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Impact Evaluation of Rashtriya Krishi Vikas Yojana (RKVY) in Gujarat

S. S. Kalamkar, M. Swain & S. R. Bhaiya

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Agro-Economic Research Centre
(Ministry of Agriculture, Govt. of India)
Sardar Patel University
Vallabh Vidyanagar 388 120, Anand, Gujarat

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Prepared by
Dr. Parmod Kumar, Project Coordinator and Head, ADRTC, ISEC, Bangalore & his team
Dr. S.S. Kalamkar, *Director and Professor, AERC*
Dr. M. Swain, Research Officer (Sr.)/Assistant Professor (SS), AERC &
Dr. S. R. Bhaiya, Field Officer, CCS

Research Team
Shri. M. R. Ojha, Research Associate, AERC
Shri Manish Makwana, Research Associate, AERC
Shri T. B. Parihar, Research Associate, AERC
Ms. Kalpana Kapadia, Research Associate, AERC
Shri Jasawant Singh, Computer, CCS
Shri H. P. Parmar, Research Fellow, AERC
Shri N. G. Chauhan, Research Fellow, AERC
Shri R. I. Patel, Agri. Supervisor, CCS
Shri Brijesh P. Pandya, Field Supervisor, CCS
Shri Hemal U. Padhiyar, Field Supervisor, CCS
Shri Hitesh P. Makwana, Field Supervisor, CCS

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The Director
Agro-Economic Research Centre
For the states of Gujarat and Rajasthan
(Ministry of Agriculture, Govt. of India)
H.M. Patel Institute of Rural Development,
Opp. Nandalaya Temple, Post Box No. 24,
Sardar Patel University,
Vallabh Vidyanagar 388120, Dist. Anand, Gujarat.
Ph. No. +91-2692-230106, 230799;
Mobile- 09822437451; 7383554616
Fax- +91-2692-233106
Email: director.aerc@gmail.com; directoraercgujarat@gmail.com

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Foreword

The process of planned economic development in India began with the launching of the First Five Year Plan in 1951 and currently India is in the 12th Five Year Plan (2012-13 to 2016-17). The main objective of policy makers is to promote growth with social justice. While growth rate of gross domestic product was 3.6 percent per annum during the First-Five Year Plan, it grew at the rate of 7.8 percent per annum during the Tenth Plan and a road map for 9 percent per annum for the 11th Plan (2007-08 to 2011-12) was being conceived by the Planning Commission. However, despite this improved performance in growth rates over the plan periods, the major concern is that workforce continues to perpetuate in the agricultural sector. This means that the agricultural sector has to be an engine of growth as this will lead to inclusive growth. However, a contrary picture had emerged as there has been a sharp deceleration in Indian agriculture with declining growth rates and fall in share of agriculture in gross domestic product (GDP) from 36.4 percent in 1982-83 to 17.0 percent in 2008-09.

Realizing the gravity of the situation and steep fall in growth rates in SDP from agriculture, National Development Council, in its meeting held on 29th May, 2007 resolved that a special Additional Central Assistance Scheme (Rashtriya Krishi Vikas Yojana-RKVY) be launched. RKVY was launched in 2007-08 with an aim to provide assistance to the states to ensure a holistic development of agriculture and to enhance public investment so as to achieve 4 percent growth rate in agriculture and allied sectors during Eleventh Five Year Plan period which has been operational since then. The NDC resolved specifically that agricultural development strategies must be reoriented to meet the needs of farmers and called upon the Central and State governments to evolve a strategy to rejuvenate agriculture.

The National Development Council in order to give a boost to the agricultural and allied sector, conceived a centrally sponsored scheme namely-*Rashtriya Krishi Vikas Yojana* with a view to achieve a growth rate of 4 per cent per annum during the Eleventh Five Year Plan Period. The pattern of funding under this scheme is 100 percent Central grant. In order to be eligible to receive funds under this scheme, each district in every state has prepared a Comprehensive District Agricultural Plan (CDAP) indicating its budgetary requirements for innovative as well as on-going schemes. A large number of districts in the country have already prepared this plan. Further, each state has to prepare a Comprehensive State Agricultural Plan (SAP) by integrating the District Plans. The state has to, at the outset, indicate resources that can flow from the state to the district.

