0	226	250	69	0

Source: Web site State Emergency Operation Centre, Revenue Department, Gandhinagar.

2.5.11 Soil fertility indices:

Available N status:

The overall, available N status for the target district was low with value of 249.4 kg ha^{-1}. The highest mean value of available N was found in Shihor taluka followed by and Mahuva taluka. The lowest mean value was found in Bhavnagar taluka.

Available P_2O_5 Status

The available P_2O_5 status of soils is 31.6 kg P_2O_5 ha^{-1}, which was in medium categories. The highest mean value of available P_2O_5 was found in Bhavnagar taluka followed by Talaja and Vallabhipur taluka. The lowest value was found in Umarala taluka.

Available K_2O Status:

Available K_2O status of the district was high (422.6 kg K_2O ha^{-1}). The highest mean value for available K_2O was found in Vallabhipur followed by Ghogha and Talaja taluka. The lowest mean value of available K_2O was found in Gariyadhar.

Available S status:

Overall available sulphur in the district is 10.3 mg kg^{-1}. Shihor taluka has highest amount of sulphur followed by Umarala and Mahuva taluka. Talaja taluka contain the lowest mean value of available sulphur.

Table 2.5.11.1: Talukawise mean value for available N, P_2O_5, K_2O and S

Name of Taluka	Av. N (kg ha^{-1})	Av. P_2O_5 (kg ha^{-1})	Av. K_2O (kg ha^{-1})	Av. S (mg kg^{-1})
Bhavnagar	206.5	39.7	437.1	8.01
Botad	229.1	35.6	396.0	9.70
Gadhada	213.4	23.7	431.4	8.74
Gariyadhar	228.5	27.2	239.8	7.29
Ghogha	239.1	35.9	523.4	7.94
Mahuva	281.4	36.3	292.9	10.9
Palitana	320.3	26.6	453.9	9.02
Shihor	343.1	32.0	437.0	22.4
Talaja	240.9	37.9	456.6	4.75
Umarala	238.9	15.7	397.6	13.8
Vallabhipur	208.3	36.7	582.5	10.8
Overall	249.4	31.6	422.6	10.3

Source: Rajput,G. (2010), "Evaluation of Soil Fertility and Under Ground water Quality of Bhavnagar District of Saurashtra Region" M.Sc. (Agri.) Thesis, (Unpblished)

DTPA extractable Fe:

The overall Fe status of the soils of *Bhavnagar* district is high with mean value of 9.21 mg kg^{-1}. Shihor and Bhavnagar taluka soils possess the highest mean value of DTPA extractable Fe followed by Ghogha and Palitana taluka. Gadhada taluka soils contain the lowest mean value of DTPA extractable Fe.

DTPA extractable Mn:

The soils of *Bhavnagar* district were found rich with respect to DTPA extractable Mn with value of 10.78 mg kg^{-1} The soils of Gadhada taluka have highest mean value followed by Mahuva and Palitana talukas. The lowest mean value was observed in Botad taluka.

DTPA extractable Zn:

The available Zn status of the soils of *Bhavnagar* district was 0.60 mg kg^{-1}. Palitana taluka had highest mean value followed by Gariyadhar and Umarala. Vallabhipur taluka soils had the lowest mean value. This indicates the wide spread deficiencies of available Zn in the soil of Bhavnagar district.

DTPA extractable Cu:

The available Cu status of the soils of *Bhavnagar* district was high. The available Cu mean value is 0.72 mg kg^{-1}. The highest mean value of available Cu was observed in soils of Umarala followed by Botad and Ghogha taluka. The lowest mean value was in Talaja taluka.

Table 2.5.11.2: Taluka wise mean value for Fe, Mn, Zn and Cu

Name of Taluka	Fe (mg kg^{-1})	Mn (mg kg^{-1})	Zn (mg kg^{-1})	Cu (mg kg^{-1})
Bhavnagar	11.7	10.2	0.60	0.71
Botad	5.97	5.07	0.64	1.18
Gadhada	3.99	21.9	0.50	0.79
Gariyadhar	8.72	10.4	0.67	0.58
Ghogha	11.6	10.1	0.55	0.82
Mahuva	9.96	11.47	0.64	0.76
Palitana	10.2	11.5	0.71	0.38
Shihor	11.7	5.72	0.50	0.45
Talaja	8.88	9.64	0.63	0.36
Umarala	8.91	14.4	0.66	1.21
Vallabhipur	9.73	8.18	0.45	0.74
Overall	9.21	10.78	0.60	0.72

Source: Rajput,G. (2010), "Evaluation of Soil Fertility and Under Ground water Quality of Bhavnagar District of Saurashtra Region" M.Sc. (Agri.) Thesis, (Unpblished)

Table 2.5.11.3: Talukawise micronutrient status

Taluka	Percentage (%)							
	Iron (Fe)		Manganese (Mn)		Zinc (Zn)		Copper (Cu)	
	Suffi.	Defi.	Suffi.	Defi.	Suffi.	Defi.	Suffi.	Defi.
Bhavnagar	95	5	85	15	60	40	85	15
Botad	50	50	45	55	40	60	95	5
Gadhada	90	10	100	0	30	70	85	15
Gariyadhar	90	10	100	0	55	45	95	5
Ghogha	95	5	85	15	50	50	90	10
Mahuva	90	10	95	5	60	40	95	5
Palitana	90	10	100	0	55	45	85	15
Shihor	95	5	40	60	35	65	75	25
Talaja	90	10	95	5	70	30	80	20
Umrala	80	20	100	0	45	55	100	0
Vallbhipur	95	5	95	5	30	70	65	35

Source: Rajput,G. (2010), "Evaluation of Soil Fertility and Under Ground water Quality of Bhavnagar District of Saurashtra Region" M.Sc. (Agri.) Thesis, (Unpblished)

2.5.12 Chemical Properties of Soils of *Bhavnagar* District

Soil samples were analyzed for different chemical properties viz., $EC_{2.5}$, $pH_{2.5}$, free lime, organic carbon and CEC, by using standard methods.

$EC_{2.5}$

The overall mean value of $EC_{2.5}$ of soil samples was 1.01 dS m^{-1}. Further the lowest mean value was obtained in the soils of Bhavnagar taluka and the highest mean value was registered in the soils of Mahuva taluka.

$pH_{2.5}$

In general, the soils of this district are alkaline in reaction. The pH values of the soils for the entire district was 8.10. The lowest pH values were recorded in Vallabhipur and Gariyadhar taluka. The highest value was recorded in Umarala taluka.

Free Lime ($CaCO_3$)

The overall free lime content was 54.6 g kg^{-1} indicating the calcareous nature of the soil. The highest mean value was recorded in Umarala taluka and the lowest value was obtained in Ghogha taluka.

Organic Carbon

In general, the soils of this district are low to medium in O.C. status. The overall organic carbon, content in the soils was 5.77 g kg^{-1}.

Cation Exchange Capacity (CEC)

The overall range of CEC was 37.4 cmol (P^+) kg^{-1}. The highest mean value of 40.9 cmol (P^+) kg^{-1} was obtained in Talaja taluka

Table 2.5.12.1: Talukawise mean values of chemical Properties of soils

Name of Taluka	$EC_{2.5}$ (dS m^{-1})	$pH_{2.5}$	$CaCO_3$ (g kg^{-1})	O.C. (g kg^{-1})	CEC cmol(p^+)kg^{-1}
Bhavnagar	0.86	7.93	58.1	5.07	33.9
Botad	1.00	7.98	48.8	5.96	37.9
Gadhada	0.98	8.07	73.0	4.83	36.7
Gariyadhar	1.05	8.01	37.5	5.53	38.8
Ghogha	0.88	7.97	30.9	5.58	30.6
Mahuva	1.56	8.21	37.6	6.71	40.3
Palitana	0.91	8.10	49.6	7.02	39.0
Shihor	1.17	8.28	81.0	6.68	36.5
Talaja	0.92	8.21	45.2	5.94	40.9
Umarala	0.93	8.18	81.5	4.99	38.7
Vallabhipur	0.92	8.13	57.4	5.11	37.9
Overall	1.01	8.10	54.6	5.77	37.4

Source: Rajput,G. (2010), "Evaluation of Soil Fertility and Under Ground water Quality of Bhavnagar District of Saurashtra Region" M.Sc. (Agri.) Thesis, (Unpblished)

Salinity/sodicity status of soils

For characterizing the soils of Bhavnagar district for salinity/sodicity status, all the 220 soil samples were analyzed for EC_e, pH_s, water soluble ions (1:2.5 soil: water extract) and exchangeable cations.

Exchangeable Cations

The Ca^{++} was the dominant exchangeable cation followed by Mg^{++}, Na^{+} and K^{+} with their corresponding mean values of 17.7, 14.4, 4.82 and 0.49 cmol (p^{+}) kg^{-1}.

Table 2.5.12.2: Talukawise mean values of Exchangeable cations in cmol (p^{+}) kg^{-1}

Taluka	Exchangeable cations in cmol(p^{+}) kg^{-1}			
	Ca^{++}	Mg^{++}	Na^{+}	K^{+}
Bhavnagar	16.8	12.4	4.06	0.66
Botad	18.1	15.0	4.44	0.44
Gadhada	17.1	14.3	4.76	0.50
Gariyadhar	18.3	15.10	4.98	0.40
Ghogha	14.8	11.4	3.91	0.45
Mahuva	18.2	15.0	6.53	0.60
Palitana	18.3	15.2	5.07	0.45
Shihor	16.8	13.9	5.26	0.49
Talaja	20.1	15.3	5.09	0.39
Umarala	18.4	15.4	4.44	0.50
Vallabhipur	17.8	15.1	4.43	0.56
Avg.	17.7	14.4	4.82	0.49

Source: Rajput,G. (2010), "Evaluation of Soil Fertility and Under Ground water Quality of Bhavnagar District of Saurashtra Region" M.Sc. (Agri.) Thesis, (Unpblished)

Water soluble cations

Among water soluble cations, Na^{+} was the predominant one followed by Ca^{++}, Mg^{++} and K^{+} with their mean values of 7.22, 1.79, 1.18, and 0.18 me l^{-1}, respectively.

Water soluble anions

In case of anions, the highest overall mean value of 5.61 me l^{-1} was recorded for Cl^{-} and it was followed by HCO_3^{-} (2.45 me l^{-1}) and SO_4^{-} (0.66 me l^{-1}) and the least was CO_3^{-} (0.28 me l^{-1}). Since the content of chloride and bicarbonate is considerably high, the type of salinization prevailing in these soils can be of Cl^{-} HCO_3^{-} type. The proportion of CO_3^{-} is very less (0.28 me l^{-1}).

Among water soluble anions, Cl^{-} was predominant one followed by HCO_3^{-}, SO_4^{--} and CO_3^{--}. The water soluble CO_3^{-}, HCO_3^{-}, Cl^{-} and SO_4^{--} mean values were 0.28, 2.45, 5.61 and 0.66 me l^{-1}, respectively. The results of water soluble ions revealed that Na^{+} and Cl^{-} were predominant cation and anion in soil solution, respectively.

Table 2.5.12.3: Taluka mean values of Water soluble cations in me l^{-1}

Taluka	Water soluble cations in me l^{-1}				Water soluble anions in me l^{-1}			
	Ca^{++}	Mg^{++}	Na^{+}	K^{+}	CO_3^{--}	HCO_3^{-}	Cl^{-}	SO_4^{--}
Bhavnagar	1.59	1.07	6.04	0.16	0.04	2.29	5.00	0.47
Botad	1.97	1.16	6.98	0.25	0.0	2.64	5.34	0.68
Gadhada	1.61	0.99	7.31	0.14	0.12	2.39	4.98	1.09
Gariyadhar	2.02	1.28	7.20	0.12	0.03	2.81	6.10	0.64
Ghogha	1.41	1.22	6.05	0.33	0.15	2.11	5.20	0.34
Mahuva	2.41	1.59	10.6	0.20	0.6	2.88	8.52	0.88
Palitana	1.71	0.96	6.47	0.14	0.09	2.11	4.72	0.40
Shihor	1.85	1.08	9.00	0.16	0.96	3.05	6.05	0.76
Talaja	1.61	0.96	6.85	0.14	0.40	2.38	5.10	0.62
Umarala	1.76	1.47	6.46	0.11	0.27	2.14	5.56	0.60
Vallabhipur	1.73	1.17	6.52	0.24	0.47	2.12	5.16	0.78
Avg.	1.79	1.18	7.22	0.18	0.28	2.45	5.61	0.66

Source: Rajput,G. (2010), "Evaluation of Soil Fertility and Under Ground water Quality of Bhavnagar District of Saurashtra Region" M.Sc. Thesis, Dept. of Agri. Chem. and Soil Sci., College of Agriculture JAU, Junagadh.

Salinity/Sodicity Indices

Salinity/sodicity indices are very important criteria for classifying salt affected soils into saline, sodic, saline-sodic or normal.

ECe

The highest mean ECe value (6.01 dS m^{-1}) was in soils of Mahuva taluka followed by Shihor (4.97 dS m^{-1}) and Gariyadhar (4.51 dS m^{-1}) talukas. Soils of all taluka except Umarala and Bhavnagar taluka are having ECe values higher than 4 dS m^{-1}. From this information we can say that salinity is the common feature in the soils of *Bhavnagar* district.

pH_s

The pH_s values of the soils for the entire district was mean values of 8.02. The values of pH_s do not differ much from the values of $pH_{2.5}$. Although, pH_s values are slightly lower than the $pH_{2.5}$ at all the times. In general, the soils of this district are alkaline in reaction.

Exchangeable sodium percentage (ESP)

The overall ESP mean value was 13.04. The highest taluka wise mean ESP value of 16.2 was obtained in Mahuva taluka whereas the lowest mean ESP value of 11.47 was recorded in Umarala taluka. The highest ESP value of 23.8 was reported in the soils of Shihor taluka and the lowest value of 5.77 was obtained in soil sample of Umarala taluka.

Soluble sodium percentage (SSP)

The overall mean SSP value was 68.1, which ranged from 35.9 to 83.9. The highest (73.7) mean value of SSP was recorded with the soils of Shihor taluka, whereas the lowest (63.2) in Umarala taluka (Table 2.5.12.4).

Sodium absorption ratio (SAR)

The overall mean value of SAR was 5.86. The highest mean SAR value of 7.44 was recorded in the soils of Shihor, whereas the lowest values of 4.98 in the soils of Umarala taluka. The lowest SAR value (1.20) was registered in Bhavnagar taluka and the highest value (13.4) was registered in soils samples of Mahuva taluka.

Table 2.5.12.4: Talukawise mean values of salinity/sodicity indices

Taluka	EC_e (dS m^{-1})	pH_s	ESP	SSP	SAR
Bhavnagar	3.81	7.87	12.2	66.4	5.23
Botad	4.42	7.93	12.0	66.1	5.55
Gadhada	4.18	7.95	13.2	71.9	6.42
Gariyadhar	4.51	7.91	12.9	65.9	5.37
Ghogha	3.97	7.92	13.0	66.1	5.38
Mahuva	6.01	8.08	16.2	69.7	7.14
Palitana	4.02	8.02	12.7	68.4	5.55
Shihor	4.97	8.15	14.7	73.7	7.44
Talaja	4.02	8.12	12.8	70.0	5.92
Umarala	3.86	8.13	11.5	63.2	4.98
Vallabhipur	4.22	8.10	12.0	67.2	5.42
Overall	4.36	8.02	13.04	68.1	5.86

Source: Rajput,G. (2010), "Evaluation of Soil Fertility and Under Ground water Quality of Bhavnagar District of Saurashtra Region" M.Sc. (Agri.) Thesis, (Unpblished)

Soil Characterization

Soil of Bhavnagar district was categorized into three classes viz., saline, saline-sodic and sodic soils. The distribution indicates that 39.9 per cent soil samples were falling in the saline-sodic soil group, followed by 32.6 per cent into saline and 27.5 per cent into sodic group.

The highest percentage (30 %) of saline soil was recorded in Ghogha and Umarala taluka followed by Botad, Vallabhipur and Bhavnagar (25 %) taluka as same. Soils of Mahuva taluka had the highest (60 %) proportion of saline-sodic soils, followed by Shihor (40 %) and Gadhada (30%) taluka. Soils of Shihor taluka also possess highest (25 %) percentage of sodic soil.

More than half (62.8 percent) soils samples of Bhavnagar were salt affected. About 20.5, 25.0, 17.3 and 37.2 percent soil samples were found saline, saline-sodic, sodic and normal, respectively. Saline-sodic soils are the predominant salt affected soils in the district, followed by saline soils. Sodic soils are of rare occurrence in the district. The problem of sodicity was confined to comparatively heavier textured soils of Shihor, Palitana, Talaja, Gadhada and Botad taluka.

Table 2.5.12.5: Taluka wise percentage distribution of soil samples in different Categories of salt affected soils of Bhavnagar district.

	Percentage distribution			
Taluka	**Saline**	**Saline-sodic**	**Sodic**	**Normal**
Bhavnagar	25	15	20	40
Botad	25	20	20	35
Gadhada	20	30	20	30
Gariyadhar	10	20	15	55
Ghogha	30	20	20	30
Mahuva	5	60	10	25
Palitana	15	25	20	40
Shihor	20	40	25	15
Talaja	20	15	20	45
Umarala	30	15	10	45
Vallabhipur	25	15	10	50
Overall	20.5	25.0	17.3	37.2

Source: Rajput,G. (2010), "Evaluation of Soil Fertility and Under Ground water Quality of Bhavnagar District of Saurashtra Region" M.Sc. (Agri.) Thesis, (Unpblished)

2.5.13 Quality of irrigation water

In order to presence a water quality appraisal 220 underground water/tube well water samples (20 samples from each taluka) were collected. Taluka wise (range and mean values of) EC, pH, RSC, SSP and SAR are given in Table 2.5.13.1 and Percentage distribution of water samples into different EC and SAR classes are given in Table 2.5.13.2.

In general, underground well/tube well water was neutral to alkaline in reaction. The overall pH mean value was 7.72. The water was saline in nature and overall EC mean value was 2.77 dSm^{-1}.

The overall residual sodium carbonate mean value was 0.39 me l^{-1}. The highest mean value (RSC 0.75 me l^{-1}) was recorded in Vallabhipur taluka, whereas the lowest (0.07 me l^{-1}) in Gadhada taluka.

The overall mean value of sodium adsorption ratio was 9.80. The lowest (1.32) and highest (26.3) SAR values were reported in samples collected from Palitana and Botad talukas, respectively.

The overall mean value of soluble sodium percentage was 68.7. The highest mean value (72.7) was recorded in Vallabhipur and Bhavnagar talukas, whereas the lowest (60.7) in Gariyadhar taluka.

Table 2.5.13.1: Talukawise mean values of EC, pH, RSC, SSP and SAR of well/tube well water samples

Taluka	EC ($dS\ m^{-1}$)	pH	RSC ($me\ l^{-1}$)	SSP	SAR
Bhavnagar	6.59	7.94	0.52	72.6	15.3
Botad	2.10	7.75	0.43	70.8	9.53
Gadhada	2.39	7.27	0.07	70.8	10.1
Gariyadhar	1.12	7.52	0.26	60.7	5.22
Ghogha	1.65	8.01	0.52	70.4	7.93
Mahuva	2.35	7.65	0.34	68.3	10.2
Palitana	1.74	7.67	0.21	65.2	7.50
Shihor	3.01	7.95	0.65	70.2	11.0
Talaja	1.90	7.44	0.18	67.4	8.39
Umarala	2.42	7.60	0.36	67.3	9.02
Vallabhipur	5.21	8.07	0.75	72.7	13.6
Overall	2.77	7.72	0.39	68.7	9.80

Source: Rajput,G. (2010), "Evaluation of Soil Fertility and Under Ground water Quality of Bhavnagar District of Saurashtra Region" M.Sc. (Agri.) Thesis, (Unpblished)

The well/tube well waters of Bhavnagar district are poor in quality. Almost half of the samples of well/tube well waters from cultivator's fields were saline (EC 0.75 dSm^{-1} and above). This is indicative of the potential development of saline soils in the Bhavnagr district. Therefore, the salt affected soils of this district were mostly due to secondary salinization. The problem of salinity will be even more severe in this district in future.

Table 2.5.13.2: Percentage distribution of well/tube well water samples into different EC and SAR, RSC and SSP classes

	EC ($dS\ m^{-1}$)				SAR				RSC			SSP	
	C_1	S_1	S_2	S_3	S_1	S_2	S_3	S_1	Safe	Mar.	Un safe	Safe	Un safe
Bhavnagar	0	20	35	30	20	35	30	20	3	5	10	0	100
Botad	0	50	35	10	50	35	10	50	85	10	5	15	85
Gadhada	0	45	50	5	45	50	5	45	100	0	0	15	85
Gariyadhar	0	85	15	0	85	15	0	85	90	10	0	45	55
Ghogha	0	65	30	5	65	30	5	65	85	10	5	80	20
Mahuva	0	50	25	25	50	25	25	50	19	0	10	30	70
Palitana	0	65	30	5	65	30	5	65	90	5	5	35	65
Shihor	0	30	50	20	30	50	20	30	80	10	10	15	85
Talaja	0	65	20	15	65	20	15	65	95	0	5	20	80
Umarala	0	50	40	10	50	40	10	50	85	10	5	20	80
Vallabhipur	0	20	45	30	20	45	30	20	80	0	20	5	95
Overall	0	49.6	34	14.1	49.6	34	14.1	49.6	87.7	5.5	6.8	25.5	74.5

Source: Rajput,G. (2010), "Evaluation of Soil Fertility and Under Ground water Quality of Bhavnagar District of Saurashtra Region" M.Sc. (Agri.) Thesis, (Unpblished)

2.5.14 Irrigation status

Table 2.5.14.1: Talukawise Area Irrigated by different sources (ha.)

Taluka	Net irrigated area (ha)	Net irrigated area (%)	Canal	Pond	Well	Other Sources	Area irrigated more than once
Bhavnagar	4932	12.7	529	0	4403	0	1520
Botad	31081	57.4	610	0	30471	0	990
Gadhada	25376	37.89	1800	0	23576	0	1050
Gariyadhar	8708	22.62	50	0	8658	0	330
Ghogha	8095	27.25	1024	0	7071	0	2000
Mahuva	27534	30.93	710	0	26784	0	2010
Palitana	15560	37.95	971	0	14589	0	1252
Shihor	10330	23.1	467	0	9863	0	1100
Talaja	27093	41.74	7386	0	19707	0	4111
Umrala	3441	10.62	531	0	2910	0	611
Vallbhipur	16858	34.83	62	0	16796	0	105
Total	**179008**	**32.63**	**14140**		**164828**		**15079**

Source: District Statistical Report, Year: 2008-09, Bhavnagar.

Table: 2.5.14.2: Information on Rain fed and irrigated area in the district

Taluka	Rainfed area (Ha.)	%	Lift/Check dam			Wells/Bore well		
			%	P	A	%	P	A
Bhavnagar	25198	65.51	0.51	230	200	1.8	3422	3400
Botad	25871	42.32	1.5	300	290	4.5	3674	2950
Gadhada	37364	57.42	0.57	570	500	1.8	1800	1670
Gariyadhar	32704	83.09	1.35	670	600	2.6	1500	1450
Ghogha	21546	70.41	1.9	660	550	3.5	4371	4350
Mahuva	82538	87.3	0.61	170	130	7.3	2650	2580
Palitana	22890	57.78	0.75	480	400	3.4	3425	3380
Shihor	34685	74.3	1.2	350	340	2.8	2500	2000
Talaja	29299	44.5	0.8	150	120	1.5	1400	1360
Umrala	21463	66.31	0.65	450	400	2.5	2000	1800
Vallbhipur	10100	21.31	0.95	750	680	7.8	4580	4456
Total	**343658**			**4780**	**4210**		**31322**	**29396**

P = Potential area of the Project, A = Actual area of the Project
Source: District Statistical Report, Year: 2008-09, Bhavnagar.

2.5.14.3: Talukawise Information on irrigation projects in the district

Project Type	Project Name	Taluka covered	Area irrigated (Ha.)	
			Projected	Actual
Major irrigation project	Shetrunji dam, palitana	Palitana, Talaja	500	400
Minor irrigation project	Nikol bandhara	Mahuva	250	145
Minor irrigation project	Malpara dam	Ghadhada	320	100
Minor irrigation project	Chirodinala	Bhavanagar	102	12.4
Minor irrigation project	Khari	Mahuva	265	18.6
Minor irrigation project	Badipadva	Ghogha	300	15.5
Minor irrigation project	Ambla	Shihor	203	18.6
Minor irrigation project	Ramdhari	Shihor	243	15.5

Source: District Statistical Report, Year: 2008-09, Bhavnagar

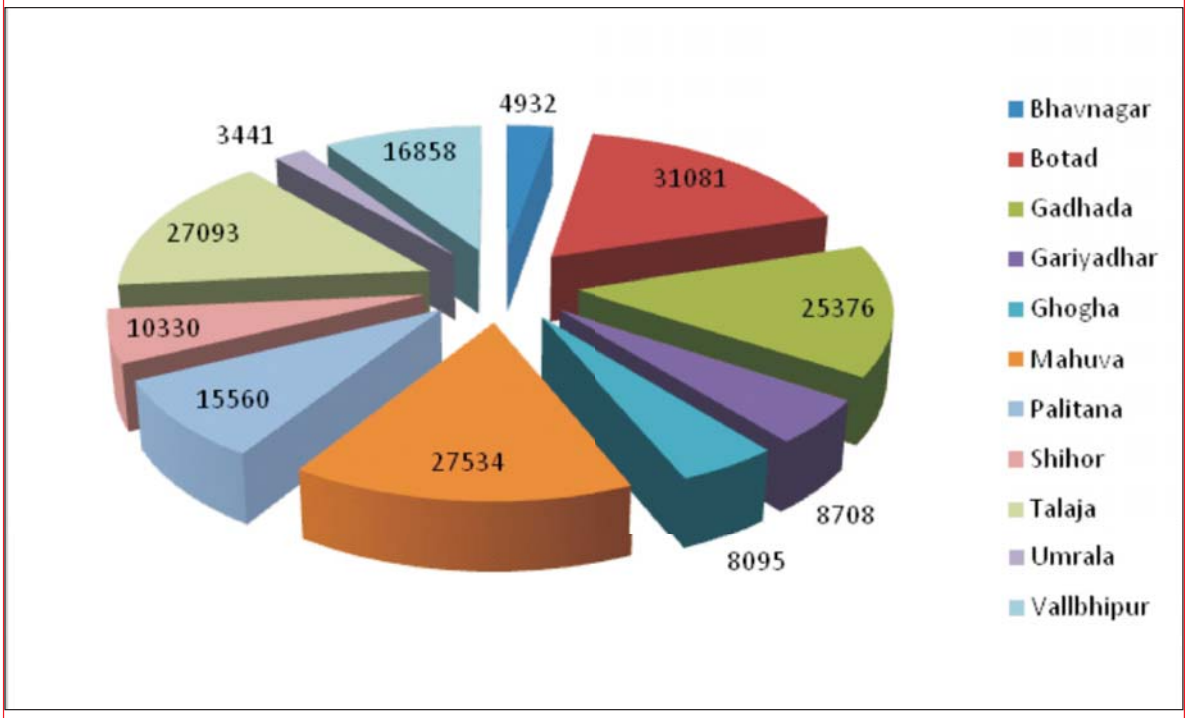


Fig.2.5.14.1: Total irrigated area in different Taluka of Bhavnagar district

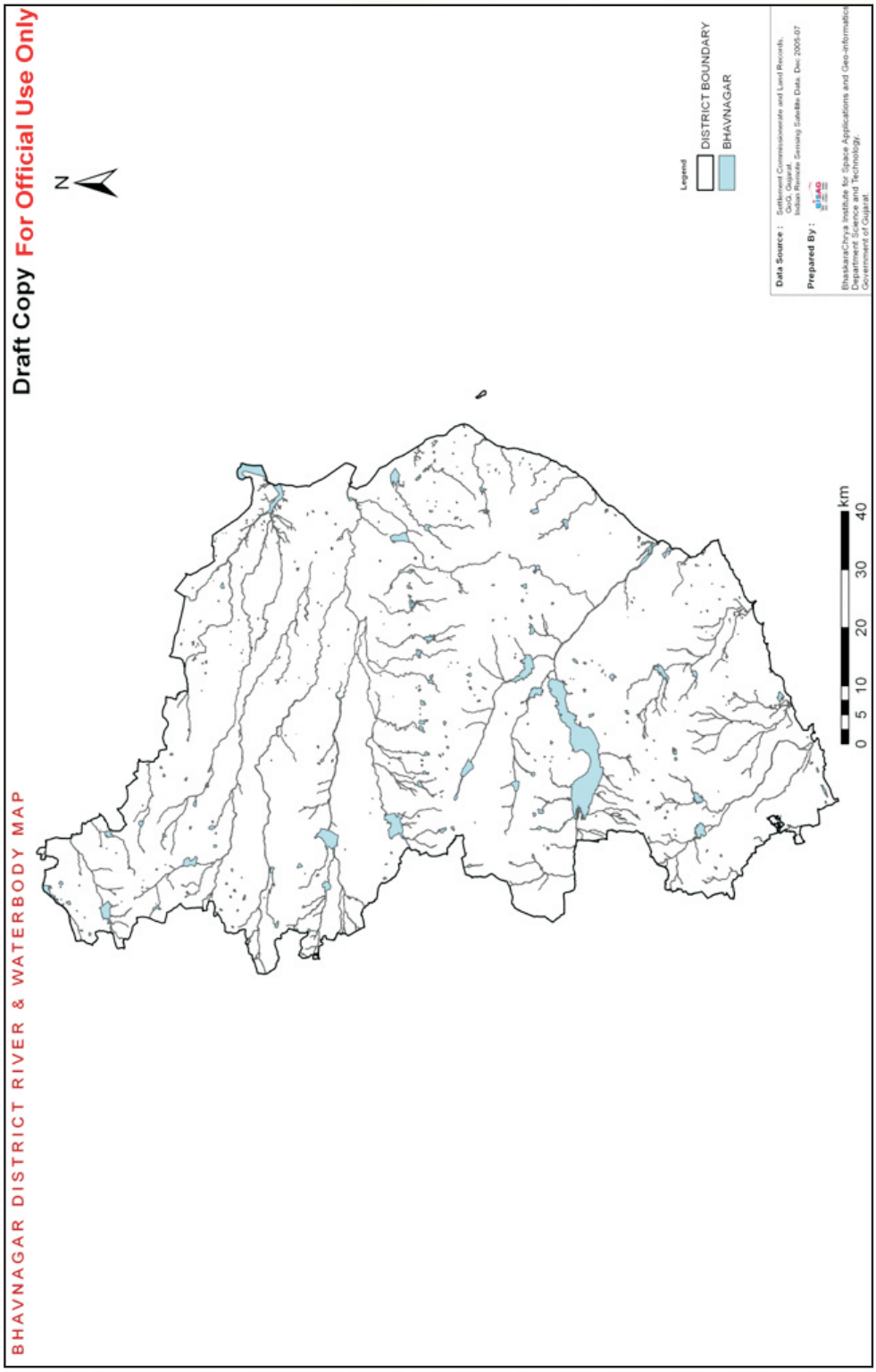


Fig. 2.5.14.2: River and waterbody map of Bhavnagar District

2.5.15 Socio-economic characters - Land Holding Pattern:

The district has total of 226416 land holders according to size class and social groups, out of which 3402 and 64 are scheduled caste and scheduled tribe, having 5605 and 79 ha of the total area, respectively.

The taluka wise land holding (in no. and area in ha.) further revealed that total area is 564373 ha. which is distributed among 241427 farmers. The no. of marginal, small and large farmers in the district is 57146, 88722 and 95559 having 33439 ha, 130277 ha. and 395637 ha. of land holding, respectively.

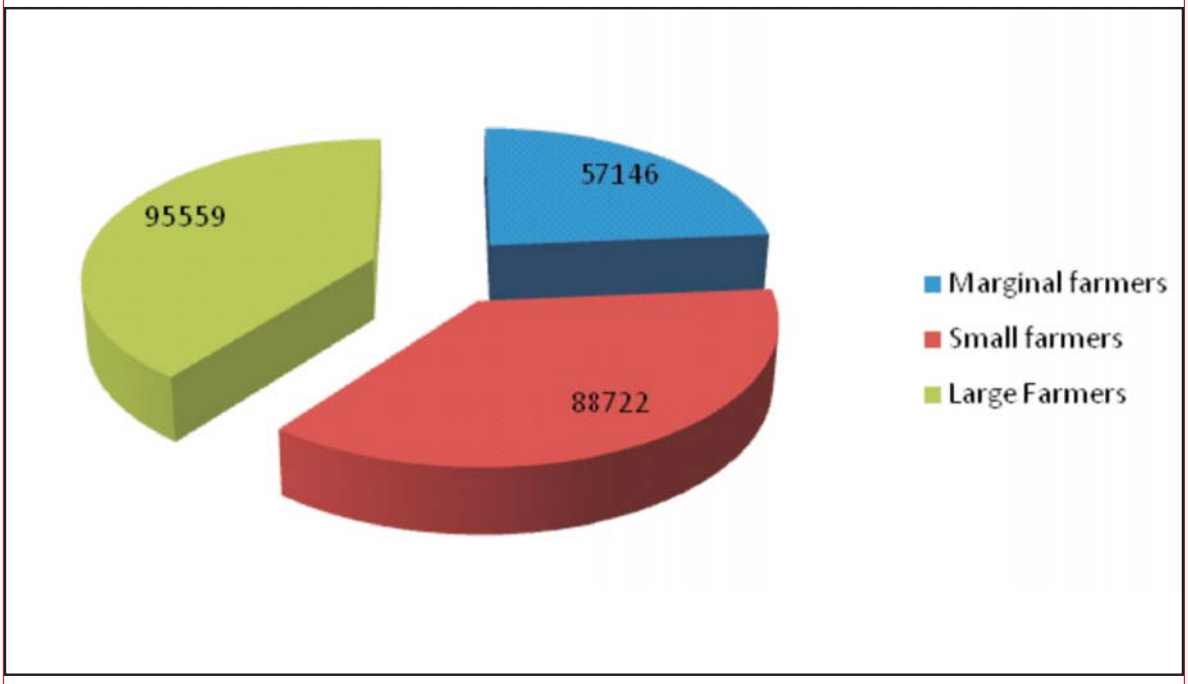


Fig.2.5.15: No. of operational holding in the district

Table 2.5.15.1: Number and area of operational holders according to size class & Social groups.

Size Class (in ha.)	Institutional		SC		ST		Others		All social group	
	No.	Area	No.	Area	No.	Area	No.	Area	No.	Area
Marginal (> 1ha)	140	65	1043	812	27	20	48168	32900	49378	33797
Small (1- 2 ha)	131	205	1570	2215	36	54	82150	120331	83887	122805
Medium (<2 ha)	479	11778	789	2578	1	5	91882	378582	93151	392943
All Classes	**750**	**12048**	**3402**	**5605**	**64**	**79**	**222200**	**531813**	**226416**	**549545**

Source: District Statistical Report, Year: 2008-09

2.5.16 Natural calamities:

The information on natural calamities in the district is given in below.

