

**COMPREHENSIVE  
DISTRICT AGRICULTURE PLAN  
(C-DAP)  
DISTRICT JAMNAGAR**



सत्यमेव जयते

**Department of Agriculture & Co-operation  
Government of Gujarat  
Gandhinagar**



**COMPREHENSIVE  
DISTRICT AGRICULTURE PLAN  
JAMNAGAR DISTRICT**



**JUNAGADH AGRICULTURAL UNIVERSITY  
JUNAGADH-362 001**

**AUGUST, 2012**

## COMPREHENSIVE- DISTRICT AGRICULTURE PLAN JAMNAGAR DISTRICT

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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.

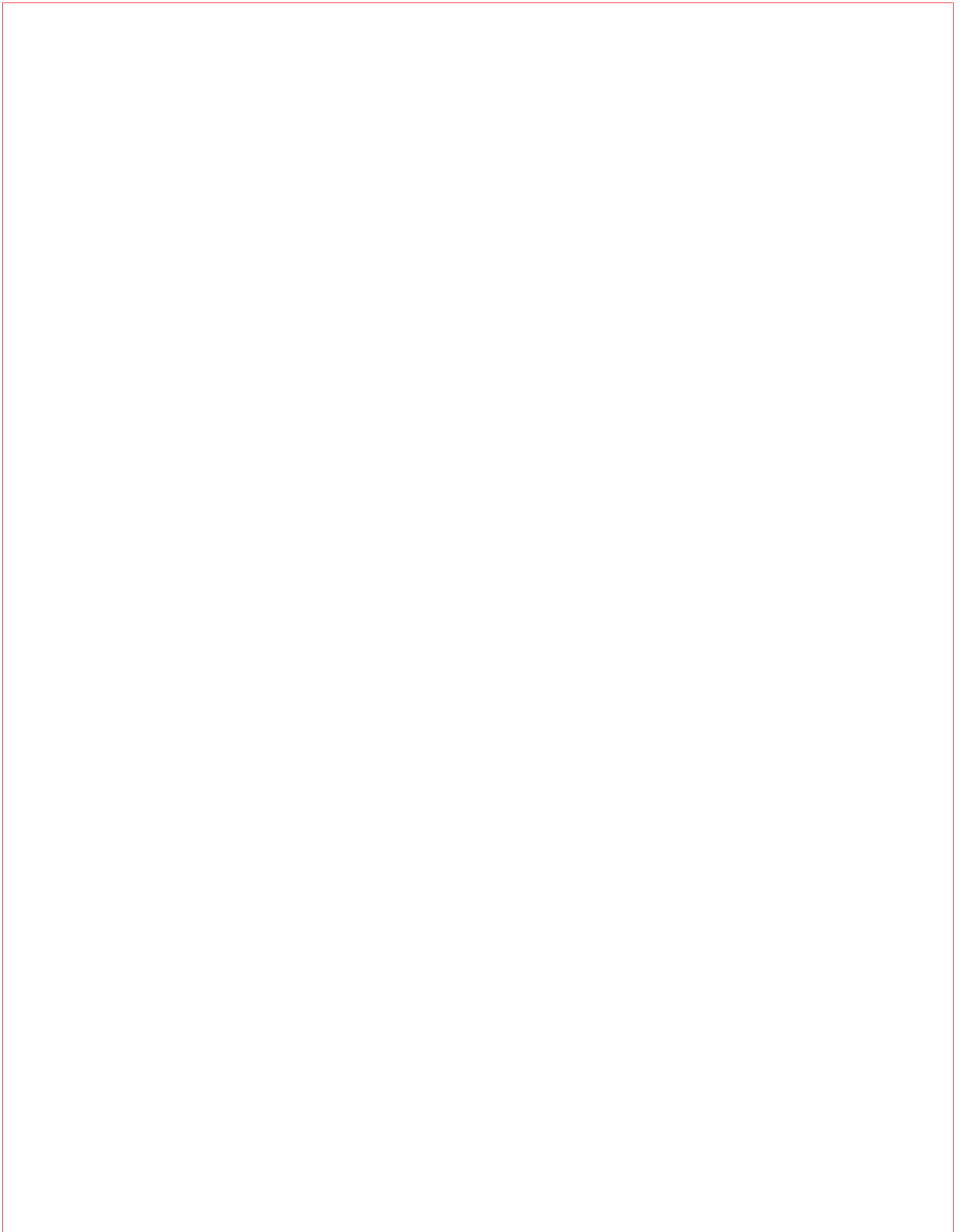


(Narendra Modi)

To,  
**Dr. C. J. Dangariya**, The Research Director,  
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Email : dr@jau.in

**Narendra Modi**

Chief Minister, Gujarat State





Dileep Sanghani



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

Date: 31 JUL 2012

### Message

In India, with the green revolution period from the mid-1960s to 1991, the agricultural sector grew at 32 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.

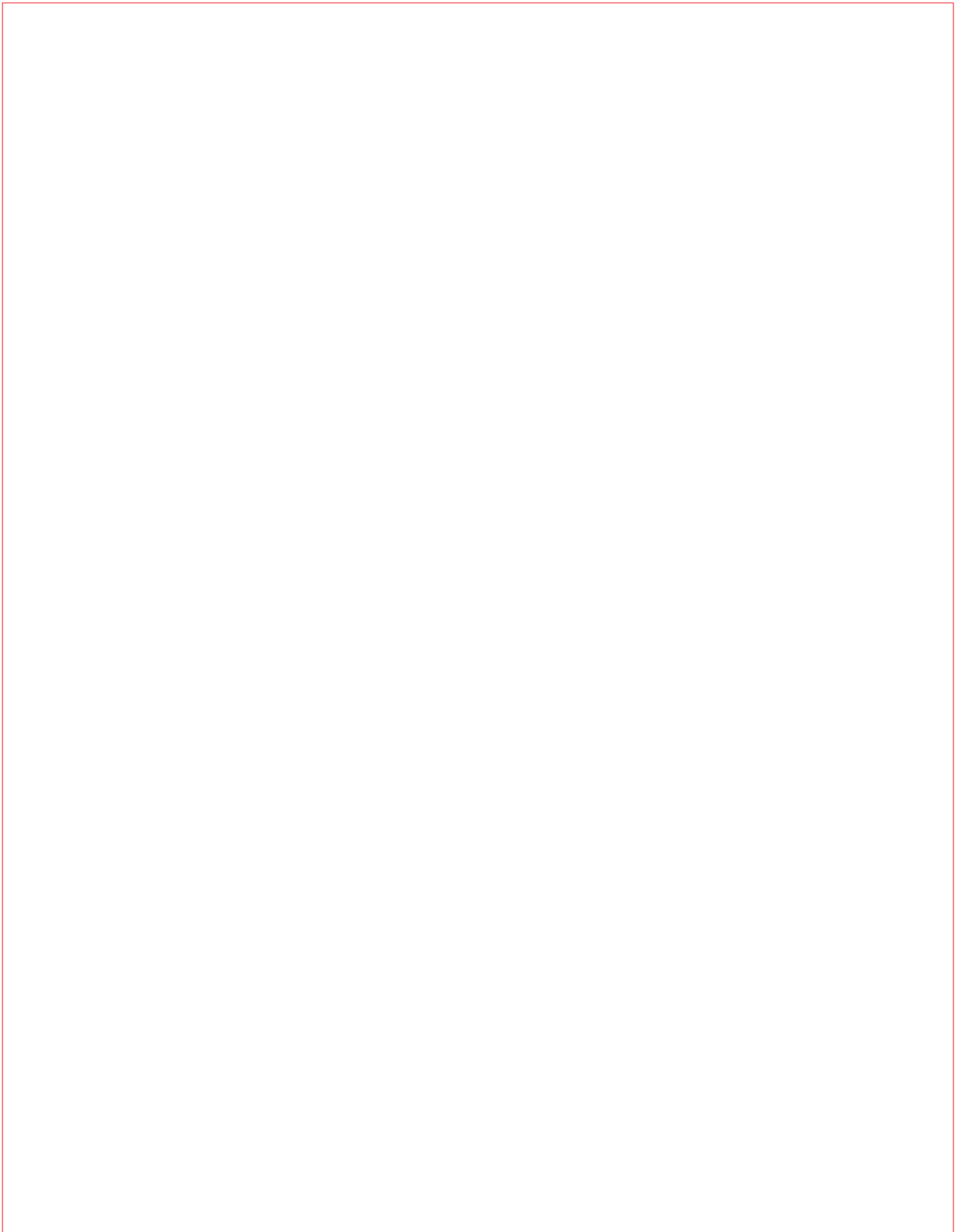
Government of Gujarat has launched various innovative schemes to accelerate the growth in the agriculture and allied sectors and to implement this, formulation of action plans by means of developing Comprehensive-District Agriculture Plans (C-DAP) have been undertaken. Junagadh Agricultural University, 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.

Office : 1, Sardar Patel Bhavan, 7th Floor, Sachivalaya, Gandhinagar-382 010.





**A. K. JOTI, IAS**  
Chief Secretary



सत्यमेव जयते

**GOVERNMENT OF GUJARAT**

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Dt.: 08/08/2012

### Message

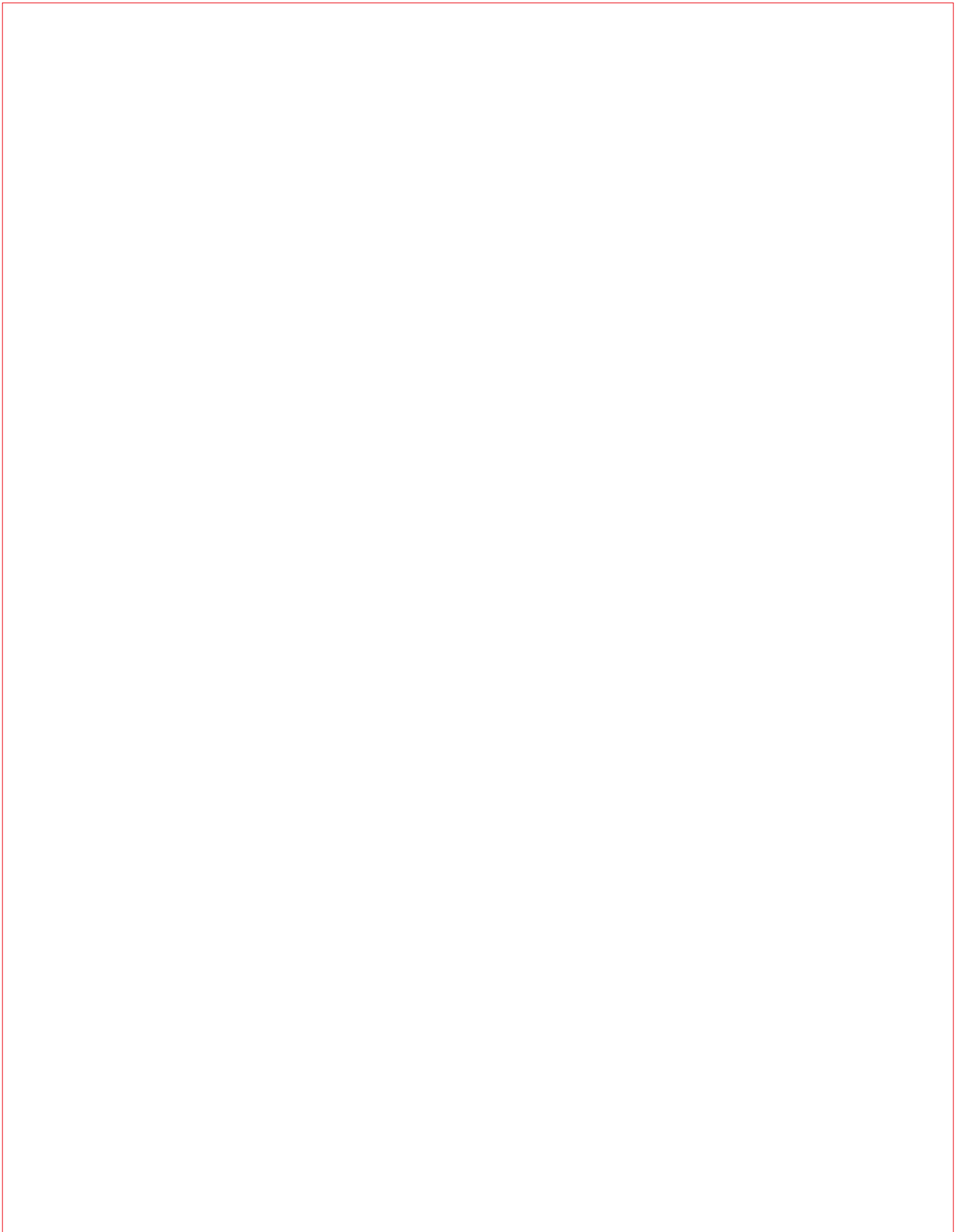
The Gujarat government envisages agricultural production through focused and innovative agricultural development programmes which resulted in extra ordinary average agricultural growth rate of above 10 per cent during last decade and presented a role model in the field of agricultural development in 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 12<sup>th</sup> 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)







**Dr. N. C. Patel**



Vice Chancellor  
Junagadh Agricultural University  
Junagadh

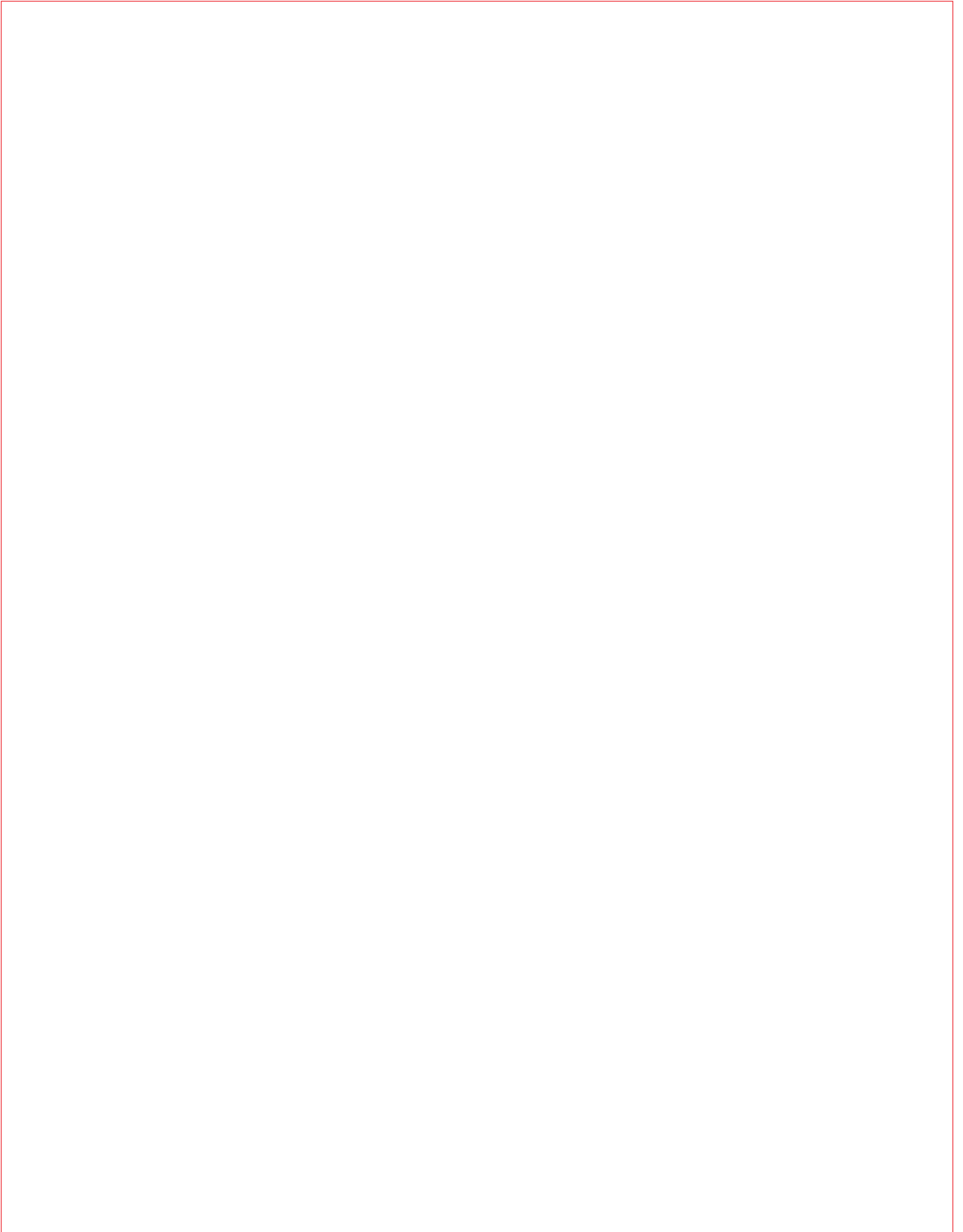
Date: August 20, 2012

## 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.

The Comprehensive-District Agriculture Plan for Jamnagar District is very well prepared. It is an outcome of fruitful discussions at different levels and valuable directives given by Shri R. K. Tripathi, Principal Secretary (Agriculture), Government of Gujarat. I extend my hearty congratulations to Dr. C. J. Dangaria, Director of Research and Dean, P.G. Studies, Dr. I. U. Dhruj, Dr. K.L. Raghvani, Dr. P. Mohnot, members of the committee and all the concerned scientists for their contribution in preparing the Comprehensive District Agriculture Plan (C-DAP) of Jamnagar district. This document will provide the guidelines to all the officials working for the development of agriculture and rural sector. With the proper execution of C-DAP in 12th five year plan, the Saurashtra region of Gujarat will get the benefit to increase its crop production, productivity and ultimately the income of farmers.

(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 identifies 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.

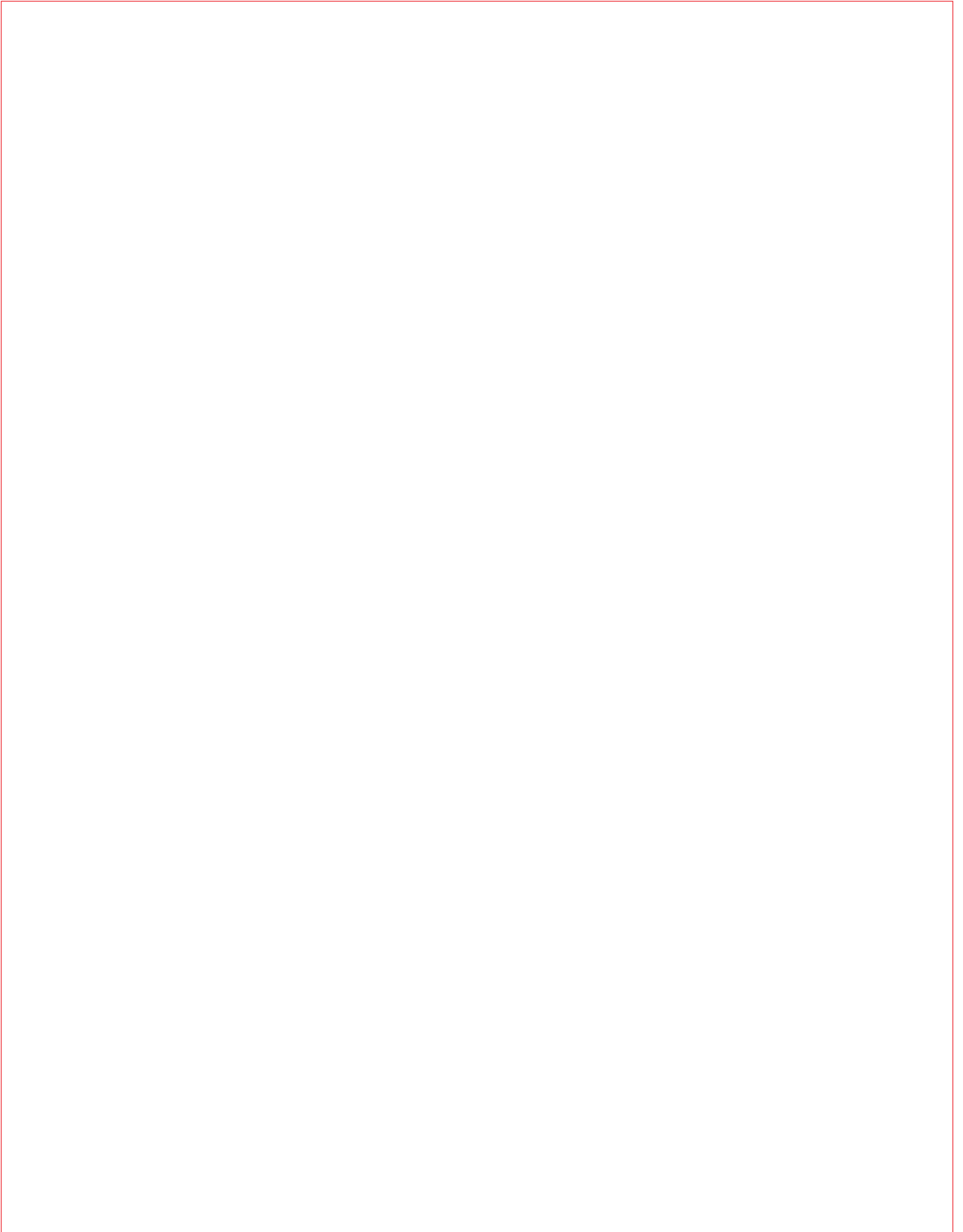
State level meeting of SAUs of Gujarat was held at AAU, Anand under the chairmanship of Shri R. K. Tripathi, IAS, Principal Secretary, Department of Agriculture & Co-operation, Government of Gujarat who provided valuable guidance and direction in bringing out this plan document. Subsequently several 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. K. L. Raghvani, Dr. I U. Dhruj, Dr. P. Mohnot, the members of committee and all the scientists of Junagadh Agricultural University, Junagadh who have contributed for preparing the Comprehensive District Agriculture Plan (C-DAP) of Jamnagar 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 CDAP 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.

(C. J. Dangaria)

Junagadh

July 31, 2012



## PREFACE


The Comprehensive District Agriculture Plan (C-DAP) of Jamnagar district is brought out for the developments in Agriculture and allied sectors viz. Horticulture, Agricultural Engineering, Animal husbandry, Fisheries and Agricultural marketing and Agricultural business based on the details provided by the scientists of Junagadh agricultural University, Junagadh and the line department officials of the Jamnagar 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 of Horticulture and Dr. A. J. Kachhiyapatel, Director 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 Shri Sandeep Kumar, District Collector, Jamnagar, who has been instrumental in providing the felt needs of the farmers and other stakeholders. The help and full cooperation rendered by the Shri Ajay Kumar, District Development Officer, Zilla Panchayat Jamnagar, Shri B. C. Patni, The Director of District Rural Development Agency, Jamnagar, the line department officials of the district is highly appreciable. Without their assistances, the formulation of the plan would not have materialised.

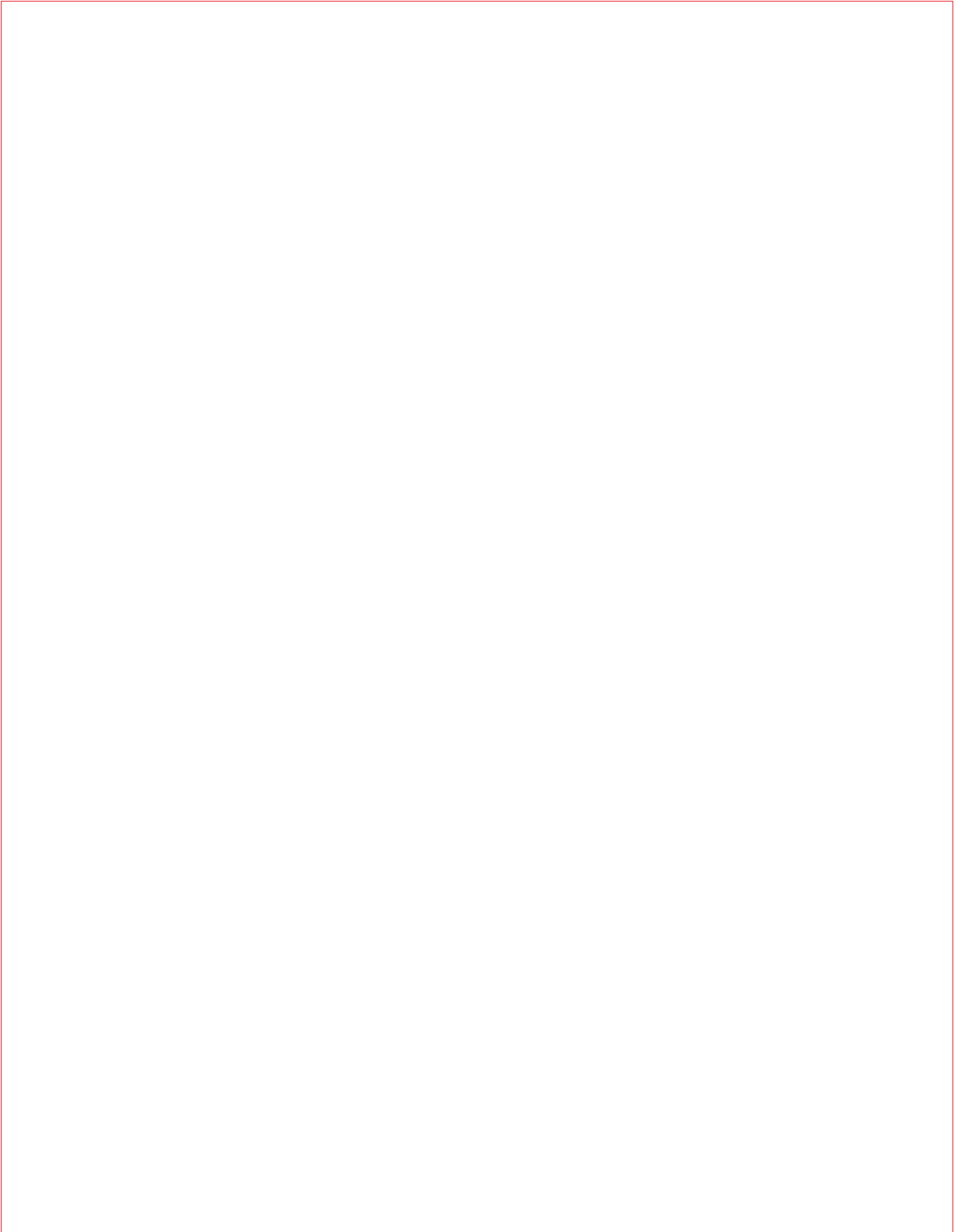
My sincere thanks to Dr. C. J. Dangaria, Director of Research and Dean, P.G. Studies, both ADRs Dr. I. U. Dhruj & Dr. P. Mohnot, Dr. V. V. Rajani and Dr. B. B. Ramani as well as all the professors and research scientists of Junagadh Agricultural University for their technical support, supply of needed inputs without which the time schedule in preparing the document could not have been adhered to.

Special thanks are due to Dr. K. D. Mungra and Shri Y. H. Ghelani, Co-Convenor, Shri L. K. Mungra, Member Secretary and all committee members of C-DAP district Jamnagar Dr. H.R. Khafi, Shri. S.D. Atara, Shri. B.D. Bunsu, Shri D.L. Kadavani, Shri. H.K. Kandoria, Dr. K.P. Baraiya, Shri. R.P. Juneja, Dr. K. K. Dhedhi, Smt. A.C. Mehta, Dr. B. K. Davda, Shri J. S. Sorathiya, Dr. N. B. Jadav, and all the staff members of Pearl millet Research Station and KVK, JAU, Jamnagar for their sustained support in the preparation and documentation of the taluka and district plans.



Date: August 23, 2012  
Place: Jamnagar

(K. L. Raghvani)  
Convener and Research Scientist (Pearl Millet)  
Pearl Millet Research Station  
Junagadh Agricultural University, Jamnagar-361 006



**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 saw 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 Jamnagar district the major areas of focus were integrated development of major food crops like groundnut, wheat, cotton, cereals, pulses, oilseeds and horticultural crops; Agriculture mechanization; Strengthening of Market Infrastructure and Marketing Development; Activities relating to enhancement of Horticultural Production and Popularization of Micro Irrigation Systems; and Animal Husbandry & Fisheries Development activities.

The responsibility of preparing C-DAP of the Jamnagar district was given to Pearl Millet Research Station, JAU, Jamnagar. The scientists of this centre, after receiving proper training from TSI held wide consultations with District/ Block/ Village Agriculture Planning Units of the district. Formal and informal meetings during March-2012 with Agriculture, line department staff and Panchayati Raj Institution's members were conducted at different levels. Data and related statistics were collected from different departments and other sources for preparation of C-DAP. One day orientation programme was also organized at centre from which the suggestions given by the officials of the line departments were incorporated in preparation of district C-DAP plan.

**District Agriculture Plan for Jamnagar District**

Jamnagar District is a district of India located on the southern coast of the Gulf of Kutch in the state of Gujarat in Saurashtra region. Its headquarters are located in the eponymous city of Jamnagar. The boundary of the Jamnagar district is comprised of the gulf and desert of Kutch at the north, desert of Madhi and the Arabian Sea at the west and the princely states of Rajkot, Dhrol, and Gondal at the east. There are ten talukas in the district viz; Bhanwad, Dhrol, Dwarka, Jam Jodhpur, Jamnagar, Jodia, Kalawad, Kalyanpur, Khambhaliya and Lalpur.



## C-DAP

The average rainfall of last ten years is 818 mm. In this District, total area is lakh ha among it the net sown area is 70 % ( lakh ha). The barren, uncultivable, degraded, forest and waste lands which are present in the district to the extent of 30 per cent (2.86 lakh ha) of the total geographical area have to be reclaimed so that the net sown area could be increased.

### Strategies to Achieve the Objectives of DAP for Jamnagar District

- Popularization of high yielding & improved cultivars by effective extension activities.
- Make door step availability of the quality seeds to the farmers by seed village concepts.
- Increase the inputs availability through strengthening/ establishing co-operative societies at village level.
- Improving soil health through the use of FYM, bio-compost, vermi-compost, green manuring etc.
- Amendment of saline/alkaline soils in coastal region of the district.
- Majors to be taken for water harvesting to increase the water table.
- Increase water use efficiency through micro irrigation systems.
- Establishment of small scale storage structure for farm produce & seeds at farmers level and in rural godowns at panchayat levels.
- To strengthen the marketing through establishing the collection centers in various clusters and linking them with APMC.
- Increase the area under vegetable, fruit and flower crops.
- Establishment of bull mother farm for breed improvement at taluka level.
- Establishment and strengthen the milk cooperative society at village level.
- For the better management of rural livestock, establish animal hostel at village level and veterinary clinic at cluster level.
- Popularization of renewable energy sources like bio gas, solar power generation unit, wind farm for its utilization in agriculture.
- Catering need of farmers related to improved technology through establishing agri-poly clinic at taluka level and connects it with KVKs and research centers of the district through e-connectivity.
- Generate the effective market accessing facilities at village by linking with major agriculture market through e-connectivity.
- Introduce the concept of agro forestry and inland fisheries for the better utilization of waste land of the district.
- Strengthening the efficient weather forecasting and early warning systems at taluka level.

### 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 seed production and seed replacement, seed treatment, soil health management, crop production technology, resource management, farm waste management, organic farming, vermi composting, Integrated Crop Management, farm mechanization, value addition and processing, marketing & cooperative society

were taken up. Under Part II Schemes, strengthening of soil & water testing Laboratories, establishment of polyclinic & capacity building centre, strengthening of weather forecasting system, development of model agricultural farm, establishment of an elite herd of cattle & buffalo, land development & soil reclamation practices, water conservation technology.

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 Jamnagar district.

Jamnagar district is a drought prone district with erratic and less than normal rainfall but during last five year more than average rainfall has been recorded in the district. Most of the rivers in this district are dry for years together, and the major irrigation source for agriculture crops is open wells & bore wells. This has resulted in over exploitation of ground water. The area under the waste and fallow lands in the district also was around one – fifth of the total geographical area.

There is an establishment of mega oil refineries and brass industries at district headquarter resulted in the large scale migration of farm labourers and in turn has resulted in a great demand for agricultural labourers.

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 Jamnagar district and the financial outlay is given in the table below:

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

<b>Budget proposal head-wise</b>	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>	<b>2015-16</b>	<b>2016-17</b>	<b>Total</b>
Agriculture	2228.90	1732.40	1781.90	1836.40	1889.90	9469.50
Horticulture	2244.65	2244.65	2244.65	2244.65	2244.65	11223.25
Animal Husbandry	1302.59	465.80	465.80	465.80	465.80	3290.99
Forestry	6.60	6.60	6.60	6.60	6.60	33.00
Fisheries	410.00	420.00	220.00	190.00	290.00	1530.00
Employment Generation Activities	16711.60	90.38	90.38	90.38	90.38	17073.10
New Innovative Projects	7907.00	6269.00	6386.00	6370.00	6682.00	33614.00
Strengthening of KVK	100.00	0.00	0.00	0.00	0.00	100.00
Miscellaneous Activities	9.25	9.25	9.25	9.25	9.25	46.25
Monitoring and Evaluation	2.00	2.00	2.00	2.00	2.00	10.00
<b>Grand Total (Rs in Lakh)</b>	<b>30922.60</b>	<b>11240.10</b>	<b>11206.60</b>	<b>11215.10</b>	<b>11680.60</b>	<b>76390.10</b>
Inflation rate (%)	0	3	3.25	3.5	3.75	0
Inflation amount	<b>0</b>	<b>337</b>	<b>364</b>	<b>393</b>	<b>438</b>	<b>0</b>
<b>GRAND TOTAL WITH INFLATION</b>	<b>30923.00</b>	<b>11577.00</b>	<b>11571.00</b>	<b>11608.00</b>	<b>12119.00</b>	<b>77922.00</b>

## C-DAP

### A brief account of SWOT of agricultural sector is discussed below:

Jamnagar District is well connected by road and rail routes to major towns of the states like Rajkot, Ahmedabad, Vadodara, Surat and Gandhinagar. There is a good network of the roads within the district and its towns and villages. An airport is also situated at district headquarter. A vast area (70% of geographical area) is under cultivation with a large number of crop species and horticultural crops also a variety of vegetables and horticultural crops are grown round the year. All the major crops have good productivity. The cultivable land under major kharif crops is about 61.23 % and district having only <1.93 per cent area as waste land. Average rainfall of the district is 818 mm during last ten years it was increased, so that ample opportunities for all crops. The district having deep sea and longest sea shore of the state which is more suitable for development of port and fishing. This also provides ample opportunities for generation of solar energy round the year. Another possibility is due to high & continuous wind velocity there is a great scope for electricity generation (average 10-15 km/h, which reach up to 30 km/h) through establishment of wind farms in coastal region. Introduction of GM cotton crops, district productivity and area increased up to a greatest level. Enriched diversity of plant genetics materials, diversified farming of agriculture, animal husbandry and horticulture which provide additional income to the stake holder are the strength of the district. Suitability of soil and environment resulted in highest productivity of groundnut. High calcareous soil is suitable for cotton, groundnut, bajra, cumin, onion and garlic cultivation. Some part of district is more popular for potato and chicory cultivation.

Besides these strength, large number of marginal and small land holding, limited irrigation facility, poor quality of irrigation water in coastal area, high pressure of sea water along the coastal belt, erratic rainfall, hilly and undulating land holdings in some part, lack of technological know-how among the farmers, agricultural labor crisis, lack of permanent pasture for animal grazing, poor soil fertility, improper management of organic matter and farm waste, poor cooperative structure, livestock with poor genetic makeup, lack of agriculture clinical facility at taluka level, poor farm mechanization, lack of agro processing unit and storage structure at village and taluka level, poor infrastructure for fisheries etc. are the major weaknesses existing in the district which hamper the growth & development in agriculture and allied sectors.

There are the ample opportunities for improvement and development of existing infrastructure and establishment of new infrastructure which boost the growth & development of agriculture and allied sectors in the district which includes use of unexplored biodiversity with respect to vegetables and fruit crops, greater scope for increasing cropping intensity by bringing more area under cultivation in Rabi and summer season, utilization of biomass available from livestock, crop and farm residues used for maintaining soil health, integrated approaches of NRM, INM and IPM, strengthening of cooperative structure, promotion of organic farming, brought area under medicinal & aromatic plants, enhanced water conservation practices, reclamation of problematic soil and development of infrastructure for inland fisheries.

General problems & threats to agriculture & allied sectors in the district are deforestation, indiscriminate & injudicious use of agrochemicals, natural calamity, soil erosion, scanty of water for

irrigation, deterioration in quality of irrigation water, increasing area under problematic soil, indiscriminate breeding practices, low/ shrinking pasture land, undulating lands, fragmented land holdings, soil erosion, high rainfall with uneven distribution, lack of secured irrigation facility throughout the year, weed problem, agricultural labour crisis, poor infrastructure and marketing facility etc. It is prime requirement to give attention on these issues.

Jamnagar city has historical and religious importance. A good breed of Gir cows is reared as draught and milking animal. A good breed of Jafrabadi Buffaloes is reared as milking animal. Being the coastal Dist. marine fish catching is practiced and fish is processed on large scale for export in coastal Talukas.

The industrial development opportunities are tremendous in the major towns of the district and in coastal regions. A temple of lord Shri Krishna at Dwarka, marine national park at Pirotan & Narara island are attracting large number of tourists, therefore there is a great opportunity of developing good tourist industry and making a tourist hub in the district.

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## Abbreviation Used

Abbreviation	Full Form
ACA	Additional Central Assistance
AES	Agro Ecological situation
AGMARK	Agricultural Produce (Grading and Marking)
AH	Animal Husbandry
AI	Artificial Insemination
APMC	Agriculture Produce Marketing Committee
ATMA	Agriculture Technology Management Agency
C-DAP	Comprehensive District Agriculture Plan
DAO	District Agricultural Officer
DAP	District Agriculture Plan
DDA	District Development Authority
DFO	District Forest Officer
DIC	Department of Industry and commerce
DP	District Panchayat
DRDA	District Rural Development Authority
DWDU	District Water Development Unit
EC	Electrical Conductivity
FM	Foot & Mouth
FMD	Foot & Mouth Disease
FAVC	First Aid Veterinary Centre
FLD	Front Line demonstration
FTC	Farmer Training Center
FYM	Farm Yard Manure
FYP	Five year Plan
GDP	Gross Domestic Product
GGRC	Gujarat Green Revolution Company
GLDC	Gujarat Land Development Corporation
GPs	Gram Panchayats
GSSC	Gujarat State Seed Certification
HRD	Human resource development
IDM	Integrated Disease Management
INM	Integrated Nutrient Management
IPM	Integrated Pest Management
IWM	Integrated Weed Management
JAU	Junagadh Agricultural University
KVIC	Khadi & Village Industries Commission
KVK	Krishi Vigyan Kendra
LN <sub>2</sub>	Liquid Nitrogen
MM	Mineral Mixture
MIS	Micro Irrigation System
MSME	Micro, Small and Medium Enterprise

## C-DAP

<b>Abbreviation</b>	<b>Full Form</b>
MT	Metric Tonnes
NABARD	National Bank for Agriculture & Rural Development
NADP	National Agriculture Development Programme
NDC	National Development Council
NGO	Non-Government Organization
NPK	Nitrogen, Phosphorus and Potash
NRM	Natural Resource Management
PLP	Potential Linked Credit Plan
PRA	Participatory Rural Appraisal
PRI	Panchayat Raj Institution
RCT	Resource Conservative Technology
RKVY	Rashtrita Krishi Vikas Yojna
RRB	Regional Rural Bank
SAP	State Agricultural Plan
SAUs	State Agricultural Universities
SREP	Strategic Research & Extension Plan
SPV	Solar Photo Voltaic pumps
SRR	Seed Replacement Ratio
SWOT	Strength Weakness Opportunity & Threat
TSI	Technical Support Institute
VD	Veterinary Dispensary
VH	Veterinary Hospital
WALMI	Water and Land Management Institute
WASMO	Water and Sanitation management Organisation

**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 12<sup>th</sup> five year plan must stand 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 backdrop 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 5<sup>th</sup> 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 constraints 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.

## C-DAP

### 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 2<sup>nd</sup> 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, mrigal 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 2<sup>nd</sup> 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 Mahotsav* for dissemination of agricultural and allied field technology to the farmers in Gujarat. In a month long *Krishi Mahotsav*, the government officials, agro-scientists and experts from SAUs are visiting all the villages of the state with informative *Krusha 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.



## C-DAP

### 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<sup>2</sup> 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.

## C-DAP

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.