The state governments have been receiving assistance under RKVY scheme from Central Government since 2007-08. It would be important to study the impact of this scheme on selected parameters of beneficiary households in the state of Gujarat. Ministry of Agriculture, GOI has assigned this task to ISEC, Bangalore. As a part of all India project, on request of ISEC, Bangalore, AERC VVN worked as a partner Institute & undertook work of data collection, imputing and processing for the state of Gujarat.

I would like to congratulate the entire project team for preparing this excellent research report. I hope findings of the study would be useful for academicians, policy makers and researchers.

Agro-Economic Research Centre
For the states of Gujarat and Rajasthan
(Ministry of Agriculture, Govt. of India)
Sardar Patel University,
Vallabh Vidyanagar 388120,
Dist. Anand, Gujarat, India.

Dr. S.S. Kalamkar
Director & Professor

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We have benefited immensely from various scholars and officials from different government departments while carrying out this study. At the outset, we would like to thank **Dr. Harish Padh**, Vice Chancellor of our University and Chairman, AERC Governing Body as well as **Dr. Mahesh Pathak**, Honorary Advisor of our Centre for their constant encouragement and support for undertaking such research activity at the Centre.

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Agro-Economic Research Centre
Sardar Patel University,
Vallabh Vidyanagar 388120, Anand.

S. S. Kalamkar
Team Leader

Contents

Foreword *iii*
Acknowledgements *v*
List of Tables *x*
List of Figures *xv*
List of Boxes *xvi*
List of Maps *xvi*
List of Annexures *xvi*
List of Abbreviations *xvii*

Chapter I Introduction 1

1.1 Introduction
1.2 Genesis of RKVY
1.3 About Rashtriya Krishi Vikas Yojana
1.4 Plan Outlay by Heads of Development
1.5 Statewise Allocation, Release, Expenditure
1.6 Growth in Indian Agricultural Sector
1.7 Main Objectives & Scope of the Study
1.8 Data and Methodology
1.9 Organization of Report

Chapter II State of Agriculture in Gujarat 23

2.1 Introduction
2.2 Population (Urban, Rural, Cultivators, Ag. Labours)
2.3 State Domestic Product and Per Capita Income
2.4 Gujarat Agriculture: Performance & Challenges
2.5 Drivers of Growth in Agriculture
2.6 Marketing and Warehouse Facilities
2.7 Emerging Demand-Supply Imbalances
2.8 Natural Resource Management
2.9 Farm Inputs and Management
2.10 Agricultural Research, Education and Extension
2.11 Animal Husbandry, Dairying and Fisheries
2.12 Post Harvest Management and Value Addition

Chapter III Allocation and Expenditure of RKVY Funds during XIth Plan 65

3.1 Introduction
3.2 Allocation & Expenditure of RKVY Funds (XI plan)
3.3 Trends in Budgetary Expenditure
3.4 Recent Trends in Input use
3.5 Recent Trends in Crop Production
3.6 Recent Trends in Livestock Production

Chapter IV Socio-Economic Profile of Selected Households 75

4.1 Socio Economic Profile of the Sample Households
4.2 Land Holding Pattern of the Sample Households
4.3 Sources of Irrigation for Sample Households
4.4 Land Holding Size distribution
4.5 Details on Holding of Livestock and Farm Assets
4.6 Cropping Pattern of Selected households
4.7 Details on sources of Household Income
4.8 Level of Crop Yield
4.9 Awareness about RKVY Programme

Chapter V RKVY Interventions in the Major Sectors & their Impact 91

5.1 Interventions under Mechanization
5.2 Interventions under Crop Development
5.3. Interventions under Horticulture
5.4 Interventions under Micro and Minor Irrigation
5.5 Intervention under Animal Husbandry and Dairy

Chapter VI RKVY Interventions in the Minor Sectors & their Impact 105

6.1 Introduction
6.2 Intervention under Watershed Development
6.3 Intervention under Soil Testing/INM
6.4 Intervention under Cooperatives