Table 2.5.16.1: Information regarding Natural calamities

Taluka	Name of calamities	Year in which affected (since last 10 years.)	Severity M/S/VS	% of cropped area affected	Livestock mortality (No.of animals)	% of families affected
Gadhada	Flood and Cyclone	1982	VS	75	200	80
Gadhada	Flood	2006	S	75	150	70
Botad	Flood	2006	S	52	40	60
Vallabhipur	Flood	2006	S	45	No	60
Umarala	Flood	2006	S	40	25	48
Bhavnagar	Flood	2006	S	48	No	65
Ghogha	Flood	2006	M	25	No	15
Gariyadhar	Flood	2006	S	35	17	58
Palitana	Flood	2006	S	40	No	30
Talaja	Flood	2006	M	30	No	20
Mahuva	Flood	2006	M	15	No	10
Vallabhipur	Drought	2007	M	10	No	10
Shihor	Drought	2007	M	20	No	15

Source: SREP, 2010, Bhavnagar District.

2.5.17 Cooperative Status:

Various types of marketing and co-operative societies have been registered in the Bhavnagar district which is primarily related with agricultural inputs like sale of fertilizers, seeds, insecticides, pesticides, sprayers, dusters, other agricultural equipment's etc. These societies are meant for production input or sell of the agricultural/other produces. The district has a total of 1997 co-operatives for eighteen kinds of sectors, among them primary agricultural credit societies are 541 and 255 dairy co-operatives run by Bhavnagar District Co-operative Milk Producer Union, Sarvottam Dairy, Bhavnagar are the major one followed by other types of societies.

In case of co-operative sector development at Taluka level, maximum no. of co-operative societies are 510 in Bhavnagar, followed by 335 in Talaja and 298 in Mahuva. The minimum development of this sector is found 52 in Gariadhar and 54 in Umrala Taluka.

Strengthening of various co-operative is one of the best ways for development of agriculture and related sectors.

Table 2.5.17.1: Status of co-operative societies in the District

(1.Bhavnagar, 2. Botad, 3. Gadhada, 4. Gariyadhar, 5. Ghogha, 6. Mahuva, 7. Palitana, 8.Shihor, 9.Talaja, 10. Umarala, 11. Vallabhipur)

Type of Societies	1	2	3	4	5	6	7	8	9	10	11	Total
Middle cooperative bank	1	0	0	0	0	0	0	0	0	0	0	**1**
Primary agricultural credit societies	39	51	60	38	25	80	55	41	88	30	34	**541**
Urban bank	5	3	0	0	0	1	0	2	1	0	0	**12**
Marketing society	0	0	0	0	0	0	0	0	0	0	0	**0**
Milk cooperative society	4	14	22	0	18	61	25	10	88	2	11	**255**
Live stock society	8	22	32	0	22	36	28	21	88	6	13	**276**
Collective Farming society	2	2	1	0	0	1	1	2	1	0	1	**11**
Fish industry society	6	1	0	0	2	1	2	2	5	0	0	**19**
Tree cooperative society	0	0	0	0	0	0	0	1	0	0	7	**8**
Builders societies	364	41	4	8	0	91	16	23	21	2	0	**570**
Labour societies	39	11	10	5	8	16	10	6	16	5	7	**133**
Irrigation societies	8	9	3	1	0	0	4	1	0	0	0	**26**
Transport society	6	1	2	0	0	1	2	1	2	6	3	**24**
Tree plantation	1	0	0	1	0	0	0	1	0	0	0	**3**
Fruits And Vegetable Societies	20	3	5	1	8	6	7	9	17	2	2	**80**
Oilseed Production Societies	3	0	2	0	0	2	2		6	0	0	**15**
Cottoncel jinning pressing Societies	3	6	4	0	0	2	1	1	2	2	1	**22**
District cooperative union	1	0	0	0	0	0	0	0	0	0	0	**1**
Total	**510**	**164**	**145**	**52**	**83**	**298**	**153**	**121**	**335**	**54**	**79**	**1997**
Source: Samajik Aarthik Samiksha, Bhavnagar, Year: 2008-09 and District Registrar, Bhavnagar-2012												

2.5.18 Industrial Status and Support Infra structure:

Industrial development in Bhavnagar district could be attributed to the presence of a large number of diamond cutting and polishing units, salt and marine chemicals, plastics, ship building, and breaking industries. Bhavnagar stands second in diamond cutting & polishing industry after Surat in India, with 6,000 units operating from the district and employing more than 3 lakh people. Bhavnagar is the largest producer of salt, with 34,500 tons of salt being produced annually in the district. Bhavnagar manufactures FRP (Fiberglass Reinforced Plastic) boats and steel vessels at ship building facility of Alcock Ashdown (Gujarat) Ltd. At Alang, Bhavnagar houses the largest ship breaking yard in the world. Bhavnagar has about 150 units manufacturing plastic monofilaments, and more than 400 units manufacturing plastic cloth, twine, ropes, films, and multifilament yarn. Some sections of the society depend upon agriculture for their livelihood.

Small Scale Industries (SSI)

The district has 10,080 SSI units with employment of 49,587 involving a total investment of INR 28,955 lakhs (USD 70.62 million). Around 4,460 SSI units are present in Bhavnagar taluka, witnessing investments to the tune of INR 9,956 lakhs (USD 24.28 million). Maximum numbers of industries are engaged in repairing & servicing, textiles, chemicals, glass & ceramics, and wood products.

Industry Investment Trends

As per the Industrial Entrepreneur Memoranda (IEMs) filed, the total investment during 1988-97 was INR 2,693 Crore (USD 657 million), and during 1998-2007 investments worth INR 4,775 Crore (USD 1,164.6 million). Around 87% of the investments during 1998-07 has been contributed by infrastructure projects, cement and gypsum, and chemicals sector, while 89% of the investments during 1988-97 was contributed by industries such as chemicals, cement and gypsum.

Economy Drivers

Recent surge in the growth of food processing industries in the district has increased employment opportunities for the masses. Presence of Bhavnagar port has helped in catalyzing the growth of industries, making it an important terminal for export and import of goods. Proximity with other major industrial hubs of the State, such as Ahmedabad, and Rajkot has helped the district in attracting investments. Small scale industry sectors such as repairing and servicing, textiles, chemicals, glass, ceramics and wood products are the supporting pillars of the economy providing numerous employment opportunities.

2.5.18.1: Industrial Estates in the District

Sr. No.	Location	Area in Ha.
1	Botad	6
2	Chitra	174.71
3	Dhasa	0.93
4	Mahuva	18
5	Palitana	33.95
6	Sihor 1	12
7	Sihor 2	18.73
8	Vartej	73.58
9	Vallabhipur	0.75
10	Vithalwadi	9

Support infrastructure:

Road:

National Highway 8E passes through the district connecting it to Junagadh (205 km) and Amreli (113 km). Bhavnagar is also connected to Ahmedabad (170 km), Vadodara (280 km), Jamnagar (266 km), Surat (447 km), Rajkot (178 km).

Rail:

Majority of talukas of Bhavnagar are well connected to cities such as Amreli, Ahmedabad and Mumbai by rail.

Airport:

The first airport in Gujarat was established in Bhavnagar. Air services are available between Bhavnagar and Ahmedabad/Mumbai. Nearest international airport is at Ahmedabad.

Port:

Bhavnagar port is well connected with a broad gauge railway line. The port is 10 km away from Bhavnagar city which is well connected to Ahmedabad and Mumbai. There is a minor port at Ghogha and ship breaking yard at Alang. Government of Gujarat plans to develop Mithivirdi and Mahuva ports for handling steel products, iron ore, coal, iron plates and automobiles. The nearest natural port 'Pipavav' is 113 km.

Bhavnagar Port:

Bhavnagar port is an all – weather direct berthing port for smaller vessels. It is located in the Gulf of Cambay on the west coast of India and has a draft upto 4 meters. The concrete jetty is 270 meters in length and 12.8 meters in width and also having North quay of 120 m. The port is illuminated by five high – mast towers and 75 KVA DG set for emergency power supply. Minor ports in the district are at Mahuva, Ghogha, and Talaja. Alcock Ashdown Ltd, a major company for ship building, ship conversion and overhauling projects, has a manufacturing shipyard in Bhavnagar. Alcock Ashdown has one of the biggest centrally air conditioned FRP boat building shops in Bhavnagar. Alang (50 km from Bhavnagar city) is the largest ship breaking yard in the world.

Proposed infrastructure projects

Road network: The Government has proposed privatization of bus services in Bhavnagar, to enhance the standards of transport facilities. Further, a "Transport Nagar" proposed by the Bhavnagar Municipal Corporation will provide the much needed connectivity in the district. Gujarat State Road Development Corporation (GSRDC) has proposed development of Bhavnagar-Vallabhipur-Dhandhuka Road and Bhavnagar- Dholera-Wataman Road.

Port: Mithivirdi, situated 40 km south of Bhavnagar and 10 km north of existingship breaking yard at Alang is the proposed site for cargo handling whichincludes steel products, iron ore, coal, iron plates, and automobiles

Power: Lignite based power station is proposed at Ghogha taluka having a capacity of 315 MW by Nirma Ltd. with investments of about INR 2,000 crore (USD 487.8 million)

Kalpasar project: Kalpasar Project envisages to build a dam (64 km) across the Gulf of Khambhat in Gujarat in the Arabian Sea to create a sweet water lake across Ghogha in Bhavnagar district and Hansot in Bharuch district. The distance between Saurashtra and south Gujarat will be reduced by 225 km after the successful completion of the project.

2.5.19 Banking and Finance:

There are total 285 banks in the district in 2011-12. The amounts of loan disbursed by different banks are given in Table 2.5.19.2.

As per source cited bellow*, the different banks are as under. State Bank of India -78 branches, Dena Bank - 20 branches , Bank of India -16 branches, Bank of Baroda -11 branches, Hdfc Bank Ltd - 9 branches, Central Bankof India - 9 branches, Union Bank of India - 7 branches, Axis Bank - 6 branches, Icici Bank Ltd -4 branches, Uco Bank - 3 branches, Punjab National Bank - 2 branches, Indian Overseas Bank - 2 branches, Vijaya Bank - 2 branches and Corporation Bank -2 branches.

*http://www.onefivenine.com/india/village/Bhavnagar

Table: 2.5.19.1: Information regarding Banks (2011-12)

Taluka	Nationalize bank	Cooperative bank	LMB	Rural bank	Private bank	Total
Bhavnagar	68	13	1	4	14	100
Botad	10	7	1	4	3	25
Gadhada	8	10	1	2	0	21
Gariyadhar	6	5	1	1	0	13
Ghogha	4	3	1	1	0	9
Mahuva	19	8	1	2	1	31
Palitana	8	7	1	4	1	21
Shihor	11	7	1	0	1	20
Talaja	10	9	1	2	1	23
Umrala	4	5	1	1	0	11
Vallbhipur	5	5	1	0	0	11
Total	**153**	**73**	**11**	**21**	**21**	**285**

Source: Bhavnagar District Statistical Report, Year: 2010-11.

Table: 2.5.19.2: Information regarding Loan Disbursed in 2011-12: (Rs. in Lakh)

Taluka	Co-operative Bank	Commercial Bank	R.R.B.	Total
Bhavnagar	662.93	7876.66	303.55	8843.14
Botad	2524.75	6103.32	910.86	9538.93
Gadhada	8641.11	4477.66	379.41	6343.99
Gariyadhar	4308.06	1676.16	359.77	13498.18
Ghogha	639.35	1063.40	251.99	1954.74
Mahuva	6100.41	7152.78	481.86	13735.05
Palitana	2573.86	5142.50	675.23	8391.59
Shihor	6438.68	1612.29	0	8050.97
Talaja	6185.43	7190.92	1156.96	14533.31
Umrala	3050.87	1468.62	130.82	4650.31
Vallbhipur	5451.91	1456.12	NA	6908.03
Total	**46577.36**	**45220.43**	**4650.45**	**96448.24**

Source: Lead Bank Officer, SBI, Bhavnagar.

2.5.20 Status of Commodity Groups:

Bhavnagar district has strong base of commodity Groups, formed by line departments, Sakhi Mandals, NGOs, Mission Mangalam Project and other organization. The Bhavnagar district has a total of 397 groups performing various functions. Diverting these groups for agricultural and its related enterprises may prove to be boon for securing lively hood of the people. The FIGs formed by ATMA projects are also better utilized for developing agricultural sector.

Table 2.5.20.1: Status of various groups in the district

Taluka	FIG*	SHG*	Sakhi Mandal	Total
Bhavnagar	46	363	29	438
Botad	20	102	13	135
Gadhada	18	158	10	186
Gariyadhar	15	74	12	101
Ghogha	31	148	22	201
Mahuva	52	168	31	251
Palitana	114	100	12	226
Shihor	38	92	20	150
Talaja	45	153	20	218
Umrala	10	72	16	98
Vallbhipur	8	130	7	145
Total	**397**	**1560**	**192**	**2149**

Source: Project Director, ATMA, & District Agriculture Officer, Bhavnagar.
* FIG: Farmers Interest Group, SHG: Self Help Group

2.5.21 Main and subsidiary occupation and Workers classification:

Out of total population of 2469630, about 944559 (38.24%) are the total workers, comprising of 303854 (32.16%) urban and 640705 (67.83%) rural workers. Maximum urban workers are in Bhavnagar (17.18%) and rural workers (13.51%) are in Mahuva. Out of the total 944559 workers in the districts, 22.49 per cent are Farmers, 22.26 per cent are Agricultural laborers. Only 4.49 per cent of the total worker is engaged in grih udhyog. A sizeable percentage of the population 61.75 % (1525031) are non-workers and total of 479265 are doing other work in the district. The distribution of the main workers by profession is total cultivators (212513); Agriculture laborer (210277); workers in small scale industry (42504) and other workers (479265). Thus, the major source of livelihood in the district is agriculture in general followed by industries according to the work distribution in the district. The subsidiary occupation is animal husbandry.

2.5.22 Availability of agriculture employment days

The district is rich in natural/industrial resources but developed poorly. This is because only 31.63 per cent of total population is engaged in one or another type work. With improvement and development of the existing resources, the number of workers in the villages and taluka levels can be improved and more number of non workers can be absorbed.

2.5.23 Infrastructure facilities:

As regards to availability of infrastructures, the district has two soil testing laboratory, one in Bhavnagar and second at Botad taluka. There are 22 net house in the district. There are 2 training

institutes, one at Bhavnagar (FTC) and second at Sanosara (KVK). There are four pack houses/ripening chambers. There are six cold storages and six rural godwons in the district. There are eleven APMCs (Agriculture Produce Marketing Committees) in the district. Functioning of market yards is fragmented without any uniform approach. Govt. may help APMCs to prepare project reports and avail loans for development of market yards. The grading and other post harvest handling may be developed at each yard.

The existing marketing infrastructure also needs to be strengthen with the facilities like roads, godowns etc. Availability of inadequate input supply, value addition and post harvest storage facilities, and irrigation will hamper agriculture motivation. To supplement the need of various aspects to boost the agriculture production, the villages are being provided with more infrastructures like irrigation, all weather roads connecting the villages (mainly the remotest ones) to the main hub.

There are 1159, 276,169 and 39 primary school, secondary, higher secondary and colleges, respectively in the district. College education facility is not available in Vallabhipur, Umrala and Ghogha taluka of the district.

All the villages of Bhavnagar district are electrified i.e. 100% under Jyoti Gram Yojna. The district has total of 3759.40 KM of Road, under State department and District panchayat. Further, all the talukas are connected through rail way line except Vallabhipur, Ghogha and Gariyadhar.

Table 2.5.23.1: Talukawise Net house and Poly House in the district

Taluka	Net house	Poly house
Bhavnagar	5	0
Botad	2	1
Gadhada	2	0
Gariyadhar	0	0
Ghogha	3	0
Mahuva	6	5
Palitana	2	0
Shihor	1	0
Talaja	0	0
Umrala	0	0
Vallbhipur	1	0
Total	**22**	**6**

Source: Deputy Director of Horticulture, Bhavnagar 2012.

Table 2.5.23.2: List of Godowns and Ware House in the district

Agency	Godowns No. and Capacity (MT)	Ware House
Co-ope soc.	Total 267 (200: 200 MT) (67: 120 MT)	Botad-2 Mahuva-6
Taluka Co. Ope.	Total 34 (3: 1000 MT) (8: 500 MT) (5: 250 MT) (6: 200 MT) (5: 150 MT) (7: 100 MT)	
Dist. Co. ope.	Total 2 (2: 500 MT)	
APMC	Total 1145 under all 11 APMC of District	

Report of Gujarat State Warehousing Corporation, Ahmedabad, 2012.

2.5.24 Uniqueness of Bhavnagar District

Bhavnagar district possess several distinguished characteristics which makes it different and unique in the state as well as national and international level.

Bhavnagar Taluka:

- Capital of the district also known as *Cultural City* in the Gujarat.
- Bhavnagar State was the first capital voluntarily joined Independent India.
- Maharaja Krishkumar Singhji Gohil was very popular in the people because of his justice, policy,whisdom and foresightness.
- Bhavnagar was the first state where rail and air services started in Gujarat.
- The oldest Shamaldas College exist in Bhavnagar where Rashtrapita Mahatma Gandhi took education.

Gadhada Taluka:

- Temple of World famous Lord Swaminarayan

Ghogha Taluka:

- Location for Gujarat states Ambitious Project "Kalpsar" and Ghogha - Dahej ferry service.
- Nuclear power plant at Mithi Virdi
- Large scale lignite mining
- Famous port during British Era.

Palitana Taluka:

- Shatrunjay Mountain is the most religious place for Jain religion.

Mahuva Taluka:

- Mahuva is known as " *Kashmir of Saurashtra* "
- In entire state research on coconut and hybrid seed production cv. (D x T) and Elite Seed Farm of 10 ha. for Production of Hybrid coconut cv. (D x T) is at Agricultural Research Station, (Fruit Crop) JAU, Mahuva.
- Smart Farming Project is established at ARS, JAU, Mahuva.
- Origin of famous Mango cv. Jamadar
- Maximum number of Onion dehydration plants in the state, cotton ginning mills and development of poultry sector..
- APMC Mahuva ranks amongs first ten APMC in the state.
- Birth place of Former Finance Minister of India Mr. Jasvantbhai Maheta.
- Birthplace of Former Chief Minister and Finance Minister of Gujarat Mr. Chhabildas Maheta.
- Birth place of World famous *Ramayan Kathakar* Shri Moraribapu.
- Famous religious place of Sant shri Bajrangdasbapu is at Bagdana
- Mahuva port was world famous during British Era.
- Highly developed Rop making industries is only at Mahuva in entire state

Shihor Taluka:

- Intensive cultivation of fruit crops like Bhavnagari Pomegranate, Guava and Citrus.
- Development of Copper and Brass based utensils industries.

Talaja Taluka:

- Talaja Mountain is the religious place of Jain Tirthkar.
- Birth place of Religious Poet Narsinh Maheta who founded Gopnath Temple.
- India's largest ship breaking yard Alang is near Talaja.
- Origin of famous onion cv. Talaja Red

2.5.25 Demographic details of Bhavnagar district:

1	No. of developmental Taluka	11
2	Total villages	789
3	No. of gram Panchayat	772
4	Villages electrified	789
5	Villages having agricultural power supply	772
6	Villages having post office	349
7	Villages having primary schools	772
8	Total no. of primary schools	1256
9	Total population of the district	2469630
10	Male population	1274920
11	Female population	1194710
12	Total rural population	1519554
13	Total Urban Population	950076
14	Total Schedule tribe population	142128
15	Total Schedule caste population	7298
16	Total Literate population	1368920
17	Total literate population (Rural)	733803
18	Total literate population (Urban)	314959
19	Total geographical area (ha.)	857945
20	Forest land (ha.)	26928
21	Permanent pastures and grazing lands (ha.)	61288
22	Cultivable waste land (ha.)	24966
23	Current fallow (ha.)	36974
24	Net sown area (ha.)	548535
25	Total area available for irrigation (ha.)	179008

Cont.

26	Area irrigated by canals/channels (ha.)	14140
27	Area irrigated by wells/ borewell (ha.)	164828
28	Number of cultivators	212513
29	Agricultural laborers	210277
30	Workers engaged in household industries	42504
31	Other workers	479265
32	Milk (Chilling/cooling/processing)	3
33	Marginal farmers (≤ 1 ha.)	2474
34	Small farmers (1 to 2 ha.)	6492
35	Semi-medium farmers (> 2 ha.)	27861
36	Total numbers of holdings	37277
37	Total cattle/Buffalow population	674203
38	Cow	340063
39	Buffaloes	334140
40	Sheep indigenous	258267
41	Goat	199173
42	Poultry indigenous	1249531
43	Total Animals	1140819
44	Oil engines	46646
45	Electric Motors	19930
46	Tractors	3261
47	Soil testing centers	3
48	Plantations nurseries	2
49	Urban Store/Godowns	339
50	Rural Store/Godowns	20
51	Veterinary hospitals/Dispensaries	33
52	Intensive sheep development sub centre	19
53	Dairy co-operative societies	183
54	Milk collection centers	555
55	Fisherman societies	14
56	Fish production (Tonne)	4388
57	Milk production ()	136255

Note: Variations in data is due to the different sources. Where-ever discrepancies were recorded in the data, these were cross-checked and the most reliable data/figures/ sources is quoted/ used.

The Vision

Bhavnagar district is important district in Saurashtra region. Total geographical area is about 857945 hectares. It is noteworthy to find that 63.93 per cent of the geographical area is under cultivation during 2009. The 61.52 per cent of the population resides in the villages and depends on Agriculture. The district is blessed with fairly good amount of rainfall varying from *517 to 836 mm* during last ten years. Out of 548535 ha of cultivable area, 179008 ha (32.63 %) is irrigated area. The remaining area (67.36 %) is un irrigated and depends only on rainfall. The major crops of the district are cotton; groundnut, sesame, and Bajra are *kharif* crops. Wheat, cumin and onion are main *rabi* crops.

The Bhavnagar district is comprised of eleven talukas. The four talukas namely Botad, Talaja, Palitana and Gadhada enjoying prosperity with good irrigation facilities as compared to the remaining talukas. The remaining talukas are under rain fed conditions and rely on monsoon season. Further, due to ingress of salinity, part of Mahuva, Ghogha, Bhavnagar and Talaja facing problems of saline soil and saline irrigation water. The poor economic condition of the farmers and fragmented land holding are other major constraints. The availability of improved seeds and other inputs is also very less. The adoption gap between recommended technology and farmers' practices are wide enough.

Due to variations in natural resources, soil, water and other conditions, the vision is to be made systematic approach considering the different situations for the overall development of all the eleven Taluka.

For small holdings prevailing in the district, integrated farming system approach, especially with multiple crop husbandries in integration with one or two allied enterprise with market potential, is the sure way for optimum utilization of limited resources with sustainable income. Instead of single enterprise, the co-existence of multiple enterprises (crops and allied) make optimum utilization of resources in an integrated way. The scientific integration of certain enterprises is eco-friendly, and imparts sustainability to the system with increased income and employment generation.

The ever increasing cost of production and dependency on purchased inputs can effectively be controlled by adopting this approach through enhanced use efficiency of different critical inputs in crop enterprises with judicious combination of one or more allied enterprises complimenting each other through effective recycling of residues, wastes, byproducts or the products itself. The allied enterprises are important part of the farming systems.

Both price and income elasticity of demand for most of these enterprises' products is high. There is wide gap between demand and supply of these products. There exists high potential for increasing the yield rates of these enterprises, as the gap between present productivity (in the district) and the achievable yield and potential yield is quite large. The prevailing infrastructural facilities, easy access to big markets and up-coming processing facilities in and around the district are added advantage for the farmers of this district.

The farmers of the Bhavnagar district are utilizing very less amount of chemical inputs. In this situation, if they are converted to organic farming that will be the strength of the district. The interest of farmers has to be shielded by improving the efficiency of inputs like water, energy, labour and nutrients. Some of the presion farming technologies like laser land leveling will be in favour of the farmers for optimal use of water.

The concept of farm mechanization with respect to small and big holdings like bullock drawn automatic seed drill, tractor with farm implements, rotavator etc. is also very important. Increase in seed replacement ratio, increased use of FYM and other organic matter, seed treatment, improved agronomic practices, drip irrigation, weed management in rain fed farming, Integrated pest management, farm mechanization, harvesting, small scale processing and marketing, increase area under vegetable and fruit crops, introduction of new crops like cashew, turmeric, castor and increased area under pulse crops are the major issues to be addressed for overall development of agriculture sector. Breed improvement of non descript breed through artificial insemination, proper health, housing and feeding management, scientific calf rearing, supplementing mineral mixture, concentrate feeding, increasing fodder availability *etc* are the major area of development for strengthening animal husbandry in the district.

The forest covers 3.13 per cent of the total geographical area of the district. The pasture land is only 7.14 per cent and cultivable waste land is only 2.9 per cent. This indicates that the forest area and pasture land are not sufficient in the district. Hence, Development of forest, pasture land and increase area under fodder cultivation in the district is the prime requirement of the district for increasing the fodder availability for good number of the livestock (1140819).

Vision Statement

Secure the livelihood through bridging the knowledge gap and adoption of improved farming as well as market linking.

Priority Setting

1. Increase the adoption of improved varieties/hybrids by increasing seed replacement ratio by promoting seed production activity through strengthening of seed production and seed village programmes.
2. Increase the inputs availability through strengthening of co-operative societies.
3. Popularize the use of low cost and eco-friendly recommended technologies like seed treatment and use of bio-fertilizers.
4. Improving soil health through soil testing and use of FYM, bio-compost and vermi-composting., green manuring and organic farming.
5. Increase area under irrigation through increased water use efficiency and water harvesting.
6. Integrated nutrient and pest management in crops like cotton, groundnut, bajra, sesame and vegetables.
7. To strengthen the marketing through establishing the collection centers in various clusters and linking them with proper markets.
8. Small scale processing at taluka level for fruit and food crops.
9. Promotion of horticultural crops and high tech horticulture for high valued crops.
10. Crop diversification like Soya bean, gum guar, ajwan etc.
11. Scientific Dairy Management through health, housing and feeding management.
12. Establishment of cattle feed factory for regular feed supply at reasonable rate.

13. Establishment of milk chilling units at village collection centre.
14. Popularizing the use of mineral mixture, cattle feed and scientific management in the animal husbandry.
15. Increase area under fodder crops and establishment of fodder bank at village/Taluka level.
16. Agro-waste management through vermi-composting, cotton shredder/slicer and composting units.
17. To find and fulfill the need of farmers related to improved technology through establishing Agro- informatics at Taluka level and connects it with research stations/KVK through e-connectivity.
18. Popularizing low cost net house technology
19. Popularize the concept of ago- forestry in the district.
20. Need for Agribusiness clinics in Talukas for rendering various agro services to the farmers.
21. Need for strengthening of existing Agribusiness centers and elimination of middlemen by strengthening of APMC (Agriculture Produce Marketing Committee).
22. Need for management of water resources and popularization of micro-irrigation system and their adoption by farmers.
23. Genetic up-gradation of cattle and facilities for general cattle health and hygiene.
24. Promotion of inland and marine fishery.
25. Strengthening of Value addition for horticultural produce.

◄ Alang Ship Break Yard

Swaminarayan Temple
- Gadhada ►

◄ Jain Temple - Palitana

CHAPTER III

SWOT ANALYSIS

3.1 Introduction:

Analysis of SWOT is a basic and straight forward tool that gives direction and serves as a basis for the development of an enterprise. It accomplishes this by assessing an enterprise Strengths (what an enterprise can do) and Weaknesses (what an enterprise can not do) in addition to Opportunities (potential favorable conditions for an enterprise) and Threats (potential unfavorable conditions for an enterprise). The role of SWOT analysis is to take the information from the concerned agencies and separate it into internal issues (strengths and weaknesses) and external issues (opportunities and threats).In applying the SWOT analysis in agriculture, it is necessary to minimize both weaknesses and threats. Weaknesses should be looked at in order to convert them into strengths. Likewise, threats should be converted into opportunities. The strengths and opportunities should be matched to optimize the potential production. Applying SWOT in this fashion can generate income for the farmers in sustainable manner.

The all operations concerning to agricultural farming viz., land preparation, sowing and inter culturing totally depend on the onset of monsoon and rainfall distribution. The entire district is divided into eight agro-ecological situations based upon topography soil type rainfall, availability of irrigation water/canal irrigation etc. The gross cultivated area of the district is mainly under agricultural crops. Animal husbandry and horticulture are the other important enterprises. The proportion ranges from 75-80 percent only under agricultural crops and remaining enterprises put together ranges to 20-25 percent. The major source of irrigation is through wells and supported by minor and medium irrigation project. Animal husbandry is the common enterprise in all the blocks. In Bhavnagar district the different types of farming systems are observed based on the agro-ecological situation and resource availability i.e. soil type and fertility status, availability of irrigation facilities, availability of finance, human resource, micro-climate and marketing.

The major-farming systems under AES are shown in following table.

Farming system	AES-I	AES-II	AES-III	AES-IV	AES-V	AES-VI	AES-VII	AES-VIII
1	Agri.	Agri.	Agri.+ A.H	Agri.	Agri.+ A.H	Agri.+ H.+ A.H.	Agri.+ A.H	Agri.+ H.
2	Agri.+ A.H	Agri.+ A.H	A.H.+ A.L.	Agri.+ A.H	Agri.+ H.	A.L.	Agri.+ A.L.	Agri.+ A.L.
3	A.H.+ A.L.	Agri.+ A.L.		Agri.+ H.	A.H.+ A.L.		Agri.+ V.	Agri.
4					Agri.+ F.			A.H.

Agri.: Agriculture, A.L.: Agricultural Labor, H.: Horticulture,
V.: Vegetable, A.H.: Animal Husbandry, F.: Fisheries

3.2 SWOT analysis of the Bhavnagar District

3.2.1 Strength

- Majority of geographical land area (69.18 %) is under cultivation.
- Majority of the cultivated area is covered in kharif season. Among them 60 % is covered by cotton followed by Groundnut (25 %) and Bajri (10 %).. Majority of field crops grown are cash crops, oilseeds, fruits, vegetables and spices.
- A variety of vegetables and arid/semi arid fruit crops are grown round the year.
- Improved farm implements are used for cultivation practices.
- Abundance of solar energy round the year.
- Availability of wind energy round the year.
- Traditional farming in the district.
- Potash content of the soil is high.
- Bore well and open well is the major source of irrigation for majority of irrigated area.
- Large number of land holders is having more than 2 ha. land.
- A good breed of Jafrabadi Buffaloes is reared as milking animal.
- All the Talukas have their own APMC (Agricultural Produce Marketing Committee) and their marketing yards.
- Long sea coast favourable for expansion of fisheries and port.
- Highest no. of onion dehydration plant in mahuva
- Mahuva, Talaja and Vallabhipur have Research stations of Junagadh Agricultural University. Sanosara has KVK under Lok Bharti Trust, which is famous for their grass root level activity in relation to agricultural education, research and extension programmes.

3.2.2 Weaknesses:

- Out of 566690 ha of net sown area, only 179008 ha (31.58 %) are irrigated by various sources. Rest of the area is purely depends on rain fall.
- The average rainfall is comparatively between *517 to 836* mm (last 10 years) but the distribution is not satisfactorily.
- Hilly and undulating land holdings in some blocks.
- The soil is poor in organic carbon.
- Problematic soils (saline/sodic/water logging/wet land) in some blocks like Bhavnagar, Ghogha, Mahuva, Talaja and Vallabhipur.
- Micronutrient deficiencies in soil due to continuous mono cropping of cotton.
- Limited soil testing facility is in the district
- Improper management of farm crop residue and poor adoption for organic fertilizers, bio fertilizers, bio control measures.

- Critical technological gaps in specific area of crop like seed treatment, balanced use of fertilizers and integrated pest, disease and fertilizer management in major field/fruit crops.
- Low seed replacement ratio in major crops like groundnut and lack of quality planting material of horticultural crops.
- Scarcity of human labours especially at peak period of various agricultural operations.
- Genetic impurity in milch animal.
- Low availability of quality fodder throughout the year..
- High rate of soil erosion in some of the blocks.
- Poor marketing, transportation and post harvest storage facilities for
- Poor infrastructure facilities like farm approach roads, rural godowns *etc.*
- Lack of Processing industries for coconut at Mahuva region.
- Scarcity of good quality water for irrigation and households

3.2.3 Opportunities:

- Out of 819085 ha of geographical area, 42883 ha (5.23 %) are cultivable waste land.
- Productivity of crops and milch animals can be enhanced with improved production technologies.
- Near about 70.00 % of cultivated land is under rainfed conditions. Irrigation facilities may be increased in rain fed talukas through Water harvesting and use of MIS
- Biomass available from livestock, crop and farm residue can be used through scientific recycling for maintaining soil fertility.
- Wide scope exists to tackle the resource degradation through utilizing integrated approaches Like Natural Resource Management, Integrated Nutrient Management and Integrated Pest Management.
- The area under horticultural and plantation crops can be increased to considerable extent along with sea coast.
- Greater scope is there for popularization and promotion of organic farming for arid fruit crops and cereal crops in some specific area like Bhal.
- Abundance scope to increase area under stress tolerant medicinal and aromatic plants in fellow lands.
- Opportunities for strengthening infrastructure and marketing facilities.
- Greater scope for increasing irrigated area through rain water harvesting
- High potential for conjunctive use of harvested water with ground water.

3.2.4 Threat:

- Problems of chemical hazards through industrialization.
- Soil erosion due to excessive mining and mineral excavation.
- Deterioration in quality of underground water due to sea water ingress
- Deterioration of soil due to application of poor quality water.
- Low/ shrinking pasture land.
- Deforestation

On the basis of primary and secondary information collected, SWOT analysis was carried out with respect to existing farming systems under different AES

The details of SWOT analysis are given in the following table.

3.3 SWOT Analysis of existing Farming System

3.3.1 Agriculture

Crop : Ground nut	AES : IV, V, VI, VII
Strength	**Weakness**
a) Traditional knowledge for cultivation of crop in semi –arid region, where rain is the limiting factor. b) Good yield potentiality of groundnut under the soil & climate. Fodder quality also very nutritive for milc animals.	a) Poor quality of water in coastal area. b) Mono cropping creates soil health problems. c) Shortage of quality seed.
Opportunities	**Threats**
a) Short duration salt resistant Cash crop. b) Better suitability under the soil, water and climate of district. c) Healthy available market, as it is the very important crop of this area. d) high quality of groundnut suitable for HPS	a) Drought and erratic rainfall restricts the yield. b) Lowering ground water table. c) Pest and diseases problems. d) Fluctuating in market price may affect the sustainability. e) Labour intensive harvesting, labour problem during peak seasons

Crop : Groundnut + Wheat	AES : IV, V, VI, VII
Strength	**Weakness**
a) Groundnut–Wheat is the best cropping sequence in all AES. b) Congenial atmosphere of soil and climate for this sequence. c) Traditional knowledge of cultivation of these crops. d) Wheat yield potentiality / day is very high.	a) Irrigation is for 33% area only, restricts yield potentiality. b) Traditional practices are followed. c) Fluctuating in market price may affect the sustainability. d) Labour intensive harvesting, labour problem during peak seasons.
Opportunities	**Threats**
a) Groundnut–Wheat is the best Legume-cereal sequence provides better soil health condition and provide maximum opportunities to explore the yield potentiality in the region. b) Very good quality of Groundnut kernels and Wheat grains under this situation.	a) Erratic and uncertainty of rain restricts the yield. b) Fluctuating in market price may affect the sustainability. c) Pest and diseases especially in groundnut that affects the soil health and ultimately the entire sequence.