Visit of Gir Cow unit at JAU, Jamangar by Director General, ICAR Dr. S. Ayyappan

## CHAPTER II

## GENERAL DESCRIPTION OF JAMNAGAR DISTRICT

## 2.1 Brief History of Jamnagar:

Jamnagar District is a district of India located on the southern coast of the Gulf of Kutch in the state of Gujarat in Saurashtra region. Its headquarters are located in the eponymous city of Jamnagar. The historians believe that present Jamnagar was founded in 1519 by Jam Rawalji. This region was called as “Halar” on the name of Halaji – son of “Gajan” the predecessor of the Jadeja dynasty, and since then, this region is called as Halar. Pearl Millet Research Station, Jamnagar is affiliated to Junagadh Agricultural University. One of the seven districts of Saurashtra, Jamnagar has a long tradition of handicrafts like *bandhani*, *sudi*, etc. The city, Jamnagar, from which the district takes its name is a historic town renowned for its brass industries, pearl fisheries, the only Ayurved University in Asia/India. and also for the Indian Cricket legend late H.H. Ranjit Sinhji Vibhaji Jadeja.

The boundary of the ancient Halar state is comprised of the gulf and desert of Kutch at the north, desert of Madhi and the Arabian Sea at the west and the princely states of Rajkot, Dhrol, and Gondal at the east.

## 2.2 Jamnagar district at a Glance:

Jamnagar district lies between 21° 47' and 22° 57' north latitude and 68° 57' and 70° 37' west longitude in the peninsular region in the North West, in the state of Gujarat, at 7.77 m AMSL (above mean sea level). It is one of the most important district of Saurashtra and one of the major industrial hub of the country. It is flanked by the Gulf of Kutch on the north, Rajkot district to its East, and Porbandar districts in the South.

The total geographical area of the district is 14125 km<sup>2</sup>. For administrative convenience, the district has been divided into 10 talukas and 667 gram panchayats with 702 villages. Agriculture is still the main source of livelihood for the rural people of the district.

The farming sector is undergoing dual stress, on one hand it has become energy intensive using more natural resources to produce more while on the other hand it has little scope to reach potential output due to urbanization and decreasing land holding per capita. Under the present circumstances diversification through various enterprises like horticulture, dairy, poultry, fisheries, food processing and preservation has become the alternative to the meet the future demands. The interventions in the form of human resources development through nurturing entrepreneurial and technical skills in rural youths for self employment particularly with SHG is the need of the hour.

Despite much progress in agricultural research and education, a lot needs to be done, which is reflected by considerable gap between the experimental and the actual farm yields. The Research stations of Universities have assumed a great significance thereby playing a crucial role in catering to the needs of local farming community. Research stations are acting as a strong motivating force to the farmers by way of providing quality seeds and the saplings along with the needed technological support for the crops of the region.

## C-DAP



Fig. 2.2.1a: Location map of Jamnagar district



Fig. 2.2.1b: Map of Jamnagar district

### 2.3 Demographic Profile:

The district has a population of 19,04,278 (as per 2001 census). The decadal growth of population is 21.79 %. The total number of household in the district is 104422. Out of the total population, 10,68,022 (56.09 %) reside in the rural area. The total male population is 9,81,320 (51.20 %) and female population is 9,22,958 (48.2%). The Jamnagar district having Schedule Tribe population (0.55 %) and Schedule Caste population 154819 (8.13 %) of the total district population. The population density of the district is 135 per sq. km. much below the state average of 258 per sq Km. Its population growth rate over the decade 2001-2011 was 13.38 %. Jamnagar has a sex ratio of 938 females for every 1000 males, and a literacy rate of 74.4 %.

**Table 2.3.1: Area, population density, habitat, inhabitat villages of Jamnagar district**

General				Population (Taluka wise data, 2001 census)						
Taluka	Villages		No. of revenue villages	Area (km <sup>2</sup> )	No. of G.	Male	Female	Total	SC	ST
	habited	Inhabited								
Jamnagar	99	12	99	1173.94	99	397689	363686	761375	59353	3546
Lalpur	75	0	72	1078.29	73	52076	49561	101637	10080	618
Jam Jodhpur	69	0	69	1091.32	65	59961	57519	117480	13025	1413
Bhanvad	80	1	80	731.95	53	55891	53654	109545	7752	2750
Kalyanpur	65	4	65	1412.22	62	82023	78515	160538	8087	343
Okha	41	36	41	716.67	40	75457	68812	144269	16789	718
Khambhaliya	86	3	86	1214.25	86	106837	101902	208739	10395	346
Jodia	52	1	51	868.66	52	46158	43420	89578	7117	151
Dhrol	41	0	41	569.89	40	37575	37368	74943	6904	247
Kalawad	98	0	98	1244.37	97	67653	68521	136174	15317	327
<b>Total</b>	<b>706</b>	<b>57</b>	<b>702</b>	<b>14125.00</b>	<b>667</b>	<b>981320</b>	<b>922958</b>	<b>1904278</b>	<b>154819</b>	<b>10459</b>

Source: District Statistics Dept., DPs., Jamnagar

**Table 2.3.2: Demographic changes in Jamnagar district from 2001 to 2011.**

Description	2001	2011
<b>Actual Population</b>	1,904,278	21,59,130
Male	9,81,320	11,14,360
Female	9,22,958	10,44,770
<b>Population Growth</b>	<b>21.79 %</b>	<b>13.38 %</b>
Area Sq. km.	14,125	14,125
<b>Density/sq.km</b>	<b>135</b>	<b>153</b>
Proportion to Gujarat Population	3.76 %	3.58 %
<b>Sex Ratio (Per 1000)</b>	<b>941</b>	<b>938</b>
Child Sex Ratio (0-6 Age)	898	898
<b>Average Literacy</b>	<b>66.48</b>	<b>74.40</b>
Male Literacy	76.25	82.35
Female Literacy	56.18	65.97
<b>Total Child Population (0-6 Age)</b>	<b>2,74,268</b>	<b>2,54,066</b>
Male Population (0-6 Age)	1,44,494	1,33,861
Female Population (0-6 Age)	1,29,774	1,20,205
<b>Literates</b>	<b>10,83,696</b>	<b>14,17,294</b>
Male Literates	6,38,101	8,07,397
Female Literates	4,45,595	6,09,897
<b>Child Proportion (0-6 Age)</b>	<b>14.40 %</b>	<b>11.77 %</b>
Boys Proportion (0-6 Age)	14.72 %	12.01%
Girls Proportion (0-6 Age)	14.06 %	11.51 %

Source: Census 2011 from Website

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### 2.4 Educational Facilities:

Education has been considered as central to the development of our society. Basic ability to read, write and count is an important goal of any national educational system. Though the nation has achieved in regards to elimination of hunger and poverty but not much has been achieved with regards to elimination of ignorance and inequality of opportunity. Ignorance owing to illiteracy and lack of access to information and knowledge continues to be pervasive and challenging. In the recent 83<sup>rd</sup> constitutional amendments establish elementary education as a fundamental right of all citizens in India.

The district has a moderate literacy rate where the male literacy is higher than female literacy. The literacy rate in the district is 56.90% of which male literacy is 65.0 % and female literacy is 48.3%.

**Table 2.4.1: Taluka wise educational facility (nos.)**

Taluka	Anganwadi	Primary school	Secondary school (Higher education)
Jamnagar	223	204	61
Lalpur	142	137	17
Jam Jodhpur	153	119	25
Bhanvad	138	123	17
Kalyanpur	185	220	30
Okha	148	91	8
Khambhaliya	203	210	23
Jodia	138	74	11
Dhrol	94	71	9
kalawad	183	119	21
<b>Total</b>	<b>1607</b>	<b>1368</b>	<b>222</b>

Source: District Education Department, District Panchayat, Jamnagar

### 2.5 Agricultural and allied sectors:

Agriculture sector is the main occupation in the district and alone occupy about 79% workers. The Taluka wise Land Utilisation Statistics is presented in Table 2.5.1; it shows that the gross cropped area is about 80% of the total geographical area of the district. The classification farmers according to their land holding in Jamnagar district indicated that 13.44 per cent of the farmers (30569 farmers) belong to marginal group having less than one ha. of land. The small farmers constituted about 36.04 percent (81982 farmers) having land holding between 1 to 2 ha. 50.52 per cent farmers (114941 farmers) belong to medium and large holding groups. The district has no farmers belongs to big farmer groups. The district having 49 per cent farmers belong to small and marginal groups. Number of operational holdings and area in different taluka of Jamnagar district is given in Table 2.5.2.

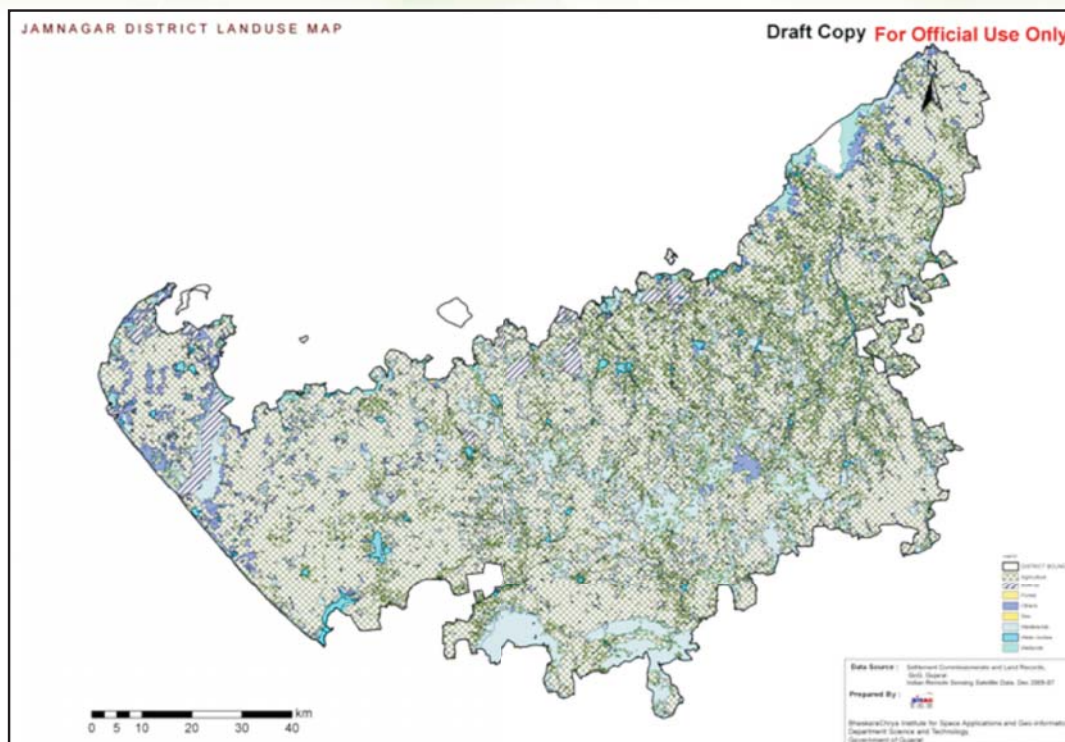


Fig. 2.5.1: Land use map of Jamnagar district

Table 2.5.1: Land use pattern in the district (Are in ha)

Taluka	Geographical area	Forest Area	Land under non-agril.	Cultivable waste	Permanent pastures	Current fallows	Other fallows	Net sown area	Gross cropped area	Cropping intensity (%)
Jamnagar	117394	1735	11132	10970	8247	2066	130	82500	104473	126.63
Lalpur	107736	5368	13552	7302	7731	2918	120	64650	70500	109.05
Jam	109132	8517	21221	4590	10436	727	0	62500	74640	119.42
Bhanvad	73195	7535	8087	2740	6112	642	0	44915	55311	123.15
Kalyanpur	141222	3685	28909	7755	9667	6997	0	81600	83662	102.53
Okha	71667	4243	2728	16366	3882	1682	880	36355	36855	101.38
Khambhaliya	121425	1897	25876	5337	8791	3184	50	75500	76850	101.79
Jodia	86866	8208	13801	3580	6348	869	100	53500	58597	109.53
Dhrol	56989	835	7772	3025	4606	244	0	40111	46099	114.93
Kalawad	124437	3371	22396	4605	10551	270	0	83123	107213	128.98
<b>Total</b>	<b>1010063</b>	<b>45397</b>	<b>155478</b>	<b>66275</b>	<b>76377</b>	<b>19607</b>	<b>1289</b>	<b>624764</b>	<b>714211</b>	<b>114.32</b>

Source : Statistics Department, DPs, Jamnagar



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**Table 2.5.2: Number of operational holdings and area in different taluka of Jamnagar district:**

Taluka	Marginal	Small	Large	S.C.	S.T.	others
Jamnagar	4766	11188	13630	520	0	29064
Lalpur	1973	7093	11075	454	2	19685
Jam Jodhpur	2460	7680	11179	910	5	20404
Bhanvad	2257	6427	7884	400	17	16151
Kalyanpur	4104	9215	16716	337	8	29690
Okha	608	2352	6984	1272	5	8667
Khambhaliya	4598	9792	13998	412	2	27974
Jodia	3194	8137	10778	509	0	21600
Dhrol	2559	7450	7183	460	0	16732
Kalawad	4050	12648	15514	917	0	31295
<b>Total</b>	<b>30569</b>	<b>81982</b>	<b>114941</b>	<b>6191</b>	<b>39</b>	<b>221262</b>

Source : Statistics Department, DPs, Jamnagar

### 2.5.1 Agriculture:

The Jamnagar is agriculture dominated district. About 80% of population is engaged in agriculture and allied activities. Out of total Geographical area of 1010063 lakh ha, the forest area is 45,397 ha, Non- agricultural use is 1,55,478 ha, cultivable waste is 66,275 ha, permanent pasture is 76,377 ha, current fallow is 19,607 ha, other fallow (barren) is 1289 ha, net sown area is 6,24,764 ha and the gross cropped area is 7,14,211 ha. The Taluka wise land holding of the district is shown in tab 2.5.3. Groundnut, cotton, wheat, bajra, sesame, pulses, castor and sorghum are the major field crops grown in the district. The major horticultural crops are sapota, ber and pomegranate. The major vegetables and spices crops grown are onion, garlic, brinjal, cabbage, cauliflower, tomato, chilly, radish, spinach, fenugreek, turmeric, coriander, cumin, ajwan etc. The major field crops cultivated in *Kharif* season are groundnut, cotton, pulses, bajra, castor and sesame. Jamnagar district is the major producer of groundnut in the state. Wheat, gram, pulses, garlic, onion and other vegetables are the important *Rabi* crops of the area, in summer the major crops grown are groundnut, pulses, pearl millet and sesame.

The district is poor in farm mechanization with little availability of farm machines. The farmers are still using bullock drawn traditional wooden implements and the hand tools used are also traditional. Recently the use of rotavators, combine harvester, low horse power tractor (mini tractors), seed drill and tractor drawn sprayer is increasing. The farmers have adopted micro irrigation system like drip irrigation, sprinkler irrigation etc. to save the scarce water resources. Still there is long gap in development of agricultural engineering in the district.

**Table 2.5.3: Number of operational holdings & area in different taluka of Jamnagar district:**

Taluka	Marginal Farmers		Small Farmers		Large Farmers		Total	
	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)	No.	Area (ha)
Bhanvad	2257	1591	6427	9631	7884	31959	16568	43181
Dhrol	2559	1728	7450	11232	7183	26129	17192	39089
Jamjodhpur	2460	1531	7680	11607	11179	46626	21319	59764
Jamnagar	4766	3194	11188	16737	13630	54595	29584	74526
Jodiya	3194	2164	8137	12142	10778	41972	22109	56278
Kalavad	4050	2546	12648	18963	15514	60231	32212	81740
Kalyanpur	4104	2724	9215	13947	16716	66403	30035	83074
Khambhalia	4598	2858	9792	14465	13998	59680	28388	77003
Lalpur	1973	1299	7093	10799	11075	45160	20141	57258
Dwarka	608	340	2352	3631	6984	30023	9944	33994

Less than 1 ha-marginal farmers, 1-2 ha- small farmers, and more than 2 ha-large farmers)

Source : Statistics Department, DPs, Jamnagar

### 2.5.2: Animal Husbandry and Fisheries:

The animal Husbandry programme in Jamnagar district performs various activities and schemes for the welfare of people. Gujarat Pattern, DRDA, District Panchayat, Dairy Sector are doing effective efforts to secure livelihood of the village farmers. Data on animal husbandry situations in the districts revealed that total live stock population in the district is 1025876 as per the 2011-12 census. Total population comprise of 34.1 % cow, 25.03 % buffalo, 20.3 % sheep, 16.8 % goat and 3.8 % poultry. Due to the maximum population of cow & buffalo (59.13 %) milk production is the largest occupation in the district. Population of the poultry observed only in Jamnagar taluka (3.8 %). Maximum population of cow is found in Kalyanpur taluka (61608) followed by Kalawad (49199) & Khambhalia taluka (46035) while, minimum population is in Jodia taluka (16432). Highest buffalo population was observed in Jamnagar taluka (42102) followed by Khambhalia taluka (36377) while, lowest observed in Dhrol taluka (13034). Among the different taluka of the district, highest livestock population inhabited in Jamnagar taluka (223162) followed by Kalyanpur (142578) and Khambhalia (139380) taluka while, lowest in Dhrol taluka (57249). The development of Livestock as an economic activity. It is important to focus on intensive management of dairy animals viz. cow (indigenous and crossbreed) and buffaloes in the district. Another area which needs attention is to increase the poultry sector on the large scale. Due to lack of cooperative sector in milk processing, marketing & distribution, the district has not reach to its potential.

The Jamnagar district has 355 km. long coast line adjoining to Arabian Sea and Gulf of Kutch. The coastal community earns their livelihood through fishery. The industries are providing some opportunities in service and wage. The coastal Jamnagar has many developed fishing centers like Salaya, Sikka, Dwarka, Jodia and Okha. About 41341 people from 8,000 families are involved in fishing and fish processing industries. Apart from this, large floating

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population from Junagadh, Porbandar and Amreli stay in these centers during fishing season. In local population fishing is restricted among Muslims and Kolis families. The production of fish is reducing because of construction of Bandhara, salt pans and mining activities in near shore area resulting in reduction of fish catching in near shore area. The fishermen have to go for deep sea fishing, which result in increasing dependency of the fishermen on money lenders. The information shared by fisheries department office indicates that there is a good potential for development of prawn cultivation in all talukas.

### 2.6 Natural Resources:

The district is medium in natural resources. The larger coastal area comprising the part of Jodia, Jamnagar, Khambhalia, Kalyanpur, Lalpur and Dwarka taluka of district and much potential for fisheries business. Fishing is an important component of rural economy in coastal area. The Okha is known for the hub-centre for the fisherman. The important rivers are Und, Morzar, Sinhan, Nagmati, Rangmati, Aji, Kankavati, Ruparel and others. In general, the water flows in most of the rivers during monsoon season only.

#### 2.6.1 Soil Type:

The land of Jamnagar district is plain and productive and are ideal for crops like groundnut, pearl millet, wheat, cotton, vegetables etc. There are mainly two classes of soil observed in the district viz; Medium to Shallow black soils and Coastal alluvial soils The characteristics of medium black to shallow black soils are with medium fertility and low water holding capacity. Coastal alluvial soils are alkaline and saline soil with low fertility with poor drainage which mainly observed in coastal region of the district. The soil fertility and micro nutrient status of different talukas are presented in Table 2.6.1 and 2.6.2

**Table 2.6.1: Soil fertility status of different talukas of Jamnagar district**

Taluka	No. of Soil Samples analyzed	PH	EC (dS/m)	Organic Carbon (%)
Jamnagar	175	8.0 to 8.5	0.7	22
Lalpur	165	7.6 to 8.0	0.7	22
Jam Jodhpur	180	7.6 to 8.0	0.6	22
Bhanvad	145	7.7 to 8.1	0.5	22
Kalyanpur	190	7.8 to 8.3	0.5	22
Okha	89	8.4 to 8.6	0.7	22
Khambhaliya	158	8.0 to 8.5	0.7	22
Jodia	79	8.0 to 8.5	0.7	22
Dhrol	98	7.5 to 8.0	0.5	22
Kalawad	189	7.5 to 7.9	0.6	22

Source : Soil Testing Laboratory, Department of Agriculture, Jamnagar

Continue...(Table 2.6.1)

Taluka	Available Nitrogen	Available Phosphorus	Available Potash
Jamnagar	Low	Low	Medium
Lalpur	Low	Low	Medium
Jam Jodhpur	Low	Low	Medium
Bhanvad	Low	Low	Medium
Kalyanpur	Low	Low	Medium
Okha	Low	Low	Medium
Khambhaliya	Low	Low	Medium
Jodia	Low	Low	Medium
Dhrol	Low	Low	Medium
Kalawad	Low	Low	Medium

Source : Quality Control Unit, Department of Agriculture, Jamnagar

Table 2.6.2: Micronutrient Status (Soil classification as per Fe, Zn, Mg & Cu Status)  
(Year: 2011-12)

Taluka	Soil Samples Analyzed	Fe (%)			Zn (%)			Mg (%)			Cu (%)		
		L	M	H	L	M	H	L	M	H	L	M	H
Jamjodhpur	175	45*	25	30	10	65	25	05	30	65	00	00	100
Bhanvad	165	10	35	55	40	50	10	00	00	100	00	00	100
Kalyanpur	180	10	45	45	05	30	65	00	00	100	00	00	100
Dwarka	145	35	40	25	20	20	60	00	00	100	00	00	100
Kalavad	190	00	55	45	20	30	50	00	00	100	00	00	100
Jamnagar	89	05	35	60	25	25	50	00	15	85	00	00	100
Lalpur	158	00	05	95	30	30	40	00	30	70	00	00	100
Jamkhambhaliya	79	00	15	85	35	30	35	00	15	85	00	00	100
Jodiya	98	00	30	70	30	35	35	00	35	65	00	00	100
Dhrol	189	00	30	70	20	25	55	00	00	100	00	00	100
Average		10.5	31.5	58.0	23.5	34.0	42.5	0.5	12.5	87.0	0.0	0.0	100.0

\* Figure indicate the percentage of samples in low category

L= Low, M = Medium, H= High

Source: Soil Chemistry Department, College of Agriculture, JAU, Junagadh

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## 2.6.2: Agro Climate Characteristics:

Climate condition of an area is resultant of various components like temperature variation; mean average rainfall and number of rainy days. The temperature ranges from around 41 degree Celsius in May to 6.3 degree Celsius in the month of December.

The district is part of Saurashtra and falls under semi arid tropic agro climatic region. The record of rainfall data of last ten years indicated that the maximum rainfall is received in the year 2010 (1528 mm) while minimum average rainfall was in the year 2002 (326 mm). Considering the different talukas the maximum rainfall was received in Khambhalia taluka in the year 2010 (2645 mm) while it was minimum in Dwarka taluka in the year 2002 (136 mm). The average rainfall of last ten years is 818 mm.

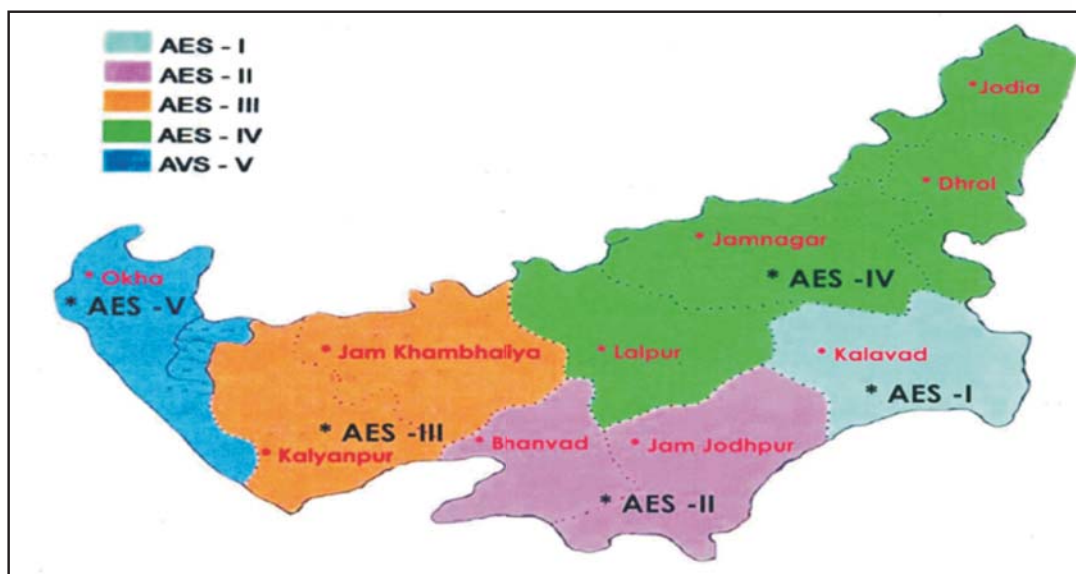
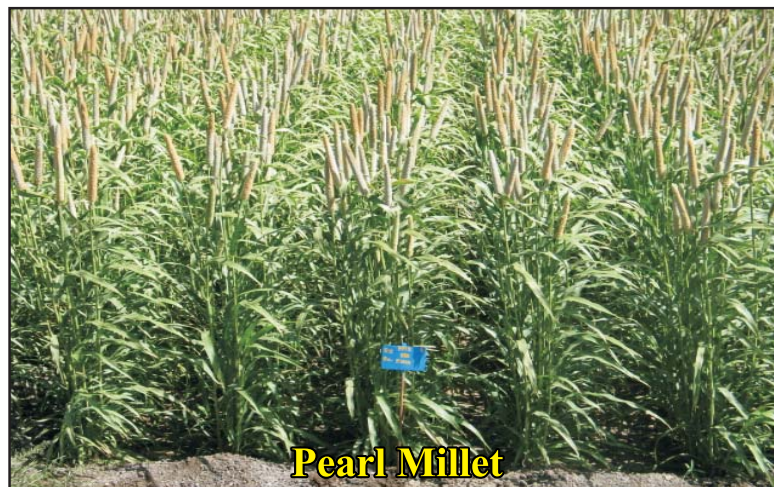
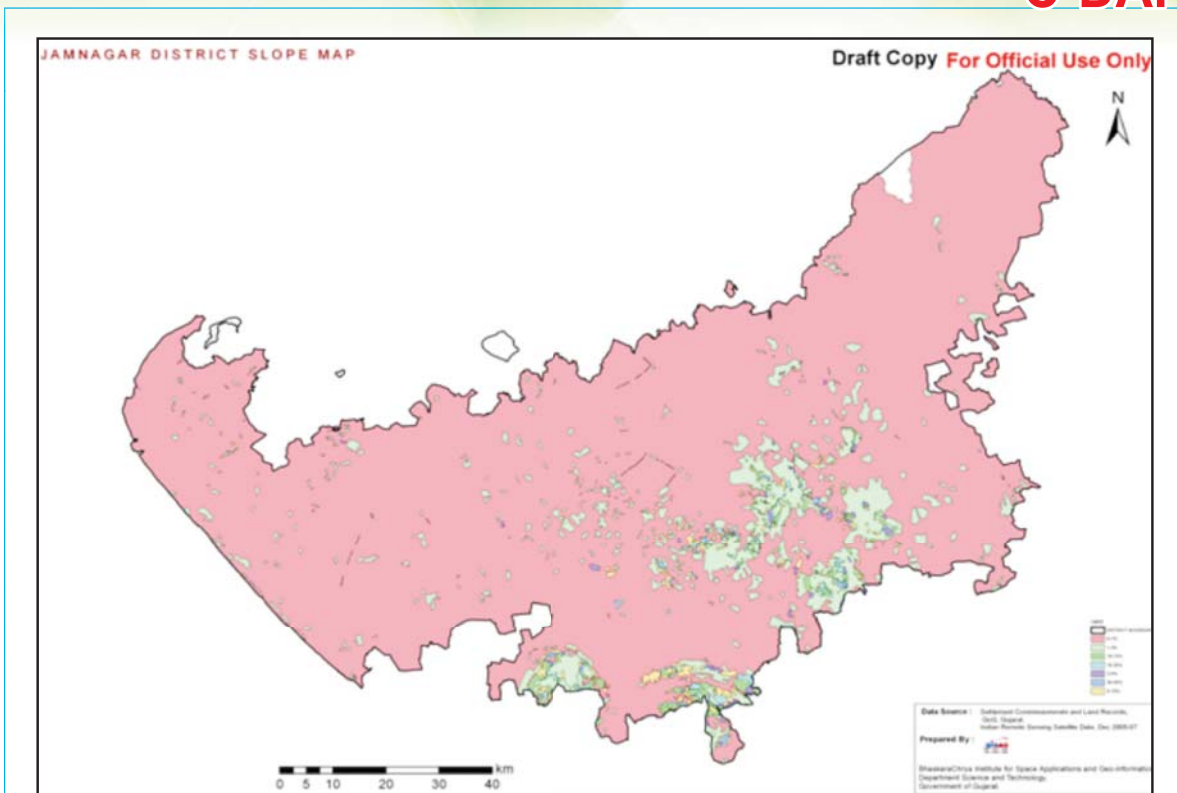


Fig. 2.6.1: Agro Ecological Situation of Jamnagar district





**Fig. 2.6.2: Slope map of Jamnagar district**

### 2.6.3: Water Resources:

Jamnagar district is blessed with 30 rivers, like Nagmati, Rangmati, Ghee, Sinhan, Panna Sorthi, Und, Kankavati, Ruparel, Aji, Gholavadi, Kalavadi, Fulzar, Dhandhar, Sasoi, Rupavti, Khari, Vartu, Sani, Sonmati, Veradi, Minsar, Morzari etc. On these rivers, 20 dams are constructed and water is utilized for irrigation purpose through main canal (219 km) and distributory canal (294 km). Irrigation potential of these dams is 35,888 ha land.

The existing major and medium irrigation projects and from ground water, net irrigated area is about 213016 ha. Among the different talukas, the maximum area under irrigation is in Kalawad followed by Jamnagar and Jamjodhpur. The Okha taluka is having least area under irrigation.

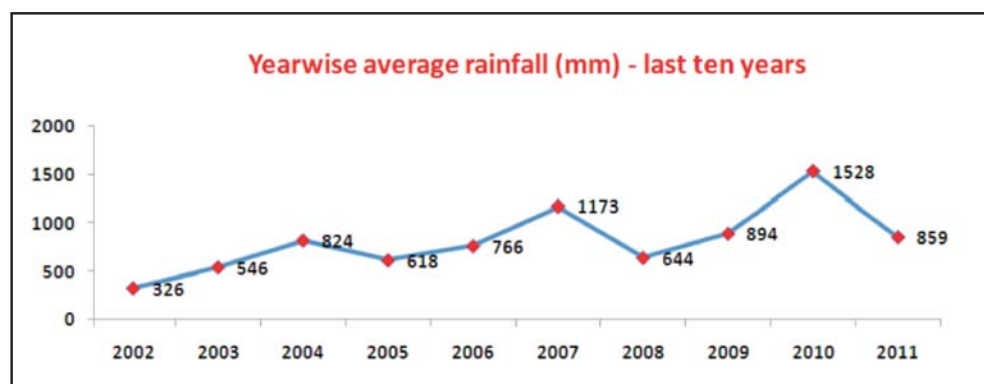
As regards to different sources of irrigation, 12040 ha is being irrigated by canal water (5.7 % of total irrigated area). The area irrigation by well and bore well is 51647 and 142348 ha, respectively which contributes 91 % of total irrigation area. Thus, major source of the irrigation in the district is by well and tube well.

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**Table 2.6.3: Year wise rainfall in different talukas in Jamnagar District**

Sr. No.	Taluka	Year										Mean
		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	
1	Bhanvad	257	518	549	500	959	1177	730	1156	1451	678	<b>798</b>
2	Dhrol	354	500	832	707	695	940	402	556	702	514	<b>620</b>
3	Jamjodhpur	215	543	635	622	655	1062	653	703	1318	807	<b>721</b>
4	Jamnagar	433	869	1429	977	666	1945	825	897	2064	973	<b>1108</b>
5	Jodiya	275	493	881	488	776	1020	406	751	1065	764	<b>692</b>
6	Kalawad	617	530	660	777	515	947	610	582	897	619	<b>675</b>
7	Kalyanpur	371	663	998	353	1524	1426	835	1203	1950	1353	<b>1068</b>
8	Khambhalia	210	350	610	642	681	997	501	825	2645	1117	<b>858</b>
9	Lalpur	390	669	1139	705	544	1317	919	1455	1937	866	<b>994</b>
10	Dwarka	136	322	507	413	642	903	554	816	1246	896	<b>644</b>
<b>Average of District</b>		<b>326</b>	<b>546</b>	<b>824</b>	<b>618</b>	<b>766</b>	<b>1173</b>	<b>644</b>	<b>894</b>	<b>1528</b>	<b>859</b>	<b>818</b>

Source : Disaster Management Cell, Jamnagar



**Fig 2.6.3 Year wise average rainfall (mm) in Jamnagar district**

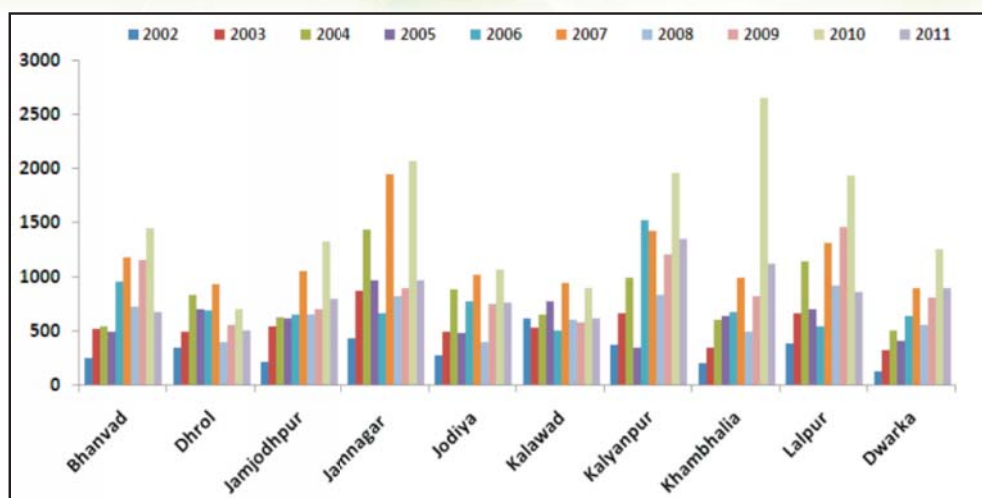


Fig 2.6.4 Year wise average rainfall (mm) in different talukas

### 2.6.3.1: Irrigation facilities:

Jamnagar district is blessed with 30 rivers, like Nagmati, Rangmati, Ghee, Sinhan, Panna Sorthi, Und, Kankavati, Ruparel, Aji, Gholavadi, Kalavadi, Fulzar, Dhandhar, Sasoi, Rupavti, Khari, Vartu, Sani, Sonmati, Veradi, Minsar, Morzari etc. On these rivers, 20 dams are constructed and water is utilized for irrigation purpose through main canal (219 km) and distributory canal (294 km). Irrigation potential of these dams is 35,888 ha land. The existing major and medium irrigation projects and from ground water, net irrigated area is about 213016 ha. Among the different talukas, the maximum area under irrigation is in Kalawad followed by Jamnagar and Jamjodhpur. The Okha taluka is having least area under irrigation. As regards to different sources of irrigation, 12040 ha is being irrigated by canal water (5.7 % of total irrigated area). The area irrigation by well and bore well is 51647 and 142348 ha, respectively which contributes 91 % of total irrigation area. Thus major source of the irrigation in the district is by well and tube well.

The information on existing MIS in the district revealed that maximum MIS units in Jam Jodhpur taluka followed by Kalawad and Bhanwad taluka while, minimum in Dwarka & Jodia taluka. Only 3.4 % area is covered by MIS (7317 ha) out of total irrigated area of the district (213016 ha). Hence, effort should be made to popularize the MIS technology with special provision of subsidy in the district.



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**Table 2.6.4: Information of Canal & Dams Irrigation**

Sr. No.	Dams	Taluka	River	Total irrigation Potential (ha.)	Length of Canals (km.)	
					Main	Distributory
1	Und-I	Kalavad	Und	9450	28	105
2	Sasoi	Lalpur	Sasoi	3055	24	35
3	Fulzar-I	Kalavad	Fulzar	1214	7	15
4	Sorthi	Bhanvad	Sorthi	1861	11	15
5	Vartu-I	Bhanvad	Vartu	2610	16	17
6	Sani	Kalyanpur	Sani	2759	14	4
7	Puna	Lalpur	Puna	607	9	8
8	Ghee	Jamhambhalia	Ghee	830	11	14
9	Rangmati	Jamnagar	Rangmati	740	6	3
10	Fulzar-II	Lalpur	Fulzar	688	5	2
11	Sapda	Jamnagar	Bhageri	974	6	8
12	Vijarkhi	Jamnagar	Fulzar-nani	593	3	7
13	Vodisang	Jamnagar	Fulzar	1303	0	27
14	Sonmati	Bhanvad	Sonamati	825	1	6
15	Daiminsar	Jamjodhpur	Dai	1515	2	0
16	Sindhani	Kalyanpur	Sindhani	1116	11	1
17	Sh-Bhadhari	Khambhalia	Bhadhari	1697	6	10
18	Rupavati	Lalpur	Rupavati	1045	4	4
19	Kankavati	Jamnagar	Kankavati	1850	9	8
20	Khodapipar	Dhrol	Ghogham	1156	45	4
<b>Grand Total</b>				<b>35888</b>	<b>219</b>	<b>294</b>

Source : Statistics Department, DPs, Jamnagar

**Table 2.6.5: Area irrigated by different sources in different talukas of the district**

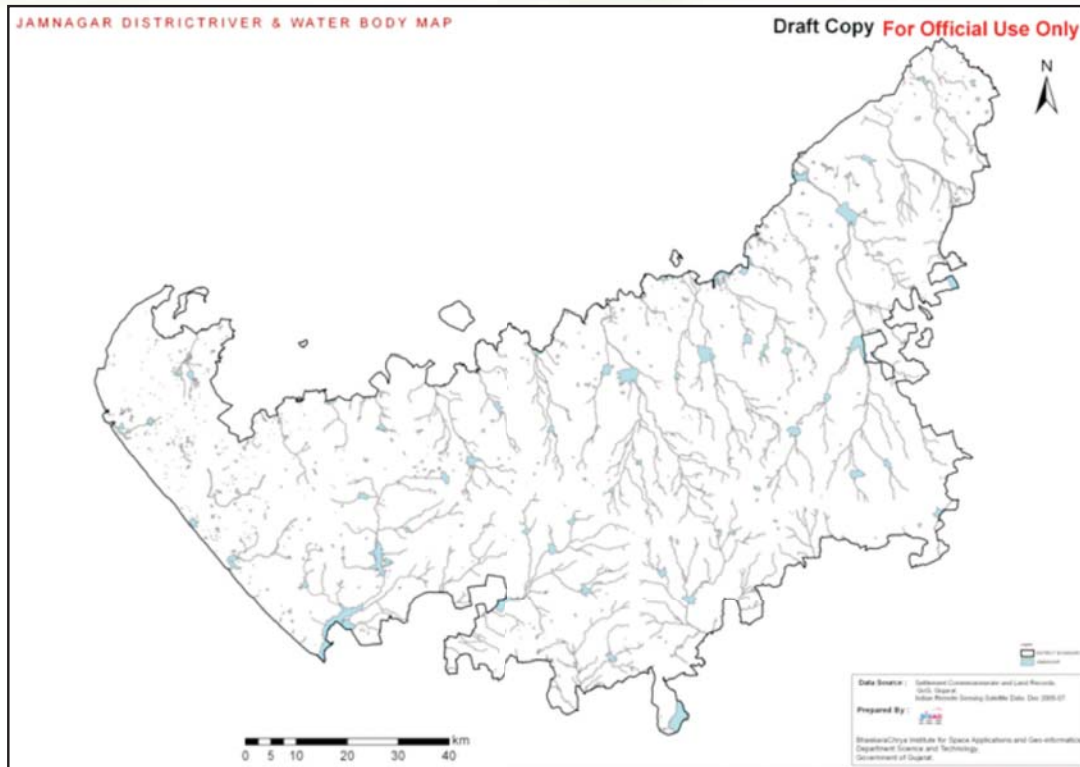
Taluka	Canal (Area)	Pond		Well		Tube well		Other Sources dams/check dams		Total	
		Nos.	Area	Nos.	Area	Nos.	Area	Nos.	Area	Nos.	Area
Jamnagar	1700	0	0	9200	10777	2080	34100	28	100	11308	46677
Lalpur	900	4	900	5770	1580	1289	11480	18	150	7081	15010
Jam Jodhpur	1260	0	0	9640	9787	980	15684	15	75	10635	26806
Bhanvad	3000	1	675	8108	1235	1020	6244	21	115	9150	11269
Kalyanpur	600	0	0	12060	1478	770	7640	18	100	12848	9818
Okha	150	5	1145	2040	2848	20	25	12	220	2077	4388
Khambhaliya	2400	1	880	9865	238	1015	6480	21	178	10902	10176
Jodia	500	0	0	4496	6592	1278	12415	16	225	5790	19732
Dhrol	200	1	495	4707	2865	1420	9640	24	198	6152	13398
Kalawad	1330	2	1245	10067	14247	1892	38640	35	280	11996	55742
<b>Total</b>	<b>12040</b>	<b>14</b>	<b>5340</b>	<b>75953</b>	<b>51647</b>	<b>11764</b>	<b>142348</b>	<b>208</b>	<b>1641</b>	<b>87939</b>	<b>213016</b>

Source: Statistics Department, DPS, Jamnagar

**Table 2.6.6: Taluka wise information on drip/sprinkler (2005-06 to 2011-12)**

Taluka wise progress of MIS in Jamnagar Dist. From 2005-06 to 2011-12.			Taluka wise information on Drip /Sprinkler for the year 2011-12 in Jamnagar Dist					
Taluka	Drip irrigation & Sprinkler irrigation		Drip		Sprinkler		Total	
	No. of farmers	Area in ha	No.of farmers	Area in ha	No.of farmers	Area in ha	No.of farmers	Area in ha
Bhanvad	2558	4074	341	541	385	681	726	1222
Dhrol	906	1071	186	262	8	13	194	275
Dwarka	363	555	2	3	21	28	23	31
Jam Jodhpur	2647	3793	766	1229	240	417	1006	1646
Jam Khambhalia	1787	2632	283	426	250	450	533	876
Jamnagar	1087	1460	299	435	12	21	311	456
Jodia	331	425	39	64	23	44	62	107
Kalavad	2714	3757	825	1260	63	97	888	1357
Kalyanpur	1601	2389	113	156	264	461	377	617
Lalpur	894	1389	418	691	23	39	441	729
<b>Total</b>	<b>14888</b>	<b>21545</b>	<b>3272</b>	<b>5067</b>	<b>1289</b>	<b>2250</b>	<b>4561</b>	<b>7317</b>

Source: GGRC, Vadodara



**Fig. 2.6.3 River and water body map of Jamnagar district**

### 2.6.4 Coastal Area in Jamnagar district:

The Jamnagar district has 355 km. long coast line adjoining to Arabian Sea and Gulf of Kutch. The coastline extending from Harshad in Porbandar to Bedi Bandar in Jamnagar taluka is characterized by open sea and gulf environment with expanding saline wasteland. Almost entire coast line has industrial development in form of mining, ports and chemical industries. The establishment of Reliance and Essar refineries in Jamnagar and Khambhaliya taluka has changed the status of the district as the Oil capital of the country.