Chapter VII Other Achievement and Constraints 109

7.1 Introduction
7.2 Training to Beneficiaries
7.3 Information Technology (IT)
7.4 Employment Generation under RKVY
7.5 Agricultural Marketing details
7.6 Constraints Faced under RKVY
7.7 Sources of Funds
7.8 Views and Opinion of the Beneficiaries
7.9 Suggestions for the Better Implementation
7.10 Benefits availed from Other Govt. Schemes
7.11 Effect of various Subsidy Programmes-Regression Analysis

Chapter VIII Institutional/Infrastructure Projects in Gujarat 125

8.1 Introduction
8.2 Infrastructure Project by type of Institutions
8.3 Sector-wise Infrastructure Project
8.4 Status of Infrastructure Projects
8.5 Sectorwise cent per cent Objectives Achieved
8.6 Distribution of Expenditure by Sector
8.7 Achievements and Constraints

Chapter IX Conclusions and Policy Suggestions 137

References 141

Annexures I to IV 145

List of Tables

Table No.	Title	Page
1.1	Growth Rate of National State Domestic Products (NSDP) from Agriculture (1984-85 to 1995-96 7 1995-96 to 2004-05)	03
1.2	Plan Outlay by Heads of Development in India: IXth to XIIth Five Year Plans	08
1.3	Head-wise share in total plan outlay in India: IXth -XIIth Five Year Plans	09
1.4	State-wise Allocation, Release , Expenditure of the States under RKVY 2007-08 to 2011-12	13
1.5	State-wise Allocation, Release, Expenditure of the States under RKVY 2012-13 to 2014-15	14
1.6	Sector-wise Rate of Growth at Factor Cost in India (at 2004-2005 prices) (%)	17
1.7	List of Selected Villages/Talukas/Districts In RKVY In Gujarat State	21
1.8	No. of Institutions Responded on RKVY fund &its utilization: Gujarat	22
2.1	Composition of Total Population in Gujarat (2011)	25
2.2	Sectoral Composition of Net State Domestic Product(NSDP) at constant (2004-05) prices	27
2.3	Plan wise Growth in Area, Production and Yield of Major Crops in Gujarat	31
2.4	Area, Yield and Production of Major Crops in Gujarat during 1991-2010	33
2.5	Food grains Production in Gujarat and India	33
2.6	Change in Cropping Pattern in Gujarat	35
2.7	Investment outlay and expenditure on agriculture and allied sectors during 11th Five Year Plan	37

2.8	Warehousing Capacity under Gujarat State Warehousing Corporation	39
2.9	Salient Features of Agro Climatic Zones of Gujarat State	41
2.10	Land Use Pattern in Gujarat	43
2.11	Land Holding Pattern in Gujarat (2005-06)	44
2.12	Ceiling Limits on Land Hold	45
2.13	Water Resources Development in Gujarat	47
2.14	Seeds Requirement and Availability	50
2.15	Fertilizer Consumption in Gujarat State (1980-81 to 2013-14)	52
2.16	Agricultural Implements in Gujarat	53
2.17	Irrigated Area in Gujarat during 2007-08 to 2012-13	54
2.18	Credit Disbursed under Rashtirya Krishi Vikas Yojana (RKVY)	56
2.19	Credit Disbursed under Kisan Credit Card Scheme in Gujarat	57
2.20	Performance of National Agricultural Insurance Scheme in Gujarat	58
2.21	Performance of Weather based Crop Insurance Scheme in Gujarat	58
2.22	Performance of Fisheries and Dairy Sector in Gujarat	62
2.23	Marine and Inland Fish Production	62
3.1	Year over Year Growth in the Agricultural Economy of Gujarat	66
3.2	Sector-wise Expenditure under RKVY in Gujarat during 11th FYP	68
3.3	Trend in Budgetary Expenditure on Agriculture and Allied Sector (at 2004-05 prices)	70
3.4	Trend in Inputs Use in Gujarat	71
3.5	Average Annual Growth in Area, Production and Yield of Major Crops (Per cent)	73
3.6	Average Annual Growth in Production of Livestock Products and Fishery (Per cent)	73