Crop : BT Cotton	AES : All AES
Strength	**Weakness**
a) Cotton is highly remunerative cash crop as it restricts plant protection measures. b) Inter cropping in cotton provides higher income and restricts the risk. c) Knowledge for cultivation of the crop. d) Organic farming. e) Bio-control of pest.	a) Lack of high yielding & diseases, pest resistant varieties from JAU and Govt. Institutes. b) Erratic and uncertainty of rain restricts the yield. c) Irrigation is for 33% area only, restricts yield potentiality. d) Less risk bearing ability. Higher skills & knowledge is required for this crop.
Opportunities	**Threats**
a) Congenial atmosphere for this crop. b) One of the best cash crops for higher income. c) Providing fuel for cooking. d) Composting of cotton stalks can be done after chaffing. e) Inter cropping is one of the important tools for minimizing the risk.	a) Comparatively longer duration crop, it requires soil moisture for the longer time. b) Irregular rain restricts the crop growth and yield. c) Problems of sucking pests. d) Fluctuating in market price. e) Unsealonal and high rainfall causes failure of the crop.

3.3.2. Farming System: Horticulture

Crop: Coconut	AES: VI,VII
Strength	**Weakness**
a) Coastal area climate and well drained soils are favorable for this crop. b) Minimum establishment cost and comparatively higher income throughout the year for long term as compared to other plantation crops. c) High yielding hybrid varieties are available d) Soil - climate suit to farming system e) Knowledge and skills are available	a) Old plantations are low yielding and at close spacing. b) Lack of availability of quality planting material. c) Shortage of skilled labour for harvesting. d) Market is not steady
Opportunities	**Threats**
a) Can withstand salinity as compared to other fruit crops. b) Scope for mixed farming (Coconut + animals + poultry + fisheries + honey bee) etc. and mixed cropping hence low risk c) Scope for value addition, waste recycling and coconut based industries. d) Scientific recommendation are available. e) Improvement in Ecology balance.	a) Need irrigation throughout year b) Labour problems for harvesting of nuts c) Unknown disease could destroys plantation on large scale d) Problems of pest and disease e) Chances of cyclone are higher at costal area results in damage to plantation.

3.3.3. Farming System: Agriculture + Animal husbandry

Agriculture + Animal Husbandary	AES: VII
Strength	**Weakness**
a) Experience in management of animal husbandry and dairy. b) Knowledge of agriculture farming and feed and fodder management. c) Higher remunerative farming system as compared to only agriculture / animal husbandry. d) Co-operative activities certainly encourage this system.	a) Negligence towards maintenance of cattle. b) Risk bearing ability is low. c) Less availability of feed and fodder.
Opportunities	**Threats**
a) Availability of pure breed of cows (Gir cow) and buffalos (Jafarabadi) are very famous for higher milk yield. b) Risk is minimizing under this farming system. c) Finance can be easily available through bank. e) All Members of family may be involved. f) Increased availability of FYM and biogas.	a) Diseases infective. Veterinary facilities are limited. b) Unavailability of soft drinking water during the summer. c) Rapid decrease in the pasture/ grazing lands.

3.3.4. Farming System: Agriculture + Animal husbandry+ Horticulture

Agriculture + Animal husbandry + Horticulture	AES: VI
Strength	**Weakness**
a) Soil and climate suit to this farming system. Knowledge and skills are available. b) Minimum risk is involved. All family members are involved for the entire year. c) Income available throughout the year. d) Good variety of mango (Kesar/Jamadar) is very famous. e) Available technical personals.	a) Risk bearing ability is low. b) Pest and disease problems in fruit crops. Negligence towards maintenance of cattle. c) Less availability of feed and fodder.
Opportunities	**Threats**
a) Improved seed / pure breed of milch animals and pure varieties of mango and coconut. b) Transport facility is good. c) Healthy market available.	a) Irregular rainfall. Negligence towards maintenance of cattle. b) Diseases infective. Veterinary facilities are limited. d) Unavailability of soft drinking water during the summer. e) Rapid decrease in the pasture/ grazing lands.

3.3.5. Farming System: Agril. Labour + Fisheries

Agril. Labour + Fisheries	AES:V
Strength	**Weakness**
a) Longest coast line provide good production of sea food b) Good scope for cage culture of fin fish/ shell fish c) Sea coast provides very well facilities for fishing. d) Good qualities of fishes are available at the west coast. e) Very good environment for aquaculture.	a) No risk bearing ability in fishery business. b) Socio-economic status is poor. Technical know-how is very low. c) Not well established market for small fishermen
Opportunities	**Threats**
a) Sea water is very near to this area. b) Demand of fish is very high. c) Technical support is available from Fisheries college Veraval and the fisheries department	a) Low market price. b) People are mostly vegetarian. c) Poor financial capacity.

3.4 Sectorial/Regional Economy Drivers of the District

Major investments were witnessed in infrastructure projects during 1998-07. Recent surge in the growth of food processing industries in the district has increased employment opportunities for the masses. Presence of Bhavnagar port has helped in catalyzing the growth of industries, making it an important terminal for export and import of goods. Small scale industry sectors such as repairing and servicing, textiles, chemicals, glass & ceramics and wood products are the supporting pillars of the economy providing numerous employment opportunities.

I Agriculture:

1. The economy of Bhavnagar is mainly based on agriculture. Increasing area under hybrids/ high yielding varieties in cotton, ground nut, bajra and improved variety in wheat.
2. Seed treatment and enhancing seed replacement rate.
3. Resource conservation technologies for sustaining and improving the productivity levels.
4. Groundwater recharge and increasing water use efficiency using MIS.
5. Demonstration and capacity building of field functionary and farmers for implementation of IPM, INM and IWM.
6. Training the farmers, traders, and other stakeholders on micro irrigation, protected cultivation, grading, post harvest technologies, value addition and market intelligence.
7. Establishment of rural godown with drying yards.
8. Formation of commodity groups for groundnut, cotton and wheat crops; as well as for cattle breeding and fisheries.
9. Encouraging contract farming and increasing cropping intensity through mechanization.
10. Increasing in the use of Bio-fertilizer and Bio-Pesticide for management of soil born diseases.

II Soil Health:

1. Prevention of degradation of soil fertility using west biomass available from livestock, crop & farm.
2. Reclamation of salinity and sodicity in coastal area.

III Horticulture:

1. Increasing area under fruits and vegetable crops by providing improved planting material.
2. Implementation of IPM and INM.
3. Demonstrations and trainings including farmers and field official.
4. Protected cultivation for horticulture development.
5. Harvesting and post harvesting techniques for fruit crops.
6. Improvement in the processing and transportation technologies.

IV Forestry:

1. Increasing area under forests through plantation in community lands.
2. Increasing area under agro-forestry and plantation on farm bunds.
3. Demonstrations and trainings including farmers and field officials
4. Fodder and pasture land development.

V Animal Husbandry:

1. Breed improvement through community bulls and A.I.
2. Balanced feed and mineral mixture feeding.
3. Demonstration and capacity building of field functionary and farmers.
4. Animal feed industry.
5. Improvement in the fodder availability.
6. Modernization of cattle rearing.

VI Fisheries:

1. Renovation of village/town ponds for fisheries and making availability of good quality fish seed (Rearing unit/hatcheries)
2. Capacity building of fish farmers and field functionary.
3. Processing plants for marine fish, fish oil and powder.

CHAPTER IV

DEVELOPMENT OF AGRICULTURAL SECTOR

4.1: Introduction

In this chapter, issues relating to utilization of natural resources and input management for the development of agriculture sector are discussed.

4.2: Land Use

The current fallow and cultivable waste currently present in the district to the extent of 8.93 per cent of the total geographical area have to be reclaimed so that the net sown area in the district could be increased. The 2.48 % area (20390 ha) of the district is under forest and has opportunity to develop into dense forest. There is a need to improve the pastures in the district, which occupies about 7.39 % (60545 ha) of the total area and the net sown area is 566690 ha which is 69.18%.

4.3: Soil type and Soil Health Management:

The soils of Bhavnagar districts were calcareous in nature and alkaline in reaction with low to medium in organic carbon. Majority of the soils of Bhavnagar district were low in available nitrogen phosphorus and sulphur. While only about one third of these soils were low in available potassium. Among the micronutrients, status of available manganese and copper was high, whereas the available iron and zinc was medium and low, respectively. The area is drain by river Shetrunji, Kalubhar and its tributaries flowing west to east. Majority of streams are ephemeral in nature flowing for 5 to 6 months in post monsoon period. The well/tube well waters of Bhavnagar district are poor in quality. Almost half of the samples of well/tube well waters from cultivator's fields were saline (EC 0.75 dSm^{-1} and above).

Application of nutrients based on soil testing, use of proper soil amendments, use of bio-fertilizers, crop residue management, use of organic fertilizers, green manuring in irrigated area, use of zinc based fertilizer or gypsum and crop rotation will help in restoration of soil health.

4.4 Land development:

Soil and water being the two basic factors of agricultural production need to be conserved well and used carefully to ensure sustained level of production and productivity. Land development includes various activities like land leveling, bunding, terracing, water management, dry land farming, construction and use of Water Harvesting Tanks (WHTs), Farm fencing, watershed management and compost/vermi composting. Bhavnagar district faces the problem of wind & water erosion, moisture stress, salinity & alkalinity. There is a need for development activities like land leveling, bunding and soil-water conservation, water management etc. in the district. Majority of the district is dependent on rainfed farming. On farm development through watershed basis and dry land farming assumes importance for the district. Government implemented various watershed development activities covering various villages for their development.

Table 4.4.1: Status of Watershed Development activity in the district

Name of Taluka	Area available for watershed activity (ha)	Area Treated so far (ha)	Balance area (ha)	2012-13 (Projected) (ha)	2013-14 (Projected) (ha)	2014-15 (Projected) (ha)	2015-16 (Projected) (ha)	2016-17 (Projected) (ha)
Bhavnagar	82617	00.00	82617	800	800	800	800	800
Botad	68258	25195	43063	400	400	400	400	400
Gadhada	83366	13897	69469	700	700	700	700	700
Gariyadhar	45113	00.00	45113	400	400	400	400	400
Ghogha	43705	00.00	43705	400	400	400	400	400
Mahuva	120769	20141	100628	1000	1000	1000	1000	1000
Palitana	69029	19085	49944	200	200	200	200	200
Shihor	68655	20775	47880	500	500	500	500	500
Talaja	85381	2042	83339	800	800	800	800	800
Umrala	40734	21354	19380	200	200	200	200	200
Vallabhipur	54763	00.00	54763	500	500	500	500	500
Total	**762392**	**122492**	**639901**	**5900**	**5900**	**5900**	**5900**	**5900**

Source: Department of Forest, Social Forestry division, Bhavnagar.

4.5: Status of problematic soils in coastal area. (www.cspc.org.in)

The coastal area of Bhavnagar once known for its agriculture and horticulture productions now faces challenges of conversion of agriculture land and orchids into saline wasteland due to salinity ingress. Baseline study was carried out by CSPC-*Coastal Salinity Prevention Cell*, Gujarat during 2008 in parts of coastal Taluka namely Ghogha, Bhavnagar, Mahuva and Talaja forming part of Bhavnagar district.

Land Use Pattern in study area

The land use analysis reflects status of land and water resources which is important for livelihood opportunities. It also helps in understanding the opportunities and threats for the most popular livelihood activities of agriculture and animals performed in rural areas.

The following table showing percentage of land used under each category indicates that the surveyed villages have 70 percent of the geographical area under agriculture of which 54 percent is irrigated.

Table 4.5.1: Land use pattern in salinity affected Taluka

	Land Use Category (%)				
Taluka	**Agriculture**	**Irrigated**	**Un Irrigated**	**Cultivable Waste**	**Non Cultivable**
Bhavnagar	70.81	41.13	58.87	10.58	5.38
Ghogha	60.78	42.45	57.55	12.42	10.07
Mahuva	77.67	56.12	43.88	4.92	6.12
Talaja	70.24	66.31	50.81	11.76	5.74
Total	**70.82**	**54.21**	**45.79**	**9.72**	**6.50**

www.cspc.org.in Baseline survey on salinity in coastal villages of Bhavnagar district, Gujarat (2008)

Salinity ratio of affected taluka

The ratio between areas under each salinity category provides environmental status of the surveyed villages in Taluka. The analysis of the ratios between probable to fully, probable to partially and partially to fully saline villages was worked out for each Taluka for comparison. The lower ratios between any categories indicates great concern about salinity.

Table 4.5.2: Ratio between various salinity categories at Taluka level

Sr. No.	Ratio	Bhavnagar	Ghogha	Mahuva	Talaja
1	Probable/Fully	0.87	5.89	1.21	7.39
2	Probable/Partially	1.41	13.58	2.78	2.28
3	Partially/Fully	0.62	0.43	0.43	3.24
	Average	**0.97**	**6.63**	**1.47**	**4.30**

www.cspc.org.in Baseline survey on salinity in coastal villages of Bhavnagar district, Gujarat (2008)

The analysis of four taluka shows that the average of all ratios is less for Bhavnagar Taluka indicating higher probability of salinity among the four taluka.

Irrigated land

The amount of irrigated area is a good indicator of area development as higher irrigated area can lead to higher amount of employment opportunities in rural areas. The analysis of irrigated area was done to understand variation in irrigation facility across the study taluka and across salinity category as under.

Table 4.5.3: Status of Irrigated land in salinity affected Taluka

Salinity Level	Name of Taluka -Area in ha.(Percentage)				
	Bhavnagar	Ghogha	Mahuva	Talaja	Total
Fully saline	2797 (28)	317 (5)	6766 (36)	1703 (7)	11583 (19)
Partially Saline	2641 (26)	327 (5)	3234 (17)	6508 (27)	12710 (21)
Probable Saline	4559 (46)	6253 (91)	9018 (47)	16299 (66)	36229 (60)
Total	**10098**	**6898**	**19018**	**24510**	**60523**

www.cspc.org.in Baseline survey on salinity in coastal villages of Bhavnagar district, Gujarat (2008)

It was found that the fully saline, partially saline and probable saline areas cover 19 percent, 21 percent and 60 percent respectively of the total irrigated area in study area.

Un-irrigated land

The area of un-irrigated land indicates harsh water availability and quality situation in the area.

Table 4.5.4: Status of Un-Irrigated in salinity affected Taluka

Salinity Level	Name of Taluka-Area in ha.(Percentage)				
	Bhavnagar	Ghogha	Mahuva	Talaja	Total
Fully saline	6415 (44)	1243 (13)	4469 (30)	1241 (10)	13368 (26)
Partially Saline	3944 (27)	515 (6)	2905 (20)	2835 (23)	10200 (20)
Probable Saline	4092 (28)	7593 (81)	7498 (50)	8377 (67)	27561 (54)
Total	**14451**	**9352**	**14872**	**12454**	**51128**

www.cspc.org.in Baseline survey on salinity in coastal villages of Bhavnagar district, Gujarat (2008)

The analysis indicates that the highest percentage of un-irrigated land area is found in probable saline villages of Ghogha Taluka. Among the partial saline villages highest percentage of un-irrigated land is recorded in Bhavnagar Taluka. The highest percentage of un-irrigated land in fully saline category of villages is also recorded in villages of Bhavnagar Taluka. This may lead to conclusion that villages in Bhavnagar district may face worst situation if salinity level increase in future.

Wasteland Area

The distribution of the waste land area among various salinity categories varies widely.

Table 4.5.5: Status of Waste land in salinity affected Taluka

Salinity Level	Name of Taluka-Area in ha. (Percentage)				
	Bhavnagar	Ghogha	Mahuva	Talaja	Total
Fully saline	792 (55)	848 (36)	1393 (65)	416 (21)	3449 (44)
Partially Saline	249 (17)	296 (13)	314 (15)	239 (12)	1098 (14)
Probable Saline	386 (27)	1215 (52)	446 (21)	1296 (66)	3344 (42)
Total	**1428**	**2359**	**2153**	**1952**	**7891**

www.cspc.org.in Baseline survey on salinity in coastal villages of Bhavnagar district, Gujarat (2008)

The observations indicate that fully saline villages of Bhavnagar and Mahuva having higher percentage of irrigated area also show higher percentage of wasteland and Un-irrigated area. The fully saline Mahuva & Bhavnagar and probable saline villages in Talaja and Ghogha show potential for wasteland development program.

Pasture land

The fully saline, partially saline and probable saline areas cover 18 percent, 20 percent and 62 percent respectively of the total pasture land area in study area.

Table 4.5.6: Status of Pasture land in salinity affected Taluka

Salinity Level	Name of Taluka - Area in ha (Percentage)				
	Bhavnagar	Ghogha	Mahuva	Talaja	Total
Fully saline	1189 (32)	144 (4)	839 (39)	592 (10)	2764 (18)
Partially Saline	678 (18)	203 (6)	326 (15)	1916 (31)	3124 (20)
Probable Saline	1800 (49)	2972 (90)	980 (46)	3682 (59)	9435 (62)
Total	**3667.92**	**3319.65**	**2144.65**	**6190.67**	**15323**

www.cspc.org.in Baseline survey on salinity in coastal villages of Bhavnagar district, Gujarat (2008)

Area under ponds

The analysis of the pond area which is an important resource in rural areas indicates that probable saline villages have majority of ponds covering 757 ha. land followed by fully and partially saline villages respectively. The taluka level analysis provide following status of pond area in fully, partially and probable saline villages at taluka level.

Table 4.5.7: Status of Pond area in salinity affected Taluka

Salinity Level	Name of Taluka - Area in ha (Percentage)				
	Bhavnagar	Ghogha	Mahuva	Talaja	Total
Fully saline	158 (74)	53 (23)	123 (29)	7 (2)	341 (26)
Partially Saline	31 (15)	29 (13)	81 (19)	62 (14)	203 (16)
Probable Saline	24 (11)	146 (64)	226 (52)	361 (84)	757 (58)
Total	**212.76**	**228.48**	**429.76**	**429.48**	**1300**

www.cspc.org.in Baseline survey on salinity in coastal villages of Bhavnagar district, Gujarat (2008)

4.6: Reclamation and Management of Salt Affected Soil.

The soil salinity/sodicity is an important factor affecting the soil health and crop productivity. While with the available technology some of this area is being reclaimed, simultaneously good soils are becoming salt affected due to multifarious reasons including sea water ingress in coastal areas and improper irrigation in irrigated areas.

Source: Brief note on status of salt affected soils in Gujarat-S. Raman

Arid coastal salt affected soils:

The reason for the development of coastal salinity in this region is mainly attributed to the intrusion of sea water into the main land coupled with the transportation of salt particles through wind form salt affected patch creating salinity in normal soils. This soil is distributed in Bhavagar, Jamnagar, Junagadh, Rajkot and Surendranagar districts in Saurashtra region.

Inland salt affected soils:

The salinity/sodicity problems occurring in the mainland, away from the coastal belt and not contributed due to sea water intrusion can be termed as inland salt affected soils. This can be either natural salinization which occurs widely in the irrigated belt. The cause for the above may be aridity, topography, basic parent material, poor drainage, over irrigation, poor quality water etc. Generally it is due to a combination of some of these factors though there is a predominance of a particular factor in specific locations. These soils are distributed in different districts of Saurashtra region.

Constraints:

Some of the main constraints of soil productivity and ultimate agriculture production in these arid coastal salt affected areas are:

Sea water intrusion through high tide and back flow in river estuaries affecting soil and crop growth. Inadequate drainage resulting in water logging during monsoon.

Poor soil physical condition restricting crop production and nutrient availability. Cultivation restricted mainly to mono cropping system.

High temperature especially during summer, resulting in salinization by Capillary River. High water table conditions developing into secondary salinization affecting soil health and crop productivity.

Impact on crop production

In both the types of salt affected soils yield reduction varying to the tune of 30 to as high as 70 per cent has been observed in various crops, depending upon the degree of the problems.

Reclamation and Management

Primarily these soils develop salinity, sodicity or combination of both due to either sea water ingress or poor quality underground water or poor drainage or combination of all. As a first step, the ingress has to be stopped. Further rain water harvesting on large scale through big pond/farm pond and construction of structures especially at river end which restrict flow of river water to the sea have been found effective as observed in Mahuva (Malan and Nikol bandhara scheme). Another step to prevent the ingress is to reduce the excess withdrawal of ground water especially around the coastal areas. This can be done by adoption of water saving irrigation methods and devices which includes adoption of micro irrigation.

A package of practices including crop/varietal selection to suit the coastal/inland saline conditions have been identified along with agro techniques including those of sowing techniques, crop spacing, planting techniques, fertilizer selection and its method of application, irrigation technologies including mulching, use of proper amendments like gypsum and others of organic origin along with their dosage, drainage etc. have been developed by the state agricultural universities in the state.

Future need:

In spite of the development of the above technologies their adoption pattern is very low and slow mainly due to the fact that peoples are not aware of the technologies developed and their location and problem specificities. Hence to hasten the spread of the technologies, and rejuvenate the salt affected soils with the ultimate objective of improving the socio economic conditions of the farmers; there is a vital need for the popularization of the technologies among the peoples through awareness creation, education and demonstrations.

4.7: Water Resource Management

The main sources of water supply for irrigation purposes in Bhavnagar district include wells, canals and ponds etc. Of these canals and wells are the most important source of irrigation since old times. Out of 566690 ha of net sown area of the district, only 179008 ha (32.63%) is net irrigated area. The remaining area is un irrigated. The canal as well as tube well/bore well are the important sources of irrigation. The maximum net irrigated area 31081 ha, (57.40 %) of net sown area is observed in Botad taluka followed by Mahuva (27534 ha, 30.93 %), Talaja (27093 ha, 41.74 %). Minimum net irrigated area is observed in Umrala taluka (3441 ha, 10.62 %).

Irrigation status in Coastal area and problem of salinity in water:

There are eight irrigation water sources in the villages covered under baseline survey conducted by CSPC-*Coastal Salinity Prevention Cell*, Gujarat. They reported that river is used as irrigation source in highest number of villages followed by irrigation wells and check dams and canal. There are only 22 villages in which ponds are used for irrigation purpose. More than 50 percent villages have ground water based irrigation structures like bore wells and dug wells. Irrigation well and bore wells are major irrigation sources in probable saline villages.

Nearly 40 per cent villages belong to probable saline category also have check dams and river as water source for irrigation. In partial saline villages also majority of villages depend on ground water structures for irrigation. Number of villages having surface water resources like rivers, ponds and farm ponds are less compared to villages having ground water structures. The scarcity of irrigation water and saline irrigation water is major hurdle in the growth of agriculture. The major scope for the development of agriculture in irrigated area is by increasing gross sown area by adopting drip irrigation system particularly in horticultural and vegetable crops. Drip and sprinkler irrigation systems are getting popularity in the district. The area under drip and sprinkler irrigation is ha 17843.46 and 8848 ha, respectively in the district. There are 12095 drip and 6380 sprinkler users, respectively. Only 2.72 % area of cultivable area is under MIS in the district.

4.8: Major Crops and Varieties in the District

The major field crops cultivated in *Kharif* season are cotton, groundnut, and sesame. Cotton *Bt.* Is mainly grown as irrigated crop while Desi cotton as rain fed crop in all the blocks. Ground nut is another crop which is replacing the area under cotton during 2010-11 due to good rainfall in most of the blocks. Bajra and Sesame are important short duration crops and grown as rainfed and in summer where irrigation facilities are available. Sorghum is mostly grown in majority blocks of the district for fodder purpose. Vegetables are grown in all the blocks but mainly in Mahuva, Talaja, Gadhada and Botad. Cumin, wheat and gram are the important *Rabi* crops of the area but restricted to some blocks. There is need to evaluate and monitor the performance of released varieties and hybrids of field crops and vegetables. The major issues are the availability of quality seeds in time and use of inferior quality seeds of local variety especially in cotton. The measures to bridge the gaps have been suggested.

Table 4.8.1: Major crops and their varieties cultivated in the district

S. No.	Major crops	Varieties
1.	Groundnut	Bunch variety GG-2, GG-7, TG-37A, TPG-41 Semi spreading variety GG-20, Spreading Variety GAUG-10, GG-11, GG-13
2.	Cotton	Different Bt. Cotton hybrids. V-797, G-Cot 13, 21,
3.	Wheat	Lok-1, GW 496, GW 366
4.	Bajra (Pearl Millet)	Kharif: GHB-558, GHB-538, Summer: GHB-558 and private hybrids
5.	Pigeon Pea	GT-100, GT-101, BDN-2
6.	Gram	**Gujarat Gram – 1, Gujarat Gram – 2, Gujarat Gram – 3**
7.	Green Gram	Guj. Mug-4, K-851
8.	Blake Gram	Guj. Udad-1, T-9
9.	Sesame	GT-2, GT-3, GT-10
10.	Sorghum	GFS-4. GFS-5, Gundhari, S-1049 (Fodder),local types
11.	Sugarcane	CoN 91132, CoN 5071, Co 86032, Co-6304, CoC-671
12.	Mango	Kesar, Jamadar
13.	Sapota (Chiku)	Kalipatti,
14.	Banana	Grand nain, Robusta , Harichhal
15.	Lemon	Kagji Lime
16.	Ber	Gola,
17.	Papaya	Madhu Bindu, Taiwan-786
18.	Custard Apple	GJCA-1, Sindhan
19.	Pomegranate	Sindoori, Ganesh,
20.	Guava	Dholka, L-49, Bhavnagar red, Allahabad safeda
21.	Garlic	GG-4, Gujarat Garlic-2, Gujarat Garlic-3, G-282
22.	Onion	Talaja Red, Gujarat White Onion-1, AG Red, AG White, Pvt. Hybrids.
23.	Tomato	G.Tomato-1, Junagadh Tomato-3, Junagadh Ruby, Pvt. Hybrids.
24.	Brinjal	GBL-1, GBGR-1, GJB-2, GJB-3, Pvt. Hybrids.
25.	Okra	GO-2, GO-3, Parbhani Kranti, Pvt. Hybrids.
26.	Isabgul	Gujarat Isabgul-1, Gujarat Isabgul-2
27.	Fenugreek	Gujarat Methi-2
28.	Cumin	GC-4
29.	Coriander	GC-2
30.	Coconut	D x T, T x D, Dwarf green, West coast tall, Natural Crossed Dwarf

4.9: Farm Mechanization/Farm Equipments

Farm Mechanization is important factor determining growth and development of agriculture and related sector. It hasten the processes, save time, labour cost, save energy for the completion of particular work in given period of time and area. As a result it leads to increased production and productivity, better utilization of resource potential, adoption of multiple cropping pattern, etc. are possible which otherwise not possible only through manually. Available Farm Mechanization machinery is used with an objective to minimize production costs, increasing income, minimizing losses, reducing drudgery in operations, increasing cropping intensity etc. The main objective of mechanization is speed, accuracy, automation, reduce production cost and post harvest losses. But till today, farm mechanization is under developing stage because of many reasons like small holdings, high cost of machineries and Lack of expertise in operating, special soil conditions etc. Hence farmers are still using bullock drawn traditional wooden implements. The farmers are still winnowing their crops with traditional methods employing 5 to 6 person to winnow little amount of harvest. The hand tools used are also traditional.

These could be reduced if solution for above said problems could be achieved through intensive efforts.

4.10: Input Management

Besides improved seeds, the integrated nutrient, weed and pest management is essential to accelerate agricultural growth. At present, there exists a gap between the actual productivity and the attainable /achievable / potential productivity of the crops grown in the district. The proper and timely management of following inputs for crops is essential to fill this gap.

4.10.1 Agricultural Insurance

Agriculture production and farm incomes in India are frequently affected by natural disasters such as droughts, floods, cyclones, storms, landslides and earthquakes. Susceptibility of agriculture to these disasters is compounded by the outbreak of epidemics and man-made disasters such as fire, sale of spurious seeds, fertilizers and pesticides, price crashes etc. It can be suggested that Life insurance of all types of Farmers, Fisherman, Labours and all the other people directly or indirectly dependent and related to any agricultural activity or industries and the crop/activity not covered earlier should be incorporated under existing Agricultural Insurance through Strengthening of Agriculture Insurance and rectifying the lacuna and drawbacks.

4.10.2 Quality seed

Quality seed is the most critical input in crop production. The government agencies are trying their level best for assured supply of good quality seeds, but the demand usually falls short of supply. Unfortunately, the district has no any seed farm. The only way is to produce certified seeds through seed village programme. Further, due to Lack of knowledge regarding importance of improved seeds the farmers are still using inferior quality seeds of local varieties especially in groundnut, sesame, sorghum and maize. Series of steps have been suggested in this plan to overcome the situation.

Table 4.9.1: Agricultural Implements in the District

Taluka	Tractors	Wooden Plough	Iron Plough	Cultivator	Harrow	Seed drill	Leveller	Cart	Oil mills	Harvester	Power tiller	Pump sets
Bhavnagar	654	1320	831	545	64	805	601	1218	2	1856	45	7515
Botad	168	1237	2370	1863	300	1758	1080	1569	0	867	4	5463
Gadhada	345	2622	4486	2180	392	3785	1778	3490	0	678	24	6352
Gariyadhar	324	2320	3317	1637	783	2006	858	3704	5	1422	3	10354
Ghogha	241	1004	1869	1018	236	1416	1287	1040	152	1654	10	7260
Mahuva	490	3544	8698	4303	793	8968	2858	8868	62	1344	16	10585
Palitana	657	2376	3367	3111	1868	2788	1751	3278	0	2245	5	10528
Shihor	355	2413	3478	2943	1311	3166	1802	3726	0	866	15	5696
Talaja	646	4932	9449	5822	864	7135	4671	8415	0	2133	5	8261
Umrala	270	1090	1619	1381	454	1806	811	2010	4	665	4	3700
Vallbhipur	497	1071	838	602	134	828	498	855	40	2343	22	5890
Total	**4647**	**23929**	**40322**	**25405**	**7199**	**34461**	**17995**	**38173**	**265**	**16073**	**153**	**81604**

Source: District statistical Book, Bhavnagar district, Year: 2008-09

4.10.3 Fertilizers

Next to irrigation, fertilizer is the second most important input for the cultivation of high yielding varieties. The timely availability of fertilizer is a major constrain faced by farmers. The reason is not the short supply, but sudden huge demand in specific period (onset of monsoon, onset of winter etc) and because of poor economic condition of farmers, the farmers rush to purchase at time of need. To overcome this problem, purchase of the fertilizers should be done well in advance.

Further relay only on chemical fertilizers is also a cause for the said problems. Hence alternate of chemical fertilizers can be a good substitute not only for the full fill the demand but also for maintaining soil fertility and to reduce micronutrients deficiencies caused by solo chemical fertilizers and continuous mono-cropping in the same field. Therefore, location specific integrated nutrient management, use of bio-fertilizers, FYM and vermi-composting are required to be popularized for wider adoption which could not be achieved through only chemical means.

There are 453 fertilizer sale points in the district. Maximum sale points are private. The maximum sale points are in Shihor (60), followed by Mahuva (60), Bhavnagar (60) and Umrala taluka has minimum number of sale points (23) as per report of SREP, Bhavnagar District, 2010.

Table 4.10.3.1: Cropwise Fertilizer consumption in the district (Qt.)

(2001-02 to 2010-11)

Year	N			P			K		
	Other crops	Cotton	Total	Other crops	Cotton	Total	Other crops	Cotton	Total
2001-02	13200	13183	26383	5433	8150	13583	454	114	568
2002-03	13751	17351	31102	5263	7895	13158	718	180	898
2003-04	17164	17164	34328	6470	9705	16175	747	187	934
2004-05	22312	14875	37187	7567	1135	8702	1350	150	1500
2005-06	28881	19254	48135	10878	12396	23274	2786	307	3093
2006-07	33587	22392	55979	12028	14701	26729	3009	335	3344
2007-08	27602	41408	69010	17794	17794	35588	4849	539	5388
2008-09	40314	26876	67190	18170	18170	36340	6227	692	6919
2009-10	30290	20193	50483	16822	16822	33644	4901	545	5446
2010-11	43946	29298	73244	20408	20408	40816	6842	761	7603

Source: Dy. Director FTC, Bhavnagar

Table 4.10.3.2: Fertilizer Consumption in the district during 2011-12 (tones)

Name of taluka	Urea	DAP	20:20:0	CAN	MOP	SSP	AS	20:20:0:13	NPK
Bhavnagar	3315	2186	75	274	147	578	397	592	1130
Botad	8419	6573	970	454	52	111	173	1447	923
Gadhada	9254	4140	451	127	67	185	558	416	2024
Gariyadhar	1303	1458	124	33	54	93	111	248	25
Ghogha	1145	527	5	34	17	152	310	36	610
Mahuva	10254	3668	851	630	333	1647	622	362	1700
Palitana	4469	2166	673	447	137	318	445	434	340
Shihor	6787	2178	73	94	85	131	265	243	1109
Talaja	12041	4506	219	813	121	777	986	662	2040
Umrala	3345	1788	369	54	42	244	165	171	1497
Vallbhipur	2626	1834	363	3	50	0	447	513	918
Total	**62958**	**31024**	**4173**	**2963**	**1105**	**4236**	**4479**	**5124**	**12316**

Source: Dy. Director FTC, Bhavnagar

4.10.4 Plant Protection Chemicals

The crop diseases, insect pests and weeds are other major problems in realizing optimum yield of the crops. Integrated measures for control of insect/pests, diseases and weeds, which required to be adopted for sustainability and profitability of crops. Amongst the plant protection chemicals, the major proportion is contributed by insecticides. Fungicide consumption is low as compared to Insecticides. Majority of the plant protection chemicals are utilize for cotton.

Table 4.10.4: Pesticide consumption in the district

Name of chemicals	Year 2010-11			
	Quantity		Value	
Insecticides	**All crops**	**Cotton**	**All crops**	**Cotton**
Imidacloprid 70 WS	425	1275	1.91	5.73
Acephate 75	52590	122710	15.78	36.81
Chloro 50 EC + Cyper 5 EC	200	600	0.05	0.22
Others	200355	457503	86.36	201.51
Fungicides				
Mancozeb	314	1256	0.10	0.25
Sulphur 80 WP	3525	10575	0.30	1.20
Others	14840	59360	7.31	29.24
Weedicides				
2-4,D	0.83	2.51	3650	10950
Glyphosate	0.31	1.25	1662	6648
Pendimithaline	1.95	5.86	5556	22224
Others	6.0	24.00	7396	29584

Source: Dy. Director FTC, Bhavnagar

4.11: Integrated Weed Management (IWM)

Physical and Chemical control of the weed is the widely used management practice prevailing today. Further, shortage of labour and high wages of labour, the weeding operation became costlier. It is also observed that farmers have lower adoption about chemical weed control due to lack of awareness and technical expertise etc. Hence, it is necessary to train farmers by organizing trainings for technical expertise on chemical weed control and IWM techniques.