The entire coastal area covering Lalpur, Jodiya, Khambhaliya, Jamnagar, Okhamandal and Kalyanpur taluka are affected by salinity. These taluka cover an area of 385,211.5 ha., forming 61% of total area of the district. The coastal talukas have 248 villages (53% of villages in six talukas) affected by salinity problems. Compare to other talukas the highest number of villages fall in Jamnagar taluka. According to SIPC salinity classification, 127 villages are fully saline, 49 villages are partially saline and 74 villages are prone to saline. Highest number of fully saline villages (37) falls in Jodiya taluka, highest number of partial saline villages (12) are in Kalyanpur and highest number of prone to saline villages (34) are in Jamnagar taluka.

**2.6.5 Forest:**

Forest in Gujarat constitutes 9.66% of the total geographical area. In Jamnagar 4.5 % of the district land is under forest. The maximum forest land is in Jam Jodhpur taluka followed by Bhanwad and Jodia taluka while minimum in Dhrol taluka. Looking at the degradation of the forest, land resources the district has been granted with watershed programme through different govt. department agencies. There is a need for massive time bound programme in afforestation of wasteland. With more afforestation it will help in supplementing rural income generation activities with minor forest based collection.

**2.7 Infrastructure:**

The existing storage and marketing facilities are not adequate and require government support as well as credit flow from banks. A large portion of the district has groundnut and cotton growing area. There is a need to improve marketing infrastructure for agricultural produce at cluster level for procuring better price. Each Taluka in the district has one market committee. Currently the district has 8 regulated markets. Average number of villages served by the market is 88 and average area served is 1766 sq KM. The existing marketing infrastructure also needs to be strengthening with the facilities like roads, go downs etc. Availability of inadequate input supply and irrigation lacks agriculture motivation and on value addition and post harvest storage facilities, which is essential to fetch better price realization. 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.

A total of 695 villages of Jamnagar district are electrified. Within the villages almost all the house holds bear electric connection. Out of 695 villages, 26 villages are producing electricity from solar energy. The 95 % villages of the district access drinking water through pipelines, open well, spring, river, ponds etc. The district is having 3754 km of Road. The district is well connected to the other parts of the country through broad gauge railway line with main station at Jamnagar, Khambhaliya, Lalpur, Jam Jodhpur, Bhanwad & Okha. The district having 323 post office, 1368 primary school, 222 secondary school, 11 general health centre, 38 primary health centre, 265 sub primary health centre and 38 urban health centre.

**2.8 Banking Sectors:**

The district has 78 commercial banks with 210 branches and 39 cooperative banks with 75 branches cater to the credit requirement for crop loans. The banking service has sufficient reserve fund for credit support to the farmers. Till March, 2011, banks have dispersed Rs. 112788 lakh loan to the 151498 cultivators.

Considering the gross cropped area of ha and the usual cropping pattern and the facts that there are 259427 cultivators in the district, which includes 112551 small and marginal farmers requiring full credit support for cultivation. To deal with the existing credit gap and getting more and more people accessing benefits, the banks have to be proactive in financing the government schemes and develop more bankable schemes to cover more number of peoples under various programmes. It is also proposed that respective departments should ensure that schemes are developed in coordination with the banks for long term funding support.

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**Table 2.8.1: Details of credit institutions in the district**

S.No	Taluka	Number of institutions			
		Commercial Bank	RRBs	Cooperatives	Total
1	Jamnagar	88	09	31	<b>128</b>
2	Lalpur	03	05	04	<b>12</b>
3	Jam Jodhpur	11	05	05	<b>21</b>
4	Bhanvad	05	06	02	<b>13</b>
5	Kalyanpur	07	06	07	<b>20</b>
6	Okha	13	03	02	<b>18</b>
7	Khambhaliya	14	04	04	<b>22</b>
8	Jodia	04	05	09	<b>18</b>
9	Dhrol	05	03	04	<b>12</b>
10	Kalawad	08	06	07	<b>21</b>
	<b>Total</b>	<b>158</b>	<b>52</b>	<b>75</b>	<b>285</b>

Source: Lead Bank, SBI, Jamnagar

**Table 2.8.2: Crop loan disbursement (Short term credit in Rs Lakh)**

Taluka	Loan disbursed in 2011-12					
	Coop. Bank		Commercial Bank		RRB	
	No. of loans	Amount	No. of loans	Amount	No. of loans	Amount
Jamnagar	750	2618	15362	12599	8350	4636
Lalpur	638	3798	10210	3020	3635	2936
Jam Jodhpur	781	3381	19531	9529	4737	1956
Bhanvad	500	1501	7210	2342	3030	2663
Kalyanpur	930	5125	13185	5574	3836	3263
Okha	25	836	2587	1188	830	441
Khambhaliya	435	1618	9234	5544	2833	2643
Jodia	887	5809	10127	2527	2753	2663
Dhrol	731	4940	8092	2628	2231	2591
Kalawad	588	4515	14530	5623	3930	4291
<b>Total</b>	<b>6265</b>	<b>34141</b>	<b>110068</b>	<b>50574</b>	<b>36165</b>	<b>28083</b>

Source: Lead Bank, SBI, Jamnagar

**2.9 DISTRICT AT A GLANCE:****Table 2.9.1 : District at a Glance**

1.	No. of subdivision	1
2.	No. of developmental talukas	10
3.	Total villages (Inhabited)	702
4.	No. of gram Panchayat	667
5.	Villages electrified	695
6.	Villages having agricultural power supply	695
7.	Villages having post office	323
8.	Villages having primary schools	1368
9.	Villages having secondary schools	222
10.	Villages having general health centers	11
11.	Villages having primary health centers	38
12.	Villages having sub primary health centers	265
13.	Urban health center	38
14.	Villages having potable water supply	666
15.	Villages connected with paved approach roads	664
16.	Total population of the district	1904278
17.	Male population	987220
18.	Female population	922958
19.	Total rural population	1068022
20.	Total Urban Population	836252
21.	Total Schedule tribe population	10459
22.	Total Schedule cast population	154819
23.	Total Literate population	1083696
24.	Male literate population	6381101
25.	Female literate population	445595
26.	Rural households	227492
27.	Schedule cast households	6191
28.	Total geographical area (ha.)	1010062
29.	Forest land (ha.)	45397
30.	Permanent pastures and grazing lands (ha.)	76377

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Cont.

31	Cultivable waste land (ha.)	66275
32	Current fallow (ha.)	19607
33	Net sown area (ha.)	624774
34	Total area available for irrigation (ha.)	207676
35	Area irrigated by canals/channels (ha.)	12040
36	Area irrigated by wells (ha.)	51647
37	Area irrigated by bore well (ha.)	142348
38	Number of cultivators	259427
39	Agricultural laborers	100152
40	Workers engaged in household industries	5029
41	Other workers	6637
42	Marginal farmers ( $\leq 1$ ha.)	30569
43	Small farmers (1 to 2 ha.)	81982
44	Medium-large farmers ( $> 2$ ha.)	114941
45	Total numbers of holdings	227492
46	Population of cross bred cattle	1459
47	Indigenous cattle	348488
48	Buffaloes	258755
49	Sheep indigenous	207967
50	Goat	172618
51	Poultry indigenous	386561
52	Fertilizer/seeds/pesticides outlets	3485
53	Total NPK consumption (MT)	65685
54	Agricultural tractors	8023
55	Power tillers/trailors	37
56	Threshers/cutters	3203
57	Agricultural pump & energized sets	68883
58	Agro service centers	32
59	Soil testing centers	6
60	Plantations nurseries	1
61	Rural /urban mandi/hats	48

62	Wholesale market	8
63	Godowns	213
64	Storage capacities of godowns (MT)	2470
65	Commercial Bank	78 with 210 branch
66	Cooperative Bank	39 with 35 branch
67	Veterinary hospitals/ Dispensaries	33
68	Disease Diagnostic centers	79
69	Co-operative societies	337
70	Milk Cooperative society	48
71	Fisherman societies	20
72	Fish market	4
73	Fish production (MT)	88617
74	Egg production (Lakh nos.)	10.84
75	Milk production (MT)	300
76	Meat production (MT)	205381
77	Broiler (Lakh nos.)	139047





### SWOT ANALYSIS OF THE DISTRICT

#### 3.1 Introduction:

**SWOT is an acronym for Strengths, Weaknesses, Opportunities and Threats.** By definition, Strengths (S) and Weaknesses (W) are considered to be internal factors over which we have some measure of control. Also, by definition, Opportunities (O) and Threats (T) are considered to be external factors over which we have essentially no control.

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.

#### 3.2 SWOT analysis of the Jamnagar District (With focus separately on the Agricultural and Allied Sectors)

Jamnagar, the head-quarters of Jamnagar District, is well connected by rail and bus routes to major towns of the states like Rajkot, Ahmedabad, Vadodara, Surat and Gandhinagar. There is a good network of the roads within the district and its towns & villages. An airport is also situated at Jamnagar and well connected with sea port. The major strengths of the district are:

##### 3.2.1: Strength

- The cultivable land under major *kharif* crops is about 61.23 % and district having only less than 1.93 per cent area as waste land.
- Average rainfall of the district is 818 mm and during last ten years it was increased so, that ample opportunities for all crops.
- The Jamnagar is unique district for cultivation of medicinal crop Ajwan.
- Due to increase in water harvesting structure in entire districts, which resulted in increase in water table ultimately increased in irrigated area and helped in reduction in salinity ingress.
- The district having deep sea and longest sea shore of the state which is more suitable for development of port and fishing respectively.
- Abundance of solar energy round the year.

- Due to sea shore high wind speed (average 10-15 km/h, which reach up to 30 km/h) suitable for wind farm for electricity generation.
- Due to GM in cotton crops, district productivity and area increased up to a greatest level.
- Enriched diversity of plant genetics materials
- Diversified farming of Agriculture, Animal Husbandry and Horticulture which provide additional income to the stalk holder.
- Suitability of soil and environment resulted in highest productivity of groundnut.
- High calcareous soil suitable for cotton, groundnut, garlic and onion
- Some part of district is more popular of potato and chicory cultivation.

### 3.2.2: Weaknesses:

Jamnagar District has average annual rainfall of 675 mm. Most of the rivers in this district remain dry in the summer season. This enforced the over exploitation of ground water through open wells and deep bore wells, which has created the sea water intrusion problem in coastal Talukas and resulted in poor quality of groundwater and ultimately hampered the crops in the region. Hence, it is absolutely essential to recharge the ground water table which has gone very deep during the last decade. Proper planning and reclamation of fallow and degraded lands could also enhance the net sown area in the district. Apart from this the other weaknesses are

- Large number of marginal and small land holding
- Limited irrigation facility, and lack of canal irrigation facility
- The coastal area of the districts having poor quality of irrigation water.
- High pressure of sea water along the costal belt of the district
- Erratic rainfall in entire district.
- Hilly and undulating land holdings in some part of district.
- Lack of technological know-how among the farmers.
- Agricultural labor crisis due to establishment of mega industries in the district
- Lack of permanent pasture for animal grazing
- Poor fertility of soil, low in organic carbon and phosphorous
- Improper management of organic matter and farm waste.
- Poor cooperative structure, farmers are not fetching remunerative prices of their products.
- Livestock with poor genetic makeup and hence poor producers.
- Lack of agricultural clinic facility at taluka level
- Poor farm mechanization.
- Lack of value addition and agro processing unit
- Lack of cold storage particularly for potato, onion, garlic and other perishable agricultural produces at village and taluka level.

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## 3.2.3 Opportunities:

There is a heavy demand for fruits, vegetables and flowers from Rajkot, Ahmedabad, Mumbai and other cities, farmers who cultivate these crops are much benefited. The major crop groundnut produced in the district is used in oil mills only, but there is a need of value addition industry for various groundnut based products. The industrial development opportunities are tremendous in the major towns of this district like Jamnagar, Khambhalia, Lalpur and Dhrol, as there is a National Highway and rail track connectivity linking these towns with Ahmedabad. Lalpur, Khambhalia and Dwarka has heavy chemical industries and oil refineries. A Jyotirling temple of lord Shiva near Dwarka in Nageshwar, Lord Krishna temple in Dwarka and number of sea beaches are attracting large number of tourists, therefore there is a great opportunity of developing good tourist industry and making a tourist hub in the district. The specific opportunities for the district are

- Unexplored biodiversity with respect to vegetables and crops
- Greater scope for increasing cropping intensity by bringing more area under cultivation in *Rabi* and summer season in irrigated area
- Biomass available from livestock, crop and farm residue can be used for maintaining proper soil health.
- Immense scope exists to tackle the resource degradation through integrated approaches of NRM, INM and IPM.
- Immense scope exists to strengthen the co-operative structure in the district
- The area under horticultural and vegetable crops can be increased to a considerable extent
- Greater scope for promotion of organic farming
- Scope for increasing area under medicinal and aromatic plants because the Gujarat Aryurvedic University is located in Jamnagar therefore great opportunity existed for cultivation of medicinal crop.
- Scope for increasing nutritional food security with Kitchen gardening
- Opportunities for strengthening infrastructure and marketing facilities.
- Greater scope for rain water harvesting in the area.
- Conjunctive use of harvested water with ground water.
- Reclamation of salty soil through organic manuring and gypsum,
- Reduce sea water pressure by talukaing rainwater runoff near sea shore
- Flower, off seasonal vegetables and fruits can be grow through green house technology and use of MIS in crops which reduce deterioration of soils.
- Inland fisheries can be increase by specific technology.

## 3.2.4 Threat:

Jamnagar District is well connected to industrial cities like Rajkot, Ahmedabad, Surat and Mumbai this has resulted in the large scale migration of farm labourers in various industries located in these towns. This has resulted in a great demand for agricultural labourers and the farmers in this district face a lot of problems in getting farm labourers. The district is having a vast sea coast and over exploitation of groundwater in the region created a serious threat of sea water intrusion and salinity ingress and resulted in degradation of land and reduction of farm produce, which ultimately initiated the migration of the farmers from the Talukas like Jodia, Dhrol, Kalyanpur and Dwarka taluka.

- Deforestation
- Introduction of chemicals
- Natural calamity
- Soil erosion
- Scanty of water for irrigation
- Deterioration in quality of irrigation water.
- Increasing area under problematic soil.
- Indiscriminate breeding practices (use of non- descript, poor graded bulls used for natural matting)
- Low/ shrinking pasture land
- Allowing animals for grazing.

**3.2.5 General problems:**

- Undulating lands in some of the taluka
- The area is increasing constantly due to sea water ingression in coastal region
- Soil erosion
- High rainfall with uneven distribution
- Lack of secured irrigated facility through out the year
- Weed problem
- Agricultural labour crisis during crop season
- Poor infrastructure and marketing facility

**3.3 SWOT analysis of major crops:**

On the basis of primary and secondary information collected by the team members from representative Talukas, SWOT analysis was carried out with respect to existing farming systems. The details of SWOT analysis are given in table.

**Table 3.3.1: Farming system: Agriculture**

**i. Cropping Pattern: Bt. Cotton**

<p style="text-align: center;"><b>Strength</b></p> <ul style="list-style-type: none"> <li>➤ More area under Bt cultivation</li> <li>➤ Medium black soil suitable for cultivation</li> <li>➤ Intercropping in cotton reduce risk</li> <li>➤ Cotton can be successfully grow in all type of soil</li> <li>➤ GM cotton increase production.</li> <li>➤ Good technological know how of cotton cultivation</li> </ul>	<p style="text-align: center;"><b>Weakness</b></p> <ul style="list-style-type: none"> <li>➤ Mono cropping of cotton reduce soil fertility</li> <li>➤ Non-judicious use of fertilizer and newer pesticides.</li> <li>➤ Cotton is highly susceptible to the pests</li> <li>➤ Reddening of cotton is major problem in Bt cotton</li> <li>➤ Lack of synchronize maturity</li> </ul>
<p style="text-align: center;"><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>➤ Yield increased through enrichment of soil.</li> <li>➤ Inter cropping is one of the important tools for minimizing the risk.</li> <li>➤ Chance to reduce pest and weed problem through genetic modification</li> <li>➤ Recycling of cotton stalk increase fertility</li> </ul>	<p style="text-align: center;"><b>Threats</b></p> <ul style="list-style-type: none"> <li>➤ Constant monocropping reduce soil fertility</li> <li>➤ Possibility of development of resistance in pest due to not adoption of <i>refugee</i> technology.</li> <li>➤ Labour problems for plant protection operations and cotton picking</li> <li>➤ Price variations at different collection centers.</li> <li>➤ Mono cropping reduce fodder availability</li> <li>➤ Fluctuating market price</li> </ul>

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## ii. Cropping Pattern: Groundnut

<p style="text-align: center;"><b>Strength</b></p> <ul style="list-style-type: none"> <li>➤ Higher yield</li> <li>➤ Calcareous soil suitable for groundnut cultivation.</li> <li>➤ Rainfed drought tolerant crop</li> <li>➤ Provide highly nutritive fodder for animal</li> <li>➤ Improve soil fertility through nitrogen fixation</li> <li>➤ It also cultivated in summer season</li> <li>➤ High export potentiality</li> <li>➤ Potentiality for value addition</li> </ul>	<p style="text-align: center;"><b>Weakness</b></p> <ul style="list-style-type: none"> <li>➤ Higher seed cost</li> <li>➤ Aflatoxin hurdle for export</li> <li>➤ Tikka and rust diseases reduce the fodder quality</li> <li>➤ Low seed replacement rate</li> <li>➤ Storage problem due to Bruchid.</li> <li>➤ Fluctuated market price</li> <li>➤ Pest problem</li> <li>➤ Less risk bearing ability</li> </ul>
<p style="text-align: center;"><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>➤ Value addition through preparation of numbers of confectionary item</li> <li>➤ Groundnut is well suitable in the crop sequence i.e. groundnut – wheat</li> <li>➤ Improve the soil health in legume cereal sequence</li> <li>➤ HPS variety have a good opportunity for export</li> </ul>	<p style="text-align: center;"><b>Threats</b></p> <ul style="list-style-type: none"> <li>➤ Erratic and uncertainty of rain restrict the yield</li> <li>➤ Lack of adequate knowledge of efficient use of soil moisture</li> <li>➤ Fluctuating in market price</li> <li>➤ Pest, disease and weed problem</li> </ul>

## iii. Cropping Pattern: Bajra

<p style="text-align: center;"><b>Strength</b></p> <ul style="list-style-type: none"> <li>➤ C4 type crop so have high biomass productivity.</li> <li>➤ Per day productivity is higher among cereals crop.</li> <li>➤ Atmospheric condition suited for its semi rabi cultivation</li> <li>➤ Less inputs requirement and high responsive to inputs.</li> <li>➤ High mineral content.</li> </ul>	<p style="text-align: center;"><b>Weakness</b></p> <ul style="list-style-type: none"> <li>➤ Not suitable under ready to cook system.</li> <li>➤ Low storage capacity.</li> <li>➤ Products have rough texture so less prefer by consumer.</li> <li>➤ Rancidity develops in short period of time in flour.</li> <li>➤ At harvest in case of lodging grain and fodder quality deteriorate.</li> <li>➤ Bird damage in standing crop.</li> </ul>
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<i>Opportunities</i>	<i>Threats</i>
<ul style="list-style-type: none"> <li>➤ Have a potentiality for bio fuel production, bio-butane.</li> <li>➤ Alternative uses for poultry and animal feed.</li> <li>➤ Value addition of fodder through chopping.</li> <li>➤ Better opportunity as a iron rich food in the scenario of iron deficiency in normal diet.</li> <li>➤ There is opportunity for seed production during semi rabi season</li> <li>➤ Possible to cultivate in all the three seasons</li> </ul>	<ul style="list-style-type: none"> <li>➤ Susceptible to lodging in cyclone prone coastal region in kharif.</li> <li>➤ Germination problems in crust forming soil.</li> <li>➤ In case of congenial condition out break of diseases, heavy losses may occur.</li> </ul>

**iv. Cropping Pattern: Cumin**

<i>Strength</i>	<i>Weakness</i>
<ul style="list-style-type: none"> <li>➤ More area under crop i.e. 23500 hectare in the district</li> <li>➤ Climatic condition is appropriate</li> <li>➤ With less irrigation high remunerative crop</li> <li>➤ Stable market price</li> <li>➤ Export potentiality</li> <li>➤ Short duration crop</li> </ul>	<ul style="list-style-type: none"> <li>➤ Risk is highly correlated with climatic condition</li> <li>➤ Germination problem</li> <li>➤ Lack of knowledge of package of practices</li> <li>➤ Lack of resistant variety against most of the diseases</li> <li>➤ Dense plant population and access irrigation increase diseases possibility</li> </ul>
<i>Opportunities</i>	<i>Threats</i>
<ul style="list-style-type: none"> <li>➤ Proper adoption of POP increases productivity</li> <li>➤ Extraction oil from cumin seed have a great export value</li> <li>➤ High yield in row sowing method</li> <li>➤ High demand as spice crop</li> <li>➤ Cumin suit very well in the crop sequence i.e. bajra/jowar-cumin</li> </ul>	<ul style="list-style-type: none"> <li>➤ Humid climate increase diseases problem</li> <li>➤ Infection of blight, totally loss of crop</li> </ul>

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## v. Cropping Pattern: Wheat

<p style="text-align: center;"><b><i>Strength</i></b></p> <ul style="list-style-type: none"> <li>➤ An important staple food grain crop</li> <li>➤ High yield potential</li> <li>➤ Best cropping sequence with groundnut-wheat-groundnut</li> <li>➤ Minimum diseases and pest problem</li> <li>➤ Highest usages in backing and fast food products</li> <li>➤ Value added products which give higher income.</li> </ul>	<p style="text-align: center;"><b><i>Weakness</i></b></p> <ul style="list-style-type: none"> <li>➤ It require more irrigation water</li> <li>➤ Higher temperature adversely affects on yield</li> <li>➤ Production price is comparatively less</li> <li>➤ Storage pest problem</li> <li>➤ Low nutritional value of fodder</li> </ul>
<p style="text-align: center;"><b><i>Opportunities</i></b></p> <ul style="list-style-type: none"> <li>➤ Value addition through backing and fast food product</li> <li>➤ Value addition at peasantry level</li> <li>➤ Highly input responsive crop</li> <li>➤ High domestic consumption</li> </ul>	<p style="text-align: center;"><b><i>Threats</i></b></p> <ul style="list-style-type: none"> <li>➤ Stable cultivated area</li> <li>➤ Storage problem</li> <li>➤ Humid environment affected quality and yield</li> </ul>

## vi. Cropping Pattern: Gram

<p style="text-align: center;"><b><i>Strength</i></b></p> <ul style="list-style-type: none"> <li>➤ Rich source of protein</li> <li>➤ High per day yielding potentiality among pulses</li> <li>➤ Increase soil fertility through nitrogen fixation</li> <li>➤ Proper crop management increase yield</li> <li>➤ It has very high market value as a table purpose.</li> <li>➤ Value addition through various confectionary items.</li> </ul>	<p style="text-align: center;"><b><i>Weakness</i></b></p> <ul style="list-style-type: none"> <li>➤ Pest problem is a limiting factor</li> <li>➤ Lack of wilt resistant variety</li> <li>➤ Seed replacement rate is low</li> <li>➤ Storage pest problem</li> <li>➤ Low yield due to wilt</li> <li>➤ Limiting export market</li> </ul>
<p style="text-align: center;"><b><i>Opportunities</i></b></p> <ul style="list-style-type: none"> <li>➤ Proper crop management increase yield potential</li> <li>➤ Yield increase by SRR</li> <li>➤ Sprouted gram can be best suited in the emerging market of current health awareness scenario.</li> </ul>	<p style="text-align: center;"><b><i>Threats</i></b></p> <ul style="list-style-type: none"> <li>➤ Extremely fluctuation in temperature adversely affects on the yield</li> <li>➤ Reduce cultivable area</li> <li>➤ Pest problem</li> <li>➤ Storage pest problem</li> <li>➤ Unseasonal rain</li> </ul>

Table 3.3.2: Farming system: Vegetables

## i. Cropping Pattern: Onion-Garlic

<p style="text-align: center;"><b>Strength</b></p> <ul style="list-style-type: none"> <li>➤ Many potential microclimatic pockets</li> <li>➤ High yield potential per unit area</li> <li>➤ It is commonly used for daily dietary pattern with high consumption rate</li> <li>➤ Fairly good prices of this crop in off seasonal crop</li> </ul>	<p style="text-align: center;"><b>Weakness</b></p> <ul style="list-style-type: none"> <li>➤ Required high seed rate, inputs and labour</li> <li>➤ Require more irrigation water</li> <li>➤ Temperature adversely affects on yield</li> <li>➤ Perishable nature of crop</li> <li>➤ Highly susceptible to disease</li> <li>➤ Required specific kind of storage</li> </ul>
<p style="text-align: center;"><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>➤ Value addition through dehydration</li> <li>➤ Grading have a good opportunity for export</li> <li>➤ There is great potential for increase yield through varietal replacement and scientific package of practices</li> <li>➤ High demand for export</li> </ul>	<p style="text-align: center;"><b>Threat</b></p> <ul style="list-style-type: none"> <li>➤ Fluctuated market price</li> <li>➤ Rotting of bulbs during storage</li> <li>➤ sprouting of bulbs during storage in rainy season</li> <li>➤ Environmental factors affect on quality and quantity of produce</li> </ul>

## ii. Cropping Pattern: Other vegetable crops

<p style="text-align: center;"><b>Strength</b></p> <ul style="list-style-type: none"> <li>➤ The soil and climate of area is congenial.</li> <li>➤ Farmers having small holding can also get better income.</li> <li>➤ Most important component of human diet.</li> <li>➤ High nutritional value.</li> <li>➤ Continuous income to farmers.</li> <li>➤ Off seasonal vegetable gives more income.</li> </ul>	<p style="text-align: center;"><b>Weakness</b></p> <ul style="list-style-type: none"> <li>➤ Low availability of quality seeds and seedlings</li> <li>➤ Lack of suitable varieties.</li> <li>➤ Marketing problem.</li> <li>➤ Highly perishable nature of crops.</li> </ul>
<p style="text-align: center;"><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>➤ Cultivation is best suited to small and marginal farmers for getting high income.</li> <li>➤ Better scope for organic vegetable cultivation.</li> <li>➤ When bumper yield price will low, great opportunity for value addition.</li> <li>➤ Can be grown under protective farming</li> </ul>	<p style="text-align: center;"><b>Threats</b></p> <ul style="list-style-type: none"> <li>➤ Poor marketing facility and lack of big markets in nearby area increases the transportation cost which reduce the profit margin for the farmers.</li> <li>➤ Vegetables are susceptible to extreme low and high temperature.</li> <li>➤ Highly susceptible to pest and diseases</li> </ul>



**Table 3.3.3: Farming system: Animal Husbandry**

**i. Cropping System: Animal husbandry**

<i>Strength</i>	<i>Weakness</i>
<ul style="list-style-type: none"> <li>➤ Source of supplementary income.</li> <li>➤ Large number of live stock population.</li> <li>➤ Only source of animal protein for vegetarian people.</li> <li>➤ Renewable source of energy</li> </ul>	<ul style="list-style-type: none"> <li>➤ More than 90% livestock owners are sending their animals for grazing.</li> <li>➤ Large number of animals with low production capacity and health problems</li> <li>➤ Lack of scientific calf rearing</li> <li>➤ Feed problem during summer</li> <li>➤ Problem of sexual health: anoestrus, repeat breeding, metritis, cervicitis, etc</li> <li>➤ Higher age at first calving, longer dry period and service period.</li> </ul>
<i>Opportunities</i>	<i>Threats</i>
<ul style="list-style-type: none"> <li>➤ Scope for Breed improvement.</li> <li>➤ The milk production can be increased substantially through better health and feed management.</li> <li>➤ Cooperatives may provide good marketing facilities.</li> <li>➤ Better utilization of farm bye product</li> </ul>	<ul style="list-style-type: none"> <li>➤ Most of the geographical area is cultivated and rest is under forest, there is very limited area under pasture and there is very limited scope for bring area under pasture development.</li> <li>➤ Increasing milk production through breed improvement is a very long process.</li> <li>➤ Reducing large numbers of low yielding animals is also a bigger threat.</li> </ul>

**Table 3.3.4: Farming system: Fisheries**

**i. Cropping System: Fisheries**

<i>Strength</i>	<i>Weakness</i>
<ul style="list-style-type: none"> <li>➤ Jamnagar having longest seashore which is suitable for marine fishing</li> <li>➤ Good qualities of fishes are available at the west coast. Knowledge &amp; skills for fish culture rearing.</li> <li>➤ All family members are involved.</li> <li>➤ Sea coast provides very well facilities for fishing.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Lack storage facilities</li> <li>➤ No risk bearing ability in fishery business.</li> <li>➤ Socio-economic status is poor.</li> <li>➤ Not well established market for small fishermen.</li> <li>➤ Non availability of fish processing unit in the district</li> </ul>

<i>Opportunities</i>	<i>➤ Threats</i>
<ul style="list-style-type: none"> <li>➤ Great opportunity around Sikka region for cultured pearl.</li> <li>➤ Specific kind of fish available in the district</li> <li>➤ Technical support is easily available by the department.</li> <li>➤ There is great opportunity for export as district have large number of small and medium size ports</li> </ul>	<ul style="list-style-type: none"> <li>➤ Low market price.</li> <li>➤ Working days are very limited during the year because of natural calamities</li> <li>➤ Technical know-how is very poor.</li> <li>➤ Most of the fisherman are illiterate</li> <li>➤ Poor financial capacity.</li> </ul>

### 3.4 Sectoral/ Regional Growth Drivers of the District

Groundnut farming and processing, cotton seed and groundnut oil cattle feed and poultry farm absorbent cotton and surgical cotton bandage.

#### I Agriculture:

1. The economy of Jamnagar is mainly based on agriculture. Increasing area under hybrids/ high yielding varieties in cotton, castor, bajra and improved variety in wheat, gram & cumin.
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 Trichoderma for management of soil born diseases in groundnut.
11. Manufacturing and repairing units of agriculture equipments/ implements and agricultural machine parts.

#### 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.

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## 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. Hightech green house for floriculture development.
5. Export oriented unit for horticulture crop
6. Harvesting and post harvesting techniques for fruit crops.
7. 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.



**Fishing Boat**

## CHAPTER IV

## DEVELOPMENT OF AGRICULTURE SECTOR

**4.1: Introduction**

Jamnagar district is a rural dominating district with 56 per cent population resides in rural area having major source of income from agriculture and allied sector. The district falls under North Saurashtra Agroclimatic zone. The soil topography, resource availability is different in all the ten taluka of the district. The land of Jamnagar, Kalavad, Dhrol, lalpur, Jam-Jodhpur, Jam-Khambhaliya and part of Bhanvad having shallow depth medium black soil. While the soils of Jodiya, Okha, part of Jamkhabhaliya and Jamnagar are having a long costal region with salinity and alkalinity type soil. The soil is poor in organic carbon, nitrogen, phosphorous and rich in potash. The Jamnagar and Kalavad taluka comparatively higher irrigation facility than the other taluka and major source of irrigations are tube well and open well. The Okha have least irrigation facility followed by Dhrol and Jodiya. Since introduction of Bt cotton in almost all the talukas the area of groundnut replaced by Bt cotton. Due to introduction of Bt cotton the rural standard of living has been improved significantly. In this chapter, issues relating to utilization of natural resources available in the district and input management for the development of agriculture sector are discussed.

**4.2: Land use**

Total geographical area of the district is about 10 lakhs hectares. It is noteworthy to find that 62.00% of the geographical area is under cultivation in the district 8 talukas out of 10 talukas have about 60% of their geographical area under cultivation. However, the coverage of forest area is only 4 % and hence, there is need to increase the coverage of forest. The district has only 4% of fallow land. Pasture land forms 8% of geographical area.

**4.3: Soil type and soil health management:**

The district has long coastal line area and the soil along this coastal lines have problem of salinity due to intrusion of sea water. The soils of southern belts are medium black type with low in organic carbon, nitrogen and phosphorus and medium with potash content. The land of northern belts of Lalpur, Jam-Jodhpur, Bhanvad, Jamkalyanpur and Kalavad are slopy in nature where soil erosion is major problems and have shallow depth. The deficiency of micronutrients Zinc and iron is increasing day by day. Application of nutrients based on soil testing, use of bio-fertilizers, crop residue management, use of organic fertilizers, green manuring in irrigated area, land leveling and crop rotation will help in restoration of soil health.

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**Table 4.3.1: soil type in the district with fertility status in the district**

Sr. No	Soil type	Characteristics	Area in ha
1	Medium black to Shallow black soils	Shallow type medium black soil with medium fertility, low water holding capacity	<b>59.0%</b>
2	Coastal alluvial soils	Alkaline and saline soil with low fertility with poor drainage	<b>34.1 %</b>

### 4.4: Water Resource Management

The district is having total irrigated area of 213016 hectares Among different sources of irrigation, the major sources are bore well and open wells (193995 ha) followed by canals (12040 ha.) and ponds (5340 ha.). The major part of district comes under arid zone, lack of adoption of water harvesting practices and limited area in district are under irrigation. The scarcity of irrigation water in all the talukas 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 and by adopting drip irrigation system particularly in horticultural and vegetable crops. Specific extension activities are being proposed on these important aspects in the plan.

### 4.5: Major Crops and Varieties in the District

The major field crops cultivated in *Kharif* season are Bt Cotton, groundnut, castor, sesame, pulse and fodder crops. Wheat, gram, cumin, garlic and vegetables are the important *Rabi* crops of the district. 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. The measures to bridge the gaps have been suggested.

**Table 4.5.1 : Major crops and their varieties cultivated in the district**

Sr. No.	Crop	Varieties
1.	Cotton	Bt hybrids of private sector
2.	Groundnut	GG 2, GG 20, TG 37, GG 5
3.	Castor	GAUCH 1, GCH 4, GCH-6, GCH 7 and other private hybrids
4.	Sesame	Gujrat til 1 and Gujarat til 2
5.	Fodder crops	Local varieties of sorghum, lucern and others.
6.	Pulses	Mostly local type
7.	Wheat	GW 496, GW 322, Lok 1
8.	Gram	GG-1, GG-2, GG-3 and Local varieties
9.	Green gram	GM-4, K-851
10	Urd bean	T-9, Guj Urdbean-1
11	Cumin	GC-2 and GC-4
12	Garlic	GG-3, GG-4 and local type
13	Onion	Talaja local, Nasik red and other local type

#### **4.5.1 Cropping pattern:**

Major Cropping sequences in vogue in the district are given below:

- i. Groundnut
- ii. Groundnut - Wheat
- iii. Cotton
- iv. Cotton – Summer Groundnut/ Summer Sesame/ fodder
- v. Groundnut - Wheat - Summer Pulses (urd bean or green gram)/ Summer Bajra
- vi. Pearl Millet -Summer Groundnut /Summer pulses
- vii. Pulses- Wheat/gram- Summer Black gram/ Summer Groundnut
- viii. Groundnut – Castor/Ajwan
- ix. Groundnut – Onion / Garlic
- x. Groundnut – Summer Sesame

#### **4.6: Farm Mechanization/Farm Equipments**

The district is very poor in farm mechanization and labour in most of the part of the district and major labour force comes from the tribal area of Gujarat. There is acute need of mechanization for harvesting of groundnut and cotton. The farmers in many taluka are still using bullock drawn traditional 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. The district is having 8023 tractors/ trailers, 3203 threshers & decorticcutters, 68883 agricultural pump sets and energized pump sets. There is an immense scope for farm mechanization in the district. Though most of the farmers during rabi seasons harvest wheat crops through mechanized harvesting machines.

#### **4.7: 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.

##### **4.7.1. Good quality seed**

Good 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 only one 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 pulses, cumin, garlic and fodder crops. Series of steps have been suggested in this plan to overcome the situation

##### **4.7.2. Fertilizers**

Next to irrigation, fertilizer is second most important input for the cultivation of high yielding varieties contribute about 40 % in crop yield. The timely availability of fertilizer is a major constrain. The reason is not only the short supply but due to poor economic condition of farmers rush to purchase

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at time of sowing. Further, the co-operative structure is very weak in the district. If it is being strengthened and purchase of the fertilizers is done well in advance, the problem can be solved. Due to decrease in the use of organic manures and continuous growing of high yielding Bt cotton varieties in same field, led to deficiencies in micronutrients like Zn and Fe. Therefore, location specific integrated nutrient management, use of bio-fertilizers; FYM and vermi-composting are required to be popularized for wider adoption.

**Table 4.7.2.1: Fertilizer consumption ( in MT) in the district during 2011-12**

Taluka	Consumption of Fertiliser during 2011-12						
	Urea	DAP	MOP	SSP	Complex	Mixture	Total
Jamnagar	15232	6556	2013	616	1783	720	26920
Lalpur	3745	2298	50	285	431	350	7159
Jam Jodhpur	8599	4113	201	243	1798	530	15484
Bhanvad	3314	2287	74	258	800	400	7133
Kalyanpur	1267	2643	0	73	317	300	4600
Okha	491	272	0	0	0	200	963
Khambhaliya	4787	3202	158	221	1280	800	10448
Jodia	6528	1975	0	0	2252	300	11055
Dhrol	6584	3435	104	224	1435	400	12182
Kalawad	16505	7356	222	589	3469	600	28741
<b>Total</b>	<b>67052</b>	<b>34137</b>	<b>2822</b>	<b>2509</b>	<b>13565</b>	<b>4600</b>	<b>124685</b>

Source: Office of the Deputy Director quality control, Department of Agriculture, Jamnagar

The total fertilizers consumption of Jamnagar district was 124685 MT in the year 2011-12. Due to good & regular rainfall during last eight years and increase in irrigation facility resulted in increase in the fertilizer consumption in the district. The requirement of fertilizers increased with the increasing awareness about use of fertilizers and availability in the market.