4.1	Details on Selected Households in Gujarat	75
4.2	Sectorwise distribution of Selected Households (No. of beneficiaries)	76
4.3	Age and Gender classification of sample beneficiaries	77
4.4	Classification of Beneficiaries based on Caste	77
4.5	Classifications of Sample Beneficiaries based on Education status	78
4.6	Occupation details of Sample Beneficiaries	79
4.7	Land holding details of Sample Beneficiaries	79
4.8	Sources of Irrigation (percentage of area irrigated)	80
4.9	Distribution of Beneficiaries by Farm size Holdings (Percentage)	81
4.10	Livestock Holding by Sample Households (per household)	82
4.11	Farm Assets holding by Sample Households (per household)	83
4.12	Cropping Pattern among Selected Households	84
4.13	Details of Household Income from various Sources for the reference year 2012-13 (Rs per household)	85
4.14	Details of Area, Productivity and Net Returns (2012-13)	85
4.15	Crop Yield among the Selected Households (Quintals per acre)	86
4.16	Crop Profitability among the Selected Households (Rs per acre)	87
4.17	Awareness about RKVY programme	88
5.1	Interventions made under Agricultural Mechanization - Implement details	90
5.2	Usage of Farm Equipment procured under Agricultural Mechanization	91
5.3	Impact of Agricultural Mechanization on Crop Productivity	92
5.4	Benefits derived from Agricultural Mechanization (% of hh)	94
5.5	Interventions made under Crop Development	95

5.6	Impact of Crop Development on Crop Productivity	96
5.7	Interventions made under Horticulture Infrastructure	98
5.8	Overall Impact of Horticultural Infrastructure Intervention	98
5.9	Interventions made under Horticulture Crop Development	99
5.10	Overall Impact of Horticultural Crop Development Intervention	100
5.11	Interventions made under Micro/Minor Irrigation	101
5.12	Overall impact of Micro/Minor Irrigation	102
5.13	Interventions made under Animal Husbandry and Dairy	103
5.14	Impact of Animal Husbandry components on Household Income (% households)	104
5.15	Details of Feed Supplement availed by the Beneficiaries under Animal Husbandry	104
6.1	Details of Interventions undertaken under Watershed Development	106
6.2	Details of Intervention under Soil Testing	107
6.3	Overall Impact of Intervention under Soil Testing	107
6.4	Details of Intervention under Co-operatives	108
7.1	Trainings Participated by the Beneficiaries	110
7.2	Details on Usage of Mobile phone for Agriculture related Information	111
7.3	Annual Employment Generation under RKVY per Household	113
7.4	Agricultural Marketing details of RKVY Beneficiaries	114
7.5	Constraints faced in Availing RKVY Benefit	115
7.6	Source of Investment borne by the Households for the RKVY Intervention	117
7.7	Opinion of Beneficiary Households about RKVY programme (% of beneficiaries)	117
7.8	Benefits availed from Other Government Schemes by RKVY Beneficiaries	120

7.9	Impact of Various Sector Specific Subsidies on Value of Output at Household Level	123
8.1	Number of Filled-in Questionnaire received	127
8.2	Number of Infrastructure Projects by Type of Institutions	127
8.3	Number of Infrastructure Projects by Type	128
8.4	Number of Infrastructure projects by National Importance	129
8.5	Number of Institutional & Infrastructure Projects by Sector	129
8.6	Status of Institutional and Infrastructure Projects (No.)	130
8.7	Yearwise Distribution of Institutional & Infrastructure Projects (Nos.)	131
8.8	Sector wise cent per cent Objectives Achieved (Numbers)	132
8.9	Allocation, Release and Expenditure (Rs lakhs)	133
8.10	Sectorwise total Budget of the Institutional & Infrastructure Projects	134