4.12: Existing Institutional Mechanism

The present institutional mechanism in Government sector is centralized in nature with Top-down approach. The institutional mechanism and conceptual frame work of Government sector extension is being gradually transformed under the Agricultural Technology Management Agency (ATMA) in the district.

Krishi Vigyan Kendra "Lok Bharti" at Sanosara is one of the important institution in the district involved in transfer of technology needed for agriculture and related occupations existing in the districts at grass root level. The role and function of KVK are as under.

4.12.1: Krishi Vigyan Kendra

1. Organize training to update the extension personnel with emerging advances in agricultural research on regular basis.
2. Organize short and long term vocational training courses in agriculture and allied vocations for the farmers and rural youth with emphasis on "Learning by doing" for higher production and generating self employment.
3. Organize the front line demonstration on various crops for generating production data and feedback information.
4. KVK should work as Knowledge power centre for the district

4.13: Special Projects/Programme on-going in the district

State as well as centrally sponsored schemes are working in the state for farmers of weaker sections. The schemes are composed of component like adding of organic manures and bio-fertilizers, seed supply, pesticides and its appliances, distribution of improved implements, creation of irrigation facilities, harvesting etc. are included to help the need based individual farmers at subsidize rates. The efficacies of those schemes are limited to certain groups of farmers. So, there is urgent need to introduce schemes for the farmers comprehensively on the basis of the need of the farmers; not on the category or holding based. The details of ongoing programme are as under.

Table 4.13.1: On-Going Activity in the District (2011-12)

Name of the Dept.: District agri. Officer, District: Bhavnagar					
Sr. no.	**Unit**	**Target**		**Achievement**	
		Physical	**Finance (Rs.)**	**Physical**	**Finance (Rs.)**
AGR-2		(Rs. In Lakh)			
Bio fertilizer	No.	119428	4.20	119428	4.20
Organic Fertilizer	Ha.	2786	27.86	2786	33.81
IPM	Ha.	800	12.00	74	1.10
Plastic cover	No.	1660	26.56	1038	26.24
Open pipeline	No.	360	16.20	360	16.20
Well	No.	2	1.06	3	1.16
Pump set	No.	40	5.40	56	10.96
Improved Farm Implement	No.	369	18.45	1231	19.52
Crop Protection Implement	No.	615	18.45	2091	18.71
Grain Storage Tank	No.	760	6.08	551	4.41
Total		**126820**	**136.26**	**127618**	**136.31**
AGR-4		(Rs. In Lakh)			
Input Kits	No.	1326	10.09	1526	9.68
Green Manure	Ha.	228	17.10	200	12.75
Pesticide	KL.	186	1.40	56	0.34
Crop Protection Implement	No.	32	1.46	172	4.64
Bullock	No.	6	0.76	1	0.09
Improved Farm Implement	No.	54	1.35	64	1.60
Well	No.	1	0.53	1	
Pump set	No.	9	2.97	32	5.92
Seed Dressing Drum	No.	66	1.98	66	1.98
Field Demonstration	No.	250	10.00	226	8.43
Open Pipeline	No.	60	4.00	72	4.00
Bio-fertilizer	No.	18000	1.08	18000	1.08
Bio-fertilizer Demonstration	No.	6	0.03	6	0.03
Plastic Cover	No.	114	2.28	272	5.44
Vermi-compost	No.	30	0.72	30	
Storage bin	No.	500	3.80	197	2.21
BPL Kits	No.	1193	33.40	1193	33.40
Total		**22061**	**92.95**	**22114**	**91.59**

Cont.

Sr. no.	Unit	Target		Achievement	
		Physical	Finance (Rs.)	Physical	Finance (Rs.)
AGR-5		(Rs. In Lakh)			
Farm field school	No	20	3.40	20	2.83
Bio-agent distribution	Ha.	610	5.49	200	0.65
Total		**630**	**8.89**	**220**	**3.48**
AGR-6		(Rs. In Lakh)			
Groundnut seed distribution	Qt.	2000	23.74	1921	23.85
Sesamum seed distribution	Qt.	17	0.2	16.25	0.19
Castor seed distribution	Qt.	13	0.15	12.80	0.15
Groundnut demonstration	Ha.	500	20.0	500	13.00
Sesamum distribution	Ha.	100	1.50	70	1.24
F.F.S. Kharif groundnut	Ha.	330	11.68	20	0.54
Officer training	No	1	0.16	1	0.16
Farmers training	No	30	4.50	33	4.93
Plant protection chemical	Ha.	850	4.25	875	4.36
Weedicide	Ha.	190	0.95	36	0.18
Crop prot. Implements/Manual	No	150	8.40	875	7.14
Crop prot. Implements/Power	No	70	1.40	96	0.96
Dry F. implements/Manual	No	250	6.25	352	6.45
Dry F. implements/Power	No	60	9.00	72	9.09
Organic Fertilizer	Ha.	150	6.00	150	6.00
Plastic cover	No	120	1.92	120	1.92
Rhizobium culture	Ha.	830	0.83	830	0.83
Gypsum	Ha.	2900	21.75	4000	36.86
Micro nutrient	Ha.	275	1.38	100	1.38
N.P.V	No	150	0.38	-	-
Pipes supply	No	70	10.50	-	-
Pump sets	No	160	16.00	160	
Castor kits	No	500	-	500	-
Ground nut kits	No	750	-	750	-
Sesamum kits	No	50	-	50	-
Total		**10516**	**150.9**	**11540**	**134.8**

Cont.

Sr. no.	Unit	Target		Achievement	
		Physical	Finance (Rs.)	Physical	Finance (Rs.)
AGR-9			(Rs. In Lakh)		
Wheat seed distribution	Qty	750	3.75	851	4.25
Field demonstration	No	5.00	0.10	3.00	0.06
Micro nutrient	Ha.	1.40	0.70	105	0.56
Gypsum (wheat)	Ha.	200	1.00	200	1.00
Gypsum (other)	Ha.	200	1.00	200	1.00
Tractor (upto 40 Hp)	No	90	40.5	90.0	40.5
Power tiller	No	4	1.80	4.0	1.80
Farm Implement (TR/P.tiller)	No	22	2.20	5.0	0.31
Thresher	No	11	1.32	5.0	0.56
Pump sets	No	7	0.70	2.0	0.20
Total		**1290.4**	**53.07**	**1465**	**50.24**
AGR-10			(Rs. In Lakh)		
		3990	**111.72**	**3990**	**111.72**
NFSM (National Food Security Mission)			(Rs. In Lakh)		
Seed distribution	Qt.	141	1.69	144.94	1.78
Gypsum	Ha	100	0.75	100	0.75
Micro nutrient	Ha	100	0.50	57	0.37
Bio fertilizer	Ha	100	0.10	100	0.10
Plant protection chemical	Ha	110	0.55	60	0.55
Sprayer	No	5	0.15	19	0.15
Seed drill	No	2	0.30	2	0.30
Rotavator	No	1	0.30	1	0.30
Pump	No	5	0.50	5	0.45
Open pipe line	M	4	0.60	2	0.19
Miscellaneous	Rs	-	1.00	-	0.55
Total		**568**	**6.44**	**490.94**	**5.49**
RKVY (Rashtriya Krishi Vikash Yojana)			(Rs. In Lakh)		
Rotavetor	No	821	246.40	825	247.20
Seed/Fertilizer drill	No	120	18.00	101	18.02
Plough/Harrow	No	74	11.00	91	11.05
Rorary Power Tiller	No	24	5.00	24	4.80

Cont.

Sr. no.	Unit	Target		Achievement	
		Physical	Finance (Rs.)	Physical	Finance (Rs.)
Power Thresher	No	25	3.00	28	3.36
Reaper	No	5	2.00	06	2.00
Pump sets	No	280	42.00	327	43.44
Plant prot. Implements	No	1225	51.00	4344	51.50
Total		**2574**	**378.4**	**5746**	**381.37**
AGR-50				(Rs. In Lakh)	
Tractor (up to 18Hp)	No	294	132.3	265	110.54
Tractor (18Hp – 40 Hp)	No	348	156.6	300	135.00
Tractor (40Hp – 60Hp)	No	147	88.2	183	109.80
Total		**789**	**377.1**	**748**	**355.34**
Grant Total		**169238.4**	**1315.73**	**173931.94**	**1270.34**

Sr. no.	Unit	Target		Achievement	
		Physical	Finance (Rs.)	Physical	Finance (Rs.)
Gujarat Horticulture Mission-32			(Rs. In Lakh)		
New Plantation					
Fruit Crop					
Perennial, new, 1st year	Ha	155	18.83	60	7.00
Perennial, new, 2nd year	Ha	350	15.75	400	9.00
Perennial, new, 3rd year	Ha	300	20.25	200	7.00
Seasonal, new, general	Ha	30	5.40	20	3.60
Seasonal, new, tissue culture	Ha	50	15.50	15	5.00
Flower crops					
Cut flower	Ha	15	4.06	7	1.86
Bulbous flower	Ha	9	3.13	4	1.50
Loose flower	Ha	10	1.00	10	1.00
Spice medicinal & aromatics					
Spices (cumin)	Ha	50	6.25	50	6.25
Rejuvenization of Orchid	Ha	100	15.00	30	4.50
Protected cultivation					
Circular green house	M^2	1000	4.68	1290	6.04
Mulching	Ha.	50	5.00	30	2.50
Circular shad net	M^2	1000	3.00	6956	20.71

Cont.

Sr. no.	Unit	Target		Achievement	
		Physical	Finance (Rs.)	Physical	Finance (Rs.)
4. IPM/INM				(Rs. In Lakh)	
Support for IPM/INM	Ha	125	1.25	125	1.25
5. Post harvest management					
Pack house/ ripening chamber	No	3	4.5	3	4.5
Cold storage	No	2	220.0	2	220.0
Onion store structure	No	30	15.00	30	15.00
6. Farm Mechanization					
Power machine (<20 Hp)	No	2	2.00	2	1.20
Power machine (>20 Hp)	No	2	2.00	2	3.00
7.Exhibition / Seminar	No	1	2.00	1	2.00
Total		**3284**	**364.6**	**9237**	**322.91**
ATMA, Bhavnagar.				(Rs. In Lakh)	
1. Developing SREP		-	-	-	-
2. Training of farmer		-	-	-	-
a. Interstate		200	2.00	40	2.00
b. Within state		500	3.75	208	3.62
c. Within district		1400	5.60	2465	5.58
3. Demonstration		400	16.00	799	15.83
4. Exposure Visit					
a. Interstate		300	1.80	30	1.79
b. Within state		810	2.43	399	2.40
c. Within district		600	1.50	836	1.49
5. Mobilization of farmer Group					
Capacity building		50	2.50	413	1.22
6. District level Exhibition, Krushi Mela		1	2.00	2	1.99
7. Information through printed material		-	2.00	-	1.95
8. Agriculture Technology Refinement,validation and adoption		-	-	-	-
Farmers scientist interaction		2	0.40	4	0.39

Cont.

Sr. no.	Unit	Target		Achievement	
		Physical	Finance (Rs.)	Physical	Finance (Rs.)
Field days/kishan goshthies		20	3.00	32	3.00
9. Farm school		55	18.38	45	12.39
10. Support for district level training institute		-	5.00	-	0.45
Total		**4338**	**66.36**	**5273**	**54.10**
Genral Activites					
1. Treatment		-	-	194356	-
2. Vacination		195500	-	447001	-
3. castration		8550	-	7377	-
4. Artifical insemination		13950	-	14407	-
5. Diseases diagnosis		4550	-	4526	-
Extension activity					
1. Pashupalan Shibir		2	3.00	2	2.45
2. Shikshan shibir		100	1.5	100	1.5
3. Kshetriya shibir		33	49.5	33	49.5
4. District shibir		3	0.075	3	0.074
5. Ratri jooth sabha		684	-	584	-
6. RKVY scheme		-	0.29	-	3.32
Cattle Health Camp					
1. Major/ minor camp		-	-	64	-
2. Major/ minor camp (Treatment)		-	-	53683	-
3. Utpadakta Vruddhi shibir		100	4.00	100	4.00
Foddar/ Forage Devlopment					
1. Fodder seed kit, distribution		-	-	210	-
Scheme for S.C.					
1. Cattle feed supplier		120	2.40	120	2.40
2. Goat unit		5	1.00	5	1.00
3. Cattle shed		19	2.85	19	2.85
4. Calf cutter/manual		15	0.06	6	0.06
5. Round wheel calf cutter		12	0.18	12	0.18
Scheme for general category					
1. Calf cutter/manual		21	0.094	21	0.094
2. Round wheel calf cutter		19	0.28	19	0.28

Cont.

Sr. no.	Unit	Target		Achievement	
		Physical	Finance (Rs.)	Physical	Finance (Rs.)
3. Goat unit		10	2.00	10	2.00
4. Cattle shed		9	1.35	9	1.35
		223702	**68.579**	**528311**	**71.058**
Name of the Dept: Fisheries				(Rs. In Lakh)	
Scheme FSH-2, 101/2					
Fish seed rearing	No	30	3	8	17.97
Farm repair/development	No	1	7	1	
Fish seed collection (Lakh)	No	15	1.5	53	
Rearing space development	Ha.	1	3	1	
Scheme FSH-2, 800/2-1					
Fish seed rearing	No	10	0.70	10	2.82
Training	No	150	2.00	150	
Fish seed collection (Lakh)	Ha	8.89	2.70	8.50	
Scheme FSH-4, 101/6					
Staff expenses		-	8.00	-	7.55
Scheme FSH-7, 103/1					
Fisheries guard	No	5	3.90	4	13.35
Asstt. Fisheries Officer	No	1	1.10	1	
Help to Pagadia Fishermen	No	220	4.95	220	
Scheme FSH-10, 193/1					
Training	No	4	0.20	2	0.28
Shibir	No	1	0.00	2	
		446.89	**38.05**	**460.5**	**41.97**

Name of the Dept.: District Rural Development Agency (Rs. In Lakh)

Sr. no	Activity	Fund allotment	Expenses incurred	No. of Beneficiaries covered
1.	Swarn Jayanti Gram Swarozgar Yojana (S.G.S.Y)	203.11	126.96	470
2.	Indra Aavas Yojana (I.A.Y)	305.41	223.55	679
3.	National Rural Employment Guarantee Act (NREGA)	553.94	560.66	3,18,929
4.	Total Sanitation Component Yojana (TSC)	112.20	78.15	5,438
5.	Shakhi Mandar Yojna	171.77	124.50	8,443

4.14: Constraint Analysis

The reasons for the yield gaps are identified and the requisite interventions are planned using participatory processes involving stakeholders. The analysis of sustainability issues and reasons for gaps in the productivity of major crops grown in the district are presented in following pages.

4.14.1 Constraints in Agricultural Progress

The major constraints affecting the progress and productivity of the district, as identified by participatory approach are listed here under.

1. Undulating fragmented land in some blocks of the district.
2. Poor economic condition of the farmers
3. Limited irrigation facilities
4. Inadequate availability of quality seeds/fertilizer etc.
5. Degradation of land due to continuous soil salinity and saline water.
6. Very low cropping intensity
7. Soil is low in organic carbon and phosphorus
8. Deficiency of micronutrient
9. Low use of organic fertilizers
10. Poor farm mechanization
11. Weed problem in rain fed farming
12. Insect pests and disease problems in crops
13. Lack of post harvest management of the produce
14. Lack of infrastructure for the Marketing of the perishable produce

Gap analysis

Table 4.14.1 (a): Sustainability issues and gap analysis of productivity of different crops and resources

Sr. No.	Crop	Factors/Constrains leading to gap	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
1.	**Groundnut**					
a.	Popularization of improved varieties of Bunch/Spreading type	Lack of awareness and non-availability of quality seed	Utilization of ground nut crop production for latest varieties.	To create Awareness and adoption through demonstrations, training, shibirs and field days for seed production.	Sur plus seed supply and increased area under cultivation.	Increased area under cultivation.
b.	Popularization of organic farming.	Lack of awareness about organic farming, problems in marketing of organic produce.	Importance of organic farming and market facilities.	Create awareness through FLD, training, shibir etc. Create demand of organic produce.	Increased demand for organic produce.	Increased area for organic ground nut.
c.	Little adoption of seed treatment	Lack of awareness and non-availability of seed treatment material	Popularize the importance of seed treatment with fungicides/ bio-pesticides	Educating and motivating farmers about importance of seed treatment and adoption through demonstrations, training, shibirs and field days,	Reduction in seed borne diseases of Ground nut.	Increase in productivity
d	Insect pest and disease problem	Lack of knowledge of insect pest and diseases and their management options	Integrated Pest and disease management	Creating awareness and adoption of IPM through shibir, demonstrations,etc	Management of insect/pest and diseases leads to yield increase.	Productivity growth in sustainability
2.	**Cotton**					
a.	Popularization of Govt. recommended Bt and Hybrid variety.	Lack of availability of quality seeds.	To full fill seed demand.	Large scale multiplication of seed	Increased area under released varieties.	Increased productivity.
b.	Imbalance use of fertilizer	Lack of knowledge,	To popularize the integrated nutrient management practices	Creating awareness and adoption of INM through demonstrations, training, shibir, literature etc.	Improvement in soil health and productivity enhancement	Productivity growth in s ustainability

c	Inter cropping of cotton and pulses	Due to mono cropping of cotton	To popularize inter cropping	Creating awareness through demonstrations, training, shibir, literature etc.	Reduction in fertilizer usage and increase in productivity	Productivity growth in sustainability
d	Insect pest problem	Lack of knowledge of insect and their management options	Integrated Pest Management	Creating awareness and adoption of IPM through demonstrations, training, shibir, literature etc.	Management of insect pests leads to increased yield	Reduce pesticide load in the environment
e	Reddening of cotton	Due to micronutrient deficiency	Spraying of potassium nitrate and other micronutrients	Creating awareness and adoption of INM through demonstrations, training, shibir, etc	Increase in productivity	Productivity growth in sustainability
3	**Sesamum**					
a.	Low adoption of improved package practices	Lack of awareness	To popularize scientific package of practices	Awareness and adoption of scientific package of practices through demonstrations, training, field days, shibir, etc	Increase in the production	Productivity growth in sustainability
b.	Low germination due to improper placement of seed	Lack of knowledge of proper placement of seed	To popularize scientific package of practices	Creating awareness through demonstrations, training, shibir, literature etc.	Increased yield	Productivity growth in sustainability
c.	Maintain plant population	High seed rate and sowing in flat land	Thinning and sowing on ridge and furrow	Creating awareness and adoption thinning by demonstrations, training etc	Increase in yield	Increase in productivity
d.	Insect pest and disease problem	Lack of knowledge of insect pest and diseases and their management options	Integrated Pest and disease management	Creating awareness and adoption of IPM through training, demonstrations, shibir, literature.	Mgt. of insect pests and diseases leads to increased yield	Productivity growth in sustainability

4	**Bajra**					
a.	Maintain plant population and land configuration	High seed rate and sowing in flat land	Thinning and sowing on ridge and furrow	Creating awareness and adoption of thinning and land configuration through demonstrations, training.	Increase in yield	Increase in productivity
b.	Insect pest and disease problem	Lack of knowledge of pest and diseases management	Integrated Pest and disease management	Creating awareness and adoption of IPM through demonstrations, training, shibir etc.	Management of insect pests and diseases leads to increased yield	Productivity growth in sustainability
c.	Low adoption of improved package practices	Lack of awareness	To popularize scientific package of practices	Creating awareness and adoption of low cost package of practices through demonstrations, training, field days, shibir, literature etc.	Increase in the production	Productivity growth in sustainability
d.	Low Popularity of cereal crops (millet, sorghum and maize) improved varieties.	Negleted as minor crop	Popularization of nutritive value, as fodder crop.	Large scale demonstrations.	Increased area under minor crops.	Increased food/fodder availability.
5	**Cumin**					
a.	Problem of germination	Proper placement of seed	To popularize scientific package of practices	Creating awareness through demonstrations, training, shibir, literature etc.	Increased yield	Productivity growth in sustainability
b.	Blight and wilt problem	Seed treatment	To popularize scientific package of practices	Creating awareness through demonstrations, training, shibir, literature etc.	Increased yield	Productivity growth in sustainability
6	**Wheat**					
a	Limited irrigation facility	Lack of knowledge of irrigation at critical stages	Application of water at critical stages	Create awareness about critical stages through demonstration	Increase in yield	Increase in productivity

b	Weed problem	Due to Lack of knowledge about scientific weed management	To popularize Integrated weed management	Creating awareness through demonstrations, training, shibir, literature etc.	Reduction in weed menace and increase in productivity	Productivity growth in sustainability
c	Less area under wheat cultivation	Limitation of water for irrigation	Increase area under conserved soil moisture.	Popularization of soil moisture conservation practices for wheat farming through demo.	Increased Soil moisture conservation and hence area under wheat.	Increased wheat production
7.	**Gram**					
a	Use of inferior quality seeds of local variety	Lack of awareness Low SSR	Increase seed replacement ratio and quality seed production through seed village. Create awareness for proper storage of seeds	Create awareness about the importance of improved variety as worthiness of variety through demonstration. Supplying seeds as mini kits. Innovate the progressive farmers for seed production at village level	Increased area under improved variety	Increase in productivity
b	Little adoption of seed treatment	Lack of awareness and non-availability of seed treatment material leading to wilt problem	Popularize the importance of seed treatment with fungicides/ bio-pesticides for managing wilt diseases	Educating and motivating farmers about importance of seed treatment and adoption through demonstrations, training, shibirs and field days,	Reduction in seed borne diseases of paddy	Increase in productivity

Proposed solution for bridging the gaps

Table 4.14.1 (b): Bridging the gaps for realizing the Vision- Agriculture sector

Sr. No	Thrust Areas/ Issues	Program	Activities	Concerned Agencies/ collaborators	Approach
1	To full fill the demand of good quality seeds/ Increase the Seed Production	Seed planning	Farmers led Participatory selection of improved varieties of crops	DAO/SAUs	By contacting farmers during crop seasons
			Motivating farmers to produce the seed of best Varieties. Through Seed village programmes, capacity building of farmers and extension functionaries and exposure visits	Gujarat State Seed Certification Agency /DAO/ATMA/KVK/FTC (Capacity building)	Capacity building Block-wise Seed production programmes will be under taken
			Establishment of seed selling units	DAO/ Gujarat State Seed Corporation/co-operative societies/ SHGs/NGOs/ FIGs	
		Seed bank/ seed storage	Construction of godowns at village and block level	Gujarat State Seed Certification Agency /DAO/ATMA	Monitoring/ Construction of godowns
		Variety Evaluation	Identification of high yielding varieties	KVK/ATMA/DAO	Demonstrations and monitoring
		Seed treatments	Motivating farmers Capacity building of farmers and extension functionaries	DAO/ATMA/KVK/FTC	Method Demonstration/FLDs and training
			Chemical and non-chemical treatments	DAO/KVK	Demonstrations

2.	Seed replacement	Selection of areas	Create awareness about the improved seeds	DAO/KVK/ATMA/FTC/ NGOs	Training and Kisan shibir.
			Ensured the availability of good quality seed as per the need of the farmers Strengthen the linkage between supply agencies and the farmers	GSSC/SAUs/DAO	Monitoring and demonstrations
3.	Soil health management	Soil testing	Establishment of soil and water testing laboratory at block level and mobile soil testing laboratory	DAO/APMC/NGOs	Establishment of soil and water testing laboratory
			Create awareness about the importance of soil testing	DDA/KVK/ATMA/FTC/ NGOs	Training, Shibirs
		Bio fertilizer	Popularize the use of bio-fertilizer trough capacity building and demonstrations	DAO/KVK/ATMA/FTC/ NGOs	Training and demonstration
		Green manuring	Popularize the green manuring practices trough capacity building and demonstrations	DAO/KVK?ATMA/FTC/ NGOs	Training and demonstration
		Enrichment of FYM	Popularize the methods of preparation of good quality FYM and vermin-compost	DAO/KVK?ATMA/FTC/ NGOs	Training and demonstration
		Integrated Nutrient Management	Educating farmers about the use of balanced fertilizer	DAO/KVK/ATMA/FTC/ NGOs	Farmers field schools, Training and Demons.
		Micronutrient	Identification of micronutrient deficient areas and Educating farmers about the important of micronutrient and	SAUs/DAO/KVK/ATMA /FTC/NGOs	Soil analysis for micronutrient deficiencies Training and demo.
		Soil erosion	Land leveling and bund formation Growing cover crops	GLDC/DAO/ Irrigation department/ATMA/FTC/ NGOs/DWMU	Land leveling Demonstrations
		Recycling of crop residues	Chopping of crop residue through shredders and using it for composting	DAO/ /NGOs/co-operative societies	Establishment of composting units
		Crop-rotation	Suggesting suitable crop after sugarcane and banana Provide incentives to the farmers for crop rotation	DAO/ /NGOs/co-operative societies	Incentive approach (75% of cost of cultivation)

4.	Water management	Water harvesting	Establishment of rain water harvesting units and deepening of well and its rechargingKhet talavadi/ mini pond	GLDC/DWMU/ WASMO and DAO/ Irrigation Dept./ WALMI	Establishment of units at subsidiary bases (90%)
		Water use efficiency	Popularize the methods of irrigation, scheduling of irrigation	GGRC/KVK/DAO	Units of drip irrigation, training
			Formation of irrigation management committee for handing the participatory irrigation management approach	DDA/DWMU/ Irrigation Dept./WALMI	Formation of society
			Moisture conservations through organic and plastic mulch	DDA/KVK/ATMA/ FTC/NGOs	Training and demonstrations
5.	Plant health management	Plant health clinic	Establishment of plant health clinic and mobile health clinic at block level	KVK and DAO	Establishment of plant health clinic
		IPM	Educating the farmers about various pest and diseases of crops and their IPM Through demonstration and training	KVK/DDA/SAUs/ FTC/ATMA/NGOs	Training and demonstrations
		Proper use of plant protection Equipment	Educate the farmers about proper use of plant protection equipments and providing	DDA/KVK/FTC/ ATMA/NGOs	Trainings, demonstrations farmers' field schools and units
		IWM	Educate the farmers for integrated weed management.	DDA/KVK/FTC/ ATMA/NGOs	Trainings and demonstrations

6.	Farm mechanization	Improved hand tools and small implements	Survey for drudgery reduction Educating farmers for its uses Providing units at subsidized rate	DDA/ NGOs/ Co-operatives/TSP KVK/FTC/ATMA	
		Hand rotary weeder, Oil engines , pumps, submersibles, Bullock cart	Educate the farmers and providing units on individual or co-operative basis for custom hiring like Power tiller Shredder Farm tractors, Mechanical harvesters, Laser leveler	DDA/DRDA/TSP	Training and providing subsidiary for purchase of units. Providing units to Co-operatives for custom hiring
7.	Value addition	Processing Units	Establishment of cotton ginning/ grading and packaging unit	DDA/TSP/DRDA/Forest	Establishment of units and training
8.	Marketing	Strengthening APMC and construction of ware houses at cluster and block levels	Establishment of ware house at cluster and block level	TSP/DRDA/Forest/DDA	Establishment of ware house at block level
		Market linkage	Strengthening market linkage through AGMARK net	DDA/TSP/DRDA	Establishment of e-connectivity at APMC
		Collection van	Units and monitoring	DDA/TSP/DRDA	Units

Table 4.14.1 (c): Area, Production and Productivity of major crops

Crop	2010-11 Normal			2012-13 (Projected)			2013-14 (Projected)			2014-15 (Projected)			2015-16 (Projected)			2016-17 (Projected)		
	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y	A	P	Y
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**
Irrigated Cotton	2755	13496	4898	2750	13076	4755	2745	13483	4912	2740	13338	4868	2735	13125	4799	2730	13172	4825
Un Irrigated cotton	255	740	2901	245	689	2814	235	680	2895	225	658	2926	215	620	2884	205	586	2859
Kharif G nut	1017	2117	2081	1027	2167	2110	1037	2025	1953	1047	2107	2012	1057	2244	2123	1067	2130	1996
Summer gnut	301	591	1966	301	623	2071	301	585	1943	301	569	1889	301	601	1995	301	605	2010
Irrigated Wheat	315	927	2944	315	877	2784	315	900	2856	315	948	3010	315	913	2899	315	921	2923
Kharif' Bajra	457	1149	2515	457	1203	2633	457	1232	2697	457	1147	2509	457	1166	2551	457	1065	2331
Summer bajra	50	123	2459	50	117	2342	50	125	2501	50	122	2430	50	121	2413	50	128	2569
Kharif Sesamun	228	153	670	233	176	756	238	167	701	243	170	698	248	162	652	253	180	712
Rabi Onion	301	8131	26977	296	8084	27311	291	7815	26855	286	7661	26788	281	7459	26544	276	7511	27213
Cumin	51	35	693	56	41	729	61	48	790	66	46	699	71	48	679	76	55	723
Pulses	72	41	569	72	47	658	72	44	612	72	42	587	72	44	609	72	45	621
	A: Area ('00ha) P: Production ('00 M.tones) Y: Productivity (kg/ha)																	

Table 4.14.1 (d): Crop Diversification Plan in next 5 years

Existing cropping pattern 2010-11		Crop Diversification proposed (Area in ha)									
		2012-13 (projected)		2013-14 (projected)		2014-15 (projected)		2015-16 (projected)		2016-17 (projected)	
Crop	Area ('00 ha) 10-11	Area under crop ('00 ha)	Change in area with reference to 11-12 (+/-)	Area under crop ('00 ha)	Change in area with reference to 11-12 (+/-)	Area under crop ('00 ha)	Change in area with reference to 11-12 (+/-)	Area under crop ('00 ha)	Change in area with reference to 11-12 (+/-)	Area under crop ('00 ha)	Change in area with reference to 11-12 (+/-)
cotton	3010	2995	-15	2980	-30	2965	-45	2950	-60	2935	-75
G nut	1318	1328	+10	1338	+20	1348	+30	1358	+40	1368	+50
Wheat	315	315	0	315	0	315	0	315	0	315	0
Bajra	507	507	0	507	0	507	0	507	0	507	0
Sesame	228	233	+5	238	+10	243	+15	248	+20	253	+25
Onion	301	296	-5	291	-10	286	-15	281	-20	276	-25
Cumin	51	56	+5	61	+10	66	+15	71	+20	76	+25
Pulses	72	72	0	72	0	72	0	72	0	72	0
Total	5802	5802		5802		5802		5802		5802	

Table 4.14.1 (e): Farmers Field Schools conducted during last five years.

Taluka/ Village	Crop/ Subject	FFS conducted during last five years			Yield obtained under FFS 2010-11/11-12 (q/ha)	Normal Avg. Yield obtained in 2010-11/11-12 (q/ha)
		FFS No.	Village No.	Area Covered (ha.)		
1	2	3	4	5	6	7
Bhavnagar						
Undavi	Wheat	1	1	0.47	31.90	28.30
Hathab	Cauliflower	1	1	0.36		
Kamlej	Wheat	1	1	1.0	31.90	29.25
Lakhanka	Ground nut	1	1	1.0	18.00	13.00
Thalsar	Ground nut	1	1	0.4	18.00	13.00
Budhel	Sorghum	1	1	0.79	240.0	200.0
Botad	-	-	-	-	-	-
Gadhada						
Malpara	Ground nut	1	1	2.0	18.00	13.00
Adtala	Wheat	1	1	1.0	31.25	27.00
Anida	Sorghum	1	1	1.0	240.0	200.0
Gariyadhar						
Viradi	Groundnut	1	1	1.0	31.95	28.00
Ghogha						
Navagam	Onion	1	1	0.65	250.0	236.0
Bhandar	Brinjal	1	1	0.80		
Bhakhal	Mango	1	1	5.0		
Mamsa	Brinjal	1	1	1.0	340.0	300.0
Bhandar	Brinjal	1	1	1.0	340.0	300.0
Mahuva						
Bhadrod	Wheat	1	1	0.36	31.00	28.00
Talgajarda	Wheat	1	1	0.87	31.65	29.00
Kumbhan	Onion	1	1	2.0	245.0	224.0
Palitana						
Bhutiya	Ground nut	1	1	0.32	18.00	13.00
Jamvadi	Ground nut	1	1	1.0	18.00	13.00
Bhadavav	Ground nut	1	1	1.0	18.00	13.00
Adapur	Ground nut	1	1	1.0	18.00	13.00
Sonpari	Ground nut	1	1	1.0	18.00	13.00
Anida-1	Ground nut	1	1	2.0	18.00	13.00
Anida-2	Ground nut	1	1	1.0	18.00	13.00
Lakhanka	Ground nut	1	1	1.15	18.00	13.00
Nani Rajasthali	Ground nut	1	1	1.0	18.00	13.00
Pipardi-1	Ground nut	1	1	1.0	18.00	13.00
Pipardi-2	Ground nut	1	1	1.0	18.00	13.00
Lapaliya	Lemon	1	1	1.0		
Anida Dam	Ground nut	1	1	1.0	18.00	13.00

Cont.

1	2	3	4	5	6	7
Nani Paniyali	Ground nut	1	1	1.0	18.00	13.00
Thorali Dam	Ground nut	1	1	1.0	18.00	13.00
Moti Paniyali	Ground nut	1	1	0.58	18.00	13.00
Shihor						
Sanosara	Wheat	1	1	1.0	32.00	30.05
Bhakhal	Onion	1	1	1.0	244.0	232.0
Toda	Wheat	1	1	3.5	31.00	26.0
Ambla	Lemon	1	1	1.0		
Ishwariya	Lemon	1	1	1.0		
Krushnapura	Ground nut	1	1	1.0	13.00	12.00
Jariya	Ground nut	1	1	1.0	13.00	12.00
Gundala	G.nut	1	1	1.0	13.00	12.00
Dhundasar	G. nut	1	1	1.0	13.00	12.00
Talaja						
Dharadi	Onion	1	1	0.8	250.00	225.0
Padargadh	Wheat	1	1	0.8	32.32	28.00
Rajpara-2	Onion	1	1	1.0	247.00	236.0
Umrala						
Langala	Wheat	1	1	0.8	32.00	27.5
Limda	Wheat	1	1	1.0	31.85	28.95
Ranghola	Wheat	1	1	1.0	31.85	28.95
Vallabhipur						
Meghvadar	Wheat	1	1	1.0	31.00	29.00
Haliyad	Wheat	1	1	1.0	31.05	27.50
Total		**58**	**58**			

Source: Project Director, ATMA Bhavnagar, 2011-12

4.14.2 Summary of availability and gaps in Infrastructure in district

- The Government has an ambitious scheme to make available the soil health cards to 38 Lakh farmers of the state to create awareness about nutrient status (Health) of their soil. The knowledge about the health of the soil will help the farmer to initiate suitable remedial measures to maintain the soil fertility.
- During the year, the Dept. of Agriculture and allied sector provided infrastructural/ extension support through Integrated Pest Management programme, Training to the farmers and extension workers.
- The district is focusing on increasing seed replacement rate by introducing HYV/hybrid seeds for both food (including horticulture crops) and cash crops to increase the in productivity by making available HYV seeds to the farmers.
- There is no taluka seed farm in the district. Taluka Seed Farm is necessary to produce foundation seeds which are required for producing certified seeds to be used by farmers. In absence of seed farms, promotion of HYV seeds will face many challenges.
- Marketing and storage facilities particularly for perishable products like Fruits and vegetables, etc., are inadequate and not well managed. At present, there are 11 regulated markets and the average no. of villages served per regulated market is 65. There is no facility of agro-processing in these regulated markets. Setting up of agro-processing units needs to be encouraged in order to give value addition to the agricultural products.
- The knowledge level of farmers regarding dry land farming technique is limited to use of seeds and compost manure. Other techniques of dry land farming, use of bio technology in agriculture may be taught to the farmers by regular extension.