### 4.7.3. Plant protection chemicals

The crop diseases, insect pests and weeds are other major problems in realizing optimum yield for all the crops in the district. The improper management of these control measures often results into increased cost of cultivation without much benefit in yield. In *Bt* cotton, cotton Jassids and other sucking pests including mealy bugs is major threat. Farmers are mainly depending on chemical control method with higher doses of chemicals. In groundnut, leaf eating cater pillar & sucking pests, stem rot & Afla rot diseases are the major problems. In vegetables, the farmers are depending mainly on chemical control with higher doses of chemicals, hence, 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. Total pesticide market of the district in the year 2011-12 was of rupees' 424 lakh. Among this major consumption of insecticides (61 %), followed by fungicides (21 %), herbicides (14 %), plant growth regulators (3 %) and seed treatment (1 %). The proportion of use of seed treatment chemicals is very low in the district. Hence effort should be made to popularize the seed treatment technology for effective management of pests & diseases and judicious use of the pesticides.

**Table : 4.7.3.1 : Pesticides use in the district**

Pesticides	Rs. in lakh
Insecticides	260
Fungicides	90
Herbicides	60
Plant growth regulators	10
Chemicals for seed treatment	4
<b>Total</b>	<b>424</b>

Source: QCI, Jamnagar

#### 4.8. Integrated Weed Management (IWM)

Weed is a major problem in the rain fed farming situation, if continuous rain exist for several days, the farmers are unable to remove weed with the help of human labour. Further, shortage of labours and high wages of labour, weeding is become costlier. It is also observed that farmers are using poor spraying techniques thereby low efficiency of applied herbicides is achieved. Hence, it is proposed to train farmers by organizing trainings on spraying techniques and integrated weed management techniques as proposed in this chapter.

#### 4.9 Existing Institutional Mechanism

The present institutional mechanism in Government sector is centralized in nature with Top-down approach. This approach focuses on individual commodities / enterprises rather than on a holistic / integrated approach. The involvement of stakeholders is rather restricted in this ad-hoc mechanism where farmers are considered as receivers of benefits rather than as responsible persons who can influence the productions process. The public extension system is supply driven rather than demand driven.

The institutional mechanism and conceptual frame work of Government sector extension is being gradually transformed under the aegis of Agricultural Technology Management Agency (ATMA) in the district. The impact of this transformation is yet to be seen in the actual working of different Government departments and others involved in it.

##### 4.9.1: KRISHI VIGYAN KENDRA

Krishi Vigyan Kendra is one of the important institution in the district under Junagadh Agriculture University, which involved in transfer of technology related to agriculture and related occupations.

1. Conducting the “On farm testing” for identifying technologies in terms of location specific sustainable land use systems.
2. Organize training to update the extension personnel with emerging advances in agricultural research on regular basis.
3. Organize short and long term vocational training courses in agriculture and allied sectors for the farmers and rural youth with emphasis on “Learning by doing” for higher production and generating self employment.
4. Organize the front line demonstration on various crops for generating production data and feedback information.
5. KVK should work as Knowledge power centre for the district



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### 4.10 Special projects / programmes on going in the district

State as well as centrally sponsored schemes are running in the state for farmers of weaker sections i.e., small and marginal farmer, poor farmers. 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 individual farmers at subsidize rates. The efficacy of those schemes is limited to certain groups of farmers. There is lacking of benefit to the other big farmers. So, there is a need of introduce schemes for the farmers comprehensively. The details of ongoing programmes are as below:

**Table : 4.10.1 : Ongoing scheme in the district**

Department of Agriculture (DAO)		District Rural Development Agency	
SN	Name of scheme	SN	Name of scheme
1	AGR-1 : Agri. Deve.	1	Swarn Jayanti Gram Swarozgar Yojana (S.G.S.Y.)
2	AGR-2 : Marginal farmers	2	Indira Awaas Yojana (IAY) (New Awaas)
3	AGR-4 : Schedule Caste farmers	3	National Rural Employment Guarantee Act. (N.R.E.G.A.)
4	AGR-5: Intensive Cotton Dev. Project (Mini mission)	4	Indira Awaas Yojana (IAY) (Up-gradation)
5	AGR-6 :ISOPOM (Oil seeds)	5	Total Sanitation Components Yojana (T.S.C.)
6	NFSM: National food security mission	6	Gokul Gram Yojana (G.G.Y.)
7	AGR-50 : Tractor help scheme	7	Sakhi Mandal Yojana
8	RKVY-Farm mechanization	8	Hariyali (DWDU)
9	RKVY special scheme	9	IWDP (DWDU)
10	Farmers accident insurance	<b>Department of Animal Husbandary</b>	
<b>Department of Horticulture</b>		1	ANH-2 : Veterinary Dispensary Organization of animal health camps
1	HRT-1- Normal	2	ANH-5 : a. Supply of liquid nitrogen & semen b. Infertility camp
2	HRT-2- Integrated Horticulture Development Programme		
3	HRT-2 – Horticulture Mission mode – Assistant in non NHM district	3	ANH-8 : a. Health package for milk animals of SC b. Subsidy for milch unit : NABARD patterns
4	HRT-4- Schedule cast		
5	HRT – 5- Training on fruit & vegetable preservation	4	ANH-9 : Integrated fodder & gauchar devel. Scheme (SC) Distribution of fodder minikits, subsidy for chaff cutter etc.
6	HRT – 7 – Promotion of medicinal & aromatic plant and floriculture in the district		
7	HRT – 8 – Horticulture development in the state	5	ANH-12 : a. Subsidy for goat (10-1) SC b. Subsidy for goat (100-1)

Cont.

	<b>Department of Fishery</b>	6	DSM-1 (Naw) : Cattle insurance for SC
1	Matsya vechan sahay		DSM-1 (001) : Health package (Gen.)
2	boat -Net	7	Instrument for clean milk production
3	Plastic crate Aqu.hatchery		
4	Reservoir stocking Training	8	Chaff Cutter Scheme
			Chaff cutter (Round wheel)
			Chaff Cutter (Manually operated)
5	Modern Eqp.sahay Cycle Net sahay		Chaff cutter (Round wheel) - SC
			Chaff Cutter (Manually operated) - SC
6	O.B.M.	9	Cattle Shed Assistant Scheme
7	Cold storage		

**Source:** DAO, DyDH, DyDAH, DyDF and DRDA, Jamnagar

#### 4.11: Constraint Analysis

The reasons for the yield gaps are identified and the requisite interventions are planned using participatory processes involving stakeholders. The major constraints leading to yield gaps are undulating land, fragmented land holdings, limited irrigation facility, poor economic condition of the farmers, use of inferior quality seeds of local varieties, lack of knowledge regarding scientific cultivation of crops. Sloppy land and erratic rainfall in part of Jam Jodhpur, Kalavad, Lalpur, Kalaynpur & Bhanvad taluka led to continuous soil erosion resulted in low organic carbon content in the soil. Lack of proper management of water and non adoption of water saving system like drip irrigation, growing of second crop is not possible. Even in the irrigated area like Jamnagar and Kalavad, the cropping intensity is comparatively less. Another important issue is the post harvest processing and the marketing of the produce. Jodia & Okha taluka have no agriculture marketing facilities available at taluka level. Farmers are selling their produce to the local dealers. Availability of seeds and other inputs in time is also one of the important constraints in the district. The poor farm mechanization even with the small farm implements is also important constraint for higher cost of cultivation. The analysis of sustainability issues and reasons for gaps in the productivity of major crops grown in the district are presented in following pages.

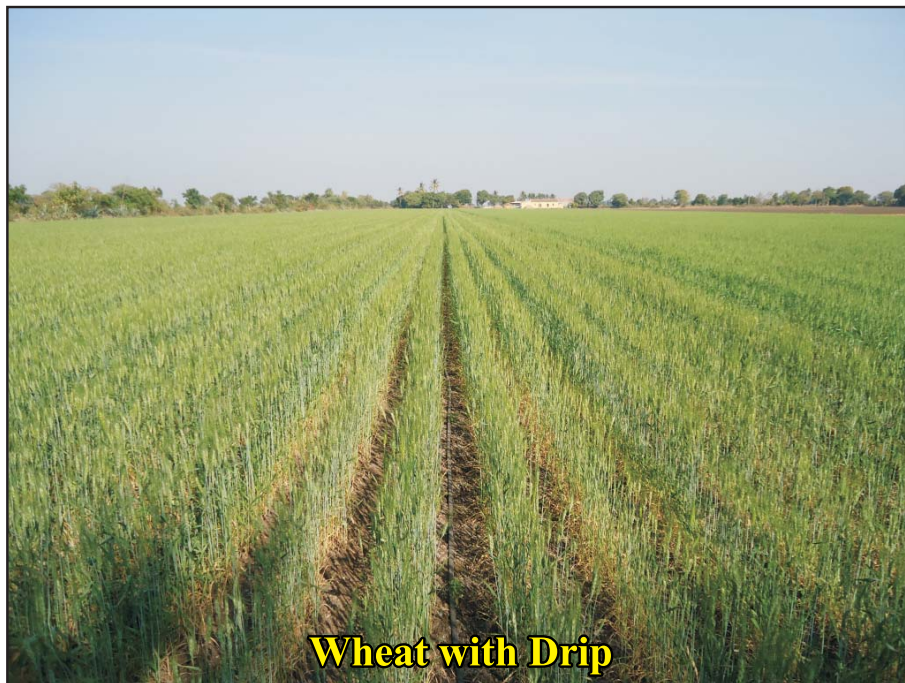
##### 4.11.1: Constraints in Agricultural Progress

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

- i. Undulating and fragmented land
- ii. Small farm holdings.
- iii. Literacy rate is low and poor economic condition of the farmers
- iv. Limited irrigation facilities
- v. Inadequate availability of quality seeds in time
- vi. Use of inferior quality seeds of local varieties

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- vii. Lack of integration among different agricultural enterprises
- viii. Rain fed farming in 50% per cent area
- ix. Degradation of land due to continuous soil erosion
- x. Low cropping intensity even in irrigated area
- xi. Soil is low in organic carbon and medium in phosphorus
- xii. Increase in micronutrient deficiency
- xiii. Low use of organic fertilizers
- xiv. Poor farm mechanization
- xv. Weed problem in rain fed farming and high density crop
- xvi. Insect pests and disease problems in crops
- xvii. Lack of post harvest management of the produce
- xviii. Poor marketing of the produce
- xix. Lack of farm finance and lack of knowledge regarding credit utilization
- xx. Inadequate availability of inputs in time
- xxi. Poor co-operative network
- xxii. Lack of motivation in SHGs and FIGs with respect to income generation/activities
- xxiii. Problematic soil in Jodia, Khambhaliya, Kalyanpur & Okha taluka due to ingress of salinity.
- xxiv. Problem of wild cow and pig in all the taluka.



**Table 4.11.1.1: 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
<b>1.</b>	<b>Cotton</b>					
a.	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 sustainability, Approximately productivity will be increased up to 5 %
b.	Weed problem	Due to lack of knowledge about scientific weed management	To popularize Integrated weed management	Creating awareness through demonstration, training, shibir, literature etc.	Reduction in weed menace and increase in productivity	Productivity growth in sustainability, Approximately productivity will be increased up to 2 %
c.	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
d.	Reddening of cotton	Due to micronutrient deficiency	Spraying of potassium nitrate and other micronutrients	Creating awareness and adoption of INM through demonstrations, training, etc	Increase in productivity	Productivity growth in sustainability
e.	Quality seeds in time	Non availability of seed selling center of Gujarat seed certification agency	Establishment of seed selling counters by Gujarat State seed certification Agency at taluka level	Creating awareness for quality seeds and establishment of seed selling counters	Timely sowing of quality seeds leads to better harvest	Increase in productivity
<b>2.</b>	<b>Groundnut</b>					
a.	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	Increase in productivity

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b.	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 demonstrations, training, shibir, literature etc.	Management of insect pests and diseases leads to increased yield	Productivity growth in sustainability
<b>3. Sesame</b>						
a.	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
b.	Low adoption of improved package practices	Lack of awareness	To popularize scientific package of practices	Creating awareness and adoption of scientific package of practices through demonstrations, training, field days, shibir, literature etc	Increase in the production	Productivity growth in sustainability
c.	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 demonstrations, training, shibir, literature etc.	Management of insect pests and diseases leads to increased yield	Productivity growth in sustainability
d.	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 thinning and land configuration through demonstrations, training, shibir, literature etc	Increase in yield	Increase in productivity
<b>4 Castor</b>						
a	Low adoption of hybrid varieties & package of practices	Lack of awareness	To popularize scientific package of practices	Creating awareness and adoption of scientific package of practices through demonstrations, training, field days, shibir, literature etc	Increase in the production	Productivity growth in sustainability

b	Improper seed setting	Lack of awareness	To popularize the adoption of certified hybrid seeds	Creating awareness and adoption of scientific package of practices through demonstrations, training, field days, etc	Increase in the production	Productivity growth in sustainability
c	Pests problem	Lack of awareness	To popularize the IPM of castor pests	Creating awareness and adoption of IPM through demonstrations, training, field days, shibir, literature etc	Increase in the production	Productivity growth in sustainability
<b>5. Bajra</b>						
a	Low adoption of improved package of practices	Lack of awareness	To popularize scientific package of practices	Creating awareness and adoption of scientific package of practices through demonstrations, training, field days, shibir, literature etc	Increase in the production	Productivity growth in sustainability
b	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 demonstrations, training, shibir, literature etc.	Management of insect pests and diseases leads to increased yield	Productivity growth in sustainability
d	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 thinning and land configuration through demonstrations, training, shibir, literature etc	Increase in yield	Increase in productivity

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6. Wheat						
a	Use of inferior quality seeds of local variety	Lack of awareness	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 through demonstration Innovate the progressive farmers for seed production at village level	Increased area under improved variety	Increase in productivity
b	Limited irrigation facility	Lack of knowledge of critical stages	Application of water at critical stages	Create awareness about critical stages through demonstration	Increase in yield	Increase in productivity
c	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
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	Increase in productivity

<b>8. Sorghum</b>						
a.	Use of inferior quality seeds of local variety	Lack of awareness	Increase seed replacement ratio and quality seed production through seed village	Create awareness about the importance of improved variety as worthiness of variety through demonstration	Increased area under improved variety	Increase in productivity
<b>9. Cumin</b>						
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, powdery mildew and wilt problem	Lack of awareness regarding disease outbreaks	To popularize the IDM technology  Strengthen disease forecasting system	Creating awareness through demonstrations, training, shibir, literature etc.	Increased yield	Productivity growth in sustainability
<b>10 Green gram</b>						
a.	Problem of viral diseases	Use of susceptible local seeds, poor management practices	Popularize tolerant varieties and management practices	Creating awareness through demonstrations, training, shibir	Increased production of pulses	Productivity growth in sustainability
<b>11 Garlic</b>						
a.	Problem of thrips & purple blanch	Lack of knowledge of pests & disases identification	Popularize the IPM /IDM technology	Creating awareness through demonstrations, training, shibir	Increased production of garlic	Productivity growth in sustainability



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**Table 4.11.1.2: Bridging the gaps for realizing the Vision- Agriculture sector**

No .	Thrust Areas/ Issues	Program	Activities	Concerned Agencies/ collaborators	Approach
1	Increase availability of quality seeds /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 rogrammes, capacity building of farmers and extension functionaries and exposure visits	Gujarat State Seed Certification Agency /DAO/ATMA KVK/FTC (Capacity building)	Capacity building Taluka-wise Seed production programmes will be under taken
			Establishment of seed selling units	DAO/ Gujarat State Seed Corporation/ co-operative societies/ SHGs/NGOs/FlGs	
		Seed bank/ seed storage	Construction of godowns at village and taluka level	Gujarat State Seed Certification Agency /DAO/ATMA	Monitoring/ Construction of godowns
		Variety Evaluation	Identification of high yielding varieties	KVK/ATMA/ DAO/SAU	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	Identific-ation of areas	Create awareness about the improved seeds	DAO/KVK/ ATMA/FTC/N GOs	Training and Kisan Gosthies
			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 managemen t	Soil testing	Establishment of soil and water testing laboratory at taluka level and mobile soil testing laboratory	DAO/APMC/ NGOs	Establishment of soil and water testing laboratory
			Create awareness about the importance of soil testing	DRDA/KVK/A TMA/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 vermi-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 Demonstration
		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 demonstrations
		Soil erosion	Land leveling and bund formation Growing cover crops and vetiver	GLDC/DAO/Irrigation department/ATMA/FTC/NGOs/DWDU	Land leveling Demonstrations
		Recycling of crop residues	Converting of crop residue in small pieces 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 recharging Khet talavadi/ mini pond	GLDC/DWDU/WASMO and DAO/irrigation department/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	DRDA/DWDU/irrigation department/WALMI	Formation of society
			Moisture conservations through organic and plastic mulch	DRDA/KVK/ATMA/FTC/NGOs	Training and demonstrations

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5.	Plant health management	Plant health clinic	Establishment of plant health clinic at KVK and mobile health clinic at taluka level	KVK and DAO	Establishment of plant health clinic
		IPM	Educating the farmers about various insect pest and diseases of crops and their IPM Through demonstration and training	KVK/DRDA/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 training regarding judicious use of pesticides	DRDA/KVK/FTC/ ATMA/ NGOs	Trainings, demonstrations farmers' field schools and units (80%)
		IWM	Educate the farmers about integrated weed management practices	DRDA/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	DRDA/ NGOs/ co-operatives/ TSP/KVK/ FTC/ATMA	
		Hand rotary weeder, Power tiller Shredder Farm tractors, Mechanical harvesters, Oil engines, pumps, submersible pumps, Laser land leveler, Bullock cart	Educate the farmers and providing units on individual or co-operative basis	DRDA/DRDA/TSP	Training and providing subsidiary for purchase of units. Providing units to Co-operatives and utilization on hiring basis
7	Value addition	Processing Units	Establishment of Dal mill/ cotton ginning/ cleaning, grading and packaging unit of wheat	DRDA/TSP/ DRDA	Establishment of units and training
8	Marketing	Strengthening APMC and construction of ware houses at cluster and taluka levels	Establishment of ware house at cluster and taluka level	TSP/DRDA/ DRDA	Establishment of ware house at taluka level
		Market linkage	Strengthening market linkage through AGMARK net	DRDA /TSP / DRDA	Establishment of e-connectivity at APMC
		Collection van	Collection of agril produce & monitoring	DRDA/TSP/ DRDA	Units

9.	Improvement of problematic soil in coastal region	Strengthening soil testing programme	Establishment of soil & water testing laboratory	DRDA/APMC	Establishment of soil & water testing laboratory
	Reclamation of alkaline & saline soil	Use of soil amendment	Educate the farmers for soil amendment	DRDA/KVK/ATM A	Reclamation of the soil through soil amendment
	Salt tolerance varieties	Sowing of salt tolerance varieties in saline/alkaline soil	Develop salt tolerance varieties & popularize the salt tolerance varieties among the farmers	DRDA/KVK/SAUs	Popularize the salt tolerance high yielding varieties of the crops

**Table 4.11.1.3: Yield gap analysis of Jamnagar district**

Crop	Three Year (2009-12) Average Yield in kg/ha		Yield gap in kg/ha
	District	State	
<b>Kharif</b>			
Bajra	1211	981	230
Mung	433	438	-5
Urd	657	596	61
Cotton (lint)	790	719	71
Groundnut	1635	1380	255
Sesame	519	383	136
Castor	3191	1945	1246
<b>Rabi</b>			
Wheat	3415	2908	507
Gram	1380	1004	376
Mustard & rape seed	1430	1458	-28
Cumin	596	557	39
Onion	22750	27641	-4891
Potato	22168	22160	8
Garlic	5921	6350	-429
<b>Summer</b>			
Bajra	2373	2373	158
Ground nut	2099	1801	298

**Source:** District-wise Area, Production and Yield of Important Food & Non-food Crops in Gujarat State, Year: 2009-10, 2010-11 and 2011-12, Directorate of Agriculture, Gujarat State, Krishi Bhavan, Sector-10/A, Gandhinagar

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### 4.11.2: Area, Production, Productivity of major crops of the district

The Area, production and productivity of main crops of the district with the projected planning for 12<sup>th</sup> five year planning, Crop diversification plan for next 5 years and proposed area under crop production tools are presented in Tab. 4.11.2.1, Tab. 4.11.2.2 and Tab. 4.11.2.3 respectively. During the year 2009 to 2012 major area was under kharif groundnut as 308950 ha followed by cotton as 230980 ha. In rabi season major area was under cumin crop (46000 ha) followed by wheat as 29200 ha. Crop Diversification Plan was proposed for major crops of the district. Different crop production tools like improved variety, Seed treatment, Biofertiliser, IPM, INM, Gypsum, etc were proposed for pulses, oilseeds for Higher seed production and to increase the awareness of farmers.

**Table 4.11.2.1: Area, Production, Productivity of major crops of the district**

(A= Area in ha, P= production in MT, Y= Yield in q/ha)

Crop	Average of three years			Projected					
	2009-10 to 2011-12			2012-13			2013-14		
	A	P	Y	A	P	Y	A	P	Y
Cotton	230980	490607	21.50	280000	587.250	21.75	265000	577700	21.80
Groundnut	308950	413993	13.40	280000	385.000	13.75	270000	372600	13.80
Wheat	29200	93732	32.10	29500	94825	32.15	30000	96600	32.20
Cumin	46000	143740	31.90	45000	144225	32.05	42000	134820	32.10
Sesame	11800	7021	5.95	12000	7260	6.05	16000	9760	6.10
Bajra	5900	9307	15.78	6000	9690	16.15	6250	10313	16.50
Castor	6300	20700	32.55	6500	21450	33.00	6750	22612	33.50
Crop	Projected								
	2014-15			2015-16			2016-17		
	A	P	Y	A	P	Y	A	P	Y
Cotton	270000	589950	21.85	280000	613200	21.90	280000	616000	22.00
Groundnut	275000	382250	13.90	270000	375300	13.90	270000	378000	14.00
Wheat	30000	96750	32.25	32000	103200	32.25	31000	102300	33.00
Cumin	45000	144225	32.05	46000	147660	32.10	46000	147660	32.10
Sesame	16000	9840	6.15	15750	9765	6.20	16000	10000	6.25
Bajra	6500	11148	17.15	6750	11813	17.50	7000	12425	17.75
Castor	7000	23800	34.00	7250	25012	34.50	7500	26250	35.00

**Source:** District Agriculture Officer, District Panchayat, Jamnagar

Table 4.11.2.2: Crop Diversification Plan in next 5 years

Existing cropping pattern		Crop Diversification proposed (Area in ha)									
Crop group	Area (Average of 2009-2012)	2012-13 (projected)		2013-14 (projected)		2014-15 (projected)		2015-16 (projected)		2016-17 (projected)	
		Area under crop	Change in area with reference to 09-12 (+/-)	Area under crop	Change in area with reference to 09-12 (+/-)	Area under crop	Change in area with reference to 09-12 (+/-)	Area under crop	Change in area with reference to 09-12 (+/-)	Area under crop	Change in area with reference to 09-12 (+/-)
Cotton	230980	280000	49020	265000	34020	270000	39020	280000	49020	280000	49020
Groundnut	308950	280000	-28950	270000	-38950	275000	-33950	270000	-38950	270000	-38950
Wheat	29200	29500	300	30000	800	30000	800	32000	2800	31000	1800
Cumin	46000	45000	-1000	42000	-4000	45000	-1000	46000	0	46000	0
Sesame	11800	12000	200	16000	4200	16000	4200	15750	3950	16000	4200
Bajra	5900	6000	100	6250	350	6500	600	6750	850	7000	1100
Castor	6300	6500	200	6750	450	7000	700	7250	950	7500	1200

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**Table 4.11.2.3: Proposed area under crop production tools (ha)**

Crop /Area under crop (ha)	Type of crop production tool	Area under crop production tools (ha) (2009-12)	Proposed area under crop production tools (ha)				
			2012-13	2013-14	2014-15	2015-16	2016-17
Oilseeds/ 327050	Imp. Var	295000	295500	295700	295850	296025	296150
	Seed treatment	165000	165500	165700	165850	166025	166150
	Biofertiliser	95000	95500	95700	95850	96025	96150
	IPM	58600	59100	59300	59450	59625	59750
	INM	115000	115500	115700	115850	116025	116150
Cereals/ 35100	Gypsum	10000	10500	10700	10850	11025	11150
	Biofertiliser	25000	25500	25700	25850	26025	26150
	INM	18000	18500	18700	18850	19025	19150
	IPM	6000	6500	6700	6850	7025	7150
Cotton/ 230980	Imp. Var	225000	225500	225700	225850	226025	226150
	Seed treatment	175000	175500	175700	175850	176025	176150
	IPM	125000	125500	125700	125850	126025	126150
	INM	160000	160500	160700	160850	161025	161150

Imp. Var.= Sort supply of Improved seeds.

Seed Treat.= Lack of awareness.

Bio. Fer.= Lack of awareness.

IPM+= Lack of awareness.

INM= Less availability of manures.

Gypsum= Lack of awareness and short supply of gypsum

Imp. Var.= Higher seed production in vast area.

Seed treat.= To increase the awareness of farmers through State level and university.

Bio Fer.= To increase the awareness of farmers through State level and university.

### 4.12 Activities for development of agriculture sector

Under the Development of Agriculture Sector different activities pertaining to training of agriculture staff, farmers, demonstrations on different latest technologies like IPM, IWM, INM, etc are given with financial planning for XII five year plan. The details are presented in Table 4.12.1 to 4.12.3.

**Table 4.12.1: Training Proposal for Capacity Building (at taluka level)**  
(Phy-No. of trainees, Fin. – Rs in lakhs)

Agriculture related	Year-wise number of staff 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.
Jamnagar	25	0.2	25	0.2	25	0.2	25	0.2	25	0.2	125	0.75
Lalpur	20	0.1	20	0.1	20	0.1	20	0.1	20	0.1	100	0.6
Jam Jodhpur	20	0.1	20	0.1	20	0.1	20	0.1	20	0.1	100	0.6
Bhanvad	18	0.1	18	0.1	18	0.1	18	0.1	18	0.1	90	0.54
Kalyanpur	22	0.1	22	0.1	22	0.1	22	0.1	22	0.1	110	0.66
Okha	15	0.1	15	0.1	15	0.1	15	0.1	15	0.1	75	0.45
Khambhaliya	25	0.2	25	0.2	25	0.2	25	0.2	25	0.2	125	0.75
Jodia	15	0.1	15	0.1	15	0.1	15	0.1	15	0.1	75	0.45
Dhrol	15	0.1	15	0.1	15	0.1	15	0.1	15	0.1	75	0.45
Kalawad	25	0.2	25	0.2	25	0.2	25	0.2	25	0.2	125	0.75
<b>Total</b>	<b>200</b>	<b>1.2</b>	<b>200</b>	<b>1.2</b>	<b>200</b>	<b>1.2</b>	<b>200</b>	<b>1.2</b>	<b>200</b>	<b>1.2</b>	<b>1000</b>	<b>6</b>

(Table 4.12.1 Continue....)

Co-operatives & NGOs	Year-wise number of staff 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.
Jamnagar	20	0.12	20	0.12	20	0.12	20	0.12	20	0.12	100	0.60
Lalpur	15	0.09	15	0.09	15	0.09	15	0.09	15	0.09	75	0.45
Jam Jodhpur	18	0.11	18	0.11	18	0.11	18	0.11	18	0.11	90	0.54
Bhanvad	15	0.09	15	0.09	15	0.09	15	0.09	15	0.09	75	0.45
Kalyanpur	13	0.08	13	0.08	13	0.08	13	0.08	13	0.08	65	0.39
Okha	13	0.08	13	0.08	13	0.08	13	0.08	13	0.08	65	0.39
Khambhaliya	12	0.07	12	0.07	12	0.07	12	0.07	12	0.07	60	0.36
Jodia	12	0.07	12	0.07	12	0.07	12	0.07	12	0.07	60	0.36
Dhrol	12	0.07	12	0.07	12	0.07	12	0.07	12	0.07	60	0.36
Kalawad	20	0.12	20	0.12	20	0.12	20	0.12	20	0.12	100	0.60
<b>Total</b>	<b>150</b>	<b>0.9</b>	<b>150</b>	<b>0.9</b>	<b>150</b>	<b>0.9</b>	<b>150</b>	<b>0.9</b>	<b>150</b>	<b>0.9</b>	<b>750</b>	<b>4.5</b>



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(Table 4.12.1 Continue....)

PRI staff & others	Year-wise number of staff 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.
Jamnagar	20	0.12	20	0.12	20	0.12	20	0.12	20	0.12	100	0.60
Lalpur	15	0.09	15	0.09	15	0.09	15	0.09	15	0.09	75	0.45
Jam Jodhpur	18	0.11	18	0.11	18	0.11	18	0.11	18	0.11	90	0.54
Bhanvad	15	0.09	15	0.09	15	0.09	15	0.09	15	0.09	75	0.45
Kalyanpur	13	0.08	13	0.08	13	0.08	13	0.08	13	0.08	65	0.39
Okha	13	0.08	13	0.08	13	0.08	13	0.08	13	0.08	65	0.39
Khambhaliya	12	0.07	12	0.07	12	0.07	12	0.07	12	0.07	60	0.36
Jodia	12	0.07	12	0.07	12	0.07	12	0.07	12	0.07	60	0.36
Dhrol	12	0.07	12	0.07	12	0.07	12	0.07	12	0.07	60	0.36
Kalawad	20	0.12	20	0.12	20	0.12	20	0.12	20	0.12	100	0.60
<b>Total</b>	<b>150</b>	<b>0.9</b>	<b>150</b>	<b>0.9</b>	<b>150</b>	<b>0.9</b>	<b>150</b>	<b>0.9</b>	<b>150</b>	<b>0.9</b>	<b>750</b>	<b>4.5</b>

Training Proposal for Capacity Building of staff at district level on different technologies is given in Tab. 4.12.1 with total financial outlay of Rs. 15 lakh under different technologies .

**Table 4.12.2 : Training Proposal for Capacity Building of Farmers at taluka level on different technologies.**

(Phy- No. , Fin. – Rs in lakhs)

Seed production/ seed replacement	Year-wise number of staff 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.
Jamnagar	140	0.42	140	0.42	140	0.42	140	0.42	140	0.42	700	2.1
Lalpur	75	0.225	75	0.225	75	0.225	75	0.225	75	0.225	375	1.125
Jam Jodhpur	95	0.285	95	0.285	95	0.285	95	0.285	95	0.285	475	1.425
Bhanvad	90	0.27	90	0.27	90	0.27	90	0.27	90	0.27	450	1.35
Kalyanpur	95	0.285	95	0.285	95	0.285	95	0.285	95	0.285	475	1.425
Okha	75	0.225	75	0.225	75	0.225	75	0.225	75	0.225	375	1.125
Khambhaliya	115	0.345	115	0.345	115	0.345	115	0.345	115	0.345	575	1.725
Jodia	90	0.27	90	0.27	90	0.27	90	0.27	90	0.27	450	1.35
Dhrol	85	0.255	85	0.255	85	0.255	85	0.255	85	0.255	425	1.275
Kalawad	140	0.42	140	0.42	140	0.42	140	0.42	140	0.42	700	2.1
<b>Total</b>	<b>1000</b>	<b>3</b>	<b>1000</b>	<b>3</b>	<b>1000</b>	<b>3</b>	<b>1000</b>	<b>3</b>	<b>1000</b>	<b>3</b>	<b>5000</b>	<b>15</b>

(Table 4.12.2 Continue....)

Seed treatment	Year-wise number of staff 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.
Jamnagar	72	0.216	72	0.216	72	0.216	72	0.216	72	0.216	360	1.08
Lalpur	36	0.108	36	0.108	36	0.108	36	0.108	36	0.108	180	0.54
Jam Jodhpur	45	0.135	45	0.135	45	0.135	45	0.135	45	0.135	225	0.675
Bhanvad	44	0.132	44	0.132	44	0.132	44	0.132	44	0.132	220	0.66
Kalyanpur	48	0.144	48	0.144	48	0.144	48	0.144	48	0.144	240	0.72
Okha	40	0.12	40	0.12	40	0.12	40	0.12	40	0.12	200	0.6
Khambhaliya	62	0.186	62	0.186	62	0.186	62	0.186	62	0.186	310	0.93
Jodia	46	0.138	46	0.138	46	0.138	46	0.138	46	0.138	230	0.69
Dhrol	44	0.132	44	0.132	44	0.132	44	0.132	44	0.132	220	0.66
Kalawad	63	0.189	63	0.189	63	0.189	63	0.189	63	0.189	315	0.945
<b>Total</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>2500</b>	<b>7.5</b>

(Table 4.12.2 Continue....)

Soil health management (soil testing/ bio-fertilizers/ green manuring/ micronutrients)	Year-wise number of staff 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.
Jamnagar	420	1.26	420	1.26	420	1.26	420	1.26	420	1.26	2100	6.3
Lalpur	225	0.675	225	0.675	225	0.675	225	0.675	225	0.675	1125	3.375
Jam Jodhpur	285	0.855	285	0.855	285	0.855	285	0.855	285	0.855	1425	4.275
Bhanvad	270	0.81	270	0.81	270	0.81	270	0.81	270	0.81	1350	4.05
Kalyanpur	285	0.855	285	0.855	285	0.855	285	0.855	285	0.855	1425	4.275
Okha	225	0.675	225	0.675	225	0.675	225	0.675	225	0.675	1125	3.375
Khambhaliya	345	1.035	345	1.035	345	1.035	345	1.035	345	1.035	1725	5.175
Jodia	270	0.81	270	0.81	270	0.81	270	0.81	270	0.81	1350	4.05
Dhrol	255	0.765	255	0.765	255	0.765	255	0.765	255	0.765	1275	3.825
Kalawad	420	1.26	420	1.26	420	1.26	420	1.26	420	1.26	2100	6.3
<b>Total</b>	<b>3000</b>	<b>9</b>	<b>3000</b>	<b>9</b>	<b>3000</b>	<b>9</b>	<b>3000</b>	<b>9</b>	<b>3000</b>	<b>9</b>	<b>15000</b>	<b>45</b>

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(Table 4.12.2 Continue....)

NRM	Year-wise number of staff 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.
Jamnagar	70	0.21	70	0.21	70	0.21	70	0.21	70	0.21	350	1.05
Lalpur	35	0.105	35	0.105	35	0.105	35	0.105	35	0.105	175	0.525
Jam Jodhpur	45	0.135	45	0.135	45	0.135	45	0.135	45	0.135	225	0.675
Bhanvad	45	0.135	45	0.135	45	0.135	45	0.135	45	0.135	225	0.675
Kalyanpur	45	0.135	45	0.135	45	0.135	45	0.135	45	0.135	225	0.675
Okha	40	0.12	40	0.12	40	0.12	40	0.12	40	0.12	200	0.6
Khambhaliya	65	0.195	65	0.195	65	0.195	65	0.195	65	0.195	325	0.975
Jodia	45	0.135	45	0.135	45	0.135	45	0.135	45	0.135	225	0.675
Dhrol	40	0.12	40	0.12	40	0.12	40	0.12	40	0.12	200	0.6
Kalawad	70	0.21	70	0.21	70	0.21	70	0.21	70	0.21	350	1.05
<b>Total</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>2500</b>	<b>7.5</b>

(Table 4.12.2 Continue....)

Farm waste	Year-wise number of staff 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.
Jamnagar	100	0.3	100	0.3	100	0.3	100	0.3	100	0.3	500	1.5
Lalpur	80	0.24	80	0.24	80	0.24	80	0.24	80	0.24	400	1.2
Jam Jodhpur	90	0.27	90	0.27	90	0.27	90	0.27	90	0.27	450	1.35
Bhanvad	95	0.285	95	0.285	95	0.285	95	0.285	95	0.285	475	1.425
Kalyanpur	100	0.3	100	0.3	100	0.3	100	0.3	100	0.3	500	1.5
Okha	95	0.285	95	0.285	95	0.285	95	0.285	95	0.285	475	1.425
Khambhaliya	110	0.33	110	0.33	110	0.33	110	0.33	110	0.33	550	1.65
Jodia	100	0.3	100	0.3	100	0.3	100	0.3	100	0.3	500	1.5
Dhrol	90	0.27	90	0.27	90	0.27	90	0.27	90	0.27	450	1.35
Kalawad	140	0.42	140	0.42	140	0.42	140	0.42	140	0.42	700	2.1
<b>Total</b>	<b>1000</b>	<b>3</b>	<b>1000</b>	<b>3</b>	<b>1000</b>	<b>3</b>	<b>1000</b>	<b>3</b>	<b>1000</b>	<b>3</b>	<b>5000</b>	<b>15</b>

(Table 4.12.2 Continue....)

Organic farming	Year-wise number of staff 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.
Jamnagar	40	0.12	70	0.21	70	0.21	70	0.21	70	0.21	320	0.96
Lalpur	35	0.105	35	0.105	35	0.105	35	0.105	35	0.105	175	0.525
Jam Jodhpur	30	0.09	45	0.135	45	0.135	45	0.135	45	0.135	210	0.63
Bhanvad	30	0.09	45	0.135	45	0.135	45	0.135	45	0.135	210	0.63
Kalyanpur	60	0.18	45	0.135	45	0.135	45	0.135	45	0.135	240	0.72
Okha	70	0.21	40	0.12	40	0.12	40	0.12	40	0.12	230	0.69
Khambhaliya	55	0.165	65	0.195	65	0.195	65	0.195	65	0.195	315	0.945
Jodia	70	0.21	45	0.135	45	0.135	45	0.135	45	0.135	250	0.75
Dhrol	70	0.21	40	0.12	40	0.12	40	0.12	40	0.12	230	0.69
Kalawad	40	0.12	70	0.21	70	0.21	70	0.21	70	0.21	320	0.96
<b>Total</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>2500</b>	<b>7.5</b>

(Table 4.12.2 Continue....)

Vermi composting	Year-wise number of staff 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.
Jamnagar	65	0.195	65	0.195	65	0.195	65	0.195	65	0.195	325	0.975
Lalpur	40	0.12	40	0.12	40	0.12	40	0.12	40	0.12	200	0.6
Jam Jodhpur	60	0.18	60	0.18	60	0.18	60	0.18	60	0.18	300	0.9
Bhanvad	55	0.165	55	0.165	55	0.165	55	0.165	55	0.165	275	0.825
Kalyanpur	50	0.15	50	0.15	50	0.15	50	0.15	50	0.15	250	0.75
Okha	40	0.12	40	0.12	40	0.12	40	0.12	40	0.12	200	0.6
Khambhaliya	60	0.18	60	0.18	60	0.18	60	0.18	60	0.18	300	0.9
Jodia	40	0.12	40	0.12	40	0.12	40	0.12	40	0.12	200	0.6
Dhrol	30	0.09	30	0.09	30	0.09	30	0.09	30	0.09	150	0.45
Kalawad	60	0.18	60	0.18	60	0.18	60	0.18	60	0.18	300	0.9
<b>Total</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>2500</b>	<b>7.5</b>

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(Table 4.12.2 Continue....)

IPM	Year-wise number of staff 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.
Jamnagar	205	0.615	205	0.615	205	0.615	205	0.615	205	0.615	1025	3.075
Lalpur	115	0.345	115	0.345	115	0.345	115	0.345	115	0.345	575	1.725
Jam Jodhpur	155	0.465	155	0.465	155	0.465	155	0.465	155	0.465	775	2.325
Bhanvad	145	0.435	145	0.435	145	0.435	145	0.435	145	0.435	725	2.175
Kalyanpur	145	0.435	145	0.435	145	0.435	145	0.435	145	0.435	725	2.175
Okha	115	0.345	115	0.345	115	0.345	115	0.345	115	0.345	575	1.725
Khambhaliya	175	0.525	175	0.525	175	0.525	175	0.525	175	0.525	875	2.625
Jodia	130	0.39	130	0.39	130	0.39	130	0.39	130	0.39	650	1.95
Dhrol	115	0.345	115	0.345	115	0.345	115	0.345	115	0.345	575	1.725
Kalawad	200	0.6	200	0.6	200	0.6	200	0.6	200	0.6	1000	3
<b>Total</b>	<b>1500</b>	<b>4.5</b>	<b>1500</b>	<b>4.5</b>	<b>1500</b>	<b>4.5</b>	<b>1500</b>	<b>4.5</b>	<b>1500</b>	<b>4.5</b>	<b>7500</b>	<b>22.5</b>

(Table 4.12.2 Continue....)

IWM	Year-wise number of staff 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.
Jamnagar	205	0.615	205	0.615	205	0.615	205	0.615	205	0.615	1025	3.075
Lalpur	115	0.345	115	0.345	115	0.345	115	0.345	115	0.345	575	1.725
Jam Jodhpur	155	0.465	155	0.465	155	0.465	155	0.465	155	0.465	775	2.325
Bhanvad	145	0.435	145	0.435	145	0.435	145	0.435	145	0.435	725	2.175
Kalyanpur	145	0.435	145	0.435	145	0.435	145	0.435	145	0.435	725	2.175
Okha	115	0.345	115	0.345	115	0.345	115	0.345	115	0.345	575	1.725
Khambhaliya	175	0.525	175	0.525	175	0.525	175	0.525	175	0.525	875	2.625
Jodia	130	0.39	130	0.39	130	0.39	130	0.39	130	0.39	650	1.95
Dhrol	115	0.345	115	0.345	115	0.345	115	0.345	115	0.345	575	1.725
Kalawad	200	0.6	200	0.6	200	0.6	200	0.6	200	0.6	1000	3
<b>Total</b>	<b>1500</b>	<b>4.5</b>	<b>1500</b>	<b>4.5</b>	<b>1500</b>	<b>4.5</b>	<b>1500</b>	<b>4.5</b>	<b>1500</b>	<b>4.5</b>	<b>7500</b>	<b>22.5</b>

(Table 4.12.2 Continue....)