List of Figures

Figure No.	Figure	Page
1.1	Sectorwise Contribution of GDP of India 1950-2014 (at 2004-05 prices)	01
1.2	State-wise Allocation, Release, Expenditure of the States under RKVY- Total during 2007-08 to 2014-15	15
1.3	State-wise share in total Allocation, total Release, total Expenditure of the States under RKVY during 2007-08 to 2014-15	15
2.1	Sectoral Composition of NSDP at Current Price in Gujarat (2005-06 to 2013-14)	30
2.2	Growth in Area , Production and Yield of all Major Crops (1990-91 to 2012-13)	32
2.3	Rainfall Pattern in Gujarat (1969-70 to 2010-11)	48
2.4	Seed Replacement Rate (%) of Selected Crops in Gujarat and India (2011)	51
2.5	Irrigation Coverage by Sources in Gujarat (1990-91 and 2012-13)	55
7.1	Suggestions of beneficiaries on RKVY programme	119

List of Boxes

Box No.	Box title	Page
1.1	Resolution with respect to the Additional Central Assistance scheme	04
1.2	Basic Features of the RKVY	05
1.3	Areas of focus under the RKVY	06

List of Maps

Map No.	Maps	Page
1.1	Study Area in Gujarat	20
2.1	Agriculture Map of Gujarat	34

List of Annexures

Annexure No.	Title	Page
I	RKVY Guidelines- XII Plan	145
II	RKVY Guidelines- GR 2014	171
III	Conversion factors (land)	173
IV	Index for RKVY Success Stories	174

List of Abbreviations

A	Area
AAGR	Annual Average Growth Rate
AGR	Annual Growth Rate
AFCL	Agricultural Finance Corporation Limited
ASMO	Area Sown More Than Once
Av.	Average
C.I.	Cropping Intensity
CAGR	Compound Annual Growth Rate
CGR	Compound Growth Rate
DES	Directorate of Economics and Statistics
FAO	Food and Agriculture Organization
FFP	Farmers Field School
FYP	Five Year Plan
GCA	Gross Cropped Area
GDP	Gross Domestic Product
GIA	Gross Irrigated Area
GOG	Government of Gujarat
GOI	Government of India
GSDP	Gross State Domestic Product
ha	Hectare
HH/hh	Household
I.I.	Irrigation Intensity
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
INM	Integrated Nutrient Management
IPM	Integrated Pest Management
kg	kilograms
mha	Million hectares
MOA	Ministry of Agriculture
mt	Metric Tonnes
NA	Not Available
NCA	Net Cropped Area
NFHS	*National Family Health Survey*
NFSM	National Food Security Mission

Non-NFSM		Non Beneficiary of National Food Security Mission
NHM		National Horticultural Mission
NIA		Net Irrigated Area
NPK		Nitrogen (N), Phosphorus (P), and Potassium (K)
NSA		Net Sown Area
NSDP		Net State Domestic Product
NSS		National Sample Survey
OBC		Other Backward Classes
P		Production
PACS		Primary Agricultural Credit Societies
PDS		Public Distribution System
RKVY		Rashtriya Krishi Vikas Yojana
SC		Scheduled Caste
SRR		Seed Replacement Ratio
ST		Scheduled Tribe
TE		Triennium Endings
USA		United States of America
WFP		World Food Programme
Y		Yield
A.I.	-	Artificial Insemination
A.I.C.	-	Artificial Insemination Centre
AEZs	-	Agri Export Zones
APMC	-	Agricultural Produce Market Committee
ATMA	-	Agriculture Technology Management Agency
BAPU	-	Block Agriculture Planning Unit
BPL	-	Below Poverty Line
BRGF	-	Backward Region Grants Fund
CACP	-	Commission for Agricultural Cost and Prices
CB	-	Cross Breed
C-DAP	-	Comprehensive District Agriculture Plan
C-SAP		Comprehensive State Agricultural Plan
DPAP	-	Drought Prone Area Programme
DAPU	-	District Agriculture Planning Unit
DDP	-	District Development Plan
DFL	-	Disease Free Layings
DIC	-	District Industries Centre
DPAP	-	Drought Prone Area Programme
DRDA	-	District Rural Development Authority