- Use of Integrated Bio-Nutrient/Bio dynamic nutrient Management (IBNM) inputs in soil before sowing, for treating the seeds and use as pesticide. IBNM not only helps in increasing the crop production but also improves the soil health, decreases pollution and since it leads to production of fodder without the insecticide residue, the human and animal health also in good condition.
- Gram panchayat should take up desilting/digging and excavation of village ponds and Rain water harvesting structures should be encouraged.
- Micro-irrigation system which focuses on efficient management of available water resources becomes of prime importance in Bhavnagar District. Micro-irrigation system has its own importance in the field of horticulture and needs to be promoted vigorously.
- GSLDC carries out / helps farmers in carrying out land development activities for water harvesting structures, check dams etc. through its various schemes and also implement subsidy based scheme for farm ponds needs to be strengthen further.
- District Watershed Development Agency is implementing Watershed Development Programmes through Panchayats with the support of NGOs/VAs. In most of the watersheds, basic activities like soil treatments, construction of check dams, recharge structures, etc.. have been carried out and needs to be continue in further areas.
- There are no commercial units making organic manures on large scale through vermi-composting or by tapping on farm and off-farm bio-waste sources including the by-products of the agro-processing units and biodegradable city garbage. So promotion should be given to such units.
- There is one State Govt. nursery at Mahuva under Horticulture Dept. and one nursery under Junagadh Agricultural University (each mainly for coconut seedlings) are exists.
- Bhavnagar is also one of the 5 districts under AEZ for Onion identified by the GOI in 2005-06 for promoting infrastructure so as to enhance exports of onion.
- Forest department and other agencies also make efforts for afforestration on private waste land while implementing watershed development programme. Dy. Conservator of Forest, Social Forestry Division is engaged in afforestration activities.
- District Co-op. Milk Producers' Union has started procurement of milk from 555 active milk societies. The total capacity is 2.0 Lakh liter per day. The quantity of milk procured was 1.40 Lakh liter per day and the distribution was 0.64 Lakh liter during 2010-11. Mini dairy units schemes may be formulated by the banks with the help of department of animal husbandry and DRDA in area where the potential is available.

During the meeting with stakeholders, the following problems/issues pertaining to agriculture and allied sectors were discussed in details:

General decrease in fertility status of soil has been observed by stack holders. Salinity problems in costal and some inland areas, Scarcity of irrigation water, Salinity/high salt content in Ground water and irrigation water, Shortage of Labours at peak period, Shortage of seeds, fertilizers and other input, Low price of Agricultural produce especially Cotton, Pest and Disease problems in the grown crops. Need for adoption of HYV seeds for food and cash crops - Cropping pattern – need for diversification of crops (specially cash crops)- Availability of HYV seeds at subsidized rates to small and marginal farmers- Production of foundation seeds in seed farms- Management of seed farms by farmers themselves - Production of certified seeds and making them available to farmers in the village - Need for seed treatment and their demonstration to the people in the villages - Issue of soil health cards to the farmers (free cards to small and marginal farmers) - Soil testing facilities including mobile soil testing facilities - Land development activities to bring more land under agriculture - Development of pasture land to grow fodder for animals - Agriculture mechanization – promotion of gender friendly tools - Various Watershed activities like construction of check dams, Khet talawdis and other water harvesting structures - Need for awareness for micro nutrient - Awareness for organic farming and need for motivating the farmers - Promotion of floriculture / horticulture - Problems of pest and diseases to the crops.

4.15 Activities for development of agriculture sector

Table 4.15.1: Training for capacity building of Agriculture staff (Rs. in Lakh)

Taluka	Name of Dept.	Name of training institute			Year-wise fund require for training					Training halls
					2012-13	2013-14	2014-15	2015-16	2016-17	
		FTC	KVK	FIAC						
Bhavnagar	Agriculture, Co-operatives, NGOs, PRI staff and others				0.5+12*	0.5	0.5	0.5	0.5	1
Botad					0.5+12*	0.5	0.5	0.5	0.5	1
Gadhada					0.5+12*	0.5	0.5	0.5	0.5	1
Gariyadhar					0.5+12*	0.5	0.5	0.5	0.5	1
Ghogha					0.5+12*	0.5	0.5	0.5	0.5	1
Mahuva		√			0.5+12*	0.5	0.5	0.5	0.5	1
Palitana					0.5+12*	0.5	0.5	0.5	0.5	1
Shihor			√		0.5+12*	0.5	0.5	0.5	0.5	1
Talaja					0.5+12*	0.5	0.5	0.5	0.5	1
Umarala					0.5+12*	0.5	0.5	0.5	0.5	1
Vallabhipur					0.5+12*	0.5	0.5	0.5	0.5	1
Total					**137.5**	**5.5**	**5.5**	**5.5**	**5.5**	**11**

*Non-Recurring funds includes construction of hall, LCD, Computer, Printer and Furniture
25 Trainee/Training, 2 training/Year/Taluka
Rs 200/trainee including literature/day, 5 days/Training

Table 4.15.2: Training Proposal for Capacity Building of Farmers on different technologies.

(Phy- No. , Fin. – Rs in Lakh)

Taluka	Name of Technology	No. of Trainee/Year	Year-wise number of farmers to be trained											
			2012-13		2013-14		2014-15		2015-16		2016-17		Total	
			Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
All Talukas	Seed Technology	150	1650	4.95	1650	4.95	1650	4.95	1650	4.95	1650	4.95	8250	24.75
	Seed treatment	150	1650	4.95	1650	4.95	1650	4.95	1650	4.95	1650	4.95	8250	24.75
	Soil health mgt.	300	3300	9.9	3300	9.9	3300	9.9	3300	9.9	3300	9.9	16500	49.5
	Natural Resource Mgt.	150	1650	4.95	1650	4.95	1650	4.95	1650	4.95	1650	4.95	8250	24.75
	Farm waste Recycling	100	1100	3.3	1100	3.3	1100	3.3	1100	3.3	1100	3.3	5500	16.5
	Organic farming	300	3300	9.9	3300	9.9	3300	9.9	3300	9.9	3300	9.9	16500	49.5
	Vermi-composting	100	1100	3.3	1100	3.3	1100	3.3	1100	3.3	1100	3.3	5500	16.5
	IPM	150	1650	4.95	1650	4.95	1650	4.95	1650	4.95	1650	4.95	8250	24.75
	IWM	150	1650	4.95	1650	4.95	1650	4.95	1650	4.95	1650	4.95	8250	24.75
	Farm mechanization	150	1650	4.95	1650	4.95	1650	4.95	1650	4.95	1650	4.95	8250	24.75
	Value addition Processing	150	1650	4.95	1650	4.95	1650	4.95	1650	4.95	1650	4.95	8250	24.75
	Marketing/ Co-ope soc.	150	1650	4.95	1650	4.95	1650	4.95	1650	4.95	1650	4.95	8250	24.75
	Total		**22000**	**66**	**22000**	**66**	**22000**	**66**	**22000**	**66**	**22000**	**66**	**110000**	**330**

Rs. 300/Trainee

Varietal Demonstrations in next five years are presented in Tab. 4.15.3. Total 12515 demonstration of different crops in each taluka with 0.4 hectare per demonstration is proposed with financial requirement of Rs. 467.50 Lakh. The seed quantity requirement of different crops for next five year is presented in Table 4.15.4

Table 4.15.3: Varietal Demonstration in Next Five Years

(Phy-Area covered in ha, Fin – Rs. in Lakh)

Crop	Average No of Demonstration in each taluka	Number of demonstrations and financial requirements											
		2012-13		2013-14		2014-15		2015-16		2016-17		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Cotton	200	300	9	400	12.0	400	12.0	500	15.0	600	18.0	2200	66.0
Ground nut	200	300	12.0	400	16.0	400	16.0	500	20.0	600	24.0	2200	88.0
Wheat	100	100	3.0	150	4.5	200	6.0	300	9.0	350	10.5	1100	33.0
Bajra	150	250	7.5	300	9.0	350	10.5	350	10.5	400	12.0	1650	49.5
Sesame	150	250	7.5	300	9.0	350	10.5	350	10.5	400	12.0	1650	49.5
Onion	150	200	6.0	250	7.5	350	10.5	400	12.0	450	13.5	1650	49.5
Cumin	100	100	4.0	150	6.0	200	8.0	300	12.0	350	14.0	1100	44.0
Pulses	200	300	12.0	400	16.0	400	16.0	500	20.0	600	24.0	2200	88.0
Total		**1800**	**61**	**2350**	**80**	**2650**	**89.5**	**3200**	**109**	**3750**	**128**	**13750**	**467.5**

Area of demonstration is 0.4 ha.

Table 4.15.4 : Seed quantity required for next five year

Crop	Area ('00ha) (2010-11)	Seed rate kg/ha	Seed Quantity Req. (tonne) / year	SRR	Seed quantity in tonnes				
					2012-13	2013-14	2014-15	2015-16	2016-17
Cotton	3010	2.5	752.5	100	748.75	745	741.25	737.5	733.75
Ground nut	1318	120	15816	15	15936	16056	16176	16296	16416
Wheat	315	120	3780	35	3780	3780	3780	3780	3780
Bajra	507	3	152.1	100	152.1	152.1	152.1	152.1	152.1
Sesame	228	3	68.4	50	69.9	71.4	72.9	74.4	75.9
Onion	301	10	301	20	296	291	286	281	276
Cumin	51	15	76.5	35	84	91.5	99	106.5	114
Pulses	72	25	180	20	180	180	180	180	180

The demonstrations on plant health management like seed treatment with bio-pest is proposed to create the awareness among the farmers are presented in Tab.4.15.5. The total number of demonstrations in all taluka of the district is proposed as 8250 with total financial requirement of Rs. 165.00 lakh for the major corps of the district.

Table 4.15.5: Demonstrations on Plant health management to be conducted including seed treatment with bio-pesticides

(Phy – Number of demonstrations, Fin – Rs. in Lakh)

Name of Crop	Avg.No. of demonstration	Number of demonstrations and financial requirements											
		2012-13		2013-14		2014-15		2015-16		2016-17		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Cotton	200	400	8	400	8	400	8	600	12	400	8	2200	44
Ground nut	200	400	8	400	8	400	8	400	8	600	12	2200	44
Wheat	50	100	2	150	3	100	2	100	2	100	2	550	11
Bajra	100	200	4	200	4	200	4	300	6	200	4	1100	22
Sesame	25	50	1	75	1.5	50	1	50	1	50	1	275	5.5
Onion	50	100	2	100	2	150	3	100	2	100	2	550	11
Cumin	25	50	1	75	1.5	50	1	50	1	50	1	275	5.5
Pulses	100	200	4	200	4	200	4	200	4	300	6	1100	22
Total		**1500**	**30**	**1600**	**32**	**1550**	**31**	**1800**	**36**	**1800**	**36**	**8250**	**165**

Rs. 2000/Demonstration, Area of demonstration is 0.4 ha.

The demonstrations on soil health management like use of bio fertilizers and bio compost is proposed to create the awareness among the farmers are presented in Tab. 4.15.6. The total number of demonstrations in all taluka of the district is proposed as 8600 with total financial requirement of Rs.176.00 lakh for the major corps of the district.

Table 4.15.6: Demonstrations on Soil health management to be conducted including use of bio fertilizers and bio compost.

(Phy – Number of demonstrations, Fin – Rs. in Lakh)

Name of Crop	No. of demo	Number of demonstrations and financial requirements											
		2012-13		2013-14		2014-15		2015-16		2016-17		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Cotton	200	400	8	600	12	400	8	400	8	400	8	2200	44
G nut	200	400	8	400	8	600	12	400	8	400	8	2200	44
Wheat	50	100	2	150	3	100	2	100	2	100	2	550	11
Bajra	100	200	4	200	4	200	4	300	6	200	4	1100	22
Sesame	25	75	1.5	50	1	50	1	50	1	50	1	275	5.5
Onion	50	150	3	100	2	100	2	100	2	100	2	550	11
Cumin	25	50	1	75	1.5	50	1	50	1	50	1	275	5.5
Pulses	100	200	4	200	4	300	6	200	4	200	4	1100	22
Crop diversifi-cation	50	150	3	100	2	100	2	100	2	100	2	550	11
Total		**1725**	**34.5**	**1875**	**37.5**	**1900**	**38**	**1700**	**34**	**1600**	**32**	**8800**	**176**

Rs. 2000/Demonstration, Area of demonstration is 0.4 ha.

The demonstrations on IWM to be conducted during XII five year plan are presented in Tab. 4.15.7. The total numbers of proposed demonstrations are 4450 with the total financial requirement of Rs. 89.00 lakh for different crops with 0.4 ha demonstration area.

Table 4.15.7: Demonstrations on IWM to be conducted during plan period

(Phy – Number of demonstrations, Fin – Rs. in Lakh)

Name of Crop	No. of demonstration in each taluka	Number of demonstrations and financial requirements											
		2012-13		2013-14		2014-15		2015-16		2016-17		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Cotton	150	300	12	300	12	300	12	450	18	300	12	1650	66
G nut	100	200	8	200	8	300	12	200	8	200	8	1100	44
Wheat	50	100	4	150	6	100	4	100	4	100	4	550	22
Sesame	50 demo in Talaja, Bhavnagar, Gariyadhar, Ghogha Shihor, Gaghada, Palitana, Botad	50	2	50	2	100	4	100	4	100	4	400	16
Onion	50 demo. In Mahuva, Talaja, Bhavnagar, Gariyadhar, Ghogha, Shihor taluka	50	2	50	2	50	2	100	4	50	2	300	12
Cumin	50 demo. In Botad, Gadhada, Gariyadhar, Ghogha, mahuva, Palitana, Talaja, Umarala, Vallabhipur	100	4	50	2	100	4	100	4	100	4	450	18
Total		800	32	800	32	950	38	1050	42	850	34	4450	178

Rs. 4000/Demonstration, Area of demonstration is 0.4 ha.

IPM Demonstration and INM Demonstrations in next 5 years are presented in Table 4.15.8 and Tab. 4.15.9 respectively. The total of demonstrations on IPM as 8177 and on INM as 70 with the financial requirement of Rs. 108.23 Lakh and Rs. 50.5 Lakh respectively.

Table 4.15.8: IPM Demonstration in next 5 years (Phy-ha, Fin- Lakh Rs)

Crop	IPM Demonstration projections(financial target in lakh rupees)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Cotton	1100	22	1100	22	1100	22	1100	22	1100	22	5500	110
Other crops Including groundnut	1100	22	1100	22	1100	22	1100	22	1100	22	5500	110
Total	**2200**	**44**	**2200**	**44**	**2200**	**44**	**2200**	**44**	**2200**	**44**	**11000**	**220**

Note: Average area per demonstration is 1 ha.

Table 4.15.9: INM Demonstrations in next 5 year (Phy-ha, Fin- Lakh Rs)

crop	INM Demonstration projections											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Cotton	11	3.3	11	3.3	11	3.3	11	3.3	11	3.3	55	16.5
Groundnut	11	2.2	11	2.2	11	2.2	11	2.2	11	2.2	55	11
Wheat	11	2.2	11	2.2	11	2.2	11	2.2	11	2.2	55	11
Total	33	7.7	33	7.7	33	7.7	33	7.7	33	7.7	165	38.5

Note: Average area per demonstration is 1 ha.
One demonstration of cotton, groundnut and wheat in each talukas.

Seed planning/ Seed village programme (Seed production enhancement) and the seed storage at University Research Station , KVK, APMC, taluka level and Panchayat level are proposed as per Table 4.15.10. The total financial requirement of Rs. 61.6 Lakh is for seed production, which will cover 1,110 ha area. The total seed storage facilities proposed are 531 with total requirement of Rs. 2165.00 Lakh shown in Table 4.15.11.

Table 4.15.10: Seed production enhancement: Seed planning/ Seed village Programmes
(Phy – Area in ha, Fin – Rs. in Lakh)

Name of Crop	Seed Rate (kg/ha)	Area under seed production in ha. and financial requirements											
		2012-13		2013-14		2014-15		2015-16		2016-17		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
G nut	120	55	5.28	55	5.28	55	5.28	55	5.28	55	5.28	275	26.4
Wheat	120	55	1.1	55	1.1	55	1.1	55	1.1	55	1.1	275	5.5
Bajra	4	22	0.22	22	0.22	22	0.22	22	0.22	22	0.22	110	1.1
Sesame	3	22	1.1	22	1.1	22	1.1	22	1.1	22	1.1	110	5.5
Onion	10	33	1.98	33	1.98	33	1.98	33	1.98	33	1.98	165	9.9
Cumin	15	33	1.1	33	1.1	33	1.1	33	1.1	33	1.1	165	5.5
Pulses	25	22	0.44	22	0.44	22	0.44	22	0.44	22	0.44	110	2.2
Monitoring		--	1.1	0	1.1	0	1.1	0	1.1	0	1.1	0	5.5
Total		**222**	**12.32**	**222**	**12.32**	**222**	**12.32**	**222**	**12.32**	**222**	**12.32**	**1110**	**61.6**

Table 4.15.11: Seed storage at University/Panchayat level and Taluka level
(Phy – No. of unit, Fin – Rs. in Lakh)

Particulars	Number of storage godowns and financial requirements											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Modernization of University farms	-	-	1	25	2	50	2	50	1	25	**6**	**150**
KVK	-	-	1	25	1	25	1	25	-	-	**3**	**75**
APMC	-	-	3	75	3	75	3	75	2	50	**11**	**275**
Panchayat level	100	300	100	300	100	300	100	300	100	300	**500**	**1500**
Taluka level	-	-	3	45	3	45	3	45	2	30	**11**	**165**
Total	**100**	**300**	**108**	**470**	**109**	**495**	**109**	**495**	**105**	**405**	**531**	**2165**

Uni. Farm at Mahuva, Talaja and Vallabhipur, KVK- Sanosara, APMC- All taluka

The soil and water testing laboratory and mobile plant health clinic and strengthening of existing government laboratory are proposed in Table 4.15.12 with the total financial requirement of Rs. 635.00 Lakh.

Table 4.15.12: Establishment of soil and water testing laboratory and mobile plant health clinic

(Phy – No. of units, Fin – Rs. in Lakh)

Particulars	Number of soil and water testing laboratory and mobile plant health clinic and financial requirements (Rs. in Lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Soil and water testing lab	2	50	2	50	2	50	2	50	-	5	8	205
Strengthening & up gradation of existing uni./ govt. lab	-	-	1	50	1	50	1	50	-	5	3	155
Mobile soil testing and plant health clinic van	2	50	2	50	3	75	2	50	2	50	11	275
Total	**4**	**100**	**5**	**150**	**6**	**175**	**5**	**150**	-	**60**	**22**	**635**

Soil and water testing lab at All blocks except Bhavnagar, Botad & Mahuva and Strengthening & up gradation of existing uni./ govt. lab at Bhavnagar, Botad & Mahuva

Pearl Millet

Thresher

Oil Engine Pump Set

J.C.B.

Green House

Jafarabadi Buffalo

Sowing

Spraying

Farm Fancing

The requirement of farm mechanization in the district for XII five year plan is given in Table 4.15.13. There is an immense scope for farm mechanization in the district.

Table 4.15.13: Requirement of farm mechanization in the district (Phy – No. of units, Fin – Rs. in Lakh)

Sr. No.	Name of Equipment	Year-wise financial requirement											
		2012-13		2013-14		2014-15		2015-16		2016-17		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Rotary weeder	110	38.50	110	38.50	110	38.50	110	38.50	110	38.50	550	192.5
2	Rotavator	440	220	440	220	440	220	440	220	440	220	2200	1100
3	Portable Oil engine	220	44	220	44	220	44	220	44	220	44	1100	220
4	Threshers	33	16.5	33	16.5	33	16.5	33	16.5	33	16.5	165	82.5
5	Laser land leveler	11	22	11	22	11	22	11	22	11	22	55	110
6	Cotton shredder	33	42.9	33	42.9	33	42.9	33	42.9	33	42.9	165	214.5
7	Sprayers	440	11	440	11	440	11	440	11	440	11	2200	55
8	Tractor	440	2200	440	2200	440	2200	440	2200	440	2200	2200	11000
9	Mini Tractor	550	1650	550	1650	550	1650	550	1650	550	1650	2750	8250
10	Power tiller	330	825	330	825	330	825	330	825	330	825	1650	4125
11	Bush cutters	110	17.6	110	17.6	110	17.6	110	17.6	110	17.6	550	88
12	Automatic seed drill (Tractor)	110	44	110	44	110	44	110	44	110	44	550	220
13	Automatic seed drill (Bullock)	220	11	220	11	220	11	220	11	220	11	1100	55
14	Cultivator/Harrows	990	198	990	198	990	198	990	198	990	198	4950	990
15	Cotton Slicer	33	33	33	33	33	33	33	33	33	33	165	165
16	Plough	990	247.5	990	247.5	990	247.5	990	247.5	990	247.5	4950	1237.5
	TOTAL		**5621**		**5621**		**5621**		**5621**		**5621**		**28105**

Numbers of processing units and Research on processing of food grains by SAUs are proposed as per Table 4.15.14 and Table 4.15.15. The total financial requirement of Rs. 105.00 Lakh and Rs. 390.00 lakh, respectively.

Table 4.15.14: Number of processing units and financial requirements

(Phy – No. of units, Fin – Rs. in Lakh)

Particulars	No of units	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Groundnut mini oil mill (Ghani)	one in each taluka	2	10	2	10	2	10	3	15	2	10	11	55
Agro & Food processing units (Vegetable, pickle making, Fruit juice etc.)	Bhavnagar & Palitana	-	-	-	-	-	-	1	15	1	15	2	30
Small scale Vegetable. processing unit	Talaja, Mahuva, Bhavnagar	-	-	1	10	1	10	-	-	1	10	3	30
Total		**2**	**10**	**3**	**20**	**3**	**20**	**4**	**30**	**4**	**35**	**16**	**115**

Table 4.15.15: Research on processing of food grains by SAUs

(Phy – No. of units, Fin – Rs. in Lakh)

Particulars	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
Research on food grains	3*	150	-	60	-	60	-	60	-	60	3	390

* Mahuva, Talaja and Vallabhipur

To establish the better marketing facilities, the strengthening of APMC by collection van and e-connectivity is necessary in the district. Therefore the planning and the financial requirement are presented in Tab. 4.15.16.

Table 4.15.16: Strengthening of APMC by collection van an e-connectivity

(Phy – No. of units, Fin – Rs. in Lakh)

Particulars	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Refrigerated Collection van	5	50	4	40	4	40	4	40	4	40	21	210
E-connectivity	2	4	2	4	3	6	2	4	2	4	11	22
Establishment of cold storage	-	-	1	75	1	75	-	-	-	-	2	150
Total		**54**		**119**		**121**		**44**		**44**		**382**

Three Refrigerated Collection van at Bhavnagar, Mahuva, Talaja, Botad, Palitana and one Refrigerated Collection van at Gadhada, Ghogha, Gariyadhar, Shihor, Umarala, Vallabhipur and one E-connectivity at Each Taluka and one Establishment of cold storage at Mahuva, Talaja

Establishment of Rural godown during XII five year plan are presented in Tab. 4.15.17. The total numbers of proposed godown are 215 with the total financial requirement of Rs. 2150.00 lakh.

Table 4.15.17: Establishment of Rural godown (Fin. Rs. in Lakh)

Taluka	Existing (2011-12)		2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	No	Capacity (MT)	No	Fin	No	Fin	No	Fin	No	Fin	No	Fin	No	Fin
Bhavnagar	57	11640	5	50	5	50	5	50	5	50	5	50	25	250
Botad	30	6000	3	30	3	30	3	30	3	30	3	30	15	150
Gadhada	22	3500	3	30	3	30	3	30	3	30	3	30	15	150
Gariyadhar	23	4000	3	30	3	30	3	30	3	30	3	30	15	150
Ghogha	20	3500	3	30	3	30	3	30	3	30	3	30	15	150
Mahuva	31	8000	5	50	5	50	5	50	5	50	5	50	25	250
Palitana	22	3500	5	50	5	50	5	50	5	50	5	50	25	250
Shihor	26	4000	5	50	5	50	5	50	5	50	5	50	25	250
Talaja	38	7000	5	50	5	50	5	50	5	50	5	50	25	250
Umarala	18	2800	3	30	3	30	3	30	3	30	3	30	15	150
Vallabhipur	16	2400	3	30	3	30	3	30	3	30	3	30	15	150
Total	**303**	**56340**	**43**	**430**	**43**	**430**	**43**	**430**	**43**	**430**	**43**	**430**	**215**	**2150**

150 sq.mt. capacity

4.15.18 Micro irrigation system

Drip and sprinkler is slowly getting popularity in the district and about 12095 farmers have adopted drip irrigation systems and covered 17843.46 ha of area, the sprinkler irrigation system is adopted by 6380 numbers of farmers and covered 8848.46 ha of area. The taluka wise details are given in Table 4.15.18. The physical and the financial requirement for the protective micro irrigation are presented in Table 4.15.19 and Table 4.15.20 respectively. For the micro irrigation total financial requirement is proposed as Rs.15217 Lakh.

Table 4.15.18: Talukawise information on drip/sprinkler (From 06-07 to 2012-13)

	Drip		Sprinkler	
Taluka	**No. of farmers**	**Area (ha.)**	**No. of farmers**	**Area (ha.)**
Bhavnagar	470	571.85	409	793.29
Botad	1987	4570.18	80	138.76
Gadhada	2288	3679.45	141	201.52
Gariyadhar	867	966.29	608	610.67
Ghogha	765	968.33	762	1160.07
Mahuva	1535	2173.93	1916	3013.96
Palitana	928	1051.05	607	899.93
Shihor	1640	1730.71	613	663.59
Talaja	789	1109.48	1094	1160.87
Umarala	586	728.30	36	46.59
Vallabhipur	240	293.89	114	159.21
Total	**12095**	**17843.46**	**6380**	**8848.46**

Source: www.ggrc.co.in

Table 4.15.19: Protective Micro Irrigation Plan for drip and sprinkler (Physical in ha)

Taluka	Area covered in 2011-12	Area to be covered					Total
		2012-13	2013-14	2014-15	2015-16	2016-17	
Bhavnagar	257	308	370	444	533	639	**2294**
Botad	366	439	527	632	759	911	**3268**
Gadhada	790	948	1138	1365	1638	1966	**7055**
Gariyadhar	280	336	403	484	581	697	**2501**
Ghogha	535	642	770	924	1109	1331	**4776**
Mahuva	1262	1514	1817	2181	2617	3140	**11269**
Palitana	370	444	533	639	767	921	**3304**
Shihor	420	504	605	726	871	1045	**3751**
Talaja	365	438	526	631	757	908	**3260**
Umarala	26	100	150	200	250	300	**1000**
Vallabhipur	0	100	150	200	250	300	**1000**
Total	**4670**	**5773**	**6989**	**8426**	**10132**	**12158**	**43478**

Table 4.15.20: Protective Micro Irrigation Plan for drip and sprinkler
(Financial Rs in Lakh) @ Rs. 0.35 lakh/ha.

Taluka	2012-13 (Rs in lakh)	2013-14 (Rs in lakh)	2014-15 (Rs in lakh)	2015-16 (Rs in lakh)	2016-17 (Rs in lakh)	Total, (Rs in lakh)
Bhavnagar	108	130	155	187	224	803
Botad	154	184	221	266	319	1144
Gadhada	332	398	478	573	688	2469
Gariyadhar	118	141	169	203	244	875
Ghogha	225	270	323	388	466	1672
Mahuva	530	636	763	916	1099	3944
Palitana	155	187	224	268	322	1156
Shihor	176	212	254	305	366	1313
Talaja	153	184	221	265	318	1141
Umarala	35	53	70	88	105	350
Vallabhipur	35	53	70	88	105	350
Total	2021	2446	2949	3546	4255	15217


Wheat Harvesting


Water Harvesting

Table 4.15.21: Protective (Community Tank) Irrigation Plan

(Fin. Rs in Lakh)

Taluka	2012-13		2013-14		2014-15		2015-16		2016-17	
	No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.
Bhavnagar	10	50	10	50	12	60	15	75	20	100
Botad	10	50	10	50	12	60	15	75	20	100
Gadhada	10	50	10	50	12	60	15	75	20	100
Gariyadhar	10	50	10	50	12	60	15	75	20	100
Ghogha	10	50	10	50	12	60	15	75	20	100
Mahuva	10	50	10	50	12	60	15	75	20	100
Palitana	10	50	10	50	12	60	15	75	20	100
Shihor	10	50	10	50	12	60	15	75	20	100
Talaja	10	50	10	50	12	60	15	75	20	100
Umarala	10	50	10	50	12	60	15	75	20	100
Vallabhipur	10	50	10	50	12	60	15	75	20	100
Total	**110**	**550**	**110**	**550**	**132**	**660**	**165**	**825**	**220**	**1100**

Table 4.15.22: Land development (Phy – Area in ha, Fin – Rs. in Lakh)

Activity	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Land reclamation	1000	300	1000	300	1000	300	1000	300	1000	300	5000	1500
Bunding and soil conservation	1000	250	1000	250	1000	250	1000	250	1000	250	5000	1250
Integrated Watershed development	1000	50	1000	50	1000	50	1000	50	1000	50	5000	250
Desilting of check dam	20	10	20	10	20	10	20	10	20	10	100	50
Total		**610**		**610**		**610**		**610**		**610**		**3050**

Land reclamation and Bunding and soil conservation in Bhavnagar Mahuva, Ghogha, Talaja Integrated Watershed development and Desilting of check dam in all taluka

Bhavnagar district has Total: 136165 ha. of salinity affected land out of which 60523 ha. Irrigated and 51128 ha. Unirrigated, Waste land: 7891 ha, Pasture Land: 15323 ha. and Pond Area: 1300 ha. * Ref: Baseline survey on salinity in coastal villages of Bhavnagar district, Gujarat (2008), CSPC- *Coastal Salinity Prevention Cell*, Gujarat.* (Rs 0.30 Lakh/ ha for land Reclamation), (Rs. 0.25 Lakh/ ha for bunding and soil conservation) * (Rs 0.05 Lakh/ ha for Integrated watershed development),(Rs. 0.5 Lakh/ ha for desilting of check dam)

Table 4.15.23: Water Resources Development (Phy – No. /Area* in ha, Fin – Rs. in Lakh)

Activity	Unit cost	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Wells recharge	0.20	770	154	770	154	770	154	770	154	770	154	3850	770
Bore wells recharge	0.20	440	88	440	88	440	88	440	88	440	88	2200	440
Lift irrigation	0.40	550*	220	550*	220	550*	220	550*	220	550*	220	2750*	1100
Misc.- Pipeline	0.25	8800*	2200	8800*	2200	8800*	2200	8800*	2200	8800*	2200	44000	11000
Total			**2662**		**2662**		**2662**		**2662**		**2662**		**13310**

4.15.24 Establishment of training centre for repair and maintenance of farm implement & machinery and irrigation equipments

The training centre for repair and maintenance of farm implement & machinery and irrigation equipment is proposed to train the local artisans and technicians and maintenance of machineries. Its physical and financial plan is presented in Tab. 4.15.24.

Table 4.15.24: Proposal for Establishment of training centre for repair and maintenance of farm implement & machinery and irrigation equipment at district level

(Phy-No., Fin. – Rs in Lakh)

Description	Year-wise financial requirement											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Establishment of training centre for repair & maintenance of farm implement & machinery and irrigation equipment	1	600	-	100	-	100	-	100	-	100	1	1000

CHAPTER V

DEVELOPMENT OF ALLIED SECTORS

5.1 Introduction:-

Allied agricultural sectors i.e. Horticulture, Animal Husbandry, Fisheries development, Irrigation, Co-operation, Watershed development, Vermi-composting, etc. may perform active role in the sustainable development of agriculture and rural economy. These sectors offer good alternatives/opportunities for livelihood of rural people as well as generate employment. Farmers of Bhavnagar district are actively engaged in cultivation of allied enterprises to meet their own home requirements and subsequently for the market. The thrust in the district has been on Horticulture and dairy development.

5.2 Horticulture:

The importance of fruits and vegetable crops in improving the nutritional status and farm economy needs no justification. It offers excellent alternative for diversification in agriculture by ensuring balanced use of land, water and other resources for promoting sustainable agriculture besides increasing income of the farmers. Favorable Agro-climatic conditions, soil and water availability make it suitable for growing a wide variety of fruits, plantation, vegetable, spice and medicinal and aromatic plants. The horticulture in the district is very poor mainly due to lakh of awareness of its importance, irrigation facilities and the marketing facilities. The marketing problem is due to the scattered production of the produce. The climate of the district is highly suitable for spices production and there is immense potential exists for growing spice crops in *Rabi* season in area having irrigation facility. At present commercial floriculture is only in 467 ha area.With increase in transport and other infrastructure facilities, the scope for its cultivation and marketing will also be increased. There is immense potential to bring more area under vegetable crops by using drip irrigation in area having limited irrigation facility to provide nutritional food security.

Mango

Table 5.2.1: Strategies for human resource development plan for horticulture

Sr	Strategy for development	Training Need	Participants	Topic of training	No. of training	Institutions for training
1	Popularization of Hy. Varieties of Mango, coconut, Sapota, Papaya etc.	Horticultural plantation	Farmers	Plantation and true fruit crops	1	Dept. of Horticulture JAU, KVK
2	Popularization of post harvest technology in fruit crops	Importance of post harvest technology in fruit crops	Farmers	Importance of post harvest	2	Do
3	Popularization of cultivation of indigenous medicinal and aromatic plant	Plantation of indigenous medicinal and aromatic plants	Farmers	Importance of medicinal and aromatic plants	1	Do
4	Mobilization of farmers	Creating awareness for establishment market linkage	Farmers	Creating awareness for establishment market linkage	1	Do
5	Integrated pest management in important vegetable crop	Integrated pest management in important vegetable crop	Farmers	Integrated pest management in important vegetable crop	1	Do
6	Popularize the market policy for horticulture	Importance of market for horticulture crops	Farmers	Market policy for horticulture crops	1	Do


Guava


Pomegranate

Table 5.2.2: Strategies; Thrust areas for extension & research needs and proposed activities of horticulture (Amount: Rs. In Lakh)

Strategies proposed	Thrust areas for extension	Short-term research need	Activities Proposed		No. of units		Amount required
			Extension	Research	Extn.	Rate per item	
Popularization of Sapota, Aonla, Mango and papaya plantation	Creating awareness for growing Sapota, aonla, papaya crop in fields of FIGs, etc.	Available	Demonstration	-	15	0.04	0.60
			Training (D)	-	2	0.20	0.40
			Training (V)	-	6	0.10	0.60
			Leaflet	-		0.25	0
			Exposure visit	-	2	0.50	0.10
			IT	-	1	0.20	0.20
			Reward	-	2	0.20	0.40
			-	Field day	2	0.20	0.40
			-	Kisan Gosthi	2	0.15	0.30
			-	FS interaction	1	0.20	0.20
Disseminate integrated pest management in chillies, brinjal and tomato	Creating awareness about IPM in chillies and brinjal	Available	Demonstration	-	15	0.04	0.60
			Training (D)	-	2	0.20	0.40
			Training (V)	-	5	0.10	0.50
			Leaflet	-		0.25	0
			Exposure visit	-	1	0.50	0.50
			IT	-	1	0.20	0.20
			Reward	-	1	0.20	0.20
			-	Field day	2	0.20	0.40
			-	Kisan Gosthi	1	0.15	0.15
			-	FS interaction	1	0.20	0.20
Popularization of the post harvest technology in vegetables	Promoting post harvest technology in vegetables crop	Available	Demonstration	-	10	0.04	0.40
			Training (D)	-	2	0.20	0.40
			Training (V)	-	5	0.10	0.50
			Leaflet	-		0.25	0
			Exposure visit	-	2	0.50	0.10
			IT	-	1	0.20	0.20
			Reward	-		0.20	0
			-	Field day	1	0.20	0.20
			-	Kisan Gosthi	1	0.15	0.15
			-	FS interaction		0.20	0

Cont.

Strategies proposed	Thrust areas for extension	Short-term research need	Activities Proposed		No. of units		Amount required
			Extension	Extn.	Extn.	Rate per item	
To popularize cultivation of indigenous medicinal and aromatic plant	Creating awareness about medicinal and aromatic plants for generating more income	Available	Demonstration	-	5	0.04	0.20
			Training (D)	-	2	0.20	0.40
			Training (V)	-	6	0.10	0.60
			Leaflet	-		0.25	0
			Exposure visit	-	1	0.50	0.50
			IT	-	1	0.20	0.20
			Reward	-	1	0.20	0.20
			-	Field day	2	0.20	0.40
			-	Kisan Gosthi	1	0.15	0.15
			-	FS interaction		0.20	0
Mobilization of farmers group	Creating awareness for establishing market linkage	Available	Demonstration	-	5	0.04	0.20
			Training (D)	-		0.20	0
			Training (V)	-	6	0.10	0.60
			Leaflet	-		0.25	0
			Exposure visit	-	1	0.50	0.5
			IT	-		0.20	0
			Reward	-	1	0.20	0.2
			-	Field day		0.20	0
			-	Kisan Gosthi	1	0.15	0.15
			-	FS interaction		0.20	0
			FIG (a)	-	20	0.05	1
			FIG (b) Seed Money	-	10	0.1	0.10
			Kisan mela	-	1	0.4	0.4
			Leaflet	-	1	2	2
			Refinement FLD	-	1	1	1
							17.1

Table 5.2.3: Vision for Bhavnagar district with Baseline data in respect of Intervention

Sr. No.	Sector	Baseline (2010-11) (MT/Ha.)	Intervention	Projected after five year (2015-16) (MT/Ha.)
1	Sapota	14 MT	i. Use of recommended varieties ii. Use of IPM & INM iii. Use of recommended package of practices iv. Irrigation schedules to be managed carefully	15 MT
2	Citrus	11.5 MT	i. Use of high yielding varieties ii. Use of INM & IPM iii. Irrigation Management is to be fully cared	12.5 MT
3	Ber	13 MT	i. Use of recommended package of practices ii. Use of varieties Gola and Umaran iii. Use of IPM & INM	14 MT
4	Guava	18 MT	i. Use of high yielding varieties ii. Follow INM iii. Irrigation Management is to be fully cared	19 MT
5	Banana	55 MT	i. Use of high yielding varieties ii. Use of IPM & INM iii. Irrigation Management is to be fully cared	58 MT
6	Mango	7 MT	i. Use of high yielding varieties ii. Use of recommended package of practices iii. Use of IPM & INM	8 MT
7	Papaya	55 MT	i. Use of recommended varieties ii. Use of INM & IPM iii. Irrigation Management is to be fully cared	57 MT
8	Custard apple	12.5 MT	i. Use of high yielding varieties ii. Follow INM iii. Irrigation Management is to be fully cared	13.5 MT
9	Coconut	10.5 MT	i. Use Hy. Varieties DxT, TxD ii. Use of recommended package of practices iii. Use of IPM & INM	12 MT

Source: SREP, District Bhavnagar-2010

Table 5.2.4: Area expansions plan for horticultural crops (Area in Ha.)

Existing cropping pattern (2011-12)		Projected				
		2012-13	2013-14	2014-15	2015-16	2016-17
Crop	Area	Area	Area	Area	Area	Area
Mango	6080	6150	6200	6250	6300	6350
Sapota	2730	2700	2650	2600	2550	2500
Citrus	6375	6400	6440	6470	6500	6550
Ber	1450	1430	1400	1380	1350	1320
Banana	1600	1630	1660	1690	1720	1750
Guava	3750	3760	3770	3780	3790	3800
Papaya	1550	1570	1590	1610	1630	1650
Cust. Apple	1750	1560	1570	1580	1590	1600
Pomegranate	450	460	470	480	490	500
Coconut	3820	3870	3920	3970	4020	4070
Other	1050	1055	1060	1065	1070	1075
Total	**30605**	**30585**	**30730**	**30875**	**31010**	**31165**

5.3. Activities for development of horticulture sector

Horticultural crops are one of the crucial drivers for the sustainable agricultural growth in the state. Horticulture and Plantation is becoming the most preferred agriculture activity today as it provides an opportunity to link up with the processing industry and exports. By adopting scientific cultivation of horticulture crops even small and fragmented land holdings could be transformed as economically viable and ecologically stable units. Horticulture and plantation also enrich the waste lands and dry lands. Its impact on ecological development, employment generation, export promotion and nutritional security paves the way for sustainable eco-friendly development. In Bhavnagar all blocks possess huge potential for dry land horticulture especially fruit crops and food processing which would cater to domestic & export market. The plantation and horticulture possess immense scope for investment.

Farmers in Gujarat are aware of the inherent advantages of taking up cultivation of fruits and vegetables. Horticulture sector encompasses cultivation of fruits, vegetables, flowers, plantation crops, spices, and medicinal and aromatic crops etc. which promise to be more profitable as compare to other field crops.

The major horticulture crops of Bhavnagar district are Mango (6080 ha), Sapota (2730 ha) Citrus (6375) Guava (3750) and Coconut (3820 ha) as may be seen from growth in area under these crops. There is one Govt. nursery at Mahuva (mainly for coconut) under state horticulture department and one nursery (mainly for coconut) under Junagadh Agricultural University.

Increased agro processing could reduce post harvest losses which are around 25-30 % of the total produce. There is no major storage and processing facility in the district (except for onion dehydration plants in Mahuva and Talaja). Small units extracting pulp from mangoes and manufacturing powders and pickles.

The horticulture sector in the district is very poor mainly due to lack of awareness about its importance and poor irrigation facility facilities. For enhance the area under vegetables, fruit and spices, demonstrations will help to encourage the farmers for vegetables, fruit and spices cultivation. Horticultural crops are cheapest source of nutrition and hence there is a need to increase the production and productivity of Horticultural crops in the district for better nutritional security.

The table **5.3.1** shows the Training needs in horticulture crops which includes the different technology like cultivation, nursery raising, IPM/INM, soil health management (soil testing/ bio-fertilizers/ green manuring, organic farming, Value addition, processing, marketing/ co-operative societies. For 12th five year plan the total estimated amount for training of farmers in vegetables crops is Rs 138.60 lakhs.

Table 5.3.1: Training needs for development in Horticulture crops

(Rs. in lakhs) (Rs. 400 per trainee per day.)

Name of Technology	Year-wise number of farmers to be trained (3 days)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Horticulture cultivation	440	5.28	440	5.28	440	5.28	440	5.28	440	5.28	2200	26.4
Nursery raising	220	2.64	220	2.64	220	2.64	220	2.64	220	2.64	1100	13.2
IPM/INM	440	5.28	440	5.28	440	5.28	440	5.28	440	5.28	2200	26.4
Soil health management (bio-fertilizers/ green manuring	440	5.28	440	5.28	440	5.28	440	5.28	440	5.28	2200	26.4
Organic farming	440	5.28	440	5.28	440	5.28	440	5.28	440	5.28	2200	26.4
Value addition processing	220	2.64	220	2.64	220	2.64	220	2.64	220	2.64	1100	13.2
Marketing/ co-operative societies	110	1.32	110	1.32	110	1.32	110	1.32	110	1.32	550	6.6
Total		**27.72**		**27.72**		**27.72**		**27.72**		**27.72**		**138.6**

The table 5.3.2 shows the proposal for establishment of small scale nurseries in Bhavnagar district. The number of units is equally proposed in each Taluka and the cost per unit is Rs. 3 lakhs. The total estimated cost for establishment of small scale nurseries is Rs. 198 lakhs.

Table 5.3.2: Establishment of nurseries: (Phy – Number of nurseries, Fin – Rs. in lakh)

Activity	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
Nursery small scale	13	39	13	39	13	39	14	42	13	39	66	**198**

Six Nursery in each taluka

The table 5.3.3 shows the proposal for establishment of net houses and Poly houses in the district for 12th five year plan. The number of units is proposed equally in each Taluka. The total estimated cost for establishment of net houses is 1375 lakh and Poly houses is Rs 2750 lakhs.

Table 5.3.3: Establishment of Poly and net houses:

(Phy – Number of Net/ poly houses, Fin – Rs. in lakh)

Activity	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Net house (1000 Sq.mt: 5 lakh)	55	275	55	275	55	275	55	275	55	275	275	1375
Poly house	55	550	55	550	55	550	55	550	55	550	275	2750
Total		**825**		**825**		**825**		**825**		**825**		**4125**

Note: Net house cost 1000 Sq.mt: 5 lakh, Poly house cost 1000 Sq.mt: 10 lakh
25 net house and poly-house in each taluka

The table 5.3.4 shows the proposal for establishment of green houses and distribution of Horticulture Kits in the district for 12th five year plan. The number of units is proposed equally in each Taluka. The total estimated cost for establishment is 330 lakh.

Table 5.3.4: Establishment of green houses and distribution of Horticulture Kits

(Phy – Number, Fin – Rs. in lakh)

Activity	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
High tech green houses	2	50	2	50	2	50	2	50	3	75	11	275
Horticulture Kits for small & medium farmers	80	10	100	12.5	100	12.5	80	10	80	10	440	55
Total		**60**		**62.5**		**62.5**		**60**		**85**		**330**

One high tech green house in each taluka and 40 Horticultural kit in each taluka

(Rs. 0.125 Lakh/ kit, Rs. 25 lakh/green house)

The proposal for demonstrations for area expansion in the district is shown in table 5.3.5. The table shows the area (ha) and cost per unit. The demonstrations proposed equally in each Taluka. The total estimated cost for demonstrations on vegetables for area expansion is Rs 61.6 lakhs for 12th five year plan.

Table 5.3.5: Demonstrations on vegetables, fruit and spices for area expansion

(Phy – Number of demo., Fin – Rs. in lakh)

Name of Demonstration	Year-wise financial requirement											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
Vegetables												
Demonstrations on vegetables for area expansion	88	1.76	88	1.76	88	1.76	88	1.76	88	1.76	440	8.8
IPM in vegetable crops	88	1.76	88	1.76	88	1.76	88	1.76	88	1.76	440	8.8
INM in vegetable crops	88	1.76	88	1.76	88	1.76	88	1.76	88	1.76	440	8.8
Fruit crop												
Demonstrations on fruit crops	88	1.76	88	1.76	88	1.76	88	1.76	88	1.76	440	8.8
IPM in fruit crops	88	1.76	88	1.76	88	1.76	88	1.76	88	1.76	440	8.8
Spices cops												
IPM in spices	88	1.76	88	1.76	88	1.76	88	1.76	88	1.76	440	8.8
INM in spices	88	1.76	88	1.76	88	1.76	88	1.76	88	1.76	440	8.8
Total		**12.32**		**12.32**		**12.32**		**12.32**		**12.32**		**61.6**
Demo. Area 0.4 ha, Cost Rs.0.02 lakh/demo. And 40 Demo./Taluka												

The table 5.3.6 shows the Proposal for establishment of Mango ripening chamber in Bhavnagar district for 12th five year plan. The Mango ripening units are proposed in Mahuva, Talaja and Palitana taluka where the Mango covers more area. The total cost for establishment of mango ripening chamber in Bhavnagar district is Rs 450 lakhs for the 12th five year plan.

Table 5.3.6 Proposal for establishment of mango ripening chamber (Rs. in lakhs)

Particulars	Taluka	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	One in Mahuva, Talaja, Palitana	-	1	1	1	-	**3**
Cost @ Rs 150		-	150	150	150	-	**450**


Bottle Guard


Guar

The project proposal for horticulture development and Training needs of farmers for Horticultural crops in the district is presented in table 5.3.7 and table 5.3.8. The total cost for the same is Rs 1475.5 lakhs and Rs. 23.64, respectively for the 12th five year plan.

Table 5.3.7: Project proposal for horticulture development

(Phy – No., Fin – Rs. in lakh)

Name of Project	No. in each Talukas	No of unit (ha)	Cost per unit.	Year-wise financial requirement											
				2012-13		2013-14		2014-15		2015-16		2016-17		Total	
				Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
High tech vegetable farming	2	22	0.25	4	1	5	1.25	5	1.25	4	1	4	1	22	5.5
Establish. of cold storage units	5*	5	250	1	250	1	250	1	250	1	250	1	250	5	1250
Establishment of collection centers	1	11	3	2	6	3	9	2	6	2	6	2	6	11	33
Providing refrigerated vans	1	11	17	2	34	3	51	2	34	2	34	2	34	11	187
Total					**291**		**311.25**		**291.25**		**291**		**291**		**1475.5**

Note:* one each in Bhavnagar, Botad, Ghogha, Mahuva and Talaja taluka

Table 5.3.8: Training needs of farmers for Horticultural crops

Phy – Number of Training, Fin – Rs. in lakh)

Name of Technology	No of training	No. in each Talukas	Year-wise number of farmers to be trained											
			2012-13		2013-14		2014-15		2015-16		2016-17		Total	
			Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
Fruit & vegetable cultivation	22	50	4	0.60	4	0.60	6	0.90	4	0.60	4	0.60	22	3.3
Nursery raising	11	25	2	0.75	3	1.12	2	0.75	2	0.75	2	0.75	11	4.125
IPM/INM Fruit & vegetable	22	50	4	0.60	4	0.60	6	0.90	4	0.60	4	0.60	22	3.3
Organic farming	11	25	2	0.60	3	0.90	2	0.60	2	0.60	2	0.60	11	3.3
Value addition Processing	11	25	2	0.75	3	1.12	2	0.75	2	0.75	2	0.75	11	4.125
Importance of MIS	22	50	4	1.00	4	1.00	4	1.00	6	1.50	4	1.00	22	5.5
Total				**4.3**		**5.34**		**4.9**		**4.8**		**4.3**		**23.65**

(Rs. 0.015/ Trainee for Nursery raising) and (Rs. 0.006/Trainee for other all technology), 25 trainee/training

The Proposal for establishment of Coconut processing unit in Bhavnagar district is shown in table 5.3.9. The total estimated cost for establishment of Coconut processing unit in Bhavnagar district is Rs 150 lakhs for the 12th five year plan.

Table 5.3.9 Proposal for establishment of Coconut processing unit (Rs. in lakhs)

Particulars	Taluka	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	Mahuva	-	1	-	-	-	**1**
Cost @ Rs 150		-	150	-	-	-	**150**

The Proposal for establishment of pack house in Bhavnagar district is shown in table 5.3.10. The cost of establishment of one unit of pack house is 3 lakh and one pack house is proposed in Mahuva and Palitana taluka for mango while in Talaja taluka, two pack houses is proposed for mango and banana. The total estimated cost for establishment of pack houses in Bhavnagar district is Rs 12 lakhs for the 12th five year plan.

Table 5.3.10: Establishment of pack house (Rs. in lakhs)

Particulars	Taluka	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	Mahuva-1	-	1	1	1	1	4
Cost @ Rs 3	Palitana-1 Talaja-2	-	3	3	3	3	12

The Proposal for establishment of chips/wafer production units is shown in table 5.3.11. One Sapota chips production unit is proposed in Mahuva taluka and one banana wafer production unit is proposed for Talaja Taluka. The cost of establishment is Rs 25 lakh per unit. So, the total estimated cost for establishment of chips/wafer production units in Bhavnagar district is Rs 50 lakh for the 12th five year plan.

Table 5.3.11Establishment of Sapota chips and banana wafer production units (Rs. in lakhs)

Particulars	Taluka	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	Mahuva-1	-	1	1	-	-	**2**
Cost @ Rs 25	Talaja-1	-	25	25	-	-	**50**

Table 5.3.12 shows the Proposal for establishment of units for recycling of Coconut waste through shredder and Vermi-composting unit in mahuva taluka and cost per unit is Rs 15 lakhs per unit. The total estimated cost for establishment of recycling of Coconut waste through shredder and Vermi-composting units in Bhavnagar district is Rs 18 lakhs for the 12th five year plan.

Table 5.3.12: Recycling of coconut waste through shredder & vermi-composting (Rs. in lakhs)

Particulars	Taluka	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	mahuva	-	1	-	-	-	**1**
Cost @ Rs 15		-	15	1	1	1	**18**

Flowers

The Proposal for establishment of cluster based Model floriculture center in Bhavnagar district is shown in table 5.3.13. The model floriculture centre is proposed in Palitana taluka and expenditure is Rs 25 lakh per centre. The total estimated expenditure for this purpose is Rs 25 lakhs for 12th five year plan in Bhavnagar district.

Table 5.3.13: Establishment of cluster based Model floriculture center (Rs. in lakhs)

Particulars	Taluka	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	Palitana taluka	-	-	1	-	-	**1**
Cost @ Rs 25		-	-	25	-	-	**25**

The Proposal for establishment of training centre for value addition in coconut byproduct for small scale unit in Bhavnagar district is shown in table 5.3.14. The total estimated expenditure for this purpose is Rs 33 lakhs for 12th five year plan in Bhavnagar district.

Table 5.3.14: Establishment of training centre for value addition in coconut/banana byproduct for small scale unit (Rs. in lakhs)

Particulars	Taluka	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of unit	Mahuva taluka	1	-	-	-	-	**1**
Cost @ Rs 25		25	2	2	2	2	**33**

Fruits

5.4 Animal Husbandry

The Animal husbandry Sector plays an important and vital role in GDP of Gujarat State, which is to the tune of nearly about 5.0%. This sector also contributes to product nutritive food, rich in animal protein, to the general public and good supplementary income to the economically weaker section of society like S.T., S.C., small farmers, marginal farmers and agricultural labours. In addition, it offers a good employment generation opportunity, if adopted on a large commercial basis.

Central to the challenge of ensuring improved livelihood and environmental sustainability is the ruminant livestock-particularly buffalo, cattle and goats- that are an integral part of the district's farming system. The expanding market with rise in demand for diverse animal products and easy access to marketing are added opportunities for further strengthening of this sector in the district along with the development of wide network of infrastructural and support services.

5.4.1: Dairy Development

Dairy is an essential component of the district. There is a long tradition of rearing dairy animals by the farmers in the district. Large numbers of landless families are also engaged in dairy animal rearing. There are 340000 numbers of cattle, 334000 numbers of buffaloes and 258000 numbers of sheep, 199000 no. of goat in the district as per latest livestock census (2007). The total annual milk production of Bhavnagar district was 386890 tonnes with 9th rank in the state which was 243390 tonnes during 2001-02 (*Bulletin* of *A.H.* and *Dairy Statistics* 2010-11.). The estimated average milk yield per day for indigenous cows, crossbred cows and indigenous buffalo is 3.084 kg, 6.08 kg and 3.219 kg per day respectively, The estimated total milk production per day of cow, buffalo, and goat is 1496400, 220900 and 16350 tonnes with total of 386890 tonnes with 1060 tonnes per day production *(28th survey report on estimates of major livestock products for the year 2010-2011, Gujarat state).*

The existing gap factors are to be addressed through a shift towards technology driven livestock production and management. Enhanced farmers' interest and thrust of animal husbandry and other government departments and agencies are required in increasing milk yield of the district. The stock/germplasm gap can be tackled through A.I. services and supply of known pedigree bulls. The macro and micro-nutrient deficiency in fodder/soil is also affecting the productivity of these animals which can be cured through good quality mineral/fodder supplement and green fodder and popularizing hay and silage making in the diet.

Table 5.4.1.1: Strategies for human resource development plan for Animal husbandry

Strategy for development	Training Need	Participants	Topic of training	No. of training	Institutions for training
To improve breeds of cows and buffaloes	Importance of improve breeds	Farmers	Importance of improve breeds	1	FTC, KVK, Bhavnagar
Popularization of milk cooperative society	Strengthening overall price of milk	Farmers	Strengthening overall price of milk	1	Do
Promoting animal health seasonal disease and management in animal	Management of animal seasonal disease	Farmers	Management of animal seasonal disease	1	Do
Nutritional management and increase in milk production	Nutritional management of milk production	Farmers	Nutritional management of milk production	1	Do

Table 5.4.1.2: Strategies; Thrust areas for extension & research needs and proposed activities of Animal Husbandry

(Amount: Rs. In Lakh)

Strategies proposed	Thrust areas for extension	Short-term research need	Activities Proposed		No. of units		Amount requireed
			Extension	Research	Extn.	Rate per item	
To improved breeds of cows and buffaloes	Creating awareness for regarding good breeds of animal	Available	Demonstration	-	25	0.04	1
			Training (D)	-	2	0.20	0.40
			Training (V)	-	2	0.10	0.20
			Leaflet	-		0.25	0
			Exposure visit	-	1	0.50	0.50
			IT	-	1	0.20	0.20
			Reward	-	2	0.20	0.40
			-	Field day	1	0.20	0.20
			-	Kisan Gosthi	1	0.15	0.15
			-	FS interaction	1	0.20	0.20
Popularization of milk cooperative society	Creating awareness for milk cooperative society	Available	Demonstration	-	5	0.04	0.20
			Training (D)	-	2	0.20	0.40
			Training (V)	-	2	0.10	0.10
			Leaflet	-		0.25	0
			Exposure visit	-	1	0.50	0.50
			IT	-	1	0.20	0.20
			Reward	-	1	0.20	0.20
			-	Field day	1	0.20	0.20
			-	Kisan Gosthi	1	0.15	0.15
			-	FS interaction	1	0.20	0.20
Promoting animal health seasonal diseases and management in animal	Creating awareness regarding the animal health care	Available	Demonstration	-	10	0.04	0.40
			Training (D)	-	1	0.20	0.20
			Training (V)	-	1	0.10	0.10
			Leaflet	-		0.25	0
			Exposure visit	-	1	0.50	0.50
			IT	-		0.20	0
			Reward	-	2	0.20	0.40
			-	Field day	1	0.20	0.20
			-	Kisan Gosthi		0.15	0
			-	FS interaction		0.20	0

Cont.

Strategies proposed	Thrust areas for extension	Short-term research need	Activities Proposed		No. of units		Amount required
			Extension	Research	Extn	Rate per item	
Nutritional management and increase in milk production	Creating awareness regarding of livestock health	Available	Demonstration	-	15	0.04	0.60
			Training (D)	-	2	0.20	0.40
			Training (V)	-	2	0.10	0.20
			Leaflet	-		0.25	0
			Exposure visit	-	1	0.50	0.50
			IT	-		0.20	0
			Reward	-	1	0.20	0.20
			-	Field day	1	0.20	0.20
			-	Kisan Gosthi	1	0.15	0.15
			-	FS interaction		0.20	0
Mobilization of farmers group	Creating awareness for establishing market linkage	Available	Demonstration	-	5	0.04	0.20
			Training (D)	-	1	0.20	0.20
			Training (V)	-	1	0.10	0.10
			Leaflet	-		0.25	0
			Exposure visit	-		0.50	0
			IT	-		0.20	0
			Reward	-	1	0.20	0.2
			-	Field day		0.20	0
			-	Kisan Gosthi		0.15	0
			-	FS interaction		0.20	0
			FIG (a)	-	10	0.05	0.50
			FIG (b) Seed Money	-	5	0.1	0.50
			Kisan mela	-	1	0.4	0.40
			Leaflet	-	1	2	2
			Refinement FLD	-	1	1	1
							14.55

Table 5.4.1.3: Baseline data in respect of intervention of Bhavnagar

Sr. No.	Sector	Base line data	Achievement by the end of project period	Intervention
1	Milk production	4 lit. per day in cow 6 lit. per day in buffalo	7 lit per day in cow 10 lit per day in buffalo	By creating awareness regarding A.I. for improving pure breed of Gir cow and Jafarabadi buffalo, Adoption of scientific cattle management. Adequate precautions for health care
2	Quality of forage and fodder production	No adequate attention has been given for adoption of new development forage variety	More area will be covered under newly developed varieties which are rich in nutrient ion	By creating awareness towards quality forage and fodder production

Source: SREP, Bhavnagar District, Year-2010

Table 5.4.1.4: Vision for Bhavnagar district

Sector	Base line (2010-11) (lit/Day)	Intervention	Projection (2016-17)
Poor milk production in cow /day	Av. 4.0 lit/day	i. Improving of breed of kankrej cow and mehsani buffalo through A.I. ii. Improve management practices by training and field visit iii. Creating/improving health facilities of cattle at village level iv. Improve conception rate of animals through training of farmers v. Increase the A.I. facilities	5.0 lit/day
Poor milk production in buffalo/day	Av. 8.0 lit/day		10.0 lit/day
Fluctuating prices farmer getting lower prices	Lower point	i. creating awareness of scientific management of milch animals with efficient cost ii. By formulating women interest crops (WIGS) for management of milk and milk products	Higher profit

5.4.2: Activities for development of Animal Husbandry in the district.

The objective of the project is to create awareness regarding scientific management of livestock for gaining maximum production with minimum inputs. The detail knowledge regarding housing, feeding and health management of livestock and first aid in animals will be explained to the farmers under training programme. Rs. 300 per trainee will be utilized, which may account for the literature, tea, breakfast, lunch, travelling expense for the trainee. The tentative project proposal is shown below in the table.

5.4.2.1: Fertility Improvement Programme

The main objective of this project is to change the fertility state of animals from infertile to fertile and brought to the normal reproductive state, which may lead to increase in milk production of district. It is necessary to organize a series of infertility camps at village level and treat such infertile animals. Simultaneously awareness program pertaining to animal reproduction should also be organized. This will increase awareness in milk producers about scientific rearing of dairy animals in the district.

5.4.2.2: Supplementation of Mineral Mixture to Milch Animals

Due to over exploitation, the soils have become deficient in nutrients. Deficiency of Ca, P and micro nutrients has severely affected the health, productive and breeding efficiency of dairy animals. Reproductive problems other deficiency syndromes have severely affected the breeding ability of dairy animals. Retarded calf growth and poor animal health are another severe threats associated with mineral deficiency. Encouraging results have been obtained by supplementing 40-50 grams of quality mineral mixture per day per lactating animal in the ration. Since, milk is one of the main constituents of human diet the deficiency of mineral in milk obtained by feeding deficient fodder has become a great concern to human health.

5.4.2.3: Rearing of female cattle/buffalo calf

Calf management plays an important role in the development of the dairy sector of the country. Young calves reared scientifically will help to improve the socio- economic status of farmers through better growth rate and they could become potential milk yielders in future. Calf care is not only essential to sustain the dairy industry but is also essential for the wake of preserving and maintaining our good quality germplasm. Important aspects in the calf rearing are the health management and proper nutrition to the calves. Adoption of scientific practices could effectively control calf mortality. Non adoption of proven practices could be due to lach of awareness.

The district has good amount of animal population but livestock holders in this area are not aware of scientific calf rearing. People don't rear the calf in proper scientific way. Hence, it is an urgent requirement for this area to learn the way of scientific dairying and calf rearing as a future herd. The future of any herd depends upon how the calves are raised. One has to raise one's own calves to make a good potential herd. So the calf rearing should be taken upon scientific lines and it should be achieved cost-effectively.

The following is the proposed project for calf rearing. One unit comprising of 10 female calves will be reared for three years and afterwards the matured heifers will be inseminated with proven bull semen and these pregnant animals will be sold by the farmer. In table 5.4.2.3(a) showing total expenditure on five calf rearing units, while, table 5.4.2.3(b) shows approximate calculation of expenditure per unit of 10 calves is given.

Table 5.4.2.1(a): Capacity building of livestock farmers

(Phy-No. of Training, Fin. – Rs in lakh)

Name of Technology	Year-wise financial requirement											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Quality improvement of feed	8	0.60	12	0.90	8	0.60	8	0.60	8	0.60	44	3.30
Enhance milk Production	8	0.60	8	0.60	12	0.90	8	0.60	8	0.60	44	3.30
Improve reproductive efficiency of dairy animal	12	0.90	8	0.60	8	0.60	8	0.60	8	0.60	44	3.30
Total		**2.10**		**2.10**		**2.10**		**1.80**		**1.80**		**9.90**

44 Training, No. of Trainees(25/training) and @ Rs.0.003 lakh/trainee/day, 100 farmers in each taluka for each technologies.

Table 5.4.2.1(b): Proposal for fertility improvement program

(Phy-No. of Camp*/Programs, Fin. – Rs in lakh)

Sr	Activity	Year-wise financial requirement											
		2012-13		2013-14		2014-15		2015-16		2016-17		Total	
		Phy	Fin	Phy	Fin.	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Fertility* camp	660	132	660	132	660	132	660	132	660	132	3300	660
2	Awareness Program	660	66	660	66	660	66	660	66	660	66	3300	330
3	Equipment		5.0		0.3		0.3		0.3		0.3		6.20
Total			**203**		**198.3**		**198.3**		**198.3**		**198.3**		**996.2**

(Rs. 0.20 lakh per camp) (Rs. 0.10 Lakh/ awareness program) *(2 camp/village/yr), 150 village/year.

Table 5.4.2.2: Mineral mixture (MM) feeding supplementation.

(Phy-No. of animals, Fin. – Rs in lakh)

Activity	Year-wise financial requirement											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin.
Supply of MM for feeding	11000	247.5	11000	247.5	11000	247.5	11000	247.5	11000	247.5	55000	**1237.5**

(@50g/day/animal for 300days) (@ Rs. 0.00150/Kg), 5000 animal in each taluka/year

Table 5.4.2.3(a): Proposal for female cattle/buffalo calf rearing unit

Activity	Year-wise financial requirement											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
No. of Female calf rearing unit	11	48.4	11	48.4	11	48.4	11	48.4	11	48.4	**55**	**242**

(20 female calf per unit), Expenditure (Rs. 4.4 Lakh) per unit, 100 animal in each taluka

Table 5.4.2.3(b): Details of expenditure per year (Rs. In Lakh) per female cattle/buffalo calf rearing unit

Year	Concentrate	Fodder	Mineral Mixture	Medicines	Housing	Total
First	1.4	0.3	0.2	0.1	1	3
Second	1.54	0.33	0.22	0.11	0	2.2
Third	1.694	0.363	0.242	0.121	0	2.42
Cumulative	4.634	0.989	0.662	0.331	1	7.616

(20 female calf per unit)

5.4.2.4 Supply of balanced Concentrate ration to Animals

Feeding cost accounts for more than 70% of total cost of milk production. The profitability of any milk production programme and health of animals depend upon the feeding management of animals. The problems associated with feeding are, under feeding, over feeding, imbalanced feeding and mineral deficiency. Young, heifers and non lactating animals are generally ignored and only Milch animals are properly looked after. Such practice is not desirable. The care ignored at young age and during dry period has worse effects on the milk production and health of the animals in subsequent lactations. Balanced feeding improves the body weight gain, reduces the age at first calving, overcomes the problems of mineral deficiency and helps in better milk production and body condition.

At present there is no direct source of procuring balanced animal feed within the district, hence, milk producer are forced to pay higher prices for animal feed which is not made for this district or of poor quality. Considering geography, rainfall and poor economic condition of milk producers the feed manufacturing unit is of primea need in the district. This project will full fill following objectives.

- To improve the animals productive efficiency by providing balanced concentrate ration.
- To ensure regular supply of economical balanced cattle feed at "No profit no loss" basis, throughout year.
- To improve the existing animal feeding practices in the district.
- To improve the general health of the animals by incorporating some of the important minerals, vitamins and medicines during preparation of balanced cattle feed.

- To bring out the awareness and perception about the use and benefits of cattle feed among the milk producers.
- To promote the cattle feed marketing at large scale to rural milk producers, so, they will gain more income through animal husbandry.

The project will be under the supervision of a committee including Technical persons from N.D.D.B., District Development Officer, Project Administrator from Taluka and District and representative from DRDA *etc.*

5.4.2.5: Providing Life Insurance to Livestock

Bhavnagar district possesses good amount of livestock owners which keep animals to uplift their economics. They take their animals for grazing during day time where animals have the risk of snake bite, food poisoning by eating poisoning plants or any other accidental risk on life. In addition to this there may occur death of animals due to life threatening diseases. Therefore, there is a need to protect the livestock farmers from vagaries of nature by insuring animals against death. Protecting livestock farmers from sudden death of dairy animals and sustaining their livelihood.

5.4.2.6: Supply of health packages for animals to landless farmers.

The main occupation of landless families of the area is rearing of livestock and labor work in others' farm field .With this they grow sufficient income for their family but can't manage to pay for feed and fodder of their animals. This turns in unproductive rearing of animals with no acceptable results, which ultimately discourage the animal keeper and slowly they go away from animal husbandry to other non-agricultural work as a livelihood tool for family. To overcome this problem of the poor landless livestock owners, they should be supplied with health packages and concentrated feed for their animals. With the help of this package livestock owner will have feed and fodder supplements, de wormer, ecto parasiticidal and liver corrector for sustainable livestock rearing. This project can be used as a non-refundable loan for the farmers which can be used by the farmers at any time throughout year under supervision of government veterinary officer.

5.4.2.7: Fodder production and preservation

Feed and fodder accounts for about 70% of the total cost of milk production. Profitability and viability of any dairy production programme depends on feed and fodder availability and feeding management of dairy animals. Feed and fodder availability is continuously decreasing for the livestock due to heavy demands for grain production and urbanization. The palatable fodder crops like maize and cowpea have almost become extinct from the scene in groundnut-wheat and cotton crop rotations in the area. Secondly irrigation facility is very limited in the area. Decrease area under fodder crops leading to poor availability of green fodder for dairy animals.To boost the animal husbandry, it is necessary that quality fodder be made available to animals. Bhavnagar has vast area of land under pasture and cultivable waste land. This land is can be used for growing HYV of sorghum or good quality fodder. The availability of good quality fodder will boost the milk production apart from improving general health of animal. The production of fodder will be encouraged in all the taluka.

Table 5.4.2.4: Proposal for feed factory plant 50MT per day

S.N	Description	Total (lakh)
A	Overall Civil construction expenditure	
1	Civil works & land development	62.00
2	Storage building facilities	83.00
3	Non- industrial buildings	44.40
4	Compound wall and other	9.20
5	Roads & pavements	21.00
6	Electrification	12.00
7	Water supply & drainage	12.00
8	Architect/ Engineer consultancy service	12.00
9	Civil contingency	10.00
Sub Total		**265.60**
B	Process and production equipment	
1	Raw materials and intake equipments	14.30
2	Grinding equipments	11.05
3	Batching and mixing	69.10
4	Molassing equipments	49.35
5	Pelleting equipments	31.30
6	Bagging equipments	23.35
7	Housing steel structure	97.00
8	Product piping and fitting	11.85
9	Driving equipments	29.00
Sub Total		**336.30**
C	Service equipments	
1	Steam generating system	32.00
2	Fuel handling system	18.30
3	Compress air handling system	3.00
4	Water handling system	3.00
5	Industrial electrical high tension	10.80
6	Industrial electrical low tension	23.90
7	Service equipment contingency	4.00
Sub total		**95.00**
D	Laboratory equipments	19.50
E	Workshop tools and equipments	3.00
F	Fire fighting system	3.30
G	Weighting equipments	10.30
H	Miscellaneous equipments	15.00
Total		**748.00**
I	Installation & commission of Process&production equipment (15 %	50.45
J	Technical service fee of Process and production equipment (5 %)	16.82
K	Contingency of Process and production equipment (15 %)	16.82
Grand Total		**832.09**

Table 5.4.2.5: Providing Life Insurance to animals.

(Phy-No. of animal, Fin. – Rs in lakh)

Activity	Year-wise financial requirement											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Life Insurance	1100	16.5	1100	16.5	1100	16.5	1100	16.5	1100	16.5	5500	82.5

Rs. 0.015 lakh/ animal/year, 100 animal in each taluka/year

Table 5.4.2.6: Proposal for Supply of health packages for animals to landless farmers.

(Phy-No. of animal, Fin. – Rs in lakh)

Activity	Year-wise financial requirement											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Health packages	2200	264	2200	264	2200	264	2200	264	2200	264	11000	1320

Rs. 0.12 lakh/ farmer/year, 200 animal in each taluka per year

Table 5.4.2.7(a): Popularizing of chaff cutters among farmers.

(Phy-No. of unit, Fin. – Rs in lakh)

Activity	Year-wise financial requirement											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
Popularizing of chaff cutters	44	8.8	44	8.8	44	8.8	44	8.8	44	8.8	220	44

Rs. 0.2 lakh/unit, 4 units in each taluka/year


Gir Cow


Cow Herd

Table 5.4.2.7(b): Fodder production and preservation

Taluka	No. of farmer covered/Year	Year-wise financial requirement (Rs. In lakh)					
		2012-13	2013-14	2014-15	2015-16	2016-17	Total
Bhavnagar	500	5	5	5	5	5	25
Botad	500	5	5	5	5	5	25
Gadhada	500	5	5	5	5	5	25
Gariyadhar	500	5	5	5	5	5	25
Ghogha	500	5	5	5	5	5	25
Mahuva	500	5	5	5	5	5	25
Palitana	500	5	5	5	5	5	25
Shihor	500	5	5	5	5	5	25
Talaja	500	5	5	5	5	5	25
Umrala	500	5	5	5	5	5	25
Vallbhipur	500	5	5	5	5	5	25
Total		**55**	**55**	**55**	**55**	**55**	**275**

1000 Rs./year/Farmer

5.4.2.8: Provision of Artificial Insemination

To produce genetically improve breed by Artificial insemination of Superior breed of Cattle / Buffaloes. Establishing new A.I. centers in Bhavnagar district will help Farmer to get A.I. facilities at door step level to produce a good quality Animal and generate self employment at Village level. At present, A.I. facilities available at total 108 places. Keeping in view the animal population, 10 A.I. centers have been proposed.

5.4.2.9: Supply of breeding bulls in villages

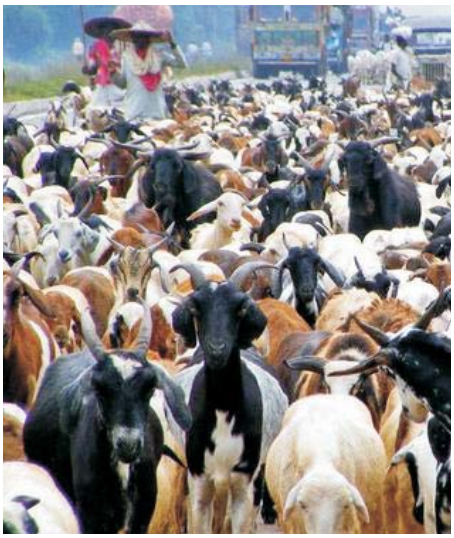
In the absence of A.I. facilities, the farmers are using nondescript animals for breeding their animals. This has resulted in decline in productivity of dairy animals. The success rate of A.I. in the buffaloes is very low and the reasons for this are manifolds. Therefore, it is proposed that bulls of proven breeding ability may be provided in each village with maintenance allowance. The maintenance cost will be given for the one year only, thereafter, the maintenance will be done from the fees procured by use of bulls.

5.4.2.10: Commercial Dairy Farming

The progressive and needy farmers from the district will be selected and will be granted with the fund to start the commercial dairy unit. One **commercial dairy** farm has been proposed in each block of the district. The supervision of the farm will be under government veterinary doctor and scientist from Krishi Vigyan Kendra of the district.

Table 5.4.2.8: Proposal for Provision of Artificial Insemination facilities

Taluka	No	Particular	2012-13			2013-14		2014-15		2015-16		2016-17	
			Unit	Unit Cost	Total Cost	Unit	cost	Unit	cost	Unit	cost	Unit	cost
Bhavnagar	2	No of A.1. Centre	2			2		2		2		2	
Mahuva	2	LN2 Container Require											
Talaja	2	55 liters for Transportation	1/3	0.3	0.1	1/3	0.1	1/3	0.1	1/3	0.1	1/3	0.1
Palitana	1	35 Liters	2	0.24	0.48	2	0.48	2	0.48	2	0.48	2	0.48
Botad	2	3 Liters	2	0.09	0.18	2	0.18	2	0.18	2	0.18	2	0.18
Shihor	1	A.I. Equipments with Furniture	2	0.3	0.3	2	0.3	2	0.3	2	0.3	2	0.3
		Vehicle for Ln2 Transportation	1	7	7	0	7	0	7	0	7	0	7
		Travis	1	0.06	0.06	2	0.06	2	0.06	2	0.06	2	0.06
		LN2 Gases											
		400 liters/year/Centre	800	12	0.096	800	0.096	800	0.096	800	0.096	800	0.096
		Training											
		A.I.Worker	2	0.15	0.30	2	0.30	2	0.30	2	0.30	2	0.3
		A.I.Officer	1	0.20	0.20	1	0.20	1	0.20	1	0.20	0	0
		Vehicle for A.1. officer	1	0.55	0.55			1	055				
		Semen Doses Required											
		500 Semen dose req./centre/year	1000	.00015	0.15	1000	.15	1000	.15	1000	.15	1000	.15
		Multi media with Computer	1	1.5	1.5	0	0	0	0	0	0	0	0
		Phase Contrast Microscope	1	0.60	0.60	0	0	0	0	0	0	0	0
		Total			**11.52**		**8.67**		**8.21**		**8.67**		**8.67**



Animals

Table 5.4.2.9: Supply of breeding bulls in villages.

(Phy-No. of bull, Fin. – Rs in lakh)

Activity	Year-wise financial requirement											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Supply of breeding bulls	110	66	110	66	110	66	110	66	110	66	550	330

Cost of two bulls @ Rs.0.70 lakh/village + Maintenance cost @ Rs. 0.25 lakh/ bull/Year, 10 bulls in each taluka/year

Table 5.4.2.10: Commercial dairy farming each in Taluka

(Phy-No. of farm, Fin. – Rs in lakh)

Description	Year-wise financial requirement											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Commercial dairy farms	11	55	11	55	11	55	11	55	11	55	55	275

Rs. 5 lakh/unit cost, one unit in each taluka/year

5.4.2.11: Sheep and Goat Development

Sheep and goat have an important role in the sustenance and livelihood security of farmers and land less rural. The rearing of these animals is having potential for poverty alleviation with low risk. With the availability of open pastures in the district, sheep and goat rearing is feasible in a big way. There are eight sheep and goat extension service centers. However, promoting small units as subsidiary to the agriculture by land less labours and those traditionally engaged in such activities is quite feasible. The strains of goat and sheep with semi-intensive feeding system, parasitic control measures and promotion of good management practices can ensure healthy economic return to the farmer.

This will be low cost, no risk moderately income generating activity with nutritional security for the family. A unit of five sheep/goat one male and four female animals costing approx. Rs. 15000/- can be given to each farmer.

5.4.2.12: Poultry Development

The estimated Eggs production for Bhavnagar district for year 2010-11 was 2021.60 Lakh Nos. with second rank in the state and fulfills 15.24% of total egg production in the state. At present, egg production is largely in the field of organized sector. Large no. of layer farms range from 5000 to 50,000 layers. These units consume high inputs and output.

A number of farmers especially the landless and other farmers are having a few birds as back yard poultry. This form of poultry farming needs institutional support for its success as the productivity is quite low in these cases

Poultry farming in general developed mostly in Mahuva, Talaja and Shihor district as they are well connected to the road and has huge local/city demand. Such development in other area is not picking up due to lakh of demand on account of social barriers and broiler farming in particular is not picking up on account of extreme climate of the district.

As regards health care, there is only one Govt. poultry unit at Shihor Taluka but poultry farming is concentrated in Mahuva, Talaja and Bhavnagar i.e. sea shore belt region. Hence 3 more poultry service centers have been proposed.

The farmers of Bhavnagar district may get an alternative occupation through low input bird project or backyard poultry farming. This will help the farmers in earning as well as a source of nutritive food. A unit of 25 poultry bird may be given to each farmer costing approx. Rs. 4000/- out of which 75% will be government subsidy. The total expenditure of the project is given in this plan.

Table 5.4.2.11: Goat and sheep rearing in district (Phy-No. of farmers, Fin. – Rs in lakh)

Description	Year-wise financial requirement											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Goat rearing	22	8.8	22	8.8	22	8.8	22	8.8	22	8.8	110	44
Sheep rearing	22	8.8	22	8.8	22	8.8	22	8.8	22	8.8	110	44

50 animal/Unit, (Rs. 0.40 lakh/Unit), 100 sheep and goat in each taluka/year

Table 5.4.2.12: Low input bird/Back yard poultry in district.

(Phy-No. of unit, Fin. – Rs in lakh)

Description	Year-wise financial requirement											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Poultry farms	100	10	100	10	100	10	150	15	150	15	600	60
Poultry Service center	1	10	1	10	1	10	-	-	-	-	3	30

50 birds/unit, (Rs. 0.002 lakh/bird), both unit are in only for Bhavnagar, Mahuva and Talaja
Rs. 0.3 lakh/poultry farm and Rs. 10 lakh/poultry service centre

5.5 Forestry:

Forestry in Gujarat constitutes 9.66 % as against 4.0% in Bhavnagar. Looking at the degradation of the forest, land resources in the district, there is a need for massive time bound programme in afforestation of wasteland. With more afforestation it will help in supplementing income generation activities with minor forest based collection.

There are 16 nurseries under Forest Department at block level with 0.5 ha. area. Total capacity is 15 lakh seedlings per annum. These plants are distributed to the village panchayat, schools and group of farmers under social forestry development activity. Technical guidance to farmers having land and irrigation facility is given by Social Forestry dept. DRDA, GSCLDC and other NGOs are also doing efforts for afforestration on private waste land while implementing watershed development programme.

Table 5.5.1: Bridging the gaps for realizing the Vision- Forestry

SN	Thrust Areas/Issues	Program	Activities	Concerned Agencies/ collaborators	Approach
1	Forestry	Tree cover improvement	Providing tree covers with high market price	DWMU, DFO	Providing tree covers

Table 5.5.2: Physical and financial achievement of social forestry division,Bhavnagar 2010-11

Sr. No.	Name of Taluka	Physical	Financial (Rs.)
1	Bhavnagar	37	515300
2	Botad	45	658011
3	Gadhada	45	676729
4	Gariyadhar	--	--
5	Ghogha	25	249950
6	Mahuva	67	1530488
7	Palitana	48	638373
8	Shihor	51	1203944
9	Talaja	62	1459286
10	Umrala	36	499415
11	Vallbhipur	31	366269
	Total	**447**	**7797765**

5.5.3: Activities for development of forestry sector

Table 5.5.3.1: Capacity building (CB) of forest staff & forest farmers

(Phy-No. of Training)

Description	Year-wise financial requirement (Rs in lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Training for forest staff	3	0.45	3	0.45	3	0.45	3	0.45	3	0.45	15	2.25
Training for forest farmers	3	0.15	3	0.15	3	0.15	3	0.15	3	0.15	15	0.75

Three training/year for forest staff and forest farmer, 2 person from each taluka/training/year
Cost/ training forest staff @ Rs.1000/trainee/day, No. of Trainees =15/training,
Cost/ training forest farmer @ Rs.200/trainee/day, No. of Trainees=25/training

Table 5.5.3.2: Farm/ social forestry and Supply of tree cover by social forestry/waste land Development

(Phy-No. / *no of tree in lakh)

Description	Year-wise financial requirement (Rs in lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Farm for social forestry	30	60	30	60	30	60	30	60	30	60	150	300
Supply of tree cover (Unit))	2	50	2	50	3	75	2	50	2	50	11	275

10 farm of social forestry in each Botad, Gadhada, Gariyadhar, Palitana, Shihor, Umrala, Vallabhipur and 20 farm of social forestry in each Bhavnagar, Mahuva, Talaja and Ghogha
Rs. 50 for Supply of one tree, 5 lakh tree/unit and Rs. 2 lakh for social forestry farm

The proposal for demonstrations on Agro forestry is shown in table 5.5.3.3 in the district for 12th five year plan. The table includes the number of demonstrations to be held and expenditure per demonstration. The number of demonstrations is equally proposed in each taluka and expenditure per demonstration is Rs 10000. The total estimated expenditure is Rs 55 lakhs for demonstrations on Agro forestry for the district for 12th five year plan.

Table 5.5.3.3: Proposal for demonstrations on Agro forestry

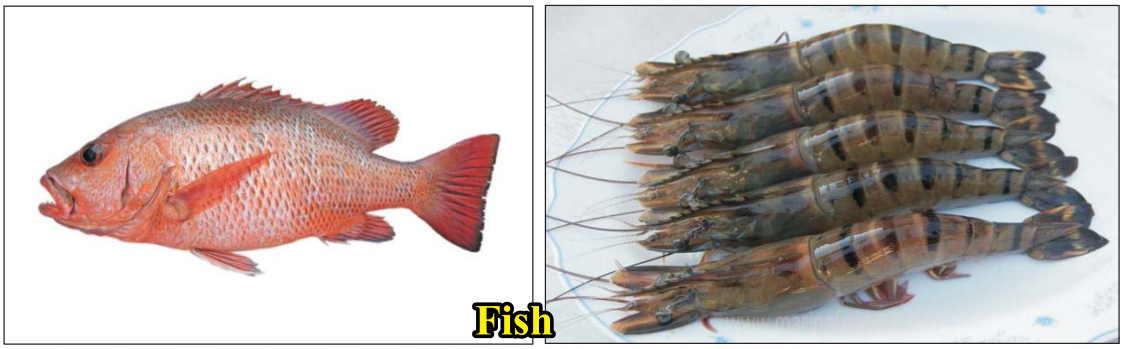
Description	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number	110	110	110	110	110	550
Cost/ demo @ Rs. 0.1 lakh **(Rs. in Lakh)**	**11**	**11**	**11**	**11**	**11**	**55**

5.6 Fisheries:

The district fisheries sector as sea shore area available in the district. There is a vast possibility of brackish water as well as freshwater aquaculture. Under inland fisheries, aquaculture is possible in ponds, reservoirs and rivers. Few coastal villages like Datari, has 16 no. brackish water culture pond whereas no of traditional pond for freshwater rearing. Few places of district has perennial reservoir pond in which culture activity can be taken up. There are around 38 fish landing centre, where fish is landed and it further preservation technique is applied. Total population of fishermen/ fisherwomen is around 1.83 lakh depending totally on fishing activity whereas their diet consist of fisheries products. During monsoon season the fishermen consume dry fish that is store and preserved during bulk capture. Bombay duck, Scinaeid, and crustacean like lobster, crab and shrimp is capture in bulk and is potential area for the same. Most of the pagadia fishermen, rear lobsters in rocky pit, that is prepare in coastal rocky shore.

Table 5.6.1: Bridging the gaps for realizing the Vision- Fisheries sector

No.	Thrust Areas / Issues	Program	Activities	Concerned Agencies/ collaborators	Approach
	Fisheries	Establishment of fisheries/ prawn production units at village level	Providing units (ponds) at cooperative base	Fisheries department	Providing units



Fish

5.6.2: Activities for development of fisheries sector

Table 5.6.2.1: Proposed physical and financial programmes of fisheries department (Rs. in lakh)

Name of activity	Unit/ Training cost (Rs)	Taluka	2012-13 (projected)		2013-14 (projected)		2014-15 (projected)		2015-16 (projected)		2016-17 (projected)		Total	
			Phy (no)	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Fish/Shrimp Culture Farm	8	Bhavnagar, Mahuva, Ghogha, Talaja	-	-	2	16	2	16	-	-	-	-	4	32
Fish Hatchery	11		-	-	1	11	1	11	1	11	1	11	4	44
Shrimp Hatchery	8		-	-	1	80	1	80	1	80	1	80	4	320
Fish processing (modern)	70	Mahuva	-	-	1	70	-	-	-	-	-	-	1	70
Training of Farmers	1	Bhavnagar, Mahuva	4	4	4	4	4	4	4	4	4	4	20	20
Fishing boats with gear	35	Bhavnagar-5, Mahuva-10, Ghogha-3, Talaja-2	4	140	4	140	4	140	4	140	4	140	20	700
Offshore culture	15	Bhavnagar-2, Mahuva-2	-	-	1	15	1	15	2	30			4	60
		Total		**144**		**336**		**266**		**265**		**235**		**1246**

50 Trainee/ Training, 4 Training/Year, Cost Rs.2000/Trainee

5.7 Employment generation activities:

Table 5.7.1: Bridging the gaps for realizing the Vision for employment generation activities.

No	Thrust Areas/ Issues	Program	Activities	Concerned Agencies/ collaborators	Approach
1.	Employment generation activities	Vermi-composting	Educating farmers through demonstration and training in cluster approaches and providing units	DHA/KVK/ DAO/DIC	Training and demonstrations, providing units
		Nursery	Educating farmers through demonstration and training and providing units	DHA/KVK/DAO/ DIC	Training and demonstrations, providing units
		Fruits and vegetable preservation	Educating rural youth by providing training	DAO/KVK/ DFO/ATMA/NGOs/FTC	Training

5.8 Vermi-composting

Animal and plant wastes are rich sources of all plant nutrients which are required for the improvement of soil health and sustainability of crops and animals production. Unfortunately recycling of these nutrients is not done in a justified way. Most of plant nutrients are either burnt or put at undesired places leading to soil and water pollution on one hand and loss of plant nutrients on other hand in terms of worth billion of rupees Vermi-composting is an excellent method for recycling the farm wastes into valuable plant nutrients.

Bhavnagar district has nearly 633407 no. of cow and buffalo apart from 243097 and 179743 of sheep and goat population, respectively. Assuming that one one cattle gives gober @ 2kg/day and 10 % of it is available for conversion into vermi compost, there is great potential is exist for production of vermi compost. To exploit this potential, planning has been given in this plan.

Table 5.8.1: Training needs for Vermi-composting

(Phy-No. of Training, Fin. – Rs in lakh)

Taluka	No of training	Year-wise financial requirement											
		2012-13		2013-14		2014-15		2015-16		2016-17		Total	
		Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
All talukas (50person per taluka)	2 per each taluka	22	1.1	22	1.1	22	1.1	22	1.1	22	1.1	110	5.5

Cost/ training @ Rs.0.002 lakh/trainee/day No. of Trainees=25/training

Table 5.8.2: Vermi-compost units for farmer group

Taluka	Farmer's group (5person / village)	No. of Unit/Year	Year-wise financial requirement(lakh)					
			2012-13	2013-14	2014-15	2015-16	2016-17	Total
Bhavnagar	280	56	11.2	11.2	11.2	11.2	11.2	**56**
Botad	260	52	10.4	10.4	10.4	10.4	10.4	**52**
Gadhada	380	76	15.2	15.2	15.2	15.2	15.2	**76**
Gariyadhar	255	51	10.2	10.2	10.2	10.2	10.2	**51**
Ghogha	210	42	8.4	8.4	8.4	8.4	8.4	**42**
Mahuva	655	131	26.2	26.2	26.2	26.2	26.2	**131**
Palitana	460	92	18.4	18.4	18.4	18.4	18.4	**92**
Shihor	405	81	16.2	16.2	16.2	16.2	16.2	**81**
Talaja	585	117	23.4	23.4	23.4	23.4	23.4	**117**
Umrala	215	43	8.6	8.6	8.6	8.6	8.6	**43**
Vallbhipur	265	53	10.6	10.6	10.6	10.6	10.6	**53**
Total	**3970**	**794**	**158.8**	**158.8**	**158.8**	**158.8**	**158.8**	**794**

Rs. 0.20 lakh / unit

5.9: Fruit and vegetable processing:

Bhavnagar district has total 787 number of industrial units and 248 small scale units spreaded over entire district. The maximum units are in Bhavnagar, Mahuva, Talaja, Shihor and Botad. The district has the advantage of having conducive agro-climatic conditions for Agro-Export Zone. Bhavnagar is one of the 6 districts that have been identified under the GOI's AEZ for promotion of exports of dehydrated onion. The major requirement for exports is quality, consistency and brand name establishment, as the state is known for high onion productivity and exports of dehydrated onions. There are about 200 units of onion dehydration and related activity in the Mahuva and Talaja of Bhavnagar district. An export of onion is basically after dehydration and caters to the demand of ethnic groups settled abroad- in USA, Europe and the Middle East. The Govt. has also launched a Central Scheme on High-tech Horticulture which, inter alia, provides grant of complete exemption of excise duty to food preparations based on fruits and vegetables. Establishment of small scale grading and processing units can help the people to get addition income from their produce. At present no fruit and vegetable processing unit exits in this district. Hence the same has been proposed in this plan.a

Table 5.9.1: Capacity building for small scale fruit and vegetable processing training

(Phy-No. of Training)

Description	Year-wise financial requirement (Rs in lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Fruit and Vegetable processing training	10	1.88	15	2.82	10	1.88	10	1.88	10	1.88	55	10.34

Cost -Rs 0.0075 lakh/ trainee for 5 day, No of training-10 having 25 participant/training 125 trainees from each taluka

Table 5.9.2: Establishment of Small scale Fruit and vegetable processing units

(Phy in No)

Description	Year-wise financial requirement (Rs in lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Establishment of Fruit and vegetable processing units	2	20	3	30	2	20	2	20	2	20	11	110
Establishment of dehydrated onion	1	15	1	15	1	15	-				3	45

One unit of Fruit and vegetable processing units in all taluka and onion dehydration units are in Bhavnagar, Talaja and Mahuva

5.10: Organic farming

Globally, preference is given to organically grown crops, fruits and vegetables and their processed products. Hence organically grown produce along with contract farming forms essential components of the AEZ programme. The district has the advantage of having conductive agro-climatic conditions for organic farming. But unfortunately, presently no any area is under organic certificate.

Table 5.10.1: Finance required for area brought under organic farming in next 5 Years

(Phy. Area in Ha.)

Taluka	Year-wise Finance required for area brought under organic farming (Projected)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Bhavnagar	5	0.2	5	0.2	5	0.2	5	0.2	5	0.2	25	1
Botad	5	0.2	5	0.2	5	0.2	5	0.2	5	0.2	25	1
Gadhada	5	0.2	5	0.2	5	0.2	5	0.2	5	0.2	25	1
Gariyadhar	5	0.2	5	0.2	5	0.2	5	0.2	5	0.2	25	1
Ghogha	5	0.2	5	0.2	5	0.2	5	0.2	5	0.2	25	1
Mahuva	5	0.2	5	0.2	5	0.2	5	0.2	5	0.2	25	1
Palitana	5	0.2	5	0.2	5	0.2	5	0.2	5	0.2	25	1
Shihor	5	0.2	5	0.2	5	0.2	5	0.2	5	0.2	25	1
Talaja	5	0.2	5	0.2	5	0.2	5	0.2	5	0.2	25	1
Umarala	5	0.2	5	0.2	5	0.2	5	0.2	5	0.2	25	1
Vallabhipur	5	0.2	5	0.2	5	0.2	5	0.2	5	0.2	25	1
Total	**55**	**2.2**	**55**	**2.2**	**55**	**2.2**	**55**	**2.2**	**55**	**2.2**	**275**	**11**

Cost Rs. 0.04 lakh / ha.

5.11: Renewable Source of Energy and Waste Utilization:

In the present world, the burning issue is of saving man from a state of a hopeless dependence on fast-dying oil-based support, protecting the world from man-made tsunami of curses like increasing environmental pollution, global warming, melting snow caps and the resultant floods, rising sea levels, widening holes in the ozone layer, etc. and, in the final reckoning, saving life. In Bhavnagar district, there is scope for harnessing solar energy, wind energy, bio energy & bio-gas.

Bio gas is a useful non conventional energy source which provides fuel for cooking lighting purpose and organic manure to rural farming. There are 11 APMCs and 11 rural markets in the district where huge wastage of food and vegetable wastage is available for developing alternate source of energy like bio-gas & Waste Utilization units which provide fuel for cooking purpose and organic manure to rural households etc. There are total of 1313 biogas plants (as per GAIC,Bhavnagar-2012) exist under the district out of which 734 in Mahuva, 394 in Talaja, 218 in Gadhada, 173 in Bhavnagar, 139 in Gariyadhar and 73 in Palitana. This is less than 2 plants per village on average basis.

The proposed number of renewable energy units and waste utilization unit and its financial requirements are presented in Tab. 5.11.1 and 5.11.2

Table 5.11.1: Number of renewable energy units and financial requirements per year

(Phy – No. of units, Fin – Rs. in Lakh)

Taluka	Community biogas plant		Solar cooker		Solar Street light		Solar cum wind submersible pump		**Total Amount per year**
	No.	Amount Rs per year	No.	Amount Rs per year	No.	Amount Rs per year	No.	Amount Rs per year	
Bhavnagar	10	70.00	560	8.4	280	70	1	4.0	**152.4**
Botad	10	70.00	520	7.8	260	65	1	4.0	**146.8**
Gadhada	10	70.00	760	11.4	380	95	1	4.0	**180.4**
Gariyadhar	10	70.00	510	7.65	255	63.75	1	4.0	**145.4**
Ghogha	10	70.00	420	6.3	210	52.5	1	4.0	**132.8**
Mahuva	10	70.00	1310	19.65	655	163.75	1	4.0	**257.4**
Palitana	10	70.00	920	13.8	460	115	1	4.0	**202.8**
Shihor	10	70.00	810	12.15	405	101.25	1	4.0	**187.4**
Talaja	10	70.00	1170	17.55	585	146.25	1	4.0	**237.8**
Umarala	10	70.00	430	6.45	215	53.75	1	4.0	**134.2**
Vallabhipur	10	70.00	530	7.95	265	66.25	1	4.0	**148.2**
Total	**110**	**770**	**7940**	**119.1**	**3970**	**992.5**	**11**	**44**	**1881.6**

Table 5.11.2: Establishment Waste utilization and Solar Off-grid (Phy-No)

Description	**Year-wise financial requirement** (Rs in lakh)											
	2012-13		**2013-14**		**2014-15**		**2015-16**		**2016-17**		**Total**	
	Phy	**Fin**	**Phy**	**Fin**	**Phy**	**Fin**	**Phy**	**Fin**	**Phy**	**Fin**	**Phy**	**Fin**
Waste utilization	2	12	3	18	2	12	2	12	2	12	11	66
Solar Off-grid	2	10	2	10	2	10	2	10	3	15	11	55

One Waste utilization unit/Taluka and One solar off-grid unit/Taluka
Rs. 6 lakh/ Waste utilization unit, Rs. 2.5 lakh/ Solar Off-grid

CHAPTER VI

DISTRICT PLAN

6.1 Introduction

The proposed district plan includes agriculture, horticulture, forestry, animal husbandry and innovative as well as miscellaneous schemes as these are the major activities undertaken in the district Bhavnagar. The existing status of these sectors reported in detail in the preceding chapters with the proposed outlays for XII plan.

6.2 Growth drivers

The targets will achieved using different growth drivers in agriculture and allied Sectors as follows:

6.2.1 Agriculture

a) Crop diversification for more remunerative crops.
b) Development of High yielding varieties & Hybrids.
c) Developing short duration varieties suitable for intercropping.
d) Increase area under hybrids and improved varieties in crops.
e) Resource conservation technologies for sustaining and improving the productivity levels.
f) Mechanization for increasing water use efficiency.
g) Seed grading, treatment and enhancing seed replacement rate.
h) IPM, INM and IWM.
i) Demonstrations and capacity building of field functionaries and the farmers
j) Human resource development.
k) Improvement in farm mechanization.
l) Increase area under micro irrigation system.
m) Development and recharge of ground water resources and implementation of watershed management programme.
n) Establishment of storage structures and food processing unit.
o) Implementation of renewable energy programme.

6.2.2. Horticulture

a) Increasing area under fruits and vegetable crops.
b) Providing improved planting material of fruit crops.
c) IPM and INM
d) Encouraging income and employment generating vocations through agro based vocations *viz.* vermin composting and food preservation etc.
e) Demonstrations and trainings including farmers and field officials

6.2.3. Floriculture

a) Introduction of new Crops / Crops varieties.

6.2.4 Forestry:

a) Increase area under agro forestry.

b) Ensuring livelihood of rural people by collection, processing and marketing of minor forest products.

c) Demonstrations and trainings including farmers and field officials

6.2.5 Soil Health Card

a) Research on soils to make it suitable for growing quality crops.

b) Prevention of degradation of soil fertility & care of soil health.

c) Reclamation of problematic soils.

d) Proper facilities of Soil & Water testing laboratory (Micronutrients & Ground water quality) in the district.

e) Use of waste biomass available from livestock, Crop & Farm for maintaining residues to maintaining proper soil health.

f) Popularization of organic farming.

6.2.6 Animal Husbandry

a) Breed improvement through community bulls and A.I.

b) Mineral mixture feeding

c) Deworming of animals.

d) Fodder production and preservation

e) Balanced feeding

f) Demonstrations and capacity building of field functionary and farmers

6.2.7 Fishery:

a) Utilization of village/Panchayat pond

6.3 New Innovative Project Proposals

6.3.1 Background / Problem Focus

In Junagadh district, Agriculture, Horticulture, Animal Husbandry and Fisheries are the major enterprises practiced by the farming community. The major agricultural crops grown are groundnut, cotton, bajra, wheat, pulses and sugarcane. Due to monsoon failures, the agricultural activities in terms of return are reducing gradually, leading to low income of the farmers. To combat this and to make the farm activities sustainable, an innovative and integrated approach comprising of agriculture, agricultural engineering, horticulture, animal husbandry, fisheries and other allied activities is the need of the hour, which can improve the income of the farmers.

In this connection, the potentiality of Junagadh district could be explored and exploited to benefit the farming community. Special projects could be designed to optimally exploit the natural and human resources in order to generate more income and employment. Towards this direction, a few income generating but small enterprises have been proposed as discussed under:

The activities to be focused are:

- Formation of commodity interest groups.
- Training on grading, post harvest technologies, value addition and market intelligence.
- Establishment of rural godown with drying yards.
- Providing cold storage facility.
- Encouraging contract farming.
- Food park with basic infrastructure facilities.

i) Goal and objectives

- To generate additional income for farming community.
- To develop entrepreneurship among farmers.
- To generate employment opportunities
- To promote value addition to agricultural products.

ii) Project Strategy

- Formation of commodity groups.
- Training programme to create awareness about market intelligence among farmers.
- Encouraging contract farming in groundnut and value addition (setting up of cattle feed mixing unit).
- Training programme and exposure visit to farmers on grading and post harvest technology.
- Setting up of agro based industries with basic infrastructure facilities - Food park (Groundnut candy making, desiccated coconut production, packed tender coconut water production, coconut shell powder, spray dried coconut powder production).
- Providing storage facilities in rural area.

iii) Project Components

- Formation and strengthening of commodity based groups.
- Training to farmers on market intelligence.
- Facilitation to contact farming.
- Setting up of Mini cattle feed mixing unit maintained by Commodity group.
- Exposure visit on grading, post harvest technology and value addition.
- Establishment of Food Park with basic infrastructure facility.
- Establishment of rural godown with drying yards.
- Providing cold storage facilities.

6.3.2. Establishment of Central Laboratory

For finding a solution of any problem, sample diagnosis or testing in the laboratory, is of immense importance for quick, easy and reliable solution. Testing of Soil and water, seed germination, feed and fodder, fertilizer and disease/pest diagnosis are required for supplying quality inputs and solving problems related to agriculture and animal production. Therefore, a central laboratory along with tissue culture plants for fulfilling the need is proposed to established at Talaja (Onion-Garlic Research station) which is recently transferred from state govt. to J.A.U. for benefiting the farmers in solving their problems. Outsourcing help can be sought for fulfilling the objectives.

Table 6.3.2: Proposal for Establishment of Central Laboratory at Talaja Farm

(Phy in No.)

Description	Year-wise financial requirement (Rs in lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Soil and water testing laboratory	1	50		25	-	-	-	-	-	-	1	75
tissue culture laboratory	1	50		50							1	100

6.3.3 Weather Watch and Forecasting System

The farmers of the district are prone to vagaries of nature. The crop damage due to hailstorms, chilling temperature, high temperature, stormy winds has become a common feature in the recent past. The crop insurance schemes are unrealistic and compensation on damage is taxing on the state. To avoid the financial loss and decrease in production, there is a strong need for Weather Watch and Forecasting System, so that farmers can save their crops or minimize the loss by manipulating/modifying the farm operations as per need. This is became of prime important in this district because it has long sea cost where the chances of above natural calamities are higher. Further it will also help to the fisherman of the district. It is therefore proposed to establish a Weather Watch and Forecasting System at appropriate place of the district sea shore.

Table 6.3.3: Establishment of Weather Watch and Forecasting System at Bhavnagar

(Phy in No.)

Description	Year-wise financial requirement (Rs in lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Weather Watch and Forecasting System	-	-	1	100	-	-	-	-	-	-	1	100

6.3.4 Establishment of New KVK at Mahuva under JAU

KVK (Krishi Vigyan Kendra) has a significant role for development of agriculture and allied sector of the region. KVK is the most powerful tool for rural up-liftment and development of all the section of rural people.

In Bhavnagar district, presently only one KVK is working at Lok Bharti Sanosara in Shihor taluka. Bhavnagar has total eleven blocks and also the agro climatic situation is also different particularly at Sea cost covering Bhavnagar, Talaja, Mahuva and Ghogha region. For these blocks the regional need is far different as compared to the rest of the blocks. But looking to the feasibility, the present KVK at Sanosara is far away for the farmers of this coastal area. So there is need to establish one KVK at Agricultural Research station, JAU Mahuva, where vast area of Land is already available which can be used for KVK

Table 6.3.4: Establishment of KVK at Mahuva under JAU (Phy in No.)

Description	Year-wise financial requirement (Rs in lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
KVK	-	-	1	400	-	100	-	100	-	100	1	700

6.3.5 Agril Informatics and training halls at taluka level

Several projects are running simultaneously for the development of the people in the district. The remote area farmers could not easily approach KVK or head quarters of line departments for information or solving their problems. Further, inviting all the farmers at district headquarters or at KVK for conducting small trainings is neither desirable/convenient nor possible. Therefore, to train the farmers and officials of other departments, a training hall along with agro informatics service equipped with computer and e –connectivity and linking them with head quarters of line departments, KVK and the SAUs is proposed in this plan.

Table 6.3.5: Fund requirement for Establishment of Agril. informatics and training centers at taluka level. (Phy in No.)

Description	Year-wise financial requirement (Rs in lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Agril. informatics and training centers at taluka level.	2	50	2	50	3	75	2	50	2	50	11	**275**

6.4 Miscellaneous activities

6.4.1 Cultivation of vegetables through bower system

Bower system and Telephone system of vegetable cultivation gave support to the plant and hence there is higher yield and reduction of losses due to diseases along with improvement in uniformity and quality of produce which fetches higher market prices.

Table 6.4.1: Fund requirement for Establishment of Bower and Telephone system of vegetable Cultivation (Phy in No.)

Description	Year-wise financial requirement (Rs in lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Establishment of Bower system	11	11	11	11	11	11	11	11	11	11	55	**55**
Establishment of Telephone system	11	9.9	11	9.9	11	9.9	11	9.9	11	9.9	55	**49.5**
Total	22	20.9	22	20.9	22	20.9	22	20.9	22	20.9	110	**104.5**

One unit of each system/taluka/ year.

Unit cost of Bower system for cucurbitaceous crops

(Permanent structure, 1 acre)

Items	Cost	Description
Construction of structure	0.40	Cement pole, galvanized wire, and construction materials.
Cultivation practices	0.15	Seed cost, fertilizers, plant protection and other measures
Drip Irrigation	0.30	Head unit, main ,sub main and lateral lines etc.
Post harvest materials	0.10	Plastic carets, buckets, cutters etc.
Miscellaneous cost	0.05	
Total	1.00	

Unit cost of Telephone system for Indeterminate Tomato

(Temperory structure, 1 acre)

Items	Cost	Description
Construction of structure	0.25	Cement pole, galvanized wire and supports etc.
Cultivation practices	0.20	Seed, fertilizers, plant protection measures
Drip Irrigation	0.30	Head unit, main ,sub main and lateral lines etc.
Post harvest materials	0.10	Plastic carets, buckets, cutters etc.
Miscellaneous cost	0.05	
Total	0.90	

6.4.2 Use of plastic in Agriculture

Plastic can be used as mulch in vegetables and field crops. It check weed growth, conserve moisture, maintain soil temperature and improves yield.

Table 6.4.2: Fund requirement for Use of Plasticulture (Phy in No.)

Description	Year-wise financial requirement (Rs in lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Establishment of Plasticulture	55	41.25	55	41.25	55	41.25	55	41.25	55	41.25	275	**206.25**

Five units/taluka/year

Unit cost for Use of Plasticulture (1ha.)

Items	Cost	Description
Cultivation practices	0.20	Cultivation cost of 1 ha.
Mulch film	0.45	15 micron Black LLDPE
Miscellaneous	0.10	Other input if needed
Total	0.75	

* 60% area covered with film, 50 micron film of 1 kg @ Rs. 150, cover 20 sq. m

6.4.3. Coconut based mixed farming system

Coconut plantation (10 yrs old) spaced at 7 x 7 m will serve as main unit. The other subsidiary unit details are given bellow. Mixed farming reduces risk and gave income surety.

Table 6.4.3: Fund requirement for Coconut based mixed farming system (Phy in No.)

Description	Year-wise financial requirement (Rs in lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
Coconut based mixed farming system	30	60	30	60	30	60	30	60	30	60	150	**300**

Ten unit in Mahuva, Talaja and Ghogha taluka per year

Unit cost for Coconut based mixed farming system (1 ha.)

Items	No/ha	Cost
Coconut plantation	200- 1 ha.	0.00
Cow/Buffalo	1+1=2	0.65
Honey bee rearing unit	15 Box	0.225
Forage fodder crops (Seasonal/Perennial)	0.25+0.25 ha.	0.10
Coconut nursery	0.25 ha	0.175
Gobar gas	1 unit	0.30
Vermi compost	1 unit	0.10
Poultry Bird	50 No.	0.10
Intercrop	0.25 ha.	0.25
Miscellaneous items	As per need	0.10
Total		2.00

Honey bee rearing unit cost Rs. 1500/box.

6.4.4. Protected cultivation system

Table 6.4.4: Fund requirement for Protected Cultivation System for leafy vegetables and onion nursery (Phy in No.)

Description	Year-wise financial requirement (Rs in lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Net House	110	495	110	495	110	495	110	495	110	495	550	**2475**
Poly House	55	522.5	55	522.5	55	522.5	55	522.5	55	522.5	275	**2612.5**
Total	**165**	**1017.5**	**165**	**1017.5**	**165**	**1017.5**	**165**	**1017.5**	**165**	**1017.5**	**165**	**5087.5**

Net house ten per taluka per year, Poly house five per taluka per year.

Unit cost for Net house (1 acre) for Leafy vegetables and onion nursery

Items	Cost	Description
Construction structure	4.00	Framework using bamboo, eucalyptus , shed net etc
Cultivation practices	0.20	Seed, fertilizers, protection and other measures
Post harvest materials	0.10	Plastic carets, buckets, cutters etc.
Miscellaneous cost	0.20	Depending on crop selection
Total	4.50	

Unit cost for Poly House (1 acre) for Capsicum and Gerbera flowers

Items	Cost	Description
Construction structure	8.00	Frames, support and net
Cultivation practices	0.50	Seed, fertilizers, protection and other measures
Drip Irrigation	0.30	Head unit, main ,sub main and lateral lines etc.
Post harvest materials	0.20	Plastic carets, buckets, cutters etc.
Miscellaneous cost	0.50	Depending on crop selection
Total	9.50	

6.4.5 Kishan Mela

In Kishan Mela, the season based crop production technologies are demonstrated. The farmer visits the melas themselves and judge the performances of different technologies exhibited and then adopt it in their farming system. Provision of one Krishi mela per tuluka per year is proposed during *Rabi* or *Kharif* seasons in the district with a financial aid of Rs. 5,00,000/- per mela.

Table 6.4.5: Fund requirement for conducting Mela (Phy in No.)

Description	Year-wise financial requirement (Rs in lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Krishi Mela	2	10	3	15	2	10	2	10	2	10	11	55.0

6.4.6 Clinical Camps

Animal husbandry plays an important role in income and employment generation in the rural areas. There are several innovative technologies which can be useful to the farmers for improving the health and productivity of animals are demonstrated in clinical camps. Operating cost up on a diseased animal through surgical operations is a troublesome problem. The clinical camps provide an opportunity to the farmers for the same. Therefore, one clinical camp per taluka is proposed with a grant in aid of Rs. 50000/- per camp.

Table 6.4.6: Fund requirement for conducting Clinic Camps (Phy in No.)

Description	Year-wise financial requirement (Rs in lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Cattle mela / Clinical camp	2	1	2	1	3	1.5	2	1	2	1	11	5.5

6.4.7 Farmer Purashkar

Wise and innovative farmers spent a lot of time and money for creating new innovations in the agricultural production system. By adoption of these innovations, a large number of farmers are benefited. If such farmers are encouraged with little awards, the other farmers will also be motivated for new innovations. Therefore Provision of five awards per year for best agriculture, animal husbandry, horticulture, agro forestry farmers has been proposed in this plan.

Table 6.4.7: Fund requirement for giving award to progressive Farmers (Phy in No.)

Description	Year-wise financial requirement (Rs in lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Incentives to progressive farmers	5	1.25	5	1.25	5	1.25	5	1.25	5	1.25	25	6.25

6.4.8 Disease Diagnostic Kits

The field officers of animal husbandry departments have to attend the problems of animals at the doorsteps of farmers with some limitations. In the absence of these facilities, animals are not treated properly. In market disease diagnostic kits are available through which lot of help is available for proper diagnosis and treatment of animals. Therefore a budget provision of Rs. 30000 per year is required for equipping all the veterinary surgeons in the district in the 12th Five Year Plan.

Table 6.4.8: Fund requirement for Disease Diagnostic Kits (Phy in No.)

Description	Year-wise financial requirement (Rs in lakh)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Disease Diagnostic Kits	2	0.60	2	0.60	3	0.90	2	0.60	2	0.60	11	3.30

6.4.9 Education and Research Components:

6.4.9.1 Polytechnic in Agriculture:

The agriculture and animal husbandry are the main sources of live hood for the rural people of the district. Further there is no any agricultural college in the district. Keeping in view the importance of agriculture and allied sector during XII five year plan, there will a great boost to agriculture and animal husbandry in the district. Establishment of Agriculture polytechnic in Bhavnagar district will definitely speed up educational components on these aspects.

Table 6.4.9.1: Establishment of polytechnic college in Agriculture

Sr. No.	Name of Post	No. of Posts
		Requirement
1.	Asso. Res. Sci.	1
2.	Asstt. Res. Sci.	4
3.	Farm manager	1
4.	Office superintendent	1
5.	Agril assistant	2
6.	Jr. Clerk	2
7.	Computer operator	1
8.	Peon	2
	Driver	2
Total		**16**

Proposed site: Agriculture Research Station (Onion/Garlic) recently established at Talaja suits best for the same considering the need.

a. Land required : 20 ha

Proposed Budget (Rs. in Lakhs):

Sr. No.	Components	Year					Total
		I	II	III	IV	V	
A. Recurring Head							
1.	Pay and allowences	40	50	60	70	80	300
2.	Contingency (Routine office work)	10	10	15	15	15	**65**
Total A		**50**	**60**	**75**	**85**	**95**	**365**
B. Non Recurring Head							
3.	Equipments	50	50	50	--	--	150
Total B		**50**	**50**	**50**	**--**	**--**	**150**
C. Infrastructure Building and others							
4.	**Building and others**	**400**					**400**
Total A + B+C		**500**	**110**	**125**	**85**	**95**	**915**

6.4.9.2 New Research Station for Arid fruits at Shihor

In Bhavnagar district, Shihor and Bhavnagar blocks has large area under arid fruit like Lime, Guava and Pomegranate etc. These crops are dominant in this area because of soils of these region is suited to these crops and also the marketing facailities is also high. But in this area presently there is no any research station specific for this crop which further exploits its potentials in terms of production and value additions. Hence one research station for these crops is proposed at Shihor block.

Table 6.4.9.2: Establishment of New Research Station for Arid fruits at Shihor (RS. in Lakh)

Description	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Establishment of Research station	-	300	100	100	-	**500**

6.4.10 Agricultural Commodity Centre

Yield and Price forecasting decides crop to be grown and information regarding prices in the world market decides marketing of the produce. In Bhavnagar district, Cotton and Onion are the main crops which have huge international demand and exported in large quantities. If information of demand, price etc. for such exportable commodities are available, all the sections like farmers and industrialist could be benefited and more foreign exchange could be earn. Considering the need of information on day to day pricing, quality, quantity and other legal procedures needed for national and international trade, one Agriculture Commodity Centre is proposed in Bhavnagar district, at Mahuva which ultimately fulfills the need of the progressive farmers and industrialist for export oriented agricultural produce.

Table 6.4.10: Establishment of Agricultural Commodity Centre at Mahuva

(RS. in Lakh)

Description	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Agricultural Commodity Centre	-	400	100	-	-	**500**

6.4.11 Monitoring, Evaluation and Consolidated Budget Proposal

Both monitoring and evaluation are the keys to success for any developmental Programme. Continuous monitoring and evaluation are also required for further extension of the project. Therefore, it is suggested that year wise monitoring of progress may be made and evaluation of the goal achieved is done. Thus, an outlay of Rs. 8.25 lakh will be required for this task as per the details given below.

Table 6.4.11 Proposed Expenditure on Monitoring and Evaluation (Rs in lakh)

Description	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Expenditure on TA,DA, POL and hiring of vehicles and office expenses	1.65	1.65	1.65	1.65	1.65	8.25

(Rs 0.15 lakh/taluka)

Table 6.5.1: Consolidated Budget Proposal of the Bhavnagar District for 12th plan (Rs. in lakh)

	1	2	3	4	5	6
Budget proposal head wise	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**2016-17**	**Total**
(I) Agriculture						
Training Proposal for Agriculture Staff	137.5	5.5	5.5	5.5	5.5	**159.5**
Training Proposal for Farmers	66	66	66	66	66	**330**
Varietal Demonstration in Next Five Years	61	80	89.5	109	128	**467.5**
Demonstrations on Plant health management	30	32	31	36	36	**165**
Demonstrations on Soil health management	34.5	37.5	38	34	32	**176**
Demonstrations on IWM	32	32	38	42	34	**178**
Demonstrations on IPM	44	44	44	44	44	**220**
Demonstrations on INM	7.7	7.7	7.7	7.7	7.7	**38.5**
Seed production enhancement	12.32	12.32	12.32	12.32	12.32	**61.6**
Seed storage at Panchayat & taluka level	300	470	495	495	405	**2165**
soil and water testing laboratory and mobile plant health clinic	100	150	175	150	60	**635**
Proposal for farm mechanization	5621	5621	5621	5621	5621	**28105**
Number of processing units	10	20	20	30	35	**115**
Research on processing of food grains	150	60	60	60	60	**390**
Strengthening of APMC	54	119	121	44	44	**382**
Establishment of rural godowns	430	430	430	430	430	**2150**
Drip and Sprinkler irrigation plan	2021	2446	2949	3546	4255	**15217**
Protective (Community Tank) Irrigation Plan	550	550	660	825	1100	**3685**
Land development	610	610	610	610	610	**3050**
Water resources development	2662	2662	2662	2662	2662	**13310**
training centre for repair & maintenance of farm implement & machinery and irrigation equipment	600	100	100	100	100	**1000**
Total (I) Agriculture	**13533.02**	**13555.02**	**14235.02**	**14929.52**	**15747.52**	**72000.1**

Cont.

Budget proposal head wise	2012-13	2013-14	2014-15	2015-16	2016-17	Total
(II) Horticulture						
Training needs in Horticulture crops	27.72	27.72	27.72	27.72	27.72	**138.6**
Establishment of nurseries:	39	39	39	42	39	**198**
Establishment of net and poly houses	825	825	825	825	825	**4125**
High tech green houses including all components	50	50	50	50	75	**275**
Providing kits to small and medium farmers	10	12.5	12.5	10	10	**55**
Demonstrations on vegetables, fruits and spices for area expansion	12.32	12.32	12.32	12.32	12.32	**61.6**
Proposal for establishment of mango ripening chamber	0	150	150	150	0	**450**
High tech vegetable farming	1	1.25	1.25	1	1	**5.5**
Establishment of cold storage units	250	250	250	250	250	**1250**
Establishment of collection centers	6	9	6	6	6	**33**
Refrigerated vans	34	51	34	34	34	**187**
Training need of farmers for fruit crops	4.3	5.34	4.9	4.8	4.3	**23.65**
Proposal for establishment of Coconut processing unit	0	150	0	0	0	**150**
Establishment of pack house	0	3	3	3	3	**12**
Establishment of Sapota chips and banana wafer production units	0	25	25	0	0	**50**
Recycling of coconut waste through shredder and vermi-composting	0	15	1	1	1	**18**
Model floriculture centers cluster based	0	0	25	0	0	**25**
Establishment of training centre for value addition in coconut/banana byproduct for small scale unit	25	2	2	2	2	**33**
Total (II) Horticulture	**1284.34**	**1628.13**	**1468.69**	**1418.84**	**1290.34**	**7090.35**

Cont.

Budget proposal head wise	2012-13	2013-14	2014-15	2015-16	2016-17	Total
(III) Animal Husbandry						
capacity building of livestock farmers	2.10	2.10	2.10	1.80	1.80	**9.9**
fertility improvement programme	203	198.3	198.3	198.3	198.3	**996.2**
Supplement mineral mixture feeding	247.5	247.5	247.5	247.5	247.5	**1237.5**
Establishment of feed factory	832.09	0	0	0	0	**832.09**
Rearing unit of female cattle/buffalo calf	48.4	48.4	48.4	48.4	48.4	**242**
Providing Life Insurance to Livestock	16.5	16.5	16.5	16.5	16.5	**82.5**
Supply of animal health packages to landless farmers.	264	264	264	264	264	**1320**
Popularizing of chaff cutter	8.8	8.8	8.8	8.8	8.8	**44**
Fodder production and preservation	55	55	55	55	55	**275**
Provision of Artificial Insemination facilities	11.52	8.67	8.21	8.67	8.67	**45.74**
Proposal for Supply of breeding bulls in villages	66	66	66	66	66	**330**
commercial dairy farming in district	55	55	55	55	55	**275**
Goat rearing in district	8.8	8.8	8.8	8.8	8.8	**44**
Sheep rearing	8.8	8.8	8.8	8.8	8.8	**44**
poultry farm in district.	10	10	10	15	15	**60**
Establishment of poultry service center	10	10	10	0	0	**30**
Total (III) Animal Husbandry	**1838.51**	**998.87**	**998.41**	**1002.57**	**1002.57**	**5840.93**
(IV) Forestry						
Training for forest staff	0.45	0.45	0.45	0.45	0.45	**2.25**
Training for forest farmers	0.15	0.15	0.15	0.15	0.15	**0.75**
Farm/ social forestry	60	60	60	60	60	**300**
supply of tree cover improvement	50	50	75	50	50	**275**
Demonstrations on Agro forestry	11	11	11	11	11	**55**
Total (IV) Forestry	**121.6**	**121.6**	**146.6**	**121.6**	**121.6**	**633**

Cont.

Budget proposal head wise	2012-13	2013-14	2014-15	2015-16	2016-17	Total
(V) Fisheries						
Fish/Shrimp Culture Farm	0	16	16	0	0	**32**
Fish Hatchery	0	11	11	11	11	**44**
Shrimp Hatchery	0	80	80	80	80	**320**
Fish processing (modern)	0	70	0	0	0	**70**
Training of Farmers	4	4	4	4	4	**20**
Fishing boats with gear	140	140	140	140	140	**700**
Offshore culture	0	15	15	30	0	**60**
Total (V) Fisheries	**144**	**336**	**266**	**265**	**235**	**1246**
(VI) Employment generation activities						
Training needs for vermi-composting	1.1	1.1	1.1	1.1	1.1	**5.5**
Proposal for providing Vermi-compost units	158.8	158.8	158.8	158.8	158.8	**794**
small scale fruit and vegetable processing trainings	1.88	2.82	1.88	1.88	1.88	**10.34**
small scale fruit and vegetable processing units	20	30	20	20	20	**110**
dehydrated onion unit	15	15	15	0	0	**45**
Funds required for organic farming	2.2	2.2	2.2	2.2	2.2	**11**
Renewable energy units	1881.6	1881.6	1881.6	1881.6	1881.6	**9408**
Establishment of waste utilization unit	12	18	12	12	12	**66**
Establishment of solar off grid	10	10	10	10	15	**55**
Total (VI) Employment Generation Activities	**2102.58**	**2119.52**	**2102.58**	**2087.58**	**2092.58**	**10504.84**

Cont.

Budget proposal head wise	2012-13	2013-14	2014-15	2015-16	2016-17	Total
(VII) New Innovative projects						
Proposal for Establishment. of laboratory	50	25	0	0	0	**75**
Establishment of tissue culture laboratory:	50	50	0	0	0	**100**
Establishment of Weather Watch and Forecasting System	0	100	0	0	0	**100**
Establishment of KVK at Mahuva under JAU	0	400	100	100	100	**700**
Agril Informatics and training halls at taluka level	50	50	75	50	50	**275**
Establishment of Bower and Telephone system of vegetable Cultivation	20.9	20.9	20.9	20.9	20.9	**104.5**
Use of Plasticulture	41.25	41.25	41.25	41.25	41.25	**206.25**
Coconut based mixed farming system	60	60	60	60	60	**300**
Protected Cultivation System	1017.5	1017.5	1017.5	1017.5	1017.5	**5087.5**
Krushi Mela	10	15	10	10	10	**55**
Cattle mela / clinical camp	1	1	1.5	1	1	**5.5**
Incentive award to progressive farmers	1.25	1.25	1.25	1.25	1.25	**6.25**
Disease Diagnostic Kits	0.6	0.6	0.9	0.6	0.6	**3.3**
Polytechnic college in agriculture	500	110	125	85	95	**915**
New Research station at Shihor	0	300	100	100	0	**500**
Agricultural Commodity Centre	0	400	100	0	0	**500**
Expenditure on TA,DA, POL and hiring of vehicles and office expenses	1.65	1.65	1.65	1.65	1.65	**8.25**
(VII) Total New Innovative projects	**1804.15**	**2594.15**	**1654.95**	**1489.15**	**1399.15**	**8941.55**

Table 6.5.2: Sector wise budget Proposal of the Bhavnagar District for 12th plan

(Rs. in lakh)

Budget proposal head-wise	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Agriculture	**13533.02**	**13555.02**	**14235.02**	**14929.52**	**15747.52**	**72000.1**
Horticulture	1284.34	1628.13	1468.69	1418.84	1290.34	**7090.35**
Animal Husbandry	1838.51	998.87	998.41	1002.57	1002.57	**5840.93**
Forestry	121.6	121.6	146.6	121.6	121.6	**633.00**
Fisheries	144	336	266	265	235	**1246**
Employment Generation Activities	2102.58	2119.52	2102.58	2087.58	2092.58	**10504.84**
New Innovative Projects	**1804.15**	**2594.15**	**1654.95**	**1489.15**	**1399.15**	**8941.55**
Grand Total (Rs in Lakh)	**20828.2**	**21353.29**	**20872.25**	**21314.26**	**21888.76**	**106256.8**

ANNEXURE - I

તા.: ૨૭/૦૯/૨૦૧૨ ના રોજ માનનીય જિલ્લા વિકાસ અધિકારીશ્રીના અધ્યક્ષ સ્થાને ભાવનગર જિલ્લા પંચાયતના સભા હોલમાં ડીસ્ટ્રીક્ટ લેવલ પ્લાનીંગ કમીટીના (આરકેવીવાય) તમામ સભ્યો સાથેની કોમ્પ્રીહેન્સીવ ડીસ્ટ્રીક્ટ અગ્રીકલ્ચરલ પ્લાનની (સી-ડીએપી) સમીક્ષા તેમજ મંજૂરી માટેની કાર્યવાહીની નોંધ

સૌપ્રથમ ડૉ. પી.કે.કાપડીયા, સંશોધન વૈજ્ઞાનિક અને નોડલ ઓફિસર સી-ડીએપી, કૃષિ સંશોધન કેન્દ્ર,જૂનાગઢ કૃષિ યુનિવર્સીટી,મહુવા એ બેઠકમાં ઉપસ્થિત માનનીય જિલ્લા વિકાસ અધિકારીશ્રી તથા તમામ અધિકારીશ્રીઓને આવકારી બેઠકની કાર્યવાહી શરૂ કરી. ડૉ. પી.કે.કાપડીયાએ સૌપ્રથમ અધ્યક્ષશ્રી તથા જિલ્લા પ્લાનીંગ કમીટીના સભ્યશ્રીઓને સી-ડીએપી પ્લાનની પૂર્વભૂમિકાથી માહિતગાર કર્યા હતા. જેમાં ભારત સરકારશ્રીની સુચના અને માર્ગદર્શન મુજબ તથા રાષ્ટ્રીય યોજના કમિટીની ભલામણ મુજબ રાષ્ટ્રનો કૃષિ વિકાસદર ૧૨મી પંચવર્ષીય યોજના(૨૦૧૨-૧૩ થી ૨૦૧૬-૧૭) ૪ ટકા કે તેથી વધુ હાંસલ કરવા માટે કૃષિ ક્ષેત્રમાં પ્લાનીંગ તૈયાર કરવાની ખાસ જરૂર છે. જેમાં તાલુકા લેવલ, જિલ્લા લેવલ અને રાજ્ય લેવલનો કૃષિ પ્લાન તૈયાર કરવો.

જેના અનુસંધાને ગુજરાત રાજ્યના દરેક જિલ્લા અને તાલુકાનો કૃષિ પ્લાન બનાવવા માટે ગુજરાત સરકારે કૃષિ યુનિવર્સીટીને જવાંબદારી સોપેલ. જેકેમાં સૌરાષ્ટ્રના છ જિલ્લાનો સી-ડીએપી પ્લાન બનાવવા માટે જૂનાગઢ કૃષિ યુનિવર્સીટીને સોપવામાં આવેલ. જેના અનુસંધાને તૈયાર કરી સૌરાષ્ટ્રના છ જિલ્લાના સી-ડીએપી પ્લાન કૃષિ અને સહકાર વિભાગમાં તા. ૩૦/૦૮/૨૦૧૨ ના રોજ જૂનાગઢ કૃષિ યુનિવર્સીટી, જૂનાગઢના અધિકારીઓએ રજુ કરેલ. જેમાં ચર્ચાને અંતે નક્કી થયેલ મુજબ જે તે જિલ્લાનો સી-ડીએપી પ્લાન જીલ્લાની ડીસ્ટ્રીક્ટ પ્લાનીંગ કમીટી સમક્ષ આરકેવીવાય યોજનાના માર્ગદર્શન મુજબ પ્લાન રજુ કરીને મંજૂરી મેળવવી.

મીટીંગમાં અધ્યક્ષશ્રી તથા સર્વે સભ્યોશ્રી તરફથી સી-ડીએપી પ્લાન રજુ કરતા નીચેના સુચનો આવેલા છે. જે નીચે મુજબ છે.

૧) અધ્યક્ષશ્રીએ સુચન કરેલ ખેડૂતોની ઉત્પન કરેલ માલની પોષણક્ષમ કીમત મળે તે માટે સહકારી બેઈઝનું માળખું વિકસાવવાની ખાસ જરૂર છે. સહકારી બેઇઝ પર મુલ્યવર્ધન કરી દેશ તેમજ દેશની બહાર ઉત્પન પેદાશની નિકાસ થાય તે માટે પ્રયત્નો હાથ ધરવા.

૨) ભાવનગર જીલ્લાના દરિયાકાંઠાના તાલુકાના ભૂગર્ભજળ ખારા થતાં જય છે અને આગળ વધે છે તેને અટકાવવાના અસરકારક પગલા લેવા તેમજ ખારી જમીનને નવસાધ્ય કરી ખેતી નીચે લાવવી.

૩) ખેડૂતો તથા કૃષિ સાથે સંકળાયેલા અધિકારીઓને કૃષિમાં વપરાતી હાઈ ટેકનોલોજીથી માહિતગાર કરવા માટે અવારનવાર તાલુકા અને જિલ્લા લેવલે જે તે વિષયોના નિષ્ણાતો દ્વારા સેમિનાર, ટ્રેનીંગ વિગેરે ગોઠવવી તથા ખેડૂતોને નવી ટેકનોલોજી જોઈ શકે તે માટે રાજ્ય અને રાજ્ય બહારના પ્રવાસ ગોઠવવા.

ઉપરોક્ત દરેક મુદ્દા સી-ડીએપી પ્લાનમાં સમાવેશ થયેલ છે. પરંતુ આ મુદ્દા ઉપર વધુ ભારણ આપવું જેથી ખેડૂતો નફાકારક ખેતી કરી શકે અને તેમની નીપજનો મહ્તમ ફાયદો તેમને થાય. આ સુચન આવકાર્ય છે.

ચર્ચાને અંતે અધ્યક્ષશ્રી તથા સર્વે સભ્યોશ્રીએ રજુ કરેલ ભાવનગર જીલ્લાના સી-ડીએપી પ્લાનને આગળની કાર્યવાહી માટે મંજૂરી આપેલ.

મિટીંગના અંતમાં શ્રી આર.એલ.ચિત્રોડા, મદદનીશ સંશોધન વૈજ્ઞાનિક, કૃષિ સંશોધન કેન્દ્ર,જૂનાગઢ કૃષિ યુનિવર્સીટી,મહુવા એ માનનીય જિલ્લા વિકાસ અધિકારીશ્રી તથા તમામ અધિકારીનો અભાર માની બેઠક પૂર્ણ જાહેર કરી.

નોડલ વૈજ્ઞાનિક	સહ અધ્યક્ષ	અધ્યક્ષ
અને	અને	અને
સંશોધન વૈજ્ઞાનિક	જિલ્લા ખેતીવાડી અધિકારી	જિલ્લા વિકાસ અધિકારી
કૃષિ સંશોધન કેન્દ્ર	જિલ્લા પંચાયત	જિલ્લા પંચાયત
જૂનાગઢ કૃષિ યુનિવર્સીટી	ભાવનગર	ભાવનગર
મહુવા		

જા.નં.જુકૃયુ/સંવૈ/કુસંકે/ટેક-૩/[illegible]/૨૦૨૨
તા: ૨૭/૧૦/૨૨. મહુવા.

નકલ જય ભારત સાથ રવાના:-

૧) જિલ્લા વિકાસ અધિકારીશ્રી, ભાવનગર
૨) જિલ્લા ખેતીવાડી અધિકારી, ભાવનગર
૩) નાયબ બાગાયત નિયામક, ભાવનગર
૪) નાયબ ખેતી નિયામક(વિસ્તરણ), ભાવનગર
૫) બ્રાન્ચ મેનેજર, બીજ નીગમ. શિહોર
૬) પ્રોગ્રામ કોઓર્ડિનેટર, કૃષિ વિજ્ઞાન કેન્દ્ર. સણોસરા
૭) મદદનીશ ખેતિ નિયામક, ભાવનગર
૮) ડી.ડી.એમ., નાબાર્ડ, ભાવનગર
૯) મદદનીશ પશુ નિયામક, જીલ્લા પંચાયત, ભાવનગર
૧૦) જી.એલ.ડી.સી., ભાવનગર
૧૧) મદદનિશ મત્સ્યઉદ્યોગ નિયામક, ભાવનગર

સંશોધન વૈજ્ઞાનિક (બાગાયત)
કૃષિ સં[illegible])
જુનાગઢ કૃષિ યુનિવર્સિટી
મહુવા - ૩૬૪ ૨૯૦.

Agriculture Research Station (Fruit Crops)
Junagadh Agricultural University
Mahuva, Dist. Bhavnagar

Presentation of

Comprehensive District Agriculture Plan (C-DAP), Bhavnagar District

Place: Bhavnagar, Date: 27/09/12

Sr.	Name	Designation & Dept.	Sign
૧	શ્રી એમ. આર. સુથાર	જિ. વિ. અધિકારીશ્રી, ભાવનગર	[illegible]
૨	શ્રી [illegible]	ના. બા. નિ., ભાવનગર	[illegible]
૩	શ્રી ડી. [illegible]	જિલ્લા [illegible] અધિકારી, ભાવનગર	[illegible]
૪	શ્રી પી. કે. ઘેવરીયા	પ્રમુખ, શ્રી સરદાર પટેલ ઇન્સ્ટીટ્યુટ, ભાવનગર	P. [illegible]
૫	ડી. બી. કુવાડીયા	ઇન્ચાર્જ બ્રાન્ચ મેનેજર [illegible]	[illegible]
૬.	ડૉ. એન. બી. શુક્લ.	પ્રોગ્રામ કોઓર્ડિનેટર, કૃષિ વિજ્ઞાન કેન્દ્ર.	[illegible]
૭	એસ. કે. ચાવડા	મદદનીશ ખેતી નિયામક, ભાવનગર	[illegible]
૮	બાબુભાઈ વાઘાણી	[illegible]	[illegible]
૯	ડૉ. દિનેશ એચ. પટેલ	નાયબ ખેતી નિયામક (વિસ્તરણ)	[illegible]
10	A. M. Kemkar	DDM NABARD Bhavnagar	[illegible]
11	P. N. GOLAKIA.	Project Co-ordinator - JVTB.	[illegible]
12	M. S. Chaudhari	V.ATI Bhavnagar [illegible] coordinator	[illegible]
13	C. P. Talreja	WORKS MANAGER, MGNREGA, BVN	[illegible]
14	[illegible]	[illegible]	[illegible]
15	[illegible]	બાગાયત અધિકારી ભાવનગર	[illegible]
16	[illegible]	બાગાયત અધિકારી (ના. ક.) [illegible]	[illegible]
17	એન. એચ. [illegible]	બાગાયત [illegible], ભાવનગર	[illegible]
18.	જે. જે. પરમાર	બાગાયત અધિકારી, ભાવનગર	[illegible]
19.	ઈશા સ્વામી.	બાગાયત અધિકારી, ભાવનગર.	[illegible]
20.	[illegible] મોમીન	બાગાયત નિરીક્ષક, મહુવા	[illegible]

Agriculture Research Station (Fruit Crops)
Junagadh Agricultural University
Mahuva, Dist. Bhavnagar

Presentation of

Comprehensive District Agriculture Plan (C-DAP), Bhavnagar District

Place: Bhavnagar, Date: 27/09/12

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ANNEXURE - II

Preparation of Draft Action Plan and Discussion with Stakeholders in Taluka Meetings

Fig.I: Stack holders during C-Dap meeting Bhavnagar District, Bhavnagar and Botad

Fig.II: Stack holders during C-Dap meeting at Gadhada, Gariyadhar and Ghogha

Fig.III: Stack holders during C-Dap meeting at Mahuva, Palitana and Shihor

Fig.IV: Stack holders during C-Dap meeting at Talaja, Umarala and Vallabhipur