Farm mechanization	Year-wise number of staff 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.
Jamnagar	35	0.105	35	0.105	35	0.105	35	0.105	35	0.105	175	0.525
Lalpur	25	0.075	25	0.075	25	0.075	25	0.075	25	0.075	125	0.375
Jam Jodhpur	30	0.09	30	0.09	30	0.09	30	0.09	30	0.09	150	0.45
Bhanvad	30	0.09	30	0.09	30	0.09	30	0.09	30	0.09	150	0.45
Kalyanpur	25	0.075	25	0.075	25	0.075	25	0.075	25	0.075	125	0.375
Okha	35	0.105	35	0.105	35	0.105	35	0.105	35	0.105	175	0.525
Khambhaliya	35	0.105	35	0.105	35	0.105	35	0.105	35	0.105	175	0.525
Jodia	30	0.09	30	0.09	30	0.09	30	0.09	30	0.09	150	0.45
Dhrol	30	0.09	30	0.09	30	0.09	30	0.09	30	0.09	150	0.45
Kalawad	25	0.075	25	0.075	25	0.075	25	0.075	25	0.075	125	0.375
<b>Total</b>	<b>300</b>	<b>0.9</b>	<b>300</b>	<b>0.9</b>	<b>300</b>	<b>0.9</b>	<b>300</b>	<b>0.9</b>	<b>300</b>	<b>0.9</b>	<b>1500</b>	<b>4.5</b>

(Table 4.12.2 Continue....)

Value addition Processing unit	Year-wise number of staff 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.
Jamnagar	70	0.21	70	0.21	70	0.21	70	0.21	70	0.21	350	1.05
Lalpur	40	0.12	40	0.12	40	0.12	40	0.12	40	0.12	200	0.6
Jam Jodhpur	65	0.195	65	0.195	65	0.195	65	0.195	65	0.195	325	0.975
Bhanvad	55	0.165	55	0.165	55	0.165	55	0.165	55	0.165	275	0.825
Kalyanpur	40	0.12	40	0.12	40	0.12	40	0.12	40	0.12	200	0.6
Okha	35	0.105	35	0.105	35	0.105	35	0.105	35	0.105	175	0.525
Khambhaliya	75	0.225	75	0.225	75	0.225	75	0.225	75	0.225	375	1.125
Jodia	40	0.12	40	0.12	40	0.12	40	0.12	40	0.12	200	0.6
Dhrol	30	0.09	30	0.09	30	0.09	30	0.09	30	0.09	150	0.45
Kalawad	50	0.15	50	0.15	50	0.15	50	0.15	50	0.15	250	0.75
<b>Total</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>500</b>	<b>1.5</b>	<b>2500</b>	<b>7.5</b>

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(Table 4.12.2 Continue....)

Marketing/ Co-operative societies	Year-wise number of staff 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.
Jamnagar	25	0.075	25	0.075	25	0.075	25	0.075	25	0.075	125	0.375
Lalpur	25	0.075	25	0.075	25	0.075	25	0.075	25	0.075	125	0.375
Jam Jodhpur	25	0.075	25	0.075	25	0.075	25	0.075	25	0.075	125	0.375
Bhanvad	25	0.075	25	0.075	25	0.075	25	0.075	25	0.075	125	0.375
Kalyanpur	25	0.075	25	0.075	25	0.075	25	0.075	25	0.075	125	0.375
Okha	25	0.075	25	0.075	25	0.075	25	0.075	25	0.075	125	0.375
Khambhaliya	25	0.075	25	0.075	25	0.075	25	0.075	25	0.075	125	0.375
Jodia	25	0.075	25	0.075	25	0.075	25	0.075	25	0.075	125	0.375
Dhrol	25	0.075	25	0.075	25	0.075	25	0.075	25	0.075	125	0.375
Kalawad	25	0.075	25	0.075	25	0.075	25	0.075	25	0.075	125	0.375
<b>Total</b>	<b>250</b>	<b>0.75</b>	<b>250</b>	<b>0.75</b>	<b>250</b>	<b>0.75</b>	<b>250</b>	<b>0.75</b>	<b>250</b>	<b>0.75</b>	<b>1250</b>	<b>3.75</b>

Training Proposal for Capacity Building of farmers at at level on different technologies is given in Tab. 4.12.2 with total financial outlay of Rs. 165.75 lakh under different technologies like seed production, seed treatment, IPM, IWM, value addition, farm mechanization, organic farming, vermi composting etc.

**Table : 4.12.3 Varietal Demonstration in Next Five Years**

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

Name of Crop	Area of each Demon. in ha	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.
Bajra	0.4	200	6	300	9	400	12	500	15	500	15	1900	57
Wheat	0.4	300	12	400	16	500	20	600	24	700	28	2500	100
Pulses	0.4	100	3	150	4.5	200	6	250	7.5	300	9	1000	30
Gram	0.4	300	9	350	10.5	400	12	450	13.5	500	15	2000	60
Groundnut	0.4	300	9	350	10.5	400	12	450	13.5	500	15	2000	60
Sesame	0.4	200	6	300	9	400	12	500	15	600	18	2000	60
Castor	0.4	300	12	350	14	400	16	450	18	500	20	2000	80
Cotton	0.4	400	16	500	20	500	20	500	20	500	20	2400	96
Cumin	0.4	200	6	300	9	400	12	500	15	500	15	1900	57
<b>Total</b>	<b>—</b>	<b>2300</b>	<b>79</b>	<b>3000</b>	<b>102.5</b>	<b>3600</b>	<b>122</b>	<b>4200</b>	<b>141.5</b>	<b>4600</b>	<b>155</b>	<b>17700</b>	<b>600</b>

To make the new improved/ hybrid varieties popular among the farming community, varietals demonstration has been proposed with financial out lay of Rs. 600 lakh and details are given in table 4.12.3.

Table : 4.12.4 Amount required per year for replacing seeds in five years

Crop	Area shown ('00Ha) (2010-11)	Area proposed to be covered under HYV/year during 12th plan	Seed Quantity Req. (tonne)	Estimated cost on seed (Rs. in lakhs)	Year (Rs. In Lakh)				
					2012-13	2013-14	2014-15	2015-16	2016-17
Cotton	1926	170000	213	4250	850	850	850	850	850
Groundnut	3963	420000	50400	50400	10080	10080	10080	10080	10080
Wheat	604	65000	8125	1625	325	325	325	325	325
Cumin	235	25000	400	800	160	160	160	160	160
Sesame	64	6000	18	18	3.6	3.6	3.6	3.6	3.6
Bajra	59	6000	24	24	4.8	4.8	4.8	4.8	4.8
Castor	63	7500	75	300	60	60	60	60	60
Gram	240	25000	1750	1050	210	210	210	210	210
Garlic	57	6000	4200	4200	840	840	840	840	840
<b>Total</b>	<b>7211</b>	<b>730500</b>	<b>65205</b>	<b>62667</b>	<b>11689.6</b>	<b>11746.6</b>	<b>11884.1</b>	<b>12011.6</b>	<b>12150.1</b>

Table: 4.12.5 Quantity of seeds required per year for replacing seeds

Crop	Seed Quantity Req. (tone) /year	Seed produced by Public sector (tone)/year	Seed produced by Private sector & Own produced (tone)/year
Cotton	213	25	188
Groundnut	50400	25000	25400
Wheat	8125	4000	4125
Cumin	400	250	150
Sesame	18	12	6
Bajra	24	5	19
Castor	75	40	35
Gram	1750	1200	550
Garlic	4200	700	3500
<b>Total</b>	<b>65205</b>	<b>31232</b>	<b>33973</b>



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**Table : 4.12.6: Demonstrations on plant health management to be conducted during plan period including seed treatment with bio-pesticides.**

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

Name of Crop	Area of Each Demon. in ha	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.
Bajara	0.4	200	4.00	200	4.00	200	4.00	200	4.00	200	4.00	1000	20.00
Wheat	0.4	300	6.00	300	6.00	300	6.00	300	6.00	300	6.00	1500	30.00
Gram	0.4	400	8.00	400	8.00	400	8.00	400	8.00	400	8.00	2000	40.00
Groundnut	0.4	300	6.00	300	6.00	300	6.00	300	6.00	300	6.00	1500	30.00
Sesamum	0.4	100	2.00	100	2.00	100	2.00	100	2.00	100	2.00	500	10.00
Castor	0.4	200	4.00	200	4.00	200	4.00	200	4.00	200	4.00	1000	20.00
Cotton	0.4	200	4.00	200	4.00	200	4.00	200	4.00	200	4.00	1000	20.00
Cumin	0.4	200	4.00	200	4.00	200	4.00	200	4.00	200	4.00	1000	20.00
Garlic	0.4	100	2.00	100	2.00	100	2.00	100	2.00	100	2.00	500	10.00
<b>Total</b>	<b>—</b>	<b>2000</b>	<b>40</b>	<b>2000</b>	<b>40</b>	<b>2000</b>	<b>40</b>	<b>2000</b>	<b>40</b>	<b>2000</b>	<b>40</b>	<b>10000</b>	<b>200</b>

The demonstrations on plant health management like seed treatment with bio-pesticide is proposed to create the awareness among the farmers are presented in Tab.4.12.6. The total number of demonstrations in all taluka of the district is proposed as 10000 with total financial requirement of Rs. 200 lakh for the major crops of the district.

**Table : 4.12.7: Demonstrations on soil health management to be conducted during plan period including use of bio fertilizers and bio compost.**

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

Name of Crop	Area of each Demon. in ha	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.
Wheat	0.4	200	4.00	200	4.00	200	4.00	200	4.00	200	4.00	1000	20.00
Gram	0.4	300	6.00	300	6.00	300	6.00	300	6.00	300	6.00	1500	30.00
Groundnut	0.4	400	8.00	400	8.00	400	8.00	400	8.00	400	8.00	2000	40.00
castor	0.4	200	4.00	200	4.00	200	4.00	200	4.00	200	4.00	1000	20.00
cotton	0.4	300	6.00	300	6.00	300	6.00	300	6.00	300	6.00	1500	30.00
Cumin	0.4	50	1.00	50	1.00	50	1.00	50	1.00	50	1.00	250	5.00
Bajra	0.4	100	3.00	100	3.00	100	3.00	100	3.00	100	3.00	500	15.00
Crop diversification	0.4	50	1.00	50	1.00	50	1.00	50	1.00	50	1.00	250	5.00
<b>Total</b>	<b>—</b>	<b>1600</b>	<b>33</b>	<b>1600</b>	<b>33</b>	<b>1600</b>	<b>33</b>	<b>1600</b>	<b>33</b>	<b>1600</b>	<b>33</b>	<b>8000</b>	<b>165</b>

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. 4.12.7. The total number of demonstrations in all taluka of the district is proposed as 8000 with total financial requirement of Rs. 165 lakh for the major crops of the district.

**Table 4.12.8: Demonstrations on IWM to be conducted during plan period**  
(Phy – Number of demonstrations, Fin – Rs. in lakhs)

Name of Crop	Area of each Demon. in ha	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.
Wheat	0.4	200	4.00	200	4.00	200	4.00	200	4.00	200	4.00	1000	20.00
Cotton	0.4	100	2.00	100	2.00	100	2.00	100	2.00	100	2.00	500	10.00
Groundnut	0.4	100	2.00	100	2.00	100	2.00	100	2.00	100	2.00	500	10.00
Castor	0.4	100	2.00	100	2.00	100	2.00	100	2.00	100	2.00	500	10.00
Cumin	0.4	100	2.00	100	2.00	100	2.00	100	2.00	100	2.00	500	10.00
Gram	0.4	50	1.00	50	1.00	50	1.00	50	1.00	50	1.00	250	5.00
<b>Total</b>	<b>—</b>	<b>650</b>	<b>13</b>	<b>650</b>	<b>13</b>	<b>650</b>	<b>13</b>	<b>650</b>	<b>13</b>	<b>650</b>	<b>13</b>	<b>3250</b>	<b>65</b>

The demonstrations on IWM to be conducted during XII five year plan are presented in Tab. 4.12.8. The total number of proposed demonstrations are 3250 with the total financial requirement of Rs. 65 lakh for different crops with 0.4 ha demonstration area.

**Seed production enhancement:**

**Table 4.12.9 : Seed planning/ Seed village programme**

(Phy – Area in ha, Fin – Rs. in lakhs)

Name of Crop	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.
Wheat	50	1.00	50	1.00	50	1.00	50	1.00	50	1.00	250	5.00
Gram	50	1.00	50	1.00	50	1.00	50	1.00	50	1.00	250	5.00
Garlic	10	0.50	10	0.50	10	0.50	10	0.50	10	0.50	50	2.50
Groundnut	10	0.20	10	0.20	10	0.20	10	0.20	10	0.20	50	1.00
Pulses	15	0.30	15	0.30	15	0.30	15	0.30	15	0.30	75	1.50
Cumin	25	0.50	25	0.50	25	0.50	25	0.50	25	0.50	125	2.50
Bajra	25	0.25	25	0.25	25	0.25	25	0.25	25	0.25	125	1.25
Monitoring	--	1.00	0	1.00	0	1.00	0	1.00	0	1.00	0	5.00
<b>Total</b>	<b>185</b>	<b>4.75</b>	<b>185</b>	<b>4.75</b>	<b>185</b>	<b>4.75</b>	<b>185</b>	<b>4.75</b>	<b>185</b>	<b>4.75</b>	<b>925</b>	<b>23.75</b>

To make the door step availability of improved/hybrid varieties to the farmers, seed village programme has been proposed for XII<sup>th</sup> five year plan. The total area under seed production is 925 ha with financial out lay of Rs. 23.75 lakh.

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**Table 4.12.10: Seed storage at University /Panchayat level and taluka level**

(Phy – No. of unit Fin – Rs. in lakhs)

Particulars	Number of storage godowns and financial requirements (Rs. in lakhs)											
	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	4	75	--	25*	--	15*	--	10*	-	10*	4	135
Panchayat level	32	800	32	800	32	800	32	800	32	800	160	4000
Taluka level	2	100	2	100	2	100	2	100	2	100	10	500
<b>Total</b>	<b>38</b>	<b>975</b>	<b>34</b>	<b>925</b>	<b>34</b>	<b>915</b>	<b>34</b>	<b>910</b>	<b>34</b>	<b>910</b>	<b>174</b>	<b>4635</b>

\* for maintenance

Facility for storage of seed at Panchayat & Taluka level has been proposed in XII<sup>th</sup> five year plan with total number of 174 with financial out lay of Rs. 4635 lakh.

**Table 4.12.11: Strengthening of existing APMC**

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

Particulars	Number of collection van and financial requirements (Rs. in lakhs)											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
Collection van	6	100	6	110	6	120	6	130	6	140	30	600
e-connectivity	10	20	-	-	-	-	-	-	-	-	10	20
LED price display unit	10	30	-	-	-	-	-	-	-	-	10	30
<b>Total</b>	<b>16</b>	<b>150</b>	<b>6</b>	<b>110</b>	<b>6</b>	<b>120</b>	<b>6</b>	<b>130</b>	<b>6</b>	<b>140</b>	<b>40</b>	<b>650</b>

To strengthen the agricultural product marketing facility existing in the district, the plan has been proposed with financial out lay of Rs. 650 lakh in XII<sup>th</sup> five year plan.

### 4.13 Agricultural Engineering:

Jamnagar district is near to an industrial city Rajkot and also existence of mega oil refineries at coastal line of the district resulted in the large scale migration of farm labourers. This has resulted in a great demand for agricultural labourers and the farmers in this district face a lot of problems in getting farm labourers. Therefore, there is a vast scope for mechanization of farm operations. To overcome the above problems, several soil and water conservation measures to recharge the ground water potential and mechanization of farm operations were being implemented in the district. Jamnagar district is a Drought Prone District with erratic and less than normal rainfall recorded during the past several decades. Most of the rivers in this district are dry for maximum time of the years and the major irrigation tanks are also dry for the most part of the year. This has resulted in over exploitation of ground water through open wells and deep bore wells. Hence it is essential to recharge the ground water table which has gone very deep during the recent years.

### 4.13.1 Farm Mechanization/Farm Equipments

The farmers are still using bullock drawn traditional implements and hand tools. The district is having 8023 tractors/ trailers, 3203 threshers, 37 power tillers, and 68883 diesel/electric pump sets, the Taluka wise availability of implements is presented in Table 4.13.1. The requirement of farm mechanization in the district for XII five year plan is given in Table 4.13.2. There is an immense scope for farm mechanization in the district.

**Table 4.13.1 Existing farm machinery in the district**

Taluka	Tractor		Thresher		Power tiller		Diesel engine , Electric motor & Pumpset	pumpset
	No	Farmer	No	Farmer	No.	Farmer		
Jamnagar	1145	1120	458	458	10	10	9090	9090
Lalpur	814	790	326	326	6	6	5564	5564
Jam Jodhpur	718	686	287	287	5	5	8684	8684
Bhanvad	846	816	338	338	0	0	7940	7940
Kalyanpur	728	630	291	291	0	0	8192	8192
Okha	186	180	74	74	0	0	868	868
Khambhaliya	948	866	379	379	8	8	8475	8475
Jodia	742	722	297	297	0	0	3484	3484
Dhrol	770	698	308	308	0	0	3527	3527
Kalawad	1126	1098	445	445	8	8	13059	13059
Total	8023	7606	3203	3203	37	37	68883	68883

**Table 4.13.2: Requirement of farm mechanization in the district**

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

SN	Name of Equipment	Year-wise financial requirement											
		2012-13		2013-14		2014-15		2015-16		2016-17		Total	
		Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy
1	Rotary weeder	35	100	35	100	35	100	35	100	35		175	500
2	Rotavator	9	25	9	25	9	25	9	25	9	25	45	125
3	Portable Oil engine	40	200	40	200	40	200	40	200	40	200	200	1000
4	Threshers	10	25	10	25	10	25	10	25	10	25	50	125
5	Lesser leveler	10	5	10	5	10	5	10	5	10	5	50	25
6	Cotton shredder	5	20	5	20	5	20	5	20	5	20	25	100
7	Sprayers	6	400	6	400	6	400	6	400	6	400	30	2000
8	Mini Tractor	50	25	50	25	50	25	50	25	50	25	250	125
9.	Power tiller	38	25	38	25	38	25	38	25	38	25	190	125
10	Bush cutters	15	100	15	100	15	100	15	100	15	100	75	500
11	Automatic seed drill bullock drawn	10	200	10	200	10	200	10	200	10	200	50	1000
14	Cotton picker	20	200	20	200	20	200	20	200	20	200	100	1000
	<b>Total</b>	<b>248</b>	<b>-</b>	<b>248</b>	<b>-</b>	<b>248</b>	<b>-</b>	<b>248</b>	<b>-</b>	<b>248</b>	<b>-</b>	<b>1240</b>	<b>-</b>

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The establishment of agricultural processing unit in the district has been proposed in XII<sup>th</sup> five year plan. Total 15 processing units has been proposed with financial out lay is Rs. 950 lakh and details are given in table 4.13.3

**Table 4.13.3: Number of processing units and financial requirements (Rs. in lakhs)**

Particulars	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
Grading & packaging unit	2	100	2	110	2	120	2	130	2	140	10	600
Garlic dehydration unit	1	50	1	60	1	70	1	80	1	90	5	350
<b>Total</b>	<b>3</b>	<b>150</b>	<b>3</b>	<b>170</b>	<b>3</b>	<b>190</b>	<b>3</b>	<b>210</b>	<b>3</b>	<b>230</b>	<b>15</b>	<b>950</b>

**Table : 4.13.4: Research on food processing component by SAUs**

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

Particulars	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
Food processing technology	1	500	-	50	-	60	-	70	-	80	1	760

### Strengthening of watershed activity:

**Table 4.13.5: Planning of Soil Survey Programme**

Name of Taluka	Watershed number	Geographical area of watershed		Area surveyed since beginning to 2011-12		Area to be deleted from survey area		Area to be surveyed in year 2012-13 to 2016-17	
		No.of villages	Area in ha	No.of villages	Area in ha	No.of villages	Area in ha	No.of villages	Area in ha
Jamnagar	72	98	114133.3	72	36000	0	0	0	0
Lalpur	66	72	107828.68	66	33000	0	0	0	0
Jam Jodhpur	75	70	108091.6	75	45920	0	0	0	0
Bhanvad	71	57	69051.21	71	39778	0	0	0	0
Kalyanpur	98	65	141192.8	98	64818	0	0	5	5731
Okha	53	44	69017.49	53	26500	0	0	0	0
Khambhaliya	96	83	119118.62	96	62200	0	0	0	0
Jodia	75	51	86866.36	75	47521	0	0	7	4779
Dhrol	58	41	53087.08	58	29000	0	0	0	0
Kalawad	9	97	123579.55	9	10526	0	0	11	15524
<b>Total</b>	<b>673</b>	<b>678</b>	<b>991966.69</b>	<b>673</b>	<b>395263</b>	<b>0</b>	<b>0</b>	<b>23</b>	<b>26034</b>

Source: DWDU, DRDA, Jamnagar

Table 4.13.6: Area available for watershed development and plan

Taluka	Geographical area (ha)	Area available for w/w development (ha)	Area treated so far (ha)	Balance area (ha) to be treated	Projected				
					2012-13	2013-14	2014-15	2015-16	2016-17
Jamnagar	114133.34	114133.34	35493.15	78640.19	1500	0	0	0	0
Lalpur	107828.68	107828.68	31208.09	76620.59	1800	0	0	0	0
Jam Jodhpur	108091.63	108091.63	51828.1	56263.53	2700	3200	3400	2900	220
Bhanvad	69051.21	69051.21	30363.81	38687.4	2700	2800	2170	1600	0
Kalyanpur	141192.84	141192.84	44231.59	96961.25	1200	6500	8500	7850	8500
Okha	69017.49	69017.49	27854.97	41162.52	1400	0	0	0	0
Khambhaliya	119118.62	119118.62	56429.14	62689.48	4200	6500	6800	5600	4100
Jodia	86866.36	86866.36	33779.88	53086.48	1900	5700	6800	5700	3200
Dhrol	53087.08	53087.08	27726.98	25360.1	1300	0	0	0	0
Kalawad	123579.55	123579.55	24525.72	99053.83	3800	6800	6700	6200	25050
<b>Total</b>	<b>991966.8</b>	<b>991966.8</b>	<b>363441.43</b>	<b>628525.37</b>	<b>22500</b>	<b>31500</b>	<b>34370</b>	<b>29850</b>	<b>41070</b>

Source: DWDU, DRDA, Jamnagar

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**Table 4.13.7: Technologies for In-situ Moisture conservation Projected Plan**

Name of activity	Total area covered (ha) up to 2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Contour cultivation	0	38	36	32	0	0
Others	238000	4000	9000	15000	12000	11000

Source: Source: DWDU, DRDA, Jamnagar

### 4.14 Problematic soils & its réclamation:

The entire coastal area covering Lalpur, Jodiya, Khambhaliya, Jamnagar, Okhamandal and Kalyanpur taluka are affected by salinity. These taluka cover an area of 385,211.5 ha., forming 61% of total area of the district. The coastal talukas have 248 villages (53% of villages in six talukas) affected by salinity problems. Compare to other talukas the highest number of villages fall in Jamnagar taluka. According to SIPC salinity classification, 127 villages are fully saline, 49 villages are partially saline and 74 villages are prone to saline. Highest number of fully saline villages (37) falls in Jodiya taluka, highest number of partial saline villages (12) are in Kalyanpur and highest number of prone to saline villages (34) are in Jamnagar taluka. The taluka wise number of villages in each category is given in table below.

**Table 4.14.1 : Distribution of villages according to salinity category**

Details	Taluka	Salinity category			
		Fully Saline	Partial Saline	Probable	Total
No. of village	Jamnagar	15	10	34	59
% of total village		25.42	16.95	57.93	100
No. of village	Jodia	37	4	0	41
% of total village		90.24	9.76	0.00	100
No. of village	Kalyanpur	22	12	7	41
% of total village		53.66	29.27	17.07	100
No. of village	Khambhaliya	18	8	15	41
% of total village		43.90	19.51	36.59	100
No. of village	Lalpur	1	3	18	22
% of total village		4.55	13.64	81.52	100
No. of village	Okha	34	12	0	46
% of total village		0	0	0	0
<b>Total villages</b>		<b>127</b>	<b>49</b>	<b>77</b>	<b>250</b>
<b>% of total village</b>		<b>50.80</b>	<b>19.60</b>	<b>29.60</b>	<b>100</b>

Source : GLDC, Jamnagar

#### **4.14.1 Reasons for Salinity**

The salinity ingress has taken place due to various reasons. Generally, more than one reason contributed to salinity problem in Jamnagar district. The development of industries during last decade has accelerated the process of salinity ingress mainly due to increased use of ground water by industries, use of sea water for industrial processes. On other hand continued irregular rainfall after 1970s has lead to over exploitation of the ground water in areas where it was available at shallow depth. The reduction in mangroves plantation in coastal area has resulted in salinity ingress particularly in Jodiya, Khambhaliya and Okha talukas. The discussions with communities also indicate that at many locations, poor construction of structures created for preventing salinity ingress has become reason for increasing salinity. In case of spreading channels, the water stored becomes saline which is used for irrigation by the farmers. This has increased soil salinity in new area. The villages in Kalyanpur and Okha have reported increase in salinity due to saline wind blowing from the salt pan as well as leakage of salt brine, transportation of salt etc.

#### **4.14.2 Impact of salinity**

The salinity ingress has affected all type of resources as well as livelihood activities. The major impact is felt on drinking water and agriculture. The overall impact on these resources and livelihood is more in villages located in periphery of 5 kms. from the coastline. Among all talukas, more impact is felt by villages in Jamnagar, Khambhaliya and Okha taluka.

#### **4.14.3 Impact on agriculture**

The salinity ingress has major impact on agriculture in coastal village of Jamnagar. The crop productivity has reduced to a level that certain food crop cultivation becomes non-viable. The productivity of crops like cotton, bajra having tolerance to salinity has reduced. The vegetable crops which were grown easily earlier have now reduced in the area. The coastal area in Jamnagar was known for chilly production, now the area under chilly cultivation has reduced drastically. Groundnut, the main crop of the area is now fast replaced by cotton due to salinity problem. In cotton the sucking of pest attacks have increased. People are now looking for crop which can provide better economic returns. The farmers have started reducing cultivation of food crops, instead of which they prefer to cultivate castor, cumin and cotton. Apart from salinity, the industrial pollution is also causing decline of agriculture in Khambhaliya, Lalpur, Okha and Kalyanpur taluka. The farmers are not able to cultivate their farms due to change in soil structure and texture. The soils have become hard which require high cost of cultivation. Due to fear of poor production the farmers use higher amount of seeds and fertilizers which in turn demand more water. The horticulture crops once found in all talukas are now restricted in few talukas which includes Jamnagar, Lalpur and Kalyanpur having some irrigation facility though canal. In other parts horticulture has vanished.



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Overall, the agriculture in the coastal Jamnagar is reducing. The agriculture land which remains uncultivated for 2-3 years eventually becomes wasteland. The change in agriculture pattern has reduced availability of fodder for animals from the agriculture produce. This has reduced animal husbandry in the area. The farmers are now waiting for industries to purchase their land in Jamnagar, Khambhaliya and Okha taluka. Those who are willing to continue with the farming activity try various solutions for maintaining the farm productivity. The major efforts are found in Jamnagar, Jodiya and Okha, where farmers are implementing soil and water management practices, change crops and try out new varieties of seeds. The soil and water management practice change is a major initiative taken up by the farmers in this taluka. The other important remedial measure is crop change where farmers are shifting to salt resistant crops like cotton, cumin and Jowar in place of groundnut and wheat.

### 4.14.4 Impact on animal husbandry

The salinity ingress has reduced the fodder availability for the animals. The grasses grown on the common land has become saline. Consuming saline grass and water deteriorates the health of the animals. The milch animals become weak and their milk production capacity reduces. In many villages people have reported poor death of animals due to consumption of saline fodder and water. The average life of milch animal has been reducing lower than the animals in the non-saline villages.

Due to salinity, the livestock rearers are shifting to small animals in villages of Jodiya, Khambhaliya and Okha taluka. The constraint of fodder has resulted in awareness about fodder and feed management in livestock rearers in these villages.

### 4.14.5 Impact on fisheries

The salinity has impacted fisheries sector directly by reduction in fishing in near shore areas. The major impact on fisheries has happened due to industrial pollution causing changes in near shore area. The mangrove has also contributed to reduction in near shore area. The reduction in mangroves having capacity to control salinity in near shore area has resulted in change in water quality impacting the diversity of fish species in the sea.



**Jafarabadi Buffalo**

## CHAPTER V

## DEVELOPMENT OF ALLIED SECTORS

## 5.1 Introduction:-

Allied agricultural sectors i.e., Animal Husbandry, Fisheries, Irrigation, Co-operation, Water harvesting, 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 employment generation. Farmers of Jamnagar 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 dairy and horticulture (especially fruit and vegetable crops).

## 5.2 Horticulture:

The agro climatic condition of the Jamnagar district is favourable for arid types fruits and vegetable crops. The major fruit crops grown in the district are citrus, papaya, sapota, pomegranate, almond, custard apple, guava, ber and aonla covering about 2459 ha area. The major vegetable crops grown in an area of 14965 ha are tomato, potato, sugar beet, carrot, cauliflower, radish, chillies, brinjal, cucurbits and leafy vegetables etc with total production of 210677 MT during 2011-12. Thus, the total area under fruit and vegetable in the district is 17424 ha which, proposed to increase up to 35000 ha during the 12<sup>th</sup> plan period. The existing orchards are also proposed to be rejuvenated for obtaining higher production. In order to increase the production of fruits and vegetables in the district and for additional income, the farmers are required to adopt naturally ventilated poly house/poly tunnels for nursery raising, drip Irrigation and other technologies in fruits and vegetables, to cover more area under hybrids of vegetables.

The climate of the district is highly suitable for spices production. The spice crops are grown in 50636 ha with production 110909 MT. The major spices crops in the districts are cumin. At present commercial floriculture is nearly 202 ha area with 1599 MT production. With increase in transport and other infrastructure facilities, the scope for floriculture cultivation and marketing will also be increased. Cultivation of medicinal and aromatic plant in 10ha and 412 ha with production 91 MT and 1329 MT, respectively. 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 to farmers.

The proposals on the following activities of horticulture are projected for achieving targeted growth rate during the XII<sup>th</sup> plan.

1. Green house/net house/ poly house/poly tunnels for nursery raising
2. Drip Irrigation / sprinkler irrigation
4. Fruit plants/ coconut plantation
5. Vegetable Crops

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**Table 5.2.1. Area, production and yield of major horticultural crops in the district**

Crop	Area in ha	Production in ton	Yield in t/ha
Fruits	2459	41211	16.76
Vegetable	14965	210677	14.08
Spices	49277	110909	2.19

Source: Deputy Director of Horticulture

**Table 5.2.2. Area expansion plan for horticultural crops**

Existing cropping pattern (2011-12)		2012-13 (projected)	2013-14 (projected)	2014-15 (projected)	2015-16 (projected)	2016-17 (projected)
Crop	Area	Area	Area	Area	Area	Area
Fruits	2459	2600	2800	2950	3050	3100
Vegetables	14965	15500	16000	16800	17500	18300
Spices	50636	52000	52500	53100	53900	55000
flowers	202	220	235	250	265	280
Medicinal plants	10	22	35	50	62	70
Aromatic	412	420	430	435	450	460
Total	68684	70762	71500	73585	74277	77210

Source: Deputy Director of Horticulture, Jamnagar

**Table 5.2.3. Rejuvenation plan for horticultural crops (area in ha)**

Area brought under rejuvenation (2011-12)		2012-13 (projected)	2013-14 (projected)	2014-15 (projected)	2015-16 (projected)	2016-17 (projected)
Crop	Area	Area	Area	Area	Area	Area
Sapota & Lime	00	4.00	5.00	10.00	5.00	10.0

Source: Deputy Director of Horticulture, Jamnagar

**Table 5.2.4: Sustainability issues and gap analysis of productivity of different crops and resources**

Sr. No.	Crop	Factors/Constraints leading to gap	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
<b>1</b>	<b>Vegetables</b>					
	Comparatively low area under vegetable crops	Lack of continuous irrigation facility and proper marketing	Popularize water harvesting techniques, drip irrigation and establishing collection centers on co-operative bases and linkage with suitable markets	Creating awareness about importance of vegetable crops, water harvesting structure, drip irrigation, establishing collection centers provided with cold chain linked vehicles	Increased area under vegetable crop	Increase the income of the farmers and secure the livelihoods.
	Poor management in roof top cultivation	Limited availability of water and lack of awareness regarding roof top cultivation	Popularize the importance of nutritional security	Creating awareness and adoption of roof top cultivation with low energy drip through demonstrations, training, shibir, literature etc	Strengthening roof top cultivation practices	Improvement in health of rural people
<b>2</b>	<b>Papaya</b>					
	Problems of insect pests and diseases	Incidence of papaya mosaic, stem rot disease and whitefly infestation	Popularize IPM and IDM technologies	Creating awareness and adoption of IPM and IDM technology through demonstrations, training, shibir, literature etc	Reduction in insect pests and disease incidence	Reduction in pesticide load and increase in yield

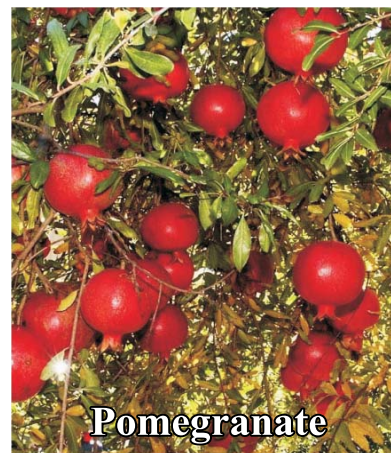
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	Management of crop residue	High cost of labour and problem of disposal	Popularize the use of papaypa stem and converting in compost	Creating awareness about the importance of shredder and converting it in compost through demonstrations, training, shibir, literature etc	Proper use of crop residue	Improvement in soil health
	Non adoption of value added product from papaya	Lack of awareness and high cost of the processing plant	1. Popularize papaypa stem 2. Popularize the preparation of value added products pappin and tutifuti from green fruits	Motivate and provide incentives to the farmers for establishing papaypa pappin unit and other value added products	Proper utilization of crop residue and increase income of the farmers	Remunerative price and employment generation
	Low post harvest management in papaya	Lack of awareness and high cost of the processing plant	Establishment of ripening chamber and packaging unit	Establishment of ripening chamber and packaging unit on co-operative basis	Increase in keeping quality, Quality improvement for foreign market	Increase income of the farmers.
3	<b>Plantation crops</b>					
	Less area under fruit crops	Lack of awareness, small land holdings, limited irrigation facility	Popularize importance of fruit trees for sustainable income	Creating awareness and adoption of fruit crops through training, demonstrations and literature	Increase income of the farmers	Sustainability of farmers income

<b>4</b>	<b>Floriculture</b>					
	Negligible area under flower crops	Lack of awareness, small land holdings, limited irrigation facility and marketing of the produce	Popularize importance of flower trees for sustainable income in identified area and market linking with suitable markets	Creating awareness and adoption of flower crops through training, demonstrations and literature	Increase income of the farmers	Sustainability of farmers income
<b>5</b>	<b>Medicinal aromatic and spice crops plants</b>					
	Low area under medicinal, aromatic and spices crops	Lack of awareness, small land holdings, limited irrigation facility and marketing of the produce	Popularize importance of medicinal aromatic and spices crops for sustainable income in identified area and market linking with suitable markets	Creating awareness and adoption of medicinal and aromatic plants through training, demonstrations and literature	Provide subsidiary income to the farmers	Sustainability of farmers income



**Poly House with Mulch**



**Pomegranate**

## C-DAP

**Table 5.2.5: Bridging the gaps for realizing the Vision- Horticulture sector**

No.	Thrust Areas/ Issues	Program	Activities	Concerned Agencies / collaborators	Approach
1.	Vegetable production	Establishment of small scale nursery	Educate the farmers for raising nursery for preparing seedlings	SAUs/KVK	Training and units
		Increase area under vegetable crops	Educating the farmers for importance of vegetable cultivations through demonstrations on vegetable cultivation, low cost net/green houses and kitchen gardening	SAUs/KVK/ATMA	Training and units
		IPM	Educating the farmers about various insect pest and diseases of vegetables and their IPM Through demonstration and training	KVK/DDA/SAUs/FTC/ATMA/NGOs	Training and demonstrations
		Integrated Nutrient Management	Educating farmers about the use of balanced fertilizer	DAO/KVK/ATMA/FTC/NGOs	Farmers field schools Training and Demonstration
		Cold storage	Establishment of cold storage at taluka level	TSP/KVIC/DIC/DRDA/NABARD	Establishment of cold storage
		Market linkage	Strengthening market linkage through AGMARK net	DDA/DRDA	Establishment of e-connectivity at APMC

		Collection centers	Establishment of collection centers	DDA/DRDA	Establishment of collection centers
		Refrigerated van	Providing refrigerated van at cluster level	DDA/DRDA	Providing refrigerated van at cluster level
2.	Fruit crops	Increase area under fruit crops	Establishment of nurseries for quality saplings, capacity building and demonstrations	KVK/ATMA	Establishment of nurseries for quality saplings Training and demonstrations
		Introduction of mango & coconut plantation	Educating farmers through demonstration and training in cluster approach	KVK/ATMA	Training and demonstrations
		IPM	Educating the farmers about various insect pest and diseases of fruit crops and their IPM Through demonstration and training	KVK/SAUs/ FTC/ATMA/ NGOs	Training and demonstrations
		Proper use of plant protection equipment	Educate the farmers about proper use of plant protection equipments	KVK/FTC/A TMA/ NGOs	Trainings, demonstrations, farmers' field schools and units (80%)
		Ripening chambers	Establishment of banana ripening chamber	DRDA/ ATMA/KVK s	Establishment of banana ripening chamber
		Banana pack house	Establishment of banana pack house	DRDA/ ATMA/KVK s	Establishment of banana pack house



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		Value addition	Establishment of banana fiber production units	DRDA/ATMA/KVKs	Establishment of banana fiber production units
			Establishment of Wafer production units	DRDA/ATMA/KVKs	Establishment of Wafer production units
		Recycling of farm waste residue	Converting of farm waste residue in small pieces through shredders and using it for composting	NGOs/co-operative societies	Establishment of composting units
3.	Floriculture	Introduction of floriculture	Educating farmers through demonstration and training in cluster approach	DHA/KVK/ATMA	Training and demonstrations
4.	Spices	Introduction of spice crops	Educating farmers through demonstration and training in cluster approach	KVK/ATMA	Training and demonstrations
5.	Conservation of biodiversity	Organic farming	Educating farmers through demonstration and training in cluster approach	KVK/DAO/ATMA	Training and demonstrations
		Medicinal and aromatic plants	Educating farmers through demonstration and training in cluster approach	KVK/DAO/ATMA	Training and demonstrations

**Activities for development of horticulture sector**

To bring more area under fruits & vegetables, training should be imparted to the farmers of the district. Hence, training component with following details is proposed.

**Table 5.2.6: Training needs in vegetables crops (Rs. in lakhs)**

Name of Technology	Year-wise number of farmers to be trained and finance Rs. in lakhs											
	2012-13		2013-14		2014-15		2015-16		2016-17		Total	
	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.	Phy	Fin.
Vegetable cultivation	700	2.10	700	2.10	700	2.10	700	2.10	700	2.10	3500	11.00
Nursery raising	100	0.30	100	0.30	100	0.30	100	0.30	100	0.30	500	1.50
IPM/INM	500	1.50	500	1.50	500	1.50	500	1.50	500	1.50	2500	7.50
Soil health management (soil testing/ bio-fertilizers/ green manuring)	1500	4.50	1500	4.50	1500	4.50	1500	4.50	1500	4.50	7500	22.50
Organic farming	500	1.50	500	1.50	500	1.50	500	1.50	500	1.50	2500	7.50
Value addition Processing	500	1.50	500	1.50	500	1.50	500	1.50	500	1.50	2500	7.50
Marketing/ Co-operative societies	250	0.75	250	0.75	250	0.75	250	0.75	250	0.75	1250	3.75
<b>Total</b>	<b>4050</b>	<b>12.15</b>	<b>4050</b>	<b>12.15</b>	<b>4050</b>	<b>12.15</b>	<b>4050</b>	<b>12.15</b>	<b>4050</b>	<b>12.15</b>	<b>20250</b>	<b>61.25</b>

For quality, timely & assured availability of seeds & planting materials of vegetable & fruit crops, establishment of nursery at taluka level is basic requirement which make door step availability of seeds & planting materials to the farmers. Therefore, establishment of nurseries at taluka level is proposed with following details.