EGS	-	Employment Guarantee Scheme
FFS	-	Farmers Field School
FHP	-	Farm Harvest Price
FYP	-	Five Year Plan
GCA	-	Gross Cropped Area
GDP	-	Gross Domestic Product
GIA	-	Gross Irrigated Area
GoI	-	Government of India
GP	-	Gram Panchayat
GSDP	-	Gross State Domestic Product
GVO	-	Gross Value of Output
Ha	-	Hectare
HYV	-	High Yielding Variety
IADP	-	Integrated Agricultural Development Plan
INM	-	Integrated Nutrient Management
IPM	-	Integrated Pest Management
IWMP	-	Integrated Watershed Development Programnme
IWMP		Integrated Watershed Management Programme
KVI	-	Khadi and Village Industries
KVK	-	Krishi Vigyan Kendra
MSAMB	-	Maharashtra State Agricultural Marketing Board
MSHMPB	-	Maharashtra State Horticulture and Medicinal Plants Board
MSP	-	Minimum Support Price
NADP	-	National Agriculture Development Programme
NAFED	-	National Agricultural Cooperative Marketing Federation of India
NCAP	-	National Centre for Agricultural Economics and Policy Research
NDC	-	National Development Council
NDP	-	Net Domestic Product
NFSM	-	National Food Security Mission
NHM	-	National Horticulture Mission
NIA	-	Net Irrigated Area
NPK	-	Nitrogen, Potassium and Potash
NREGS	-	National Rural Employment Guarantee Act
NWDPRA	-	National Watershed development Programme for Rainfed Areas
PPP	-	Public Private Partnership

Prod	-	Production
Prodvty.	-	Productivity
RKVY	-	Rashtriya Krishi Vikas Yojana
SAU	-	State Agricultural Universities
SHG	-	Self Help Group
SLSC		State Level Sanction Committee
SRR	-	Seed Replacement Ratio
SWOT	-	Strength, Weakness, Opportunity and Threat
WPI	-	Wholesale Price Index

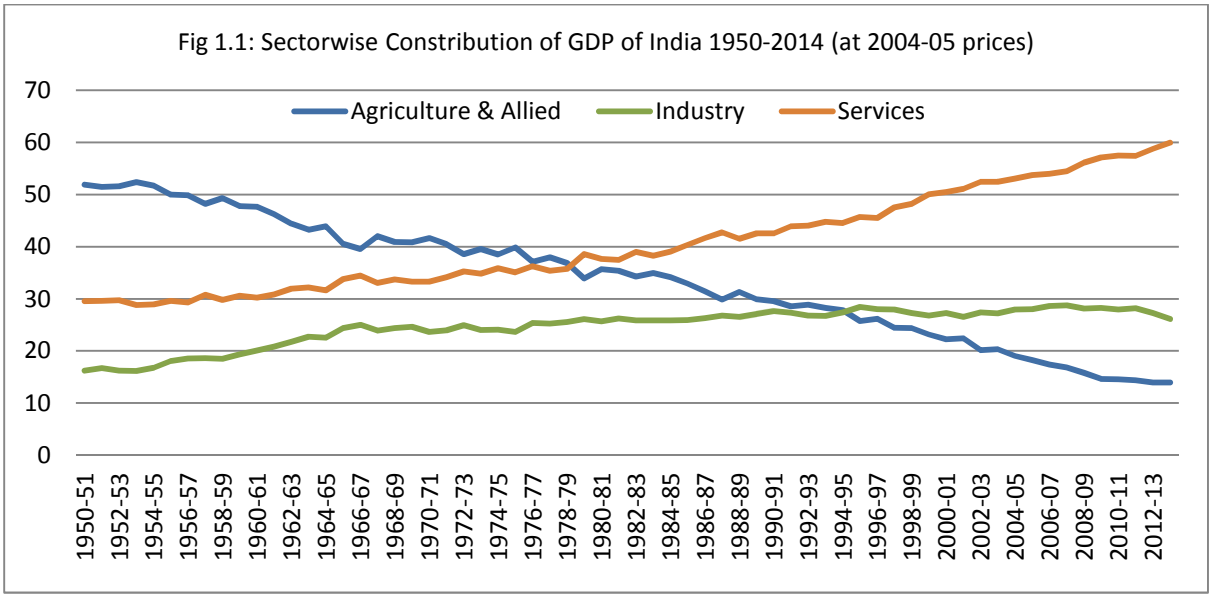
Chapter I

Introduction

1.1 Introduction:

Agricultural growth plays an important role in achieving certain national goals, such as reducing rural poverty, providing food and nutritional security, supplying raw materials to major industries such as textiles, earning foreign exchange, etc. Further, agriculture is also the dominant sector of the Indian economy because more than half the workforce in the country is engaged in agriculture. Therefore, sustained growth in India's agricultural sector is essential for economic development and for maintaining overall stability of the economy. However, despite major part of the workforce being employed in this sector, the contribution of agriculture in gross domestic product (GDP) has registered a steady decline from 51.9 percent in 1950-51 to 13.9 percent in 2013-14, at 2004-05 prices (Fig. 1.1). While slower growth of GDP in agricultural as compared to non-agricultural sector is expected, the main failure has been the inability to reduce the dependence of the workforce on agriculture significantly by creating enough non-farm opportunities to absorb the labour surplus in rural areas.

Fig 1.1: Sectorwise Constribution of GDP of India 1950-2014 (at 2004-05 prices)



1.2 Genesis of RKVY:

Given the agrarian nature of our economy, agriculture and rural development have always occupied the attention of the planners and policy makers, which is evident from the priorities given to these sectors in terms of resource allocations in different five year plans (Kalamkar and Shroff, 2011a). India's performance in agriculture over the past decades has shown considerable progress and all the Revolutions (Green, Blue, White and Yellow) have brought about vast changes in the agrarian scene since independence. However, in the recent past, there had been a sharp deceleration in Indian agriculture with the growth rate of agriculture GDP slipping from 3.62 percent during 1984-85 to 1995-96 to less than 2 percent in the period 1995-96 to 2004-05 (Table 1.1). Further, state-wise trends indicate that the largest slumps were occurred in those areas/states that are predominantly rainfed (Planning Commission, 2008). This deceleration, although most marked in rainfed areas, was occurred in almost all states and covered all major sub-sectors. Further evidence of the worsening situation of farming households was observed from the results of the 59th round of NSSO (2005 and 2005a) on the *'Situation Assessment of Farmers'*, which shows that 48.6 percent of the farmers' households in India are indebted, and about 41 percent farmers' households in the country did not like farming because it is not profitable, risky and it lacks social status. These results had clearly showed the signs of acute distress and stagnation in productivity in the sector. The deceleration in the growth rate of agriculture and allied sectors has resulted in widening disparities in the per worker productivity between agriculture and non-agricultural sectors. In fact in the recent past, the distressful condition of farmers has been the major cause of suicides in different regions of the country. This seems to be a matter of serious concern, especially in view of a growth strategy leaning towards globalization and therefore encouraging competition. A declining growth rate of investment in agriculture, declining efficiency in input-use, no major technological breakthrough and falling prices, have all contributed to the lower agricultural growth in the country.

Table 1.1: Growth Rate of National State Domestic Products (NSDP) from Agriculture (1984-85 to 1995-96 7 1995-96 to 2004-05)

(% per annum)

State	Growth rate in NSDP Agriculture		Rainfed (%)	State	Growth rate in NSDP Agriculture		Rainfed (%)
	1984-85 to 1995-96	1995-96 to 2004-05			1984-85 to 1995-96	1995-96 to 2004-05	
Punjab	4.00	2.16	03	**Rajasthan**	**5.52**	**0.30**	**70**
Haryana	4.60	1.98	17	Orissa	-1.18	0.11	73
Utter Pradesh	2.82	1.87	32	Madhya Pradesh	3.63	-0.23	74
Tamil Nadu	4.95	-1.36	49	Karnataka	3.92	0.03	75
West Bengal	4.63	2.67	49	Maharashtra	6.66	0.10	83
Bihar	-1.71	3.51	52	Kerala