**Table 5.2.7: Establishment of nurseries: (Rs. in lakhs)**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Nursery small scale	20	20	20	20	20	100
Total Cost @Rs 5.00 lakhs/unit	100.00	100.00	100.00	100.00	100.00	500

Area under flower & vegetable crops is comparatively less. Through protected cultivation of flowers & vegetables, high quality flowers and vegetables will be produced for domestic need and export purpose. Therefore, establishment of polyhouse/greenhouse demonstration units in each talukas of district is proposed with following details.

**Table 5.2.8: Establishment of Poly houses: (Rs. in lakhs)**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Poly houses/green houses	25	25	25	25	25	125
Total Cost @Rs 50.00 lakhs/unit	1250.00	1250.00	1250.00	1250.00	1250.00	6250

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Production of quality vegetables is necessary for catering the balance nutritional diet of human being. Area under vegetable crops in the district is comparatively low although having good potential & favorable condition for cultivation. To make the vegetable cultivation popular in the district demonstration on new vegetable crops & varieties, agronomical practices etc. is proposed with following details.

**Table 5.2.9: Demonstrations on vegetables for area expansion (Rs. in lakhs)**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Area expansion in vegetable crops (ha.)	200	200	200	200	200	1000
Cost@Rs 10,000/unit (Rs. in lakhs)	20	20	20	20	20	100

Due to injudicious and indiscriminate use of the pesticides, contamination of vegetables with pesticide residues is the big issue. Integrated Pest Management practices help in reducing the load of pesticides in environment thus, it avoid the ill effect of the pesticides. Demonstration on IPM in vegetable crops is proposed with following details.

**Table 5.2.10: Integrated pest management in vegetable crops (Rs. in lakhs)**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Brinjal Demon no. each 0.4 ha	500	500	500	500	500	2500
Other vegetables Demon no. each 0.4 ha	500	500	500	500	500	2500
Total demonstrations	1000	1000	1000	1000	1000	5000
Total cost @Rs. 4000 /demon. (Rs. in lakhs)	40.00	40.00	40.00	40.00	40.00	200.00

The aim of the Integrated Nutrient Management (INM) component is to develop integrated soil and crop nutrient management in vegetable crops in the district so that vegetable production can be more profitable and sustainable. The objectives can be achieved by conducting the demonstration with following details.

**Table 5.2.11: Integrated nutrient management in vegetables crops (Rs. in lakhs)**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of demon. each 0.4 ha	1000	1000	1000	1000	1000	5000
Total cost @Rs. 5000 /demon. (Rs. in lakhs)	50.00	50.00	50.00	50.00	50.00	250.00

To create the awareness among the growers regarding protected cultivation of vegetables & flowers, demonstration on low cost net house is proposed with following details. So that small and marginal farmers can also adopt this technology for off seasonal vegetable production.

**Table 5.2.12: Project proposal for low cost net house**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units(ha.) each 50 sq. m area	100	100	100	100	100	500
Cost @ Rs 60,000/unit	60.00	60.00	60.00	60.00	60.00	300.00

Vegetables occupy an important place in our daily life particularly for vegetarians and it is the only source to increase not only the nutritive values of foods but also its palatability. For a balanced diet, an adult should have an intake of 85 g of fruits and 300 g of vegetables per day as per the dietary recommendation of nutrition specialists. But the present level of production of vegetables in our country can permit a per capita consumption of only 120 g of vegetables per day. Considering the above facts, we should plan to produce our own vegetable requirements in our backyards using the available fresh water as well as the kitchen and bathroom wastewater. This will not only facilitate prevention of stagnation unused water which will be hazardous to our health through environmental pollution, but can be useful for successful production of our own requirement of vegetables. Cultivation in a small area facilitates the methods of controlling pests and diseases through the removal of affected parts and non-use of chemicals. This is a safe practice, which does not cause toxic residues of pesticides in the vegetables produced. Hence to promote the concept of the kitchen garden, establishment of demonstration units of kitchen garden in each taluka is proposed with following details.

**Table 5.2.13: Project proposal for kitchen gardening with low energy drip**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units(ha.) each 50 sq. mt area	500	500	500	500	500	2500
Cost @ Rs 3,000/unit (Rs. in lakhs)	15.00	15.00	15.00	15.00	15.00	75.00

To increase the vegetable production of the district to meet the daily diet requirement of human being, the demonstration on high tech vegetables farming in each taluka is proposed with below given details.

**Table 5.2.14: High tech vegetable farming including all components**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	20	20	20	20	20	100
Cost @ Rs 30,000/unit	6.00	6.00	6.00	6.00	6.00	30.00

Most of the vegetables are perishable in nature. It is estimated that in India, post harvest losses in vegetable is around 25 – 30 %. The facility like cold storage for vegetables will help in minimizing

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the post harvest losses. Hence, the project for establishment of cold storage facility in the district with following details is proposed.

**Table 5.2.15: Proposal for establishment of cold storage units:**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units(ha.)	1	1	1	1	1	5
Cost @ Rs 300 lacks (Rs. in lakhs)	300	300	300	300	300	1500

Vegetables are included in daily diet of human being hence the continuous demand is arise from the consumer. Farmers are unable to fetch reasonable price at rural level. If collection centre is established at taluka level, farmers can procure better price and fulfill the daily requirement of vegetables through proper marketing network. Therefore the establishment of collection centre with below details is proposed.

**Table 5.2.16: Proposal for establishment of collection centers**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	10	10	10	10	10	50
Cost @ Rs 3.00 lakhs (Rs. in lakhs)	30.00	30.00	30.00	30.00	30.00	150.00

Refrigerated van can help in minimizing the post harvest losses in vegetable during the long distance transportation. Hence refrigerated van for each taluka is proposed with following details.

**Table 5.2.17: Proposal for providing refrigerated vans**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	2	2	2	2	2	10
Cost @ Rs 30.00 lacks (Rs. in lakhs)	60.00	60.00	60.00	60.00	60.00	300.00

District has a good potential for cultivation of new fruit crops like pomegranate, date palm, aonla and sapota. Hence to popularize the cultivation practices among the farmers either on border or in field the demonstration on new fruit crops is proposed with financial requirement.

**Table 5.2.18: Introduction of new fruit crop**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of demon each 0.4 ha	50	50	50	50	50	250
Cost @ Rs 4,000 (Rs. in lakhs)	2.00	2.00	2.00	2.00	2.00	10.00

The concept of Integrated Pest Management is need to be popularize among the fruit growers for producing the residue free fruits. Integrated Pest Management practices help in reducing the load of pesticides in environment thus, it avoid the ill effect of the pesticides. Demonstration on IPM in fruit crops is proposed with following details.

**Table 5.2.19: Integrated pest management in fruit crops:**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of demon each 0.4 ha	50	50	50	50	50	250
Cost @ Rs 2,000(Rs. in lakhs)	1.00	1.00	1.00	1.00	1.00	5.00

To make the farmers familiar with the scientific fruit production technology, training to the farmers is proposed with following details.

**Table 5.2.20: Training needs of farmers for fruit crops**

Name of Technology	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 cultivation	300	4.5	300	4.5	300	4.5	300	4.5	300	4.5	1500	22.5
Nursery raising	200	3	200	3	200	3	200	3	200	3	1000	15
IPM/INM	300	4.5	300	4.5	300	4.5	300	4.5	300	4.5	1500	22.5
Value addition Processing	100	1.5	100	1.5	100	1.5	100	1.5	100	1.5	500	7.5
Total	900	13.5	900	13.5	900	13.5	900	13.5	900	13.5	4500	67.5

There are considerable area under garlic & onion in the district. To avoid the post harvest losses and long term preservations, establishment of demonstration unit of ventilated meda for onion & garlic is proposed with following financial requirement.

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**Table 5.2.21: Establishment of garlic ventilated traditional storage unit**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	5	5	5	5	5	25
Cost @ Rs 3 (Rs. in lakhs)	15	15	15	15	15	75

**Table 5.2.22: Establishment of onion ventilated traditional storage unit**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	20	20	20	20	20	100
Cost @ Rs 5 (Rs. in lakhs)	100	100	100	100	100	500

Potato is widely consumed as food all over the world. Potato chips are basically used for snacks purposes. They are produced by rapid dehydration of potato slices by direct contact with hot oil. Its crispiness and special palatability makes it the favourite of people of all age groups. The production of wafers in household units and small units provides good scope for new entrepreneurs; they may be successful in this field provided manufacturing quality product with economic price. Hence establishment of small scale potato wafer production units is proposed.

**Table 5.2.23: Establishment of potato wafer production units**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	2	2	2	2	2	10
Cost @ Rs 5 (Rs. in lakhs)	10	10	10	10	10	50

Recycling of vegetable waste through shredder and vermi composting can help in nutrient management in vegetable crops so that vegetable production can be more profitable and sustainable. The objectives can be achieved by conducting the demonstration with following details.

**Table 5.2.24: Recycling of vegetable waste through shredder and vermi-composting**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	5	5	5	5	5	25
Cost @ Rs 2 (Rs. in lakhs)	10	10	10	10	10	50

The area under floriculture is considerably low in the district. To make the concept of floriculture popularize among the farmers, cluster based model floriculture centres is proposed with following financial requirement.

**Table 5.2.25 Model floriculture centers cluster based**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	15	15	15	15	15	75
Cost @ Rs 8.35 (Rs. in lakhs)	125.25	125.25	125.25	125.25	125.25	625.25

The district has good possibilities of spices and medicinal & aromatic plants cultivation. The scientific cultivation practices is popularize among the farmers by demonstration. Hence cluster based demonstrations on spices and medicinal & aromatic plants are proposed with following financial assistance.

**Table 5.2.26: Cluster based demonstrations on spice, medicinal and aromatic plants**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of clusters each 5 ha	5	5	5	5	5	25
Cost @ Rs 0.25 (Rs. in lakhs)	1.25	1.25	1.25	1.25	1.25	6.25

To create the awareness regarding scientific cultivation practices among the tomato & cucurbit growers of the district, demonstration on tomato telephone & cucurbit trellis farming is proposed with following details.

**Table 5.2.27: Demonstration on tomato telephone & cucurbits trellis farming**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of demon (1 ha area, 2 units/taluka/year)	20	20	20	20	20	100
Cost @ Rs 1.0 (Rs. in lakhs)	20	20	20	20	20	100

District has a good potential for cultivation of date palm. The farmers can be encouraged for date palm cultivation by providing the quality date palm *offshoot* for plantation. For supply of quality *offshoot* to the farmers following project is proposed.



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**Table 5.2.28: Distribution of date palm offshoots to the growers for demonstration**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of offshoots	100	100	100	100	100	500
Cost @ Rs 0.025/offshoot (Rs. in lakhs)	2.5	2.5	2.5	2.5	2.5	10

The district has long sea shore and saline soil near the sea shore is suitable for coconut cultivation. The hybrid coconut is more productive than the conventional coconut varieties. The farmers can be encouraged for hybrid coconut cultivation by providing the quality plants for plantation. For supply of quality hybrid coconut plants to the farmers following project is proposed.

**Table 5.2.29: Distribution of hybrid coconut plants to the growers for demonstration**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of Plants	1000	1000	1000	1000	1000	4000
Cost @ Rs 100 /plant (Rs. in lakhs)	1.0	1.0	1.0	1.0	1.0	5.0

### 5.3 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.C., small farmers, marginal farmers and agricultural labourers. 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 with wide network of infrastructural and support services.

Livestock enterprise is an important complementary activity to the crop activities. The table 5.3.1 shows the taluka wise availability of none descripts and draft animals. The total number of non descript and draft animals in Junagadh district are 67690 and 124223 respectively.

**Table 5.3.1 Taluka wise non descript and draft animals**

Taluka	No. of non descript animals	No. of draft animals
Jamnagar	NA	10468
Lalpur	NA	12530
Jam Jodhpur	NA	11320
Bhanvad	NA	11431
Kalyanpur	NA	19075
Okha	NA	3726
Khambhaliya	NA	17909
Jodia	NA	6827
Dhrol	NA	7032
Kalawad	NA	23905
<b>Total</b>	<b>67690</b>	<b>124223</b>

Source: Deputy Director of Animal Husbandry, District Panchayat, Jamnagar

The taluka wise information about breeding animals (age wise) is shown in table 5.3.2. The breeding animals are categories in below 3 years and above 3 years.

**Table 5.3.2 Taluka wise breeding animals (age wise)**

Taluka	Cow		buffalo	
	Below 3 years	Above 3 years	Below 3 years	Above 3 years
jamnagar	10396	4393	7309	23288
Lalpur	2544	8642	4393	14410
Jam Jodhpur	2554	9534	4833	13870
Bhanvad	1462	5934	4351	15090
Kalyanpur	4282	12818	4554	18889
Okha	2046	7487	1885	9126
Khambhaliya	2658	9356	6467	20564
Jodia	1184	3947	2531	8795
Dhrol	1704	5062	2074	6576
Kalawad	3474	10969	4533	12008
<b>Total</b>	<b>32304</b>	<b>78142</b>	<b>42930</b>	<b>142616</b>

Source: Deputy Director of Animal Husbandry, District Panchayat, Jamnagar

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The Taluka wise fodder availability is shown in table 5.3.3. This table includes the area under fodder crop in hectare and quantity available from this area in tones. The total area under fodder crop in Jamnagar district is 45637 ha and the total quantity available from this area is 228185 tones. The highest area under fodder crop is in Okha taluka with the highest fodder production of 76345 tones.

**Table 5.3.3 Taluka wise fodder availability.**

Taluka	Area (ha) under fodder crop	Quantity available (tones)
Jamnagar	6725	33625
Lalpur	2896	14480
Jam Jodhpur	3435	17175
Bhanvad	2091	10455
Kalyanpur	5234	26170
Okha	15269	76345
Khambhaliya	1847	9235
Jodia	2896	14480
Dhrol	1206	6030
Kalawad	4038	20190
<b>Total</b>	<b>45637</b>	<b>228185</b>

Source: Annual Report (2009-10), Statistics Department, District Panchayat, Jamnagar

The taluka wise availability of household gobergas plant is shown in table 5.3.4. There are 15747 gobargas plants available in Jamnagar district. Highest gobergas plants are in Kalawad taluka while least in Okha taluka.

**Table 5.3.4 Talukawise gobergas plants.**

Taluka	No. of gobergas plants
Jamnagar	2652
Lalpur	1480
Jam Jodhpur	1272
Bhanvad	1295
Kalyanpur	1993
Okha	330
Khambhaliya	1616
Jodia	478
Dhrol	608
Kalawad	4023
<b>Total</b>	<b>15747</b>

Source: Gujarat Agro service centre, Jamnagar

The occurrence of prominent disease in animals in Jamnagar is shown in table 5.3.5.

**Table 5.3.5 Taluka wise prominent disease occurrences in animals**

Taluka	Disease
Jamnagar	HAEMORRAHGIC SEPTICEMIA, F. M. DISEASE,MASTITIS,VAGINAL PROLAPSE, ,MASTITIS
Lalpur	HAEMORRAHGIC SEPTICEMIA,MASTITIS, VAGINAL PROLAPSE ,DANGU FEVER
Jam Jodhpur	HAEMORRAHGIC SEPTICEMIA, VAGINAL PROLAPSE,,DANGU FEVER, F. M. DISEASE,MASTITIS
Bhanvad	HAEMORRAHGIC SEPTICEMIA, VAGINAL PROLAPSE ,DANGU FEVER, F. M. DISEASE,MASTITIS
Kalyanpur	HAEMORRAHGIC SEPTICEMIA, VAGINAL PROLAPSE ,DANGU FEVER, F. M. DISEASE,MASTITIS
Okha	HAEMORRAHGIC SEPTICEMIA, VAGINAL PROLAPSE ,DANGU FEVER, F. M. DISEASE,MASTITIS
Khambhaliya	HAEMORRAHGIC SEPTICEMIA, VAGINAL PROLAPSE ,DANGU FEVER, F. M. DISEASE,MASTITIS
Jodia	HAEMORRAHGIC SEPTICEMIA, VAGINAL PROLAPSE ,DANGU FEVER, F. M. DISEASE,MASTITIS
Dhrol	HAEMORRAHGIC SEPTICEMIA, VAGINAL PROLAPSE ,DANGU FEVER, F. M. DISEASE,MASTITIS
Kalawad	HAEMORRAHGIC SEPTICEMIA, VAGINAL PROLAPSE ,DANGU FEVER, F. M. DISEASE,MASTITIS

Source: Deputy Director of Animal Husbandry, District Panchayat, Jamnagar

The information on taluka wise existence of veterinary institutes is given in table 5.3.6.

**Table 5.3.6 Taluka-wise existing veterinary institutions**

Talukas	GPs	Institutions (No)					Total	GPs without any veterinary institutions
		VH	VD	Mobile veterinary centre	A.I Centers	FAVC		
Jamnagar	99	0	4	0	4	4	12	87
Lalpur	73	0	2	0	1	2	5	68
Jam Jodhpur	65	0	4	1	3	3	11	54
Bhanvad	53	0	3	0	2	2	7	46
Kalyanpur	62	0	4	0	1	2	7	55
Okha	40	0	2	0	1	1	4	36
Khambhaliya	86	0	4	0	2	2	8	78
Jodia	52	0	2	0	2	2	6	46
Dhrol	40	0	2	0	3	2	7	33
Kalawad	97	0	6	0	4	3	13	84
<b>TOTAL</b>	<b>667</b>	<b>0</b>	<b>33</b>	<b>0</b>	<b>23</b>	<b>23</b>	<b>79</b>	<b>588</b>

Source: Deputy Director of Animal Husbandry, District Panchayat, Jamnagar

**Table 5.3.7. Production plan of livestock during the next five years ( No. In lakh, P in '000 ton milk/meat, egg in lakh no. )**

Name of commodity	Baseline 2011-12		2012-13 (projected)		2013-14 (projected)		2014-15 (projected)		2015-16 (projected)		2016-17 (projected)	
	Prod.	Productivity	Prod.	Productivity	Prod.	Productivity	Prod.	Productivity	Prod.	Productivity	Prod.	Productivity
Milk	300	5.2 lt/day	306	5.4lt/day	308	5.6 lt/day	312	5.8 lt/day	315	6.0 lt/day	320	6.2 lt/day
Egg	10.84	201/day	11	204/day	11.2	207/day	11.4	211/day	11.6	214/day	11.8	218/day
Broiler	139047	-	141827	-	144608	-	147390	-	150170	-	152950	-
Meat	205381	-	209000	-	21350	-	21770	-	221820	-	226000	-

Source: Deputy Director of Animal Husbandry, District Panchayat, Jamnagar



**Interculturing by pair of bullocks**

**5.3.1 Strength / Gaps****(a) Dairy Cattle****i) Strength**

- Strong presence of cooperative dairy sector
- Enhanced marketing potential in the neighbourhoods
- Large scale participation of private players

**ii) Weakness**

- Green fodder scarcity
- Inadequate health care
- Endemic for Anthrax and Foot & Mouth Disease.
- Unavailability of barren lands for conversion it into grazing area

**(b) Sheep and Goat****i) Strength**

- Nomadic rearing – Vast uncultivable land – Rainfed area
- Sizeable number of breedable population
- Consumer's preference – By-product (leather) is efficiently utilized

**ii) Weakness**

- Non-availability of superior Rams and Bucks
- Unorganized marketing resulting in wild price fluctuations
- Absence of mechanism to promote the sector (Financial assistance)

**(c) Poultry****i) Strength**

- Availability of dry land – conducive atmosphere (Layer)
- Contract farming (Broiler)
- More scope for backyard poultry

**ii) Weakness**

- Depopulation of layers
- Increase in the input (feed) cost
- Bird flu threat due to unregulated farms

**Interventions Required Areas**

- Green fodder development
- Financial Assistance for Animal component
- Incentive to farmers through cards
- Improved livestock health care
- Hygienic utilization of offal
- Capacity building protocols
- Cattle feed production

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## 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 349947 numbers of cattle and 258755 numbers of buffaloes in the district as per latest livestock census (2010). The numbers of cross bred cows are 1459 which are almost less than 1% of total cows. During 2010-2011 total milk production of Jamnagar district was 3 lakh tones. The average milk yield of indigenous cows, crossbred cows and indigenous buffalo is 5.2 liter per day (*Animal Husbandry Department, DPs, Jamnagar*).

There exists wide gap between the average yield and attainable yield and potential yield which offers scope for improvement in productivity. The existing gaps in germplasm, low reproductive efficiency, shortage of quality feed and fodder (even quality), inadequate disease management etc. 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 AI services and supply of known pedigree bulls. The gap of milk yield can be bridged through availability of green fodder and popularizing hay and silage making. The macro and micro-nutrient deficiency in fodder/soil is also affecting the productivity of these animals through poor quality fodder supplement addressing the mineral deficiency in diet. The majority of farmers are feeding poor quality fodder to animals. To aware the farmers on this important aspect, quality fodder production through varietal and INM demonstrations are recommended. The high calf mortality and other disease threat would effectively be checked by starting extensive campaigns related to calf rearing and management. For effective disease control the veterinary services are to be strengthened by providing different improved diagnostic kits for mastitis, FMD etc. and providing mobile hospital vans for door step services to the farmers. In addition to the proposed extension activities of capacity building and skill up gradation, the entrepreneurship development programmes are also included in the plan.

**Table 5.3.8 : Sustainability issues and gap analysis of productivity in dairy industry.**

Sr. No.	Crop	Factors/ Constraints leading to gap	Strategies	Approach and methodology	Performance indicators	Sustainability outputs
a	Breed of Animals	Natural mating with non-descript bull	Strengthening A.I. facility, Community Bulls	Extension and development agencies A.H deptt. and co- operatives should jointly approach in a farmers participatory approach	Strengthening AI by establishing new AI centers, Mobile A.I. centers and semen storage facilities	Improvement in livestock breeds which increase the milk production.

b	Poor Housing management	Lack of awareness and poor economic condition of the farmers	Proper housing management	Creating awareness and increase adoption of proper housing management through training, demonstrations and literature	Increase the health, hygiene and milk production	Increase milk production
c	Imbalanced feeding	Lack of green fodder	Cultivation of green fodders and establishing fodder bank	Demonstration, Trainings, supply of seed of fodder crops and establishing fodder bank at taluka level	Improve animal health and increase in milk production	Increase milk production
		Shortage and high cost of concentrate feed	Providing concentrate feed at cheaper rate by producing at co-operative levels	Supply of concentrate feed to the buffalo /cattle farmers establishment of concentrate production unit at co-operative level	Improve animal health and milk production	Increase income of the farmers
		Poor nutrient /micronutrient status of soil as well as feeds leads to mineral deficiency in Animals	Mineral mixture supplementation of the animal feed	Supply of mineral mixture to the buffalo /cattle farmers	Correction of mineral status and Improvement of animal health and milk production	Increase income of the farmers
d	Poor Health of animal	Poor feed and fodder availability and poor body conditions	Popularize health package (deworming, mineral mixture and concentrate feeding)	Creating awareness and increase adoption popularize health package through training, demonstrations and literature	Improve health and milk production	Increase income of the farmers



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e	High calf mortality and delayed age of first calving	Lack of awareness about scientific calf rearing	Popularize scientific calf rearing	Creating awareness and increase adoption of scientific calf rearing through training, demonstrations and literature	Reduce calf mortality and production elite future herds	Increase income of the farmers
f	Goat rearing	Lack of knowledge about rearing	Popularize scientific goat rearing	Creating awareness and increase adoption of scientific Goat rearing through training, demonstrations and literature	Increase milk and meat production Provide household nutrition to poor family	Increase income and health of the farmers
g	Poultry	Lack of knowledge about rearing	Popularize scientific poultry rearing	Creating awareness and increase adoption of scientific poultry rearing through training, demonstrations and literature	Increase egg and meat production Provide household nutrition to poor family	Increase income and health of the farmers

**Table 5.3.9: Bridging the gaps for realizing the vision- Dairy sector**

Issue	Programme	Activities	Collaborators/ Targets
Dairy Development	Fertility improvement programme	Arrangement of clinical camps for treatment of infertile animals and also awareness programme	AH, Co-operatives, KVK
	Supplementation of mineral mixture to milch animals	to supplement mineral mixture to overcome the reproductive problems	AH, Co-operatives, KVK
	Supply of balanced concentrate ration to Animals	To improve the animals productive efficiency by providing balanced concentrate ration. Awareness about concentrate feeding and easy availability at cheaper rate with in district.	Co-operative
	Rearing of female cattle/buffalo calf	To provide genetically superior livestock at doorstep and to produce superior herd stock for future.	AH, Co-operatives, KVK

	Providing life insurance to livestock	To protect the livestock farmers from vagaries of nature by insuring animals against death.	AH, Co-operatives, KVK
	Fodder production and preservation	Demonstration on fodder production and preservation	AH, Co-operatives, KVK
	Provision of Artificial Insemination/ Community Bulls facilities	Breed improvement through AI and breeding bulls	AH, Co-operatives
	Commercial Dairy Farming	To establish model for motivate the farmers for dairying	AH, Co-operatives, KVK
Poultry Development	Promotion of back yard poultry	This form of rural poultry is important source of assured nutritional supply and a sizeable return with no or little extra cost to the farm family.	AH (Intensive Poultry Development Project), KVK
Sheep & Goat Development	Goat/Sheep farming	Income and employment generation for weaker section of society	AH, Co-operatives, KVK

Source: AH-Animal Husbandry department, KVK-Krishi Vigyan Kendra, Co-operatives-Dairy

**5.4: Activities for development of Animal Husbandry in the district.**

**5.4.1.: Proposal for capacity building of livestock famrers**

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. The farmer, who wants to startup his own livestock enterprise for the first time will also be most benefitted with this programme. There are 77003(36.49%) small and medium farmers in the district out of which 25231 (11.96%) are marginal. Total of six groups will be trained twice in a year, so the total number of trainings will come up to 12. The 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.

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**Table 5.4.1: Proposal for capacity building of livestock farmers**  
(Phy-No. of trainees, Fin. – Rs in lakhs)

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	200	0.60	200	0.60	200	0.60	200	0.60	200	0.60	1000	3.00
Enhance milk Production	200	0.60	200	0.60	200	0.60	200	0.60	200	0.60	1000	3.00
Improve reproductive efficiency of dairy animal	200	0.60	200	0.60	200	0.60	200	0.60	200	0.60	1000	3.00
<b>Total</b>		<b>1.80</b>		<b>1.80</b>		<b>1.80</b>		<b>1.80</b>		<b>1.80</b>		<b>9.00</b>

No. of Trainees (25/training) and @ Rs.0.003 lakh/trainee/day

### 5.4.2: Fertility Improvement Programme

The main objective of this project is to change the fertility state of animals from infertile to fertile. So, the animals which are not conceiving (Repeat breeding), showing irregular cyclicity or not showing signs of heat (anoestrus) can be treated very well and brought to the normal reproductive state, which may lead to increase in milk production of district. It is fact that infertile animals put an extra burden on milk producers and gives un-satisfaction in dairy animal rearing so it is necessary to organize a series of infertility camps at village level and treat such infertile animals. Simultaneously awareness programme pertaining to animal reproduction should also be organized. This project will help in reducing inter-calving period, increasing number of milch animals and increase in milk production of district, In addition to this there will be awareness in milk producers about scientific rearing of dairy animals in the district.

**Table 5.4.2 : - Proposal for fertility improvement program**

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

Sr. No	Activity	No. of Village / year	No. of fertility camps	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	120	360*	9000	72.0	9000	72.0	9000	72.0	9000	72.0	9000	72.0	45000	360.0
2	Awareness Program	120	360	360	36.0	360	36.0	360	36.0	360	36.0	360	36.0	1800	180.0
3	Equipment	-	-	-	5.0		0.3		0.3		0.3		0.3		6.20
			<b>Total</b>		<b>113.0</b>		<b>108.3</b>		<b>108.3</b>		<b>108.3</b>		<b>108.3</b>		<b>546.2</b>

(Rs. 0.20 lakh per camp) (Rs. 0.10 Lakh/ awareness program) (3 camp/village/yr)\*  
(25 animals/camp)

### 5.4.3: Supplementation of Mineral Mixture to Milch Animals

Due to over exploitation of land under extensive cultivation and poor recycling of farm wastes, 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 viz. age at first heat, age at first calving, calving interval, conception rate, abortion and vaginal prolapse and 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 in feeding straw, fodder and other food-stuffs. 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.

**Table 5.4.3 Proposal for mineral mixture (MM) feeding supplementation.**

(Phy-No. of trainees, Fin. – Rs in lakhs)

Sr No	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	Supply of MM for feeding	10000	225.0	10000	225.0	10000	225.0	10000	225.0	10000	225.0	50000	1125.0

( @50g/day/animal for 300days) (@ Rs. 150/kg )

### 5.4.4: 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 prime need in the district. This project will full fill following objectives.

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- 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 uplift rural economy by encouraging animal husbandry practices.
- 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 N.D.D.B. representative, District Development Officer, Project Administrator – TAPS, representative from DRDA *etc.*

**Table 5.4.4: Proposal for feed factory plant of 50 MT per day**

S.N	Description	Total (Rs. in 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
<b>Sub Total</b>		<b>265.60</b>
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
<b>Sub Total</b>		<b>336.30</b>
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
<b>Sub total</b>		<b>95.00</b>
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
<b>Total</b>		<b>748.00</b>
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
<b>Grand Total</b>		<b>832.09</b>

#### 5.4.5 : Rearing of female cattle/buffalo calf

Healthy cows/buffaloes are the basic factors involved in success of dairying and calves are the livestock industry of the future. Calf rearing is one of the most neglected aspects in dairying. 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 lack of awareness.

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Jamnagar district is having 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 so that it can be the part of their future herd. 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 following table (a) showing total expenditure on five calf rearing units, while, table (b) shows approximate calculation of expenditure per unit of 10 calves is shown.

**Table 5.4.5: Proposal for female cattle/buffalo calf rearing unit**

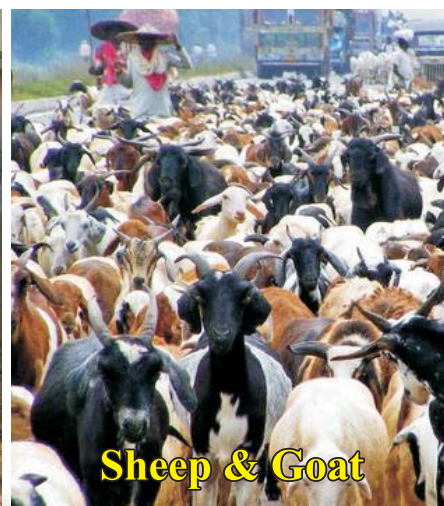
Description	2012-13	2013-14	2014-15	2015-16	2016-17	Total
No. of Female calf rearing unit (10 female calf per unit)	5	5	5	5	5	25
Expenditure (Rs. 4.31 Lakh) per unit	21.55	21.55	21.55	21.55	21.55	107.75

**Table 5.4.6: Details of expenditure per year (Rs. In Lakh) per female cattle/buffalo calf rearing unit**

Year	Concentrate	Fodder	Mineral Mixture	Medicines	Housing	Total
First	0.70	0.15	0.10	0.05	1.00	2.00
Second	0.77	0.165	0.11	0.055	0.00	1.10
Third	0.847	0.1815	0.121	0.0605	0.00	1.21
Cumulative	2.317	0.4965	0.331	0.1655	1.00	4.31



**Gir Cow**



**Sheep & Goat**

**5.4.6: Supply of health packages for animals to landless farmers.**

The main occupation for landless families of the area is to rear livestock and labour work in others' farm field or under government projects, viz., NRG. 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 motivates farmers to go away from animal husbandry to other non-agricultural work as a livelihood tool for family. To overcome this problem of poor landless livestock owners, they should be supplied with health package for their animals. With the help of this package livestock owner will have feed and fodder supplements, dewormer, ectoparasitocidal 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.

**Table 5.4.7: Proposal for Supply of health packages for animals to landless farmers.**

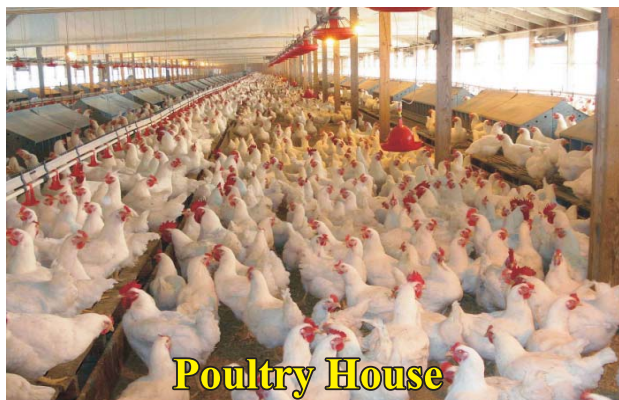
(Phy-No. of animals, Fin. – Rs in lakhs)

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	240	28.8	240	28.8	240	28.8	240	28.8	240	28.8	1200	144

Rs. 0.12 lack/ farmer/year

**5.4.7: 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.



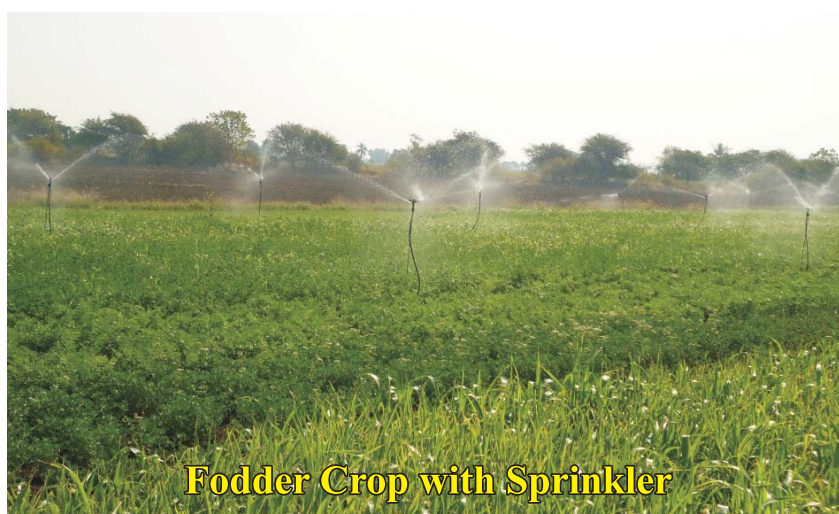


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To boost the animal husbandry, it is necessary that quality fodder be made available to animals. Jamnagar has 46032 ha and 15652 ha land under pasture and cultivable waste land, respectively. This land can be used for growing HYV of sorghum or good 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 5.4.8: Fodder production.**

Taluka	Area under fodder crop (ha)	Land to covered under HYV(ha)	Year-wise financial requirement					Total
			2012-13	2013-14	2014-15	2015-16	2016-17	
Jamnagar	6725	2690	2.7	2.7	2.7	2.7	2.7	13.5
Lalpur	2896	1158	1.3	1.3	1.3	1.3	1.3	6.3
Jam Jodhpur	3435	1374	2.5	2.5	2.5	2.5	2.5	12.6
Bhanvad	2091	836	0.8	0.8	0.8	0.8	0.8	4.2
Kalyanpur	5234	2094	1.0	1.0	1.0	1.0	1.0	5.0
Okha	15269	6108	1.4	1.4	1.4	1.4	1.4	6.8
Khambhaliya	1847	739	3.6	3.6	3.6	3.6	3.6	18.0
Jodia	2896	1158	1.6	1.6	1.6	1.6	1.6	8.1
Dhrol	1206	482	0.8	0.8	0.8	0.8	0.8	4.1
Kalawad	4038	1615	3.2	3.2	3.2	3.2	3.2	16.2
<b>Total</b>	<b>45637</b>	<b>18255</b>	<b>18.9</b>	<b>18.9</b>	<b>18.9</b>	<b>18.9</b>	<b>18.9</b>	<b>94.7</b>



**Fodder Crop with Sprinkler**

#### 5.4.8: Supply of breeding bulls in villages

In the absence of A.I. facilities, the farmers are using non-descript animals for breeding their animals. This has resulted in decline in productivity of dairy animals. For increasing the milk production and income from milch animals, an efficient and practical animal breeding system is of immense importance. The success rate of A.I. in the buffaloes is very low and the reasons for this are manifold. Therefore, it is proposed that bulls of proven breeding ability may be provided in each village with maintenance allowance. The duty of maintaining bulls can be assigned to a good and reputed person or committee in the village itself. 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.

**Table 5.4.9 : Supply of breeding bulls in villages.**

(Phy-No. of bulls, Fin. – Rs in lakhs)

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	100	65.0	100	65.0	100	65.0	100	65.0	100	65.0	500	325.0

Cost of one bull @ Rs.0.40 lakh/bull/village + Maintenance cost @ Rs. 0.25 lakh/bull

#### 5.4.9 Commercial Dairy Farming

In Jamnagar district, Most of the farm families of various land holding sizes are engaged in the livestock farming. More and more number of farmers is falling into the category of marginal and small farmers due to division of land holdings involved in livestock enterprise. Buffaloes (94872) and desi cattle (89880) are the main milch animal in the district and crossbred cows (1137) are now a days also being reared on small scale. The cost of one good animal is more than Rs. 40,000. Due to the small land holdings and the high cost of animal, it has become very difficult to maintain dairy animals. The demand for milk is continuously increasing by the urban areas. The price of milk in the area reaches up to Rs. 30/- per liter particularly during the lean periods or the summer. Milk being an important component of diet is becoming a scarce commodity for the low and middle class families in both the urban and rural areas. The reasons stated above have demanded the introduction of large commercial dairy farms, which can be run on economy of scale. The automation of this enterprise can bring down the cost of milk production, thereby making a good scope for commercially viable large sized dairy farms.

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 taluka of the district. The supervision of the farm will be under government veterinary doctor and scientist from Krishi Vigyan Kendra of the district.

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**Table 5.4.10 : Commercial dairy farming each in taluka**

(Phy-No. of farm, Fin. – Rs in lakhs)

Description	Unit cost (lakhs)	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	5.00	2	10	2	10	2	10	2	10	2	10	10	50.0

### 5.4.10: Poultry Development

Poultry farming has established itself as one of the important independent commercial activity in the state. Climate, infrastructural facilities, easy and finance availability may contribute favorably towards development of this activity.

#### Promotion of back yard poultry

A number of farmers especially the landless and other farmers are having a few birds (1129) as back yard poultry. This form of poultry farming needs institutional support for its success as the productivity is quite low in these cases. The improved strains for this type of farming (e.g. vanaraja and gramapriya) together with their production packages are required to be delivered to the farmer doorstep. This form of rural poultry is important source of assured nutritional supply and a sizeable return with no or little extra cost to the farm family. There exists a sizeable market for the product i.e. eggs and meat of these birds in local areas. The extension services, training and marketing needs for poultry farming are to be effectively addressed in the plan. The growing urbanisation, increasing demand for poultry, meat and eggs and expanding poultry units would get a boost if a marketing / poultry hub can be developed particularly in this region of state as of now there is no marketing center of these products in the area.

The farmers of Jamnagar 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/- at subsidize rate. The total expenditure of the project may be calculated as per subsidy is given below in table.

**Table 5.4.11: Low input bird/backyard poultry in district.**

(Phy-No. of farmers, Fin. – Rs in lakhs)

Description	Unit cost (Rs.)	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	4000	200	6.0	200	6.0	200	6.0	200	6.0	200	6.0	1000	30.00

### 5.4.11: 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. However, promoting small units as subsidiary to the agriculture by land less labourers 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. Just like back yard poultry, this activity can be under taken on a limited scale which has unexploited market potential in and around the village itself.

A unit of five sheep/goat one male and four female animals costing approx. Rs. 5000/- can be given to each farmer.

**Table 5.4.12: Goat rearing in district.** (Phy-No. of farmers, Fin. – Rs in lakhs)

Description	Unit cost	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	5000	40	2.0	40	2.0	40	2.0	40	2.0	40	2.0	200	10.00

### 5.5 Forestry:

Forest in Gujarat constitutes 9.66% forest area of the total geographical area. In Jamnagar 4.5% of the district land is under forest land. Looking at the degradation of the forest, land resources in the district, there is a need for massive time bound programme in forestation of wasteland. With more forestation it will help in supplementing income generation activities with minor forest based collection.

**Table 5.5.1: Bridging the gaps for realizing the vision- Forestry sector**

Sr. No	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
2	Fisheries	Establishment of fisheries/ prawn production units at village level	Providing units (ponds) at cooperative base	Fisheries department	Providing units

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**Table 5.5.2: Proposal on demonstration of nursery**

(Phy-No. of Trainees, Fin. – Rs in lakhs)

Description	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.
CB for forest staff	3	45	0.45	45	0.45	45	0.45	45	0.45	45	0.45	225	2.25
CB for forest farmers	2	50	0.15	50	0.15	50	0.15	50	0.15	50	0.15	250	0.75

Cost/ training forest staff @ Rs.1000/trainee/day      No. of Trainees =15/training

Cost/ training @ Rs.300/farmer/day                      No. of farmers =25/training

**Table 5.5.3: Demonstration on agro forestry.**

(Phy-No. of Demonstration , Fin. – Rs in lakhs)

Description	No 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.
Nursery cultivation	10	2	6.0	2	6.0	2	6.0	2	6.0	2	6.0	10	30.0

Cost/ demo @ Rs. 3.0 lakhs

### 5.6 Fisheries:

The district have longest seashore in state there is much wider scope for the development of marine as well as inland fisheries. The total number of inland fisherman across the three talukas viz., Jamnagar, Kalyanpur and Jamkhambhaliya, where it is practice are 88 whereas, number of marine fisherman concern the total numbers are 9330 across the five talukas Viz, Jamnagar, Kalyanpur, Jodiya, Okha and Jamkhambhaliya. An around 90 percent fisherman belong to Okha, Jamnagar and Jamkhambhaliya taluka where great opportunities for the development and improvement of marine fisheries. Under inland fisheries, aquaculture is possible in ponds, reservoirs and rivers. This activity has not yet picked up in the district. The district is having 2822 mechanical and 385 non mechanical boats for fishing. There are only 2 fish processing unit in the district so there is need for development of such type of processing unit. There is no any recorded refrigerated van for transportation and fish feed factory in the district so there is immense scope for development.

**Table 5.6.1: Bridging the gaps for realizing the vision- Fisheries sector**

No.	Thrust Areas/ Issues	Program	Activities	Concerned Agencies/ collaborators	Approach
1	Quality seed of fish	Establishment of fisheries/ prawn production units at village level	Providing units (ponds) at cooperative base	Fisheries department	Providing units
2	Transportation	Providing refrigerated van for transportation	Transportation of fish	Fisheries department	Providing transport facilities
3	Feed for fish	Establishment of fish feed factory	Production of nutritive fish feed	Fisheries department	Providing quality fish feed to fishermen

**5.6.1 : Activities for development of fisheries sector**

**Table 5.6.2: Establishment of fisheries/prawn production units (ponds)**  
(Phy-No. of units, Fin. – Rs in lakhs)

Description	No of 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.
Fisheries unit	25	5	60.0	5	60.0	5	60.0	5	60.0	5	60.0	25	300.0

@ Rs.12.00 lakhs per unit of 1 ha.

**Table 5.6.3: Providing refrigerated van for transportation in costal taluka**  
(Phy-physical units, Fin. – Rs in lakhs)

Description	No of 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.
Providing refrigerated van for transportation	11	5	150	2	60	2	60	1	30.0	1	30	11	330

@ Rs.30.00 lakhs per unit

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**Table 5.6.4 : Establishment of fish feed factory, processing unit and cold storage**  
(Phy-No. of units, Fin. – Rs in lakhs)

Description	No of 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.
Fish feed factory	3	1	100	1	100	0	0	0	0	1	100	3	300
Processing unit	3	0	0	1	100	1	100	1	100	0	0	3	300
Cold storage	3	1	100	1	100	0	0	0	0	1	100	3	300

@ Rs.100.00 lakhs per unit

### 5.7 Employment generation activities:

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

Sr 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.

Jamnagar district has 964019 cattle. Assuming that one cattle gives gober @ 2 kg/day and 10 % of it is available for conversion into vermi compost, there is great potential to generate 703733 quintals of vermin compost 1 year. To exploit this potential, planning has been given in this plan.

**Table 5.8.1 : Vermi-compost units cum training to farmer group**

Taluka	Farmers group (5 person / village)	Organic certificate groups	Year-wise financial requirement					Total
			2012-13	2013-14	2014-15	2015-16	2016-17	
Jamnagar	335	67	8.0	8.0	8.0	8.0	8.0	40
Jodia	315	63	7.6	7.6	7.6	7.6	7.6	38
Dhrol	440	88	10.6	10.6	10.6	10.6	10.6	53
Kalawad	215	43	5.2	5.2	5.2	5.2	5.2	26
Lalpur	225	45	5.4	5.4	5.4	5.4	5.4	27
Jamjodhpur	290	58	7.0	7.0	7.0	7.0	7.0	35
Bhanvad	565	113	13.6	13.6	13.6	13.6	13.6	68
Jam Khambhadia	380	76	9.1	9.1	9.1	9.1	9.1	45.5
Jam Kalyanpur	190	38	4.6	4.6	4.6	4.6	4.6	23
Dwarka	315	63	7.6	7.6	7.6	7.6	7.6	38
<b>Total</b>			<b>78.5</b>	<b>78.5</b>	<b>78.5</b>	<b>78.5</b>	<b>78.5</b>	<b>392.5</b>

(Rs. 0.60 lakhs)

**5.9 : Fruit and vegetable processing:**

Jamnagar district has 704 numbers of MSME units spread over entire district. The maximum units are in Jamnagar (475) followed by Lalpur (117). The Dwarka, Kalyanpur and Jodia talukas have lowest number of units with minimum employment. It is observed that people are in want of net and poly houses in Jamnagar & Lalpur Taluka. Establishment of small scale grading and processing units can help the people to get additional income from their produce. At present no fruit and vegetable processing unit exists in this district. Hence the same has been proposed in this plan.



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**Table 5.9.1 : No. of MSME Enterprise**

Taluka	No of units	Investment (Rs in Lakhs)	No of Employees
Jamnagar	14	620.18	189
Jodia	21	926.10	292
Dhrol	06	320.00	117
Kalawad	01	158	20
Lalpur	475	8718.48	4706
Jamjodhpur	32	1140.70	709
Bhanvad	117	3849.06	1535
Jam Khambhadia	15	503.80	206
Jam Kalyanpur	01	100.00	15
Dwarka			
<b>Total</b>	<b>704</b>	<b>16621.22</b>	<b>8034</b>

**Table 5.9.2 Capacity building for small scale fruit and vegetable processing**  
(Phy-No. of Trainees, Fin. – Rs in lakhs)

Description	No of training per year	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.
Capacity building	10	250	1.88	250	1.88	250	1.88	250	1.88	250	1.88	1250	9.40

Cost -Rs 150/ trainee/day for 5 day training, No. of training-25

**Table 5.9.3 Establishment of Small scale Fruit and vegetable processing units**  
(Phy-No., Fin. – Rs in lakhs)

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 Small scale Fruit and vegetable processing units	1	10.0	1	10.0	1	10.0	1	10.0	1	10.0	5	50.0

## CHAPTER VI

## DISTRICT PLAN

## 6.1 Introduction

This chapter includes proposed district plan for the development of agriculture & allied fields in the Jamnagar district. Agriculture is the main sector covering comparatively higher area under field crops & horticulture is emerging as a developing field in the district. Allied fields include animal husbandry, fisheries and forestry. The new projects are proposed for the strengthening of ongoing activities in different fields and establishment in the area where it is lacking. The existing scenario of the agriculture and allied fields are given in detail in the preceding chapters with the proposed outlays for XII plan.

## 6.2 Growth drivers

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

## 6.2.1 Agriculture

- a) Development of high yielding, pest/disease resistant varieties & hybrids.
- b) Developing varieties of pulses, suitable for intercropping.
- c) Increase the seed replacement ratio particularly in self-pollinated crops.
- d) Crop diversification for more remunerative crops.
- e) Brought the maximum area under improved and hybrid varieties of the crop.
- f) Conservation of natural resources through Resource Conservation Technologies for sustaining and improving the productivity levels.
- g) Increase the area under Micro Irrigation System (MIS) for increasing water use efficiency and quality production.
- h) Popularized the concept of mix, relay and inter-cropping for assured return and minimize the risk.
- i) Mechanization for timely agricultural operation for reducing the labor problem.
- j) Safer and judicious use of chemicals in agriculture through adopting integrated approach viz; IPM, IDM, INM and IWM.
- k) Strengthening weather forecasting system for advance planning against various natural calamities.
- l) Awareness creation and increase the adoption rate of new/improved technology through front-line demonstrations.
- m) Human resource development and capacity building through training to the extension functionaries and farmers.

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## 6.2.2. Horticulture

- a) Interest creation in the farmers for fruits and vegetable cultivation
- b) The off seasonal vegetable cultivation in net/poly house will be popularized for higher income.
- c) Assured supply of improved/hybrid varieties and planting materials.
- d) Improvement and establishment of storage facility to reduce the post harvest losses and securing maximum return.
- e) Value addition for better economic return.
- f) Safer and judicious use of the pesticides to avoid the residue problems and minimize health hazard.
- a) Demonstrations and trainings to the farmers and extension functionaries.
- b) Establishment of facilities to evolve tissue culture protocols for important crops.

## 6.2.3. Floriculture

- a) Enhancement of floriculture through poly/net house cultivation.
- b) Supply of improved/hybrid seeds and planting materials of ornamental plants.
- c) Create the interest among the farming community through training and demonstration.
- d) Strengthening the marketing system by providing adequate storage and transport facilities.

## 6.2.4 Forestry:

- a) Increase area under agro forestry.
- b) Conversion of the coastal waste land under mangrove forest.
- c) To generate additional income to rural people by collecting and marketing of the forest products.
- d) 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) Sustain the soil fertility through INM
- c) Enrichment of soil through crop residue management.
- d) Reclamation of the alkaline /saline soil.
- e) To sustain the physico-chemical properties of the soil through proper tillage.
- f) Improve the soil health through incorporating the micro nutrient with major nutrient.
- g) Judicious use of the fertilizer as per soil testing report.
- h) Proper facilities of Soil & Water testing laboratory (Micronutrients & Ground water quality) at taluka level.
- i) Popularization of organic farming.

**6.2.6 Animal Husbandry:**

- a) Breed improvement through community bulls and AI
- b) Mineral mixture feeding.
- c) Deworming.
- d) Fodder production and preservation.
- e) Balanced nutrition to increase the animal health for higher milk production.
- f) Demonstrations and capacity building of extension functionary and farmers.
- g) Establishment of animal hostel at village level.
- h) Strengthening the cooperative dairy sector.
- i) Value addition of milk through various preparations.
- j) Conservations of pasture & grazing land.
- k) Better health management of animal.

**6.2.7 Fishery:**

- a) Promotion of inland & marine fishery by conducting training cum awareness programme.
- b) Development of hatchery for availability of good quality fish seeds.
- c) Development of fresh water prawn culture for export purpose.
- d) Monitoring productivity of the water bodies by estimating production through Remote Sensing and GIS technology.
- e) Setting up advance Training and Research Centres for Skill and Entrepreneurship development.
- f) Renovation of ponds and introducing more areas under fish culture.
- g) Providing technical support/backup to fish farmers through extension services.
- h) Arranging, organizing necessary inputs for the fish farmers and fish marketing.
- i) Utilization of village/Panchayat pond.

**6.3 New Innovative Project Proposals:****6.3.1 Background / Problem Focus**

In Jamnagar district, Agriculture, Horticulture, Animal Husbandry and Fisheries are the major enterprises practiced by the farming community. The major agricultural crops grown are groundnut, cotton, castor, bajra, wheat, pulses and cumin. 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 Jamnagar 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:

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## 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 contract 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 soil and water testing laboratory at taluka level.

Looking to the current situation of land fragmentation and land use pattern, cultivable land is reducing day by day against this human population is increasing. The biggest challenge is to increase the productivity of the soil through improving the soil fertility status. Due to continuous good rain since last ten years, introduction of *Bt* cotton cropping pattern has been change in totality which resulted in degradation of soil fertility status. For increase the productivity of the soil, prime requirement is to know the nutrient status of the soil and soil property. For that testing of the soil samples of each and every units of the farms are need to be tested. Soil health card is basic requirement to know the fertility status of the soil. Rational use of fertilizer will be resulted in maximum production of the field crop. The other basis need of agriculture is the water for irrigation. The bore well is the major source for use of ground water for irrigation purpose in the district. To know the suitability of ground water, its quality testing is essential in intensive agriculture system. Existing soil & water testing laboratories is not sufficient to analyze such big sizable soil & water samples. Hence soil & water testing laboratory at each taluka level is proposed for in time soil & water analysis to cater the need of the farmers.

**Table 6.3.2.1: Proposal for establishment of soil & water testing laboratory**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	1	3	3	1	1	9
Cost @ Rs 75 lakhs (Rs. in lakhs)	75	225	225	75	75	675

Beside this, there is a need to develop the soil & water samples analysis facility at village level for quick generation of soil nutrient status report which is only possible by development of mobile soil & water testing facility. For this purpose, the following proposal is proposed for each taluka of the district.

**Table 6.3.2.2: Proposal for establishment mobile soil & water testing laboratory**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	2	2	2	2	2	10
Cost @ Rs 100 lakhs (Rs. in lakhs)	200	200	200	200	200	1000

### 6.3.3: Establishment of Poly clinic and capacity building centre at taluka level

In the agriculture sectors, the problems are arised at frequent interval. Due to the low education level, farmers are confused in finding the proper remedy of the problems, many times resulted in wrong decision which increases the cost of production. In most of the cases farmers are not able to distinguish the damage either due to pests or disease and choose wrong pesticide molecules which not only resulted

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in non-effective against pest or disease but also increase the cost of production and suffered from high economic losses. Therefore prime need is the capacity building among the farmers which can be developed only by proper training by expert scientist. Secondary, to diagnose the cause of the problem whether it is due to micronutrient deficiency or insect infestation of disease infection etc., proper diagnosis though scientists is only the solution.

Several projects are running simultaneously for the development of agriculture, animal husbandry, horticulture, agro forestry and fishery in the district. The farmers of remote area could not easily approach KVK or head quarters of line departments for getting information or solving their problems. Further inviting all the farmers at district headquarters or at KVK for conducting small trainings is neither desirable nor possible. It not only wastes the time and money of the farmers but field functionaries also face a lot of problems. Therefore, to train the farmers of all line departments' construction of 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. This can be possible though establishment of poly-clinic along with a well equipped capacity building centre (training hall) at each taluka. Hence the following proposal is proposed.

**Table 6.3.3.1: Proposal for establishment of poly clinic and capacity building centre**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	2	2	2	2	2	10
Cost @ Rs 100 lakhs (Rs. in lakhs)	200	200	200	200	200	1000

### 6.3.4: Installation of Solar Photo Voltaic Pumps (SPV)

More than 90 per cent area of the total irrigated area is under lift irrigation. The cost of pumping irrigation water is becoming costly day by day. The rising cost of diesel, and rationalizing of power tariffs and accelerated recession of water level has further aggravated the problem. Moreover, the use of diesel is unsafe for environment causing global warming. To overcome such situation, and improve the water use efficiency, the only viable option is left with the farmers seems to switch towards harnessing renewable energy i. e solar energy through SPP pumps for pumping out the irrigation water. The technology is available for converting the abundant sunshine into electricity for farm and home usage. With slight addition /modification the system can produce and operate even during non sunshine hours.

- Advantages of SPP water pump
- Cutting cost of on diesel and electricity, as it operates on abundantly available solar energy
- Negligible operational and maintenance cost
- Environmentally safe and pollution free
- Un-interrupted supply, no fear of power cut.

Looking to the above advantages proposal for solar photovoltaic pump is proposed

**Table 6.3.4.1: Fund requirement for installation of Solar Photo Voltaic Pumps (SPV)**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units of 5 HPS	50	75	100	150	200	575
Cost @ Rs 6.00 lacks (Rs. in lakhs)	300	450	600	900	1200	3450
Proposed Subsidy @ 80% (Rs. in lakhs)	240	360	480	720	960	2760

### 6.3.5 Weather watch and forecasting system

The farmers of the district are prone to vagaries of nature. The crop damage due to cyclone, unseasonal and erratic rainfall, long dry spell during crop season, 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 losses to the farmer and provide safety measure against such natural calamities and to avoid losses and damage, there is a strong need for Weather Watch and Forecasting System, so that farmers can plan strategies against such unforeseen situation and save their crops or minimize the loss by manipulating / modifying the farm operations as per need. It is therefore proposed to establish a Weather Watch and Forecasting System at district headquarter.

**Table 6.3.5.1 : Cost of project on weather watch and forecasting system**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	1	--	--	--	--	1
Cost @ Rs 100 lacks (Rs. in lakhs)	100	--	--	--	--	100

### 6.3.6 Establishment of model agriculture farm at taluka level:

The farmers are always eager to know the latest information regarding the productive, sustainable and feasible new high-tech agricultural technology. Such facilities in the vicinity area are not always available so there should be one model farm at each taluka with all the modern agricultural technology demonstrating unit. Such demonstration unit should have unit for varieties demonstration, farm mechanization, micro irrigation system, net house/ ploy house, inland fisheries, animal husbandry, high-tech horticulture and floriculture, value addition unit for farm produce etc. Therefore one such model farm in each taluka is proposed for the 12<sup>th</sup> five year plan



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**Table 6.3.6.1: Cost of model agriculture technology demonstration farm**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	2	2	2	2	2	10
One unit cost @ 100 lakh	200	200	200	200	200	1000
Manpower requirement cost @ 36 lakh per unit per year	72	80	85	90	95	422
<b>Total (lakh)</b>	<b>272</b>	<b>280</b>	<b>285</b>	<b>290</b>	<b>295</b>	<b>1422</b>

### 6.3.7: Protection of Agricultural Crops from Wild Animal by providing solar fencing unit.

About 40% cultivated area of Jamnagar district is affected by wild animals. In every "KRUSHI MAHOTSAV" farmer asking for its remedy. But till date no any suitable and proper solution given to farmers. Day by day this issue becomes very serious. Some farmer using higher voltage electric fencing which cause death of animal, so compare to this "Solar fence Guard" system is cheap, safe and advisable. And this is a priority need of farmers quite popular among farmers. In NFSM 200 farmers of Jamnagar district were provided this system as a local initiative and there is a enthusiastic response form farmers side. National consultant NFSM was impressed very much by this project during his visit of jamnagar district.

#### Objective of the Project:

1. Give satisfactory solution to farmer against damage of wild animals.
2. Save standing agricultural crops from Nil gay (Roz), Pig, etc.
3. Increase agricultural production by reducing damage of standing crops.
4. Increase cultivated area in Rabi and summer season.
5. Promote the farmer to grow his crop in summer, because farmers are generally avoids growing in summer due to wild animal's problem.
6. Increase income of farmers and ultimately to reach the goal of targeted production.

#### Project Cost :

**Table 6.3.7.1: Cost of protection of agricultural crops**

(Rs. in Lakh)

Protection of crop from wild animals by providing solar Fencing units						
Description	2013-14	2014-15	2015-16	2016-17	2018-19	Total
solar fencing unit	2,000	2,000	2,000	2,000	2,000	10,000
cost @ Rs. 0.20 lakh per unit	400	400	400	400	400	2000

### 6.3.8: Farm Mechanization (FM)

Shortage of labour at the pick period of farm operations. Irrigation scheduling problems due to limited electricity supply. Progressive farmers of district already using various farm implements. Poor farmers can not afford such farm implements due to high costing. Enhancing irrigated area of Jamnagar district.

#### Aims and Objective of the Project:

- Reduce labour cost.
- Providing timely irrigation to crop and increase crop production.
- Reduce pre and post harvest losses by performing farm harvesting operations.
- Increase income of farmers and ultimately to reach the goal of targeted production.
- Performing timely agricultural operations.

**Table 6.3.8.1: Cost of farm mechanization** (Rs. in lakh)

Description	2013-14	2014-15	2015-16	2016-17	2018-19	Total
RKVY - FM	500	500	500	500	500	2500

### 6.3.9: Strengthening of KVK:

Krishi Vigyan Kendra is one of the important institution in the district under Junagadh Agriculture University, which involved in transfer of technology related to agriculture and related occupations. Krishi Vigayn Kendra for Jamnagar district is located at Jamnagar established in 2004-05. The KVK is involve in transfer of technology through capacity building of the farmers, farm woman, rural youth and staff of the various departments and NGOs; through frontline demonstrations on the farmers filed regarding new varieties and technologies, on farm trials on farmers field for assessment and refinement of newer technologies, imparting long term training for employment generation, organizing filed days, seminars, *Kisan Gosthies*, diagnostic service etc. The main function of the KVK is to provide technological backstopping to various stack holders of the district.

**Table 6.3.9.1: Fund requirement for strengthening of KVK, Jamnagar**

Sr. no.	Particulars	Fund required Rs in lakhs
1.	Minibus for conveyance of the farmers of remote villages and for exposure visits	20.00
2.	Ideal demonstration units dairy	10.00
3.	Large scale nursery to provide quality planting material to farmers	18.00
4.	Vermi-compost unit	3.00
5.	Fisheries unit	12.00
6.	Net house/ poly house	5.00
7.	Unit on medicinal and aromatic plants	2.00
8.	Small scale processing unit	30.00
	<b>Total</b>	<b>100.00</b>

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## 6.4 Miscellaneous Activities

### 6.4.1: Kisan Mela

The Kisan *Melas* is one of important means for diffusion of new technology to farmer. In this activity the season based crop production technologies are demonstrated. The farmers visiting the *melas* themselves to judge the performance of different technologies exhibited and adopt in their farming system. These melas provide a common platform to the farmers to exchange their views with the farmers and the expert/scientists. The buzz sessions help the farmers in highlighting their problems to the experts. Participation of agro-industrial input suppliers for demonstrating their latest technologies is an additional advantage in these events. Therefore, one Kisan mela per year per taluka is proposed to be organized in the district through ATMA or KVK with a financial aid of Rs. 3,00,000/- per mela.

### 6.4.2: Farmer Puraskar

Advance 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 will also motivate for new innovations to the other farmers. Therefore five awards per year per taluka of Rs. 25 thousands each are proposed for best agriculture, animal husbandry, horticulture, fisheries farmers.

### 6.4.3 Clinical Camps

Animal husbandry plays an important role in income and employment generation in the rural areas. There are several innovative technologies which can prove to be useful to the farmers for improving the health and productivity of animals can be demonstrated in clinical camps. Operating up on a diseased animal through surgical operations is a troublesome problem. Sometimes, the cost of treatment exceeds the paying capacity of the farmers. The clinical camps provide an opportunity to the farmers to exhibit the cows and cattle in the clinical camp for motivation of other farmers. The message delivered by the scientists in such events help the farmers a lot. Therefore, one clinical camp at cluster level is proposed with a grant in aid of Rs. 50000/- per camp per cluster level. Interaction of farmers with field officers of department and other farmers motivates the farmers for improving the health and productivity of their livestock.

### 6.4.4 Disease Diagnostic Kits

The field officers of animal husbandry departments have to attend the problems of animals at the doorsteps of farmers. There are no facilities available for disease diagnosis in the veterinary hospitals and stockman centers. In the absence of these facilities, animals are not treated properly leading to unproductive farmers' expenditure. In the 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. 50000 per year is required for equipping all the veterinary surgeons in the district in the 12<sup>th</sup> Five Year Plan.

#### 6.4.5 Office Automation

In the period of information technology, the information are required urgently and updated by the funding agencies for evaluating the performance of the project in the light of state and national priorities. Services of computer and accessories have become necessary for updating and processing information. Therefore, each office of the department of agriculture, horticulture, animal husbandry, forestry and fishery may be provided computer and accessories and the estimated fund required for the purpose will be Rs. 5 lac per taluka.

**Table 6.4.5.1: Proposed expenditure on miscellaneous activities (Rs. in lakhs)**

Description	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Kisan Mela	2.00	2.00	2.00	2.00	2.00	10.00
Clinical camp@ 0.5 lac/camp,	0.50	0.50	0.50	0.50	0.50	2.50
5 Puskar/year @ 0.25 lac	1.25	1.25	1.25	1.25	1.25	6.25
Office automation	5.00	5.00	5.00	5.00	5.00	25.00
Disease diagnostic kits	0.50	0.50	0.50	0.50	0.50	2.50
<b>Grand Total</b>	<b>9.25</b>	<b>9.25</b>	<b>9.25</b>	<b>9.25</b>	<b>9.25</b>	<b>46.25</b>

#### 6.5: Monitoring, evaluation and consolidated budget proposal

Both monitoring and evaluation are the keys to success for any developmental Programme. Monitoring of the programme suggests the ways and means to add strong points and delete the undesired. Continuous monitoring and evaluation are also required for further extension of the project to achieve the desired goals. Therefore, it is suggested that year wise monitoring of progress may be made and evaluation of the goal achieved is done. A lot of expenditure (on POL, TA and other office expenses) will be incurred on monitoring and evaluation of the project for submitting the desired reports to the concerned departments. Therefore, an outlay of Rs. 10.0 lac will be required for this task as per the details given below.

**Table 6.5.1: Proposed expenditure on monitoring and evaluation (Rs in lakhs)**

Description	2012-13	2013-14	2014-15	2015-16	2016-17	Total
<b>Expenditure on TA,DA, POL and hiring of vehicles and office expenses</b>	2.00	2.00	2.00	2.00	2.00	<b>10.00</b>

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### 6.6: Education and research components:

#### 6.6.1 New polytechnic and strengthening of existing research station:

At present four research station in the district is running under Junagadh agricultural university viz, Pearl millet research station at Jamnagar, Dry farming research station at Jam-Khambhaliya, Fisheries research station at Okha and Fisheries research station at Sikka. These research stations can be strengthen by providing some infrastructure facility like cold storage facility for seed storage. In the Jam-khambhaliya area there is wide scope for increasing the vegetable cultivation. These can be achieved through educating new generation of villages through educating them in polytechnic. So it is proposed to open one vegetable polytechnic school at Jam khambhaliya. The Jamnagar district have longest sea cost in the state for harnessing this natural benefit it is also proposed to open one Polytechnic school at Okha. This will help in the development fishery farming as most of the fishermen are uneducated and they fallows traditional methods of fishing, storing and marketing. This will help greatly to young generation of fishermen and improve the livelihood of these community.

**Table 6.6.1.1: Cost of project on new polytechnic for vegetable and horticulture at Jam Khambhaliya (Rs. in lakh)**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	1	--	--	--	--	1
Office building	100	--	--	--	--	100
Hostel building	150	--	--	--	--	150
Human resource	30	35	40	45	50	200
Equipment and furniture	30	30	10	10	5	85
Recurring expenditure	10	12	12	15	15	64
<b>Total</b>	<b>321</b>	<b>77</b>	<b>62</b>	<b>70</b>	<b>70</b>	<b>600</b>

**Table 6.6.1.2: Cost of project on new polytechnic for fishery at Okha.**

(Rs. in lakh)

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	1	--	--	--	--	1
Office building	100	--	--	--	--	100
Hostel building	150	--	--	--	--	150
Human resource	30	35	40	45	50	200
Equipment and furniture	30	30	10	10	5	85
Recurring expenditure	10	12	12	15	15	64
<b>Total</b>	<b>321</b>	<b>77</b>	<b>62</b>	<b>70</b>	<b>70</b>	<b>600</b>

### 6.6.2: Vocational courses for maintainace & repairs of agricultural implements:

At present, mechanization is the prime requirement for agriculture. Various farm implements become popular among the farming communities to challenge the problem of labour crisis. Hence, by providing the training to the rural youth by vocational courses regarding maintenance and repairing of agriculture implements provides employment opportunity and farmers get door step facilities which save the cost & time of farmers.

**Table 6.6.2.1: Establishment of vocational courses institute for maintenance & repairing of farm implements (1 unit at district level).**

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Office building	100	--	--	--	--	100
Hostel building	100	--	--	--	--	100
Equipment and furniture	75	30	10	10	5	130
Recurring expenditure	10	12	12	15	15	64
<b>Total</b>	<b>285</b>	<b>42</b>	<b>22</b>	<b>25</b>	<b>20</b>	<b>394</b>

**Table 6.6.3.1: Cost of cold storage to strengthening the existing research farm at Jamnagar.**  
(Rs. in lakh)

Particulars	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of units	1	--	--	--	--	1
Cold storage with cooling system (unit cost @ 125 lakh per unit)	125	--	--	--	--	125

### 6.7: Development of sustainable livestock production in rural area

Climate change is a continuous and dynamic process. With increased intervention of human against nature has resulted in unpredictable changes in climate. It is a high time to address these changes and mitigation measures required to be taken for sustainable development of livestock on a long run. Veterinary College in Junagadh Agricultural University is already working on various aspects of animal sciences in Saurashtra region. Harnessing Livestock Research Station with "CENTRE FOR LIVESTOCK IMPROVEMENT AND DAIRY TECHNOLOGY" will definitely foster research as well as education components on these aspects. This center will work as a nodal research center working on effect of climate change on livestock and scientific mitigation measures to be taken thereupon in rural area. This center will take up priority areas of scientific research to be taken on five year plan basis. For holistic and sustainable development of livestock under climate change, it is very much necessary to collect baseline information on physical and socio-economic vulnerabilities of our livestock owners against climate change. Also quantification of livestock owner's preparedness against climate change constitutes baseline information to develop sound and practical need based package of practices required as a mitigation measures against climate change in a defined geographical area. This

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helps in prioritizing and drafting future research work on which above proposed center will work. Additionally immediate development of package of practices and mitigation measures must be addressed for known vulnerabilities of Livestock owners in Jamnagar district . Not only that Dairy Polytechnic will serve a hub to motivate the rural youth to generate self employment.

### 6.7.1: Establishment of an elite herd of cattle and buffalo and dairy polytechnic.

**Activities proposed to be taken up during XII five year plan for Livestock:**

#### Year I:

- i. Recruitment of regular staff
- ii. Construction of office
- iii. Purchase of Computers and accessories

#### Year II:

- i. Survey work
- ii. Collaboration with other research components of this project
- iii. Submission of need based projects pertaining to climate change affecting livestock owners at university, state government, central government and other agencies

#### Year III:

- i. Analysis of final data of survey work
- ii. Identification of **need based package of practices required to mitigate vulnerability of livestock owners**
- iii. **Submission of compiled report and action plan for future research.**

#### Year IV:

- i. Submission of need based projects pertaining to climate change affecting livestock owners at university, state government, central government and other agencies continued
- ii. Research work pertaining to previously taken work

**Year V:** Continued as above on regular basis

#### Requirements:

- a. **Land required** : 20 ha

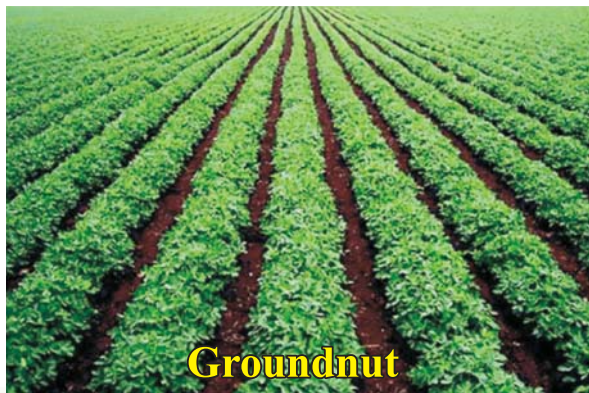


Table 6.7.1: Budgetary information of polytechnic

(Rs. in Lakhs)

Sr. No.	Components	Year					Total
		I	II	III	IV	V	
<b>A. Recurring Head</b>							
1.	Pay and allowances	70	80	90	100	110	450
2.	Contingency (Routine office work)	10	10	12	12	14	58
<b>Total A</b>		<b>80</b>	<b>90</b>	<b>102</b>	<b>112</b>	<b>124</b>	<b>508</b>
<b>B. Non Recurring Head</b>							
3.	Equipments & others	200	200	200	--	--	600
<b>C. Infrastructure (Building, hostel, animal shed etc.)</b>							
4.	Building and others	1000					1000
<b>Total A + B+C</b>		<b>1280</b>	<b>290</b>	<b>302</b>	<b>112</b>	<b>124</b>	<b>2108</b>

**6.8: Soil reclamation:**

In Jamnagar district, approximately 199987 ha area is affected by the salinity problem & 42300 ha soil under marshy land due to 355 km long sea shore. The salinity ingress has major impact on agriculture in Jamnagar district specially in coastal region. The crop productivity has reduced to a level that certain food crop cultivation becomes non-viable. The productivity of crops like cotton, groundnut and bajra has reduced. The vegetable crops which were grown easily earlier have now reduced in the area. The coastal area in Jamnagar was known for chilly production, now the area under chilly cultivation has reduced drastically. Besides this the main source of irrigation is tube well covering 60-70 % of the irrigated area. The over-exploitation of good quality water for irrigation available only in scattered pockets, is depleting at an alarming rate. The continuous and indiscriminate use of these waters by the farmers causes deleterious effect on physico-chemical properties of the soil and results in secondary sodification of soil, which ultimately renders the soil unfit for cultivation. Hence there is a urgent need to reclaim the affected soil through use of soil amendment.

Table 6.8.1: Proposal for soil reclamation through soil amendment

Description	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Area to be reclaimed (ha)	3000	3000	3000	3000	3000	15000
Amendment requirement	6000	6000	6000	6000	6000	30000
Present cost @ 1800 / MT (Lakhs)	108	108	108	108	108	540



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### 6.9: Rain water harvesting for ground water recharge

The ground water balance scenario shows that on March 2004, the net ground water available in the district was lesser than the total draft. Due to the over exploitation of the ground water in almost all the taluka of the district leads to depletion of ground water table below permissible limit. The annual rain fall of the district is nearly 815 mm (Average of last five year). However, this rainfall occurs during short spell of high intensity. Because of such intensities and short duration of heavy rain, most of the rain falling on surface tends to flow away rapidly, leaving very little for the recharge of ground water. This highlights the need to implement measure to ensure that the rain falling over a region is tapped as fully as possible through water harvesting, either by recharging it into the groundwater aquifers or storing it for direct use.

Now it becomes imperative for the farmers not only to adopt techniques for efficient water use but also pay attention towards rain water harvesting and its recharging. Water recharging has to be taken up on community level. Out of several methods of water harvesting open well method is more appropriate under the circumstances. This proposed recharge scheme will not only check decline in water level, but will result into rise of water level. It will also bring additional land under irrigation.

Area identified for artificial recharge 1,00,000 ha

Proposed recharging structures (2 to 3 recharge unit in each village) 1500

**Table 6.9.1: Budget proposal for construction of water recharging structures**

Description	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Number of structures to be constructed	300	300	300	300	300	1500
Cost (in Lakhs @ 10 Lakh / structure (Rs. in lakh)	3000	3000	3000	3000	3000	15000

### 6.10: Resource conservation through laser leveling

Effective land leveling is meant to optimize water use efficiency, improved crop efficiency, reduce the irrigation time and efforts to require managing the crop.

#### Benefits of the leveling

- Save water 25-30 %
- Improved crops establishment
- Reducing the weed problem
- Uniform maturity of crop
- Decreasing the time to complete the task of irrigation
- Reduces the amount of water required for land preparation
- Easy farm operation
- Fewer incidences of diseases and insect
- Increase in net cultivable area
- Saving of diesel/ electricity

**Table 6.10.1: Proposal for laser land leveler for XII plan**

Description	2012-13	2013-14	2014-15	2015-16	2016-17	Total
No. of laser leveler required	100	100	100	100	100	<b>500</b>
Cost @ Rs. 4 lakhs	400	400	400	400	400	<b>2000</b>

**6.11: Agro-forestry in the district:**

In the district forest coverage is less than 5%. Tree plantation may be carried out on massive scale. For easy availability of forest plant planting materials, the establishment of forest nursery at taluka level is proposed.

**Table 6.11.1: Establishment of forest nursery**

Description	2012-13	2013-14	2014-15	2015-16	2016-17	Total
Nursery establishment (No.)	2	2	2	2	2	<b>10</b>
Cost @ Rs. 10 lakhs	20	20	20	20	20	<b>100</b>

**6.12: Consolidated Budget Proposal of the Jamnagar District for RKVY the 12<sup>th</sup> plan****Table 6.12: Consolidated Budget Proposal of the Jamnagar District for the 12<sup>th</sup> plan****(Rs. in lakh)**

Budget proposal head-wise	2012-13	2013-14	2014-15	2015-16	2016-17	Total
<b>I - Agriculture</b>						
Training Proposal for Capacity Building of Agriculture Staff	3.00	3.00	3.00	3.00	3.00	15.00
Training Proposal for Capacity Building of Farmers	33.15	33.15	33.15	33.15	33.15	165.75
Varietal Demonstration in Next Five Years	79.00	102.50	122.00	141.50	155.00	600.00
Demonstrations on Plant health management	40.00	40.00	40.00	40.00	40.00	200.00
Demonstrations on Soil health management	33.00	33.00	33.00	33.00	33.00	165.00
Demonstrations on IWM	13.00	13.00	13.00	13.00	13.00	65.00
Seed production enhancement	4.75	4.75	4.75	4.75	4.75	23.75
Seed storage at Panchayat level and taluka level	975.00	925.00	915.00	910.00	910.00	4635.00
Proposal for farm mechanization	248	248	248	248	248	1240
Number of processing units and financial requirements	150.00	170.00	190.00	210.00	230.00	950.00
Research on food processing component by SAUs	500.00	50.00	60.00	70.00	80.00	760.00
Strengthening of APMC	150.00	110.00	120.00	130.00	140.00	650.00
<b>Total</b>	<b>2228.90</b>	<b>1732.40</b>	<b>1781.90</b>	<b>1836.40</b>	<b>1889.90</b>	<b>9469.50</b>

<b>II - Horticulture</b>						
Training needs in vegetables	12.15	12.15	12.15	12.15	12.15	60.75
Establishment of nurseries	100.00	100.00	100.00	100.00	100.00	500
Establishment of poly houses	1250.00	1250.00	1250.00	1250.00	1250.00	6250
Demonstrations on vegetables for area expansion	20.00	20.00	20.00	20.00	20.00	100
Integrated pest management in vegetable	40.00	40.00	40.00	40.00	40.00	200
Integrated nutrient management in Vegetables:	50.00	50.00	50.00	50.00	50.00	250
Low cost net house	60.00	60.00	60.00	60.00	60.00	300
Kitchen gardening with low energy drip	15.00	15.00	15.00	15.00	15.00	75
High tech vegetable farming including all components	6.00	6.00	6.00	6.00	6.00	30
Establishment of cold storage unit	300.00	300.00	300.00	300.00	300.00	1500
Establishment of collection centers	30.00	30.00	30.00	30.00	30.00	150
Refrigerated vans	60.00	60.00	60.00	60.00	60.00	300
Training need of farmers for fruit crops	13.50	13.50	13.50	13.50	13.50	67.5
Introduction of new crop	2.00	2.00	2.00	2.00	2.00	10
Integrated pest management in fruit crops	1.00	1.00	1.00	1.00	1.00	5
Establishment of ventilated storage facility for garlic	15.00	15.00	15.00	15.00	15.00	75
Establishment of ventilated storage facility for onion	100.00	100.00	100.00	100.00	100.00	500
Establishment of potato wafer production unit	10.00	10.00	10.00	10.00	10.00	50
Recycling of vegetable waste through shredder and vermin-composting	10.00	10.00	10.00	10.00	10.00	50
Model floriculture centers cluster based	125.25	125.25	125.25	125.25	125.25	626.25

Cluster based Demonstrations on Spice and medicinal and aromatic plants	1.25	1.25	1.25	1.25	1.25	6.25
Demonstration on tomato telephone & cucurbit trellis farming	20.00	20.00	20.00	20.00	20.00	100
Distribution of date palm offshoots to the growers for demonstration	2.50	2.50	2.50	2.50	2.50	12.5
Distribution of hybrid coconut plants to the growers for demonstration	1.00	1.00	1.00	1.00	1.00	5
<b>Total</b>	<b>2244.65</b>	<b>2244.65</b>	<b>2244.65</b>	<b>2244.65</b>	<b>2244.65</b>	<b>11223.25</b>

**III - Animal Husbandry**

Proposal for capacity building of livestock farmers	1.80	1.80	1.80	1.80	1.80	9.00
Proposal for fertility improvement programme	113.00	108.30	108.30	108.30	108.30	546.20
Supplement mineral mixture feeding	225.00	225.00	225.00	225.00	225.00	1250.00
Proposal for feed factory plant (Capacity: 50 MT/day)	832.09	0.00	0.00	0.00	0.00	832.09
Supply of animal health packages to landless rural farmers.	28.80	28.80	28.80	28.80	28.80	144.00
Fodder production and preservation	18.90	18.90	18.90	18.90	18.90	94.70
Proposal for Supply of breeding bulls in villages	65.00	65.00	65.00	65.00	65.00	325.00
Proposal for commercial dairy farming in taluka	10.00	10.00	10.00	10.00	10.00	50.00
Proposal for Low input bird/Back yard poultry in district.	6.00	6.00	6.00	6.00	6.00	30.00
Proposal for goat rearing in district	2.00	2.00	2.00	2.00	2.00	10.00
<b>Total</b>	<b>1302.59</b>	<b>465.80</b>	<b>465.80</b>	<b>465.80</b>	<b>465.80</b>	<b>3290.99</b>

**IV - Forestry**

Proposal for capacity building of forest staff	0.45	0.45	0.45	0.45	0.45	2.25
Proposal for capacity building of forestry farmers	0.15	0.15	0.15	0.15	0.15	0.75
Proposal for demonstrations on Agro forestry	6.00	6.00	6.00	6.00	6.00	30.00
<b>Total</b>	<b>6.60</b>	<b>6.60</b>	<b>6.60</b>	<b>6.60</b>	<b>6.60</b>	<b>33.00</b>

<b>V - Fisheries</b>						
Establishment of prawn/fisheries production unit	60.00	60.00	60.00	60.00	60.00	300.00
Providing refrigerator van for transportation	150.00	60.00	60.00	30.00	30.00	330.00
Establishment of fish feed factory	100.00	100.00	0.00	0.00	100.00	300.00
Establishment of fish processing unit	0.00	100.00	100.00	100.00	0.00	300.00
Establishment of cold storage unit	100.00	100.00	0.00	0.00	100.00	300.00
<b>Total</b>	<b>410.00</b>	<b>420.00</b>	<b>220.00</b>	<b>190.00</b>	<b>290.00</b>	<b>1530.00</b>
<b>VI – Employment generation activities</b>						
Training needs for <input type="checkbox"/> ermin-composting	78.50	78.50	78.50	78.50	78.50	392.50
MSME enterprise	16621.22	0.00	0.00	0.00	0.00	16621.22
Capacity building for small scale fruits and vegetable processing	1.88	1.88	1.88	1.88	1.88	9.40
Establishment of small scale fruits and vegetable processing unit	10.00	10.00	10.00	10.00	10.00	50.00
<b>Total</b>	<b>16711.60</b>	<b>90.38</b>	<b>90.38</b>	<b>90.38</b>	<b>90.38</b>	<b>17073.12</b>
<b>VII – New Innovative projects</b>						
Establishment of soil & water testing laboratory	75.00	225.00	225.00	75.00	75.00	675.00
Development of Mobile soil & Water Testing laboratory	200.00	200.00	200.00	200.00	200.00	1000.00
Proposal for establishment of Poly clinic and capacity building centre	200.00	200.00	200.00	200.00	200.00	1000.00
Proposal for installation of solar photovoltaic pump	300.00	450.00	600.00	900.00	1200.00	3450.00
Proposal for establishment of weather watch & forecasting system	100.00	0.00	0.00	0.00	0.00	100.00
Establishment of model agricultural farm	272.00	280.00	285.00	290.00	295.00	1422.00

Protection of crop from wild animals by providing solar Fencing units	400.00	400.00	400.00	400.00	400.00	2000.00
Farm Mechanization (FM)	500.00	500.00	500.00	500.00	500.00	2500.00
Proposed expenditure for new polytechnic for horticulture	321.00	77.00	62.00	70.00	70.00	600.00
Project on new polytechnic for fishery	321.00	77.00	62.00	70.00	70.00	600.00
Establishment of vocational courses institute for maintenance & repairs of farm implements	285.00	42.00	22.00	25.00	20.00	394.00
Proposed cost of cold storage strengthening at research farm	125.00	0.00	0.00	0.00	0.00	125.00
Establishment of an elite herd of cattle & buffalo and dairy polytechnic	1280.00	290.00	302.00	112.00	124.00	2108.00
Budget proposal for laser levelling	400.00	400.00	400.00	400.00	400.00	2000.00
Proposal for soil reclamation through soil amendment	108.00	108.00	108.00	108.00	108.00	540.00
Proposal for construction of water recharging structure	3000.00	3000.00	3000.00	3000.00	3000.00	15000.00
Project for establishment of forest nursery	20.00	20.00	20.00	20.00	20.00	100.00
<b>Total</b>	<b>7907.00</b>	<b>6269.00</b>	<b>6386.00</b>	<b>6370.00</b>	<b>6682.00</b>	<b>33614.00</b>
<b>Total -VIII Strengthening of KVK</b>	100.00	0	0	0	0	100.00
<b>Total</b>	<b>100.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>100.00</b>
<b>IX - Miscellaneous Activities</b>						
Propose expenditure on miscellaneous activities (Kris mela, farmer purskar, clinical camp, disease diagnosis kit etc.)	9.25	9.25	9.25	9.25	9.25	46.25
<b>Total</b>	<b>9.25</b>	<b>9.25</b>	<b>9.25</b>	<b>9.25</b>	<b>9.25</b>	<b>46.25</b>

<b>X - Monitoring and Evaluation</b>						
Proposed expenditure on monitoring & evaluation	2.00	2.00	2.00	2.00	2.00	10.00
<b>Total</b>	<b>2.00</b>	<b>2.00</b>	<b>2.00</b>	<b>2.00</b>	<b>2.00</b>	<b>10.00</b>
<b>GRAND TOTAL (Rs in Lakh)</b>	<b>30049.79</b>	<b>10385.28</b>	<b>10347.78</b>	<b>10356.28</b>	<b>10819.78</b>	<b>72084.11</b>

**Table 6.12.1: Sector wise budget Proposal of the Jamnagar District for the 12<sup>th</sup> plan**  
(Rs. in lakh)

<b>Budget proposal head-wise</b>	<b>2012-13</b>	<b>2013-14</b>	<b>2014-15</b>	<b>2015-16</b>	<b>2016-17</b>	<b>Total</b>
Agriculture	2228.90	1732.40	1781.90	1836.40	1889.90	9469.50
Horticulture	2244.65	2244.65	2244.65	2244.65	2244.65	11223.25
Animal Husbandry	1302.59	465.80	465.80	465.80	465.80	3290.99
Forestry	6.60	6.60	6.60	6.60	6.60	33.00
Fisheries	410.00	420.00	220.00	190.00	290.00	1530.00
Employment Generation Activities	16711.60	90.38	90.38	90.38	90.38	17073.10
New Innovative Projects	7907.00	6269.00	6386.00	6370.00	6682.00	33614.00
Strengthening of KVK	100.00	0.00	0.00	0.00	0.00	100.00
Miscellaneous Activities	9.25	9.25	9.25	9.25	9.25	46.25
Monitoring and Evaluation	2.00	2.00	2.00	2.00	2.00	10.00
<b>Grand Total (Rs in Lakh)</b>	<b>30922.60</b>	<b>11240.10</b>	<b>11206.60</b>	<b>11215.10</b>	<b>11680.60</b>	<b>76390.10</b>
Inflation rate (%)	0	3	3.25	3.5	3.75	0
Inflation amount	0	337	364	393	438	0
<b>GRAND TOTAL WITH INFLATION</b>	<b>30923.00</b>	<b>11577.00</b>	<b>11571.00</b>	<b>11608.00</b>	<b>12119.00</b>	<b>77922.00</b>

## CHAPTER VII

## SUGGESTION AND OUTCOME OF THE PROJECT

## a) Suggestions

- ◆ The budget allotted to different departments should be utilized in a way that maximum benefits percolate to the farmers.
- ◆ The Kisan mela and clinical camps should be organized in collaboration with the line departments.
- ◆ Farmer puraskar should be given to the farmers on the recommendation of a committee of all the line departments and SAU chaired by DDO.
- ◆ Field exposure visits should be organized by the line departments.
- ◆ The amount of subsidy should be credited directly in the account of beneficiaries.
- ◆ There should single window system for agriculture and allied sector at taluka level
- ◆ Soil testing laboratory with the facilities of testing for Micronutrient status.
- ◆ Popularizing mechanized farming to solve the labour problems in the season
- ◆ Farm accident insurance scheme should be applicable up to all family member of farmers including his farm labour.
- ◆ Farm accident insurance amount should be increase up to 2.0 lakh.
- ◆ Farm mechanized machine should be free from any type of taxes.
- ◆ High tech horticulture should be popularized
- ◆ Community base mechanized should be given more priority
- ◆ Should be given more weightage to renewable energy utilization
- ◆ Woman dragarary should be reduced through mechanization
- ◆ Inclusion of farm woman in decision making
- ◆ APMC should be strengthen by proving high tech facility
- ◆ Amul pattern for the development of dairy sector should be followed in the district
- ◆ Seed production through farmer should be enhanced
- ◆ Progressive farmers should be appreciated up to village level
- ◆ Protection should be provided to the fishermen in the sea against kidnapping and high jacking bootlegging process of neighbor country.

## b) Most priority areas for development for agriculture and allied sectors.

- **Reclamation of saline and alkaline soils for increasing agricultural production.**

In the district, out of ten talukas, five talukas are falls under coastal belt of bay of Kutch. In this talukas the problematic soils due to ingress of sea water is increasing and productivity of agricultural crops reduce much lower than the average. Reclamation of such problematic soils i.e. alkaline & saline soils is utmost priority. The reclamation can be done through use of soil amendments, preventing sea water ingression. Hence project on reclamation of soil through use gypsum has been proposed in the plan.



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- **Increasing irrigation facilities through water harvest and watershed management.**

The district falls under semi arid region of the North Saurashtra agro climatic zone of the state and receiving annual average rainfall is around 525 mm. The rainfall distribution pattern is also erratic and uneven. Possibilities for increasing the irrigation facilities will be explored through watershed management and water harvest technology. The water use efficiency can also be increase through popularizing the Micro Irrigation Systems. Hence project on water harvest and water shed management, popularization of MIS are proposed in plan.

- **Development of horticulture and dairy sector.**

The agro climatic condition of the Jamnagar district is favourable for arid types fruits and vegetable crops. At present the area under horticultural crops in the district is very less. The existing orchards are also proposed to be rejuvenated for obtaining higher production. In order to increase the production of fruits and vegetables in the district and for additional income, the farmers are required to adopt naturally ventilated poly house/poly tunnels for nursery raising, drip Irrigation and other technologies in fruits and vegetables, to cover more area under hybrids of vegetables. Therefore, the projects on various aspects of horticultural development have been proposed in plan.

The live stock population in the district is sufficient but the milk production is comparatively low. To increase milk production through breed improvement, artificial insemination, live stock management, providing better nutrition, health management are the important criteria which will be take in to account and projects on such area has been proposed in this plan.

- **Effective solution for crop damage against wild animals.**

About 40% cultivated area of Jamnagar district is affected by wild animals. In every "KRUSHI MAHOTSAV" farmer asking for its remedy. But till date no any suitable and proper solution given to farmers. Day by day this issue becomes very serious. Some farmer using higher voltage electric fencing which cause death of animal, so compare to this "Solar fence Guard" system is cheap, safe and advisable. This is a priority need of farmers quite popular among farmers. Hence the project on solar fencing has been proposed in the plan.

- **Multidisciplinary model demonstration farm at taluka level.**

The farmers are always eager to know the latest information regarding the productive, sustainable and feasible new high-tech agricultural technology. Such facilities in the vicinity area are not always available so there should be one model farm at each taluka with all the modern agricultural technology demonstrating unit. Such demonstration unit should have unit for varieties demonstration, farm mechanization, micro irrigation system, net house/ ploy house, inland fisheries, animal husbandry, high-tech horticulture and floriculture, value addition unit for farm produce etc. Therefore one such model farm in each taluka is proposed in the plan

**c) Outcome**

The following outcomes will be expected after implementation of the comprehensive district agriculture plan prepared for XII<sup>th</sup> five year plan of Jamnagar district.

- Sustainable development in agriculture and allied sectors with proper utilization of all available farm resources with an eco-friendly and holistic approach through integration of all the farm enterprises.
- Optimum utilization of natural resource with maximum production.
- Upliftment of small and marginal farmers by reducing the gap in the productivity in major crops viz; cotton, groundnut, wheat, cumin, gram, garlic, pearl millet etc.
- Better management of soil health which result in to soil fertility maintenance.
- Adoption of IDM/INM/IPM/IWM leads to judicious use of chemicals with quality production and minimum adverse effect on environment.
- Strengthening of existing marketing facility & establishment of new marketing structure will help to the farmers for procuring proper price of their produce.
- Village level storage facilities will help in reducing the post harvest losses and will able to sale his produce at proper market price.
- Soil health report can be quickly & easily available to the farmers with establishment of soil & water testing laboratory at taluka level.
- Development of model demonstration farm, capacity building centre and poly clinic at taluka level will be benefited in uplifting the knowledge regarding modern agricultural technologies that will increase the adoption rate of modern technologies among the farmers.
- With amendment and soil conservation practices, maximum areas to be brought under cultivation which will increase the total production.
- Crop diversification through adoption of horticultural crops will increase the total income of the farmers.
- Flowers and off seasonal vegetable production will be increased by adopting the Net/Poly house along with MIS technology.
- Farmers will able to get higher price of their produce by value addition though establishment of processing units at taluka/village level.
- Milk production will be increased to the great extent by better health management, breed improvement programme and development of cooperative dairy structure.
- More and more fisherman will get the technical knowledge through polytechnic establishment which help in strengthening the fisheries sector.
- The adverse effect of the global warming will be minimized through afforestation by making availability of quality planting materials at door step.

The overall outcome of the plan will be result in significant improvement in livelihood of the farming community through enhanced farm income and better economic development which ultimately reflect in economic growth of the country.

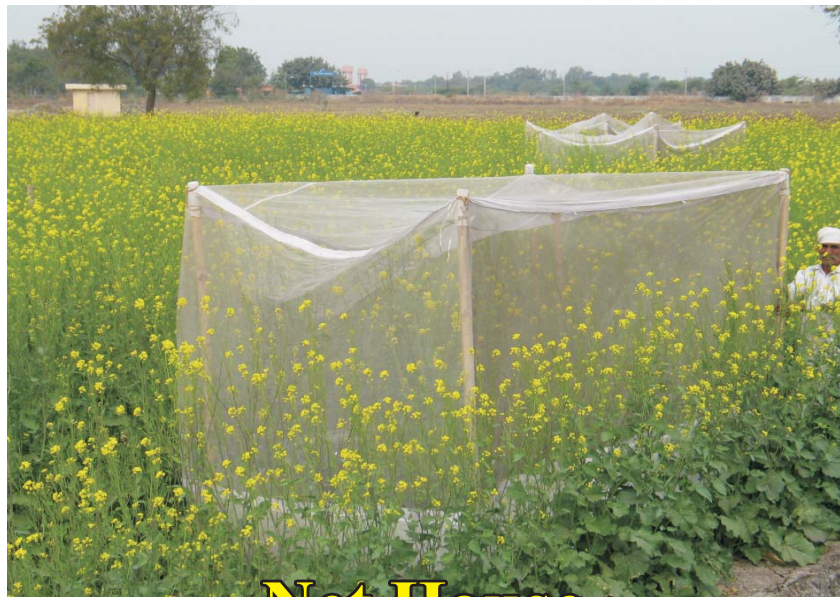
## C-DAP

### d) Concluding Remarks:

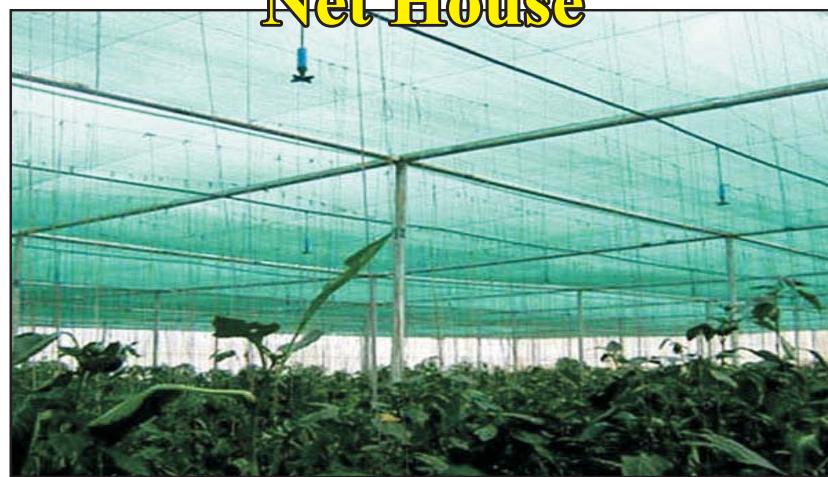
In order to improve the livelihood of rural household, there is a need to ensure better economic return in a holistic manner. Productivity can be increased by adoption of advanced agricultural technologies in a suitable manner linked with good market potential. The present comprehensive district agriculture plan has been prepared keeping in view the current and future aspects concerning livelihood security of farming community of Jamnagar district with following remarks.

1. There is a lack of awareness about importance of soil fertility maintenance almost in all the talukas of the district. It needs to be critically addressed through imparting training and providing facilities of soil & water testing laboratory at taluka level.
2. Adoption rate of improved & scientific modern package of practices is comparatively low in the district which directly effect on the production of agriculture produce. Which can be improved through various activities viz; training, demonstration and exposure visit
3. Monocropping of Bt cotton resulted into depletion of productivity of soil. There is a urgent need to adopt crop diversification by creating the opportunity of introducing the new crops in the district.
4. Various inputs viz; quality seeds, fertilizers, pesticides etc. should be made available to the farmers well in advance at right time for deriving maximum benefits.
5. Self pollinated crops like groundnut, wheat, gram and cumin are the major cultivated crops in the district and needs to be increased Seed Replacement Ratio through by making door step availability of quality certified seeds.
6. Looking to the scarcity of the agricultural labour, farm mechanization with mini tractor, harvester, wiper binder, automatic seed drill, small hand tools etc is essential which can be helped in reducing the labour crisis resulted in timely agricultural operations.
7. Wide scopes to introduce the horticultural crops in the district especially like date palm, lemon and pomegranate with provided the proper training, inputs availability and assured market facilities. Maximum area to be brought under net/poly house for floriculture and off seasonal vegetable production.
8. Extensive efforts should be made to popularize the installation of solar fencing concept by providing the maximum subsidy to avoid the damage by wild cow and pig in standing crops.
9. At present in district, only 3 % of total irrigated area is under Micro Irrigation System. The great scope to bring more area under MIS by imparting the training to the farmers and rejuvenation in package of practices.
10. The issues of animal husbandry of the district need to be carefully addressed. Keeping only productive animal, proper feeding, housing and health management, breed improvement through artificial insemination. To provide secondary income goat rearing may prove a boon for livelihood option for rural people of the district. This enterprise is women oriented and hence helps in empowering women.
11. The district has 355 km long sea shore which provides ample opportunities for exploring marine products and fisheries. Scientific knowledge is imparted to the fishermen by training for fishery related problems/ways to promote inland and marine fishery.

12. Secondary agriculture activities and employment generation activities like vermi-composting, mushroom cultivation, bakery units, small scale processing units, etc needs to be popularized which will be income generating source for rural youth as well as a farm women for empowering women.
13. In forest area and watershed areas of the district, more attention is requires to increase their income through various livelihood options, growing high return crops with their value chain and efficient utilization of available water
14. For efficient and sustainable development of agriculture and related sectors, convergence of all the Agriculture, horticulture, animal husbandry, forestry, watershed management units, KVK, NGOs and other related departments must be needed.



**Net House**



**ANNEXURE-I**

**Pearl Millet Research Station  
Junagadh Agricultural  
University Jamnagar.  
Dated 8<sup>th</sup> June 2012**

**Proceeding****Proceeding of the meeting of the “Orientation Programme” for  
Comprehensive District Agriculture Plan of Jamnagar District**

A meeting on orientation programme of District Agriculture Plan of Jamnagar district was organized by Research Scientist (Pearl Millet) & Convener C-DAP (Jamnagar) , JAU, Jamnagar on 8<sup>th</sup> June, 2012 at Pearl Millet Research Station, JAU, Jamnagar. Officials from the various line departments of the district , Scientist of Pearl Millet Research Station & KVK, progressive farmers and representative of NGOs has participated in this orientation programme. As per the agenda District Development Officer, Shri Ajay Kumar, IAS has to be act as chairman but, due to unavoidable circumstances he could not remain present and hence the meeting was chaired by shri. B. C. Patni, The Director of District Rural Development Agency, Jamnagar. The programme was inaugurated by lightening of the lamp after welcoming the Chairman & other participants.

Dr. K. L. Raghvani Research Scientist (Pearl Millet) & Convener(C-DAP) , Junagadh Agriculture University, Jamnagar has given the introductory speech in which he has highlighted the facts and figures of 11<sup>th</sup> five year plan (2007-2011) of Jamnagar district. He emphasized on new project proposals regarding Agriculture and all allied sectors which could help in upliftment of farming community of this area in forth-coming 12<sup>th</sup> five year plan.

Department wise views and suggestions were invited regarding new project proposals to be included in this plan. Shri P. B. Khistariya, District Agriculture Officer, Jilla Panchayat, Jamnagar highlighted some important suggestions like reclamation of the saline-alkali soil, establishment of modern Agriculture Demonstration Farm and Soil & Water testing Laboratory to be established.

He further emphasized on promoting on solar fencing for protection to agricultural fields against wild cows and pig damages in the area. Moreover, he suggested to implement scheme on micro irrigation system.

Dr. A. M. Dangaria, Deputy Director of Animal Husbandary, Jamnagar explained the present scenario of dairy sector in the district and he suggested to increase the milk collecting centres at village level and proposed to develop co operative sector in this region. For purchase of buffalo there should be tie-up with NABARD.

Shri C. H. Gujjar, Project Director Water Shed, DRDA, Jamnagar explained the work being carried out in Jamnagar district. He suggested increasing soil conservation technique and water harvesting in the district.

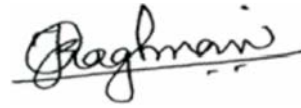
Dr. H. R. Jadav, Deputy Director of Agriculture (Training) and Project Directorate (ATMA) suggested poly clinic and training centre at taluka level. He also suggested to conduct more number of demonstrations on INM and IPM.

Shri. R. K. Boghara, Assistant Director of Horticulture, suggested to provide quality planting material and to establish tissue culture laboratory. Popularization of poly/net house for off seasonal vegetable cultivation should be done.

The other line department personals and progressive farmers participated actively in the meeting and gave very good suggestions for the improvement of present C-DAP plan proposal.

The meeting ended with vote of thanks.

Place: Jamnagar  
Date: 08-06-2012



Convener C-DAP &  
Research Scientist (Pearl Millet)  
Junagadh Agricultural University  
Jamnagar

## C-DAP



**Registration of participants in C-DAP orientation programme**



**Welcome speech by Convener (C-DAP) & Research Scientist (Pearl Millet)**

**Introductory speech by District Agriculture Officer**



**Inaugural speech by Director, District Rural Development Agency (DRDA)**



# C-DAP



Farmers and NGOs representatives are expressing their views

## Annexure - II

તા.૨૮/૦૧/૨૦૧૩નાં રોજ માનનીય જીલ્લા વિકાસ અધિકારીશ્રીનાં અધ્યક્ષ સ્થાને જામનગર જીલ્લા પંચાયતનાં કોન્ફરન્સ હોલમાં ડીસ્ટ્રીક્ટ લેવલ પ્લાનીંગ કમીટી (આર.કે.વી.વાય.)નાં તમામ સભ્યો સાથેની કોમ્પ્રીહેન્સીવ ડીસ્ટ્રીક્ટ એગ્રીકલ્ચર પ્લાનની (સી-ડીએપી) સમીક્ષા તેમજ મંજૂરી અંગેની મીટીંગની કાર્યવાહી નોંધ.

ડીસ્ટ્રીક્ટ લેવલ પ્લાનીંગ કમીટી (આર.કે.વી.વાય.)ની બેઠક ઉપર મુજબની વિગતે મળેલ જેમાં નીચે મુજબનાં સભ્યશ્રી/ અધિકારીઓ ઉપસ્થિત રહેલ હતા.

ક્રમ	સભ્યશ્રી/ અધિકારીશ્રી	હોદ્દો	ઉપસ્થિત/ અનઉપસ્થિત
૧	જીલ્લા વિકાસ અધિકારીશ્રી	અધ્યક્ષશ્રી	ઉપસ્થિત
૨	જીલ્લા ખેતીવાડી અધિકારીશ્રી	સભ્ય સચિવશ્રી	ઉપસ્થિત
૩	સંશોધન વૈજ્ઞાનિકશ્રી (કિટકશાસ્ત્ર)	કન્વીનર (સી-ડીએપી)	ઉપસ્થિત
૪	નિયામકશ્રી, જીલ્લા ગ્રામ વિકાસ એજન્સી	સભ્ય	ઉપસ્થિત
૫	જીલ્લા આયોજન અધિકારીશ્રી, જામનગર	સભ્ય	ઉપસ્થિત
૬	સંશોધન વૈજ્ઞાનિકશ્રી (બાજરા), જામનગર	સભ્ય	ઉપસ્થિત
૭	નાયબ ખેતી નિયામકશ્રી (વી), જામનગર	સભ્ય	ઉપસ્થિત
૮	નાયબ ખેતી નિયામકશ્રી (તાલીમ), પ્રોજેક્ટ ડાયરેક્ટરશ્રી (આત્મા), જામનગર	સભ્ય	ઉપસ્થિત
૯	નાયબ બાગાયત નિયામકશ્રી, જામનગર	સભ્ય	ઉપસ્થિત
૧૦	નાયબ પશુપાલન નિયામકશ્રી, જામનગર	સભ્ય	ઉપસ્થિત
૧૧	પ્રોજેક્ટ ડાયરેક્ટરશ્રી, જીલ્લા જળસત્રાલ વિકાસ એકમ, જામનગર	સભ્ય	ઉપસ્થિત
૧૨	જનરલ મેનેજરશ્રી, લીડ બેંક, જામનગર	સભ્ય	અનઉપસ્થિત
૧૩	જનરલ મેનેજરશ્રી, નાબાર્ડ, જામનગર	સભ્ય	અનઉપસ્થિત
૧૪	કાર્યપાલક ઈજનેરશ્રી (સિંચાઈ), જીલ્લા પંચાયત, જામનગર	સભ્ય	અનઉપસ્થિત
૧૫	તાલીમ વ્યવસ્થાપકશ્રી, કૃષિ વિજ્ઞાન કેન્દ્ર, જામનગર	સભ્ય	ઉપસ્થિત
૧૬	જીલ્લા રજીસ્ટ્રારશ્રી, સહકારી મંડળીઓ, જામનગર	સભ્ય	ઉપસ્થિત
૧૭	મદદનીશ નિયામકશ્રી, ગુજરાત રાજ્ય જમીન વિકાસ નિગમ લી., જામનગર	સભ્ય	અનઉપસ્થિત
૧૮	મદદનીશ નિયામકશ્રી (મત્સ્ય ઉછેર), જામનગર	સભ્ય	ઉપસ્થિત
૧૯	મદદનીશ નિયામકશ્રી (ક્ષાર અંકુશ), જામનગર	સભ્ય	ઉપસ્થિત
૨૦	મેનેજરશ્રી, ગુજરાત રાજ્ય બીજ નીગમ લી., જામનગર	સભ્ય	અનઉપસ્થિત
૨૧	મેનેજરશ્રી, ગુજરાત એગ્રો. ઈન્ડ. કોર્પો. લી., જામનગર	સભ્ય	અનઉપસ્થિત
૨૨	પ્રતિનિધીશ્રી, ગુજરાત ગ્રીન રીવોલ્યુશન કંપની, જામનગર	સભ્ય	ઉપસ્થિત
૨૩	નાયબ વનસંરક્ષકશ્રી, જામનગર	સભ્ય	ઉપસ્થિત

## C-DAP

નિયત કોરમ પુર્ણ થતા સૌ પ્રથમ શ્રી પી.બી. ખિસ્તરીયા, જીલ્લા ખેતીવાડી અધિકારી તથા મેમ્બર સેક્રેટરીશ્રી (ડીએલપીસી), જામનગરએ બેઠકમાં ઉપસ્થિત માનનીય જીલ્લા વિકાસ અધિકારીશ્રી અને ડીએલપીસી (આર.કે.વી.વાય.)નાં સભ્યશ્રીઓને આવકાર્યાં. ત્યાર બાદ જામનગર જીલ્લાનાં કોમ્પ્રીહેન્સીવ ડીસ્ટ્રીક્ટ એગ્રીકલ્ચર પ્લાન તૈયાર કરવા તથા ચર્ચા બાદ બહાલી આપવા અર્થે તેની રજૂઆત કરવા ડો. કે.એલ. રાઘવાણી, સંશોધન વૈજ્ઞાનિક (કિટકશાસ્ત્ર) તથા કન્વીનરશ્રી (સી-ડીએપી)ને સભ્યશ્રીઓ સમક્ષ સી-ડીએપી રજૂ કરવા વિનંતી કરેલ.

ડો. કે.એલ. રાઘવાણી, સંશોધન વૈજ્ઞાનિક (કિટકશાસ્ત્ર) તથા કન્વીનરશ્રી (સી-ડીએપી) એ અધ્યક્ષશ્રી તથા હાજર રહેલ સભ્યશ્રીઓને આવકારી, અધ્યક્ષશ્રીની પરવાનગીથી આગામી બારમી પંચવર્ષીય યોજના માટે તૈયાર કરવામાં આવેલ જામનગર જીલ્લાનાં કોમ્પ્રીહેન્સીવ ડીસ્ટ્રીક્ટ એગ્રીકલ્ચર પ્લાન અંગે સંક્ષિપ્તમાં ચેપ્ટર વાઈઝ માહિતી આપેલ. જેમાં ભારત સરકારશ્રીની સુચના તથા માર્ગદર્શન મુજબ રાષ્ટ્રનો કૃષિ વિકાસ દર ૪ ટકાથી વધારે મેળવવાનાં હેતુથી કૃષિ ક્ષેત્ર તેમજ કૃષિ સંલગ્ન વિભાગોનું યોજનાકીય પ્લાનીંગ કરવા અંગે જામનગર જીલ્લાનો બારમી પંચવર્ષીય યોજના માટેનો કોમ્પ્રીહેન્સીવ ડીસ્ટ્રીક્ટ એગ્રીકલ્ચર પ્લાનમાં સમાવિષ્ટ કરવામાં આવેલ યોજનાની પ્રપોઝલ ડીએલપીસીનાં સભ્યશ્રીઓ સમક્ષ ચર્ચા અર્થે રજૂ કરવામાં આવેલ.

ગુજરાત રાજ્યનાં દરેક જીલ્લા અને તાલુકાનો સી-ડીએપી બનાવવા માટે ગુજરાત સરકારે આ જવાબદારી રાજ્યની કૃષિ યુનિવર્સિટીઓને સોંપેલ. જે અંતર્ગત સૌરાષ્ટ્રનાં છ જીલ્લાનો સી-ડીએપી પ્લાન બનાવવા માટેની જવાબદારી જુનાગઢ કૃષિ યુનિવર્સિટીને સોંપવામાં આવેલ. જેનાં અનુસંધાને તૈયાર કરવામાં આવેલ સૌરાષ્ટ્રનાં છ જીલ્લાનાં સી-ડીએપીને રાજ્યનાં કૃષિ અને સહકાર વિભાગમાં તા.૩૦/૦૮/૨૦૧૨નાં રોજ જુનાગઢ કૃષિ યુનિવર્સિટીનાં અધિકારીશ્રીઓએ રજૂ કરેલ જેમાં ચર્ચાને અંતે નક્કી થયા મુજબ જે-તે જીલ્લાનો સી-ડીએપી જીલ્લાની ડીસ્ટ્રીક્ટ લેવેલ પ્લાનીંગ કમીટી સમક્ષ રજૂ કરીને મંજૂરી મેળવવા જણાવેલ. તે અનુસાર મીટીંગમાં સી-ડીએપી રજૂ કર્યા બાદ અધ્યક્ષશ્રી તથા સભ્યશ્રીઓ તરફથી નીચે મુજબનાં સુચનો આવેલ જે નીચે મુજબ છે.

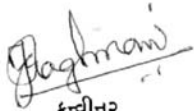
૧) અધ્યક્ષશ્રી એ સુચન કરેલ કે જામનગર જીલ્લાનાં મુખ્ય પાંચ બાબતો જેવી કે ક્ષારીય અને ભાસ્મીક જમીન સુધારણા, સિંચાઈ સવલતોમાં વધારો, બાગાયત અને ડેરી ક્ષેત્રનો વિકાસ, ખેતી પાકોને જંગલી પ્રાણીઓથી રક્ષણ અને તાલુકા કક્ષાએ બહુહેતુક મોડેલ ફાર્મનો સમાવેશ જેવા મુદ્દાઓને વિસ્તૃત કરવા સૂચન કરવામાં આવેલ.

૨) જીલ્લા ખેતીવાડી અધિકારીશ્રી તરફથી કૃષિનાં ઉભા પાકનેજંગલી પ્રાણીઓથી થતા નુકશાન થી રક્ષણ આપવાનાં હેતુથી સોલાર ફેન્સીંગની પ્રોજેક્ટ પ્રપોઝલનો સમાવેશ કરવા જણાવેલ આ ઉપરાંત ફાર્મ મીકેનાઈઝેશન સેક્ટરમાં કૃષિ કાર્યો ચોકસાઈ તથા ઝડપી કરવા માટે ફાર્મ મીકેનાઈઝેશનની પ્રોજેક્ટ પ્રપોઝલનો પ્લાનમાં સમાવેશ કરવા જણાવેલ.

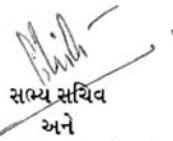
૩) નાયબ પશુપાલન નિયામકશ્રી તરફથી જણાવવામાં આવેલ કૃત્રિમ બીજદાન યોજનાની પ્રોજેક્ટ પ્રપોઝલ અમલીકરણ અંગે ટેકનીકલી યોગ્ય ન જણતા તેમજ પશુ વિમા અંગેનો પ્રોજેક્ટ પ્રપોઝલને પ્લાનમાંથી દુર કરવા જણાવેલ.

ચર્ચાને અંતે અધ્યક્ષશ્રી તથા સર્વે સભ્યોશ્રીએ રજૂ કરેલ જામનગર જીલ્લાનાં સી-ડીએપી અંગેનાં આવેલ સુચનોને પ્લાનમાં સમાવેશ કરવા તથા સુધારા-વધારા મા-ચ રાખી આ પ્લાન મંજૂર કરવામાં આવે છે.

મીટીંગનાં અંતમાં ડો. પી.આર. પટ્ટર, સંશોધન વૈજ્ઞાનિક (બાજરા), બાજરા સંશોધન કેન્દ્ર, જુનાગઢ કૃષિ યુનિવર્સિટી, જામનગર એ માનનીય જીલ્લા વિકાસ અધિકારીશ્રી તથા તમામ અધિકારીનો આભાર માની બેઠક પુર્ણ જાહેર કરી.

  
કન્વીનર

અનેસંશોધન વૈજ્ઞાનિક (કિટકશાસ્ત્ર)  
બાજરા સંશોધન કેન્દ્ર  
જુનાગઢ કૃષિ યુનિવર્સિટી  
જામનગર

  
સભ્ય સચિવ  
અને

જીલ્લા ખેતીવાડી અધિકારી  
જીલ્લા પંચાયત  
જામનગર



અધ્યક્ષ  
અને  
જીલ્લા વિકાસ અધિકારી  
જામનગર

**નકલ જયભારત સાથે રવાના:-**

- ૧ નિયામકશ્રી, જીલ્લા ગ્રામ વિકાસ એજન્સી.
- ૨ જીલ્લા આયોજન અધિકારીશ્રી, જામનગર
- ૩ સંશોધન વૈજ્ઞાનિકશ્રી (બાજરા), જામનગર
- ૪ નાયબ ખેતી નિયામકશ્રી (વી), જામનગર
- ૫ નાયબ ખેતી નિયામકશ્રી (તાલીમ), પ્રોજેક્ટ ડાયરેક્ટરશ્રી (આત્મા), જામનગર
- ૬ નાયબ બાગાયત નિયામકશ્રી, જામનગર
- ૭ નાયબ પશુપાલન નિયામકશ્રી, જામનગર
- ૮ પ્રોજેક્ટ ડાયરેક્ટરશ્રી, જીલ્લા જળસત્રાવ વિકાસ એકમ, જામનગર
- ૯ જનરલ મેનેજરશ્રી, લીડ બેંક, જામનગર
- ૧૦ જનરલ મેનેજરશ્રી, નાબાર્ડ, જામનગર
- ૧૧ કાર્યપાલક ઈજનેરશ્રી (સિંચાઈ), જીલ્લા પંચાયત, જામનગર
- ૧૨ તાલીમ વ્યવસ્થાપકશ્રી, કૃષિ વિજ્ઞાન કેન્દ્ર, જામનગર
- ૧૩ જીલ્લા રજીસ્ટ્રારશ્રી, સહકારી મંડળીઓ, જામનગર
- ૧૪ મદદનીશ નિયામકશ્રી, ગુજરાત રાજ્ય જમીન વિકાસ નિગમ લી., જામનગર
- ૧૫ મદદનીશ નિયામકશ્રી (મત્સ્ય ઉછેર), જામનગર
- ૧૬ મદદનીશ નિયામકશ્રી (ક્ષાર અંકુશ), જામનગર
- ૧૭ મેનેજરશ્રી, ગુજરાત રાજ્ય બીજ નીગમ લી., જામનગર
- ૧૮ મેનેજરશ્રી, ગુજરાત એગ્રો. ઈન્ડ. કોર્પો. લી., જામનગર
- ૧૯ પ્રતિનિધીશ્રી, ગુજરાત ગ્રીન રીવોલ્યુશન કંપની, જામનગર
- ૨૦ વનસંરક્ષકશ્રી, જામનગર

**નકલ રવાના સવિનય જાણ માટે :-**

1. સંયુક્ત ખેતી નિયામકશ્રી, રાજકોટ
2. સંશોધન નિયામકશ્રી, જી.કૃ.યુ., જામનગર

PA Computer/D:/Tech-3/Guj.letter

# C-DAP

## ડી.બેલ.પી.સી. સમીક્ષા બેઠક

તારીખ:- ૨૮/૦૧/૨૦૧૩

સ્થળ:- જિલ્લા પંચાયત, જામનગર

ક્રમ	નામ	હોદ્દો	મો. નંબર	સહી
1	શ્રી સુરજ કુમાર	જા. ડી. યા. ડી.	91122254618	f s/d.
2	શ્રી. પી.બી. વાસાણી	જા. ડી. યા. ડી.	91122254615	
3	ડી. ડી. યા. ડી. યા. ડી.	ડી. ડી. (જા. ડી.)	9858823080	
4	ડી. ડી. એલ. શાહવાણી	ડી. ડી. (ડી. ડી.)	9427497561	Shahmans
5	ડી. ડી. એમ. વટેલ	ડી. ડી. (જા. ડી.)	9525167764	A.M. Patel
6	ડી. ડી. આર. વાઘેલા	ડી. ડી. (જા. ડી.)	9429820022	
7	Narvki - Singh	D.L.M, G.L.P.C. D.R.B.A, Jamnagar	0099955946	
8	Harsh R. Vadav	ડી. ડી. (જા. ડી.)	9426226976	
9	Y. H. Ghelan,	જા. ડી. (જા. ડી.)	9235141556	
10	DR K.D. Muniyoy	Assoc. Res. Sci.	9825016923	
11	DI SE. Regi. CO. OP. YW. S.M. DARTAPG	JAU, Jamnagar CO. OP. OFFICE Dist. Regi. (CO. OP.)	94267314790	
12	ANOOPI, SHARMA	Assistant Dir. (Soil Cons.)	9925934876	
13	જા. ડી. વટેલ	જા. ડી. (જા. ડી.)	9426999667	
14	R. H. Ladani	Dy. Dir. of Horti. Jamnagar	9924761747	
15	C. H. Gajjar	Project Director District, Jamnagar	9176982383	
16	જા. ડી. વટેલ	Dist. Planning Officer Jamnagar	9925026300	
17	C.K. Thakkar	DCT Extn. Jamnagar	9825271335	
18	m. P. Vachhani		9825562652	
19	K.B. Fozdiya	Fuemas	9324218489	K.B. Fozdiya
20	B.P. Kothari	Asst. Supdt. of Fisheries Jamnagar	2564907 Office no - 2567882	B. Kothari
21	C.F. Said	ડી. ડી. (જા. ડી.)		

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**Chairman Remarks by Shri Ajaykumar, District Development Officer, Jamnagar**



**Dr. K. L. Raghvani, Convener present C-DAP**

**Approval of C – DAP of Jamnagar district from DLPC**

## C-DAP



**Officials from line department of the District**



**Vote of thanks by Dr. P. R. Padhar, Research Scientist ( Pearl Millet )**

**Approval of C – DAP of Jamnagar district from DLPC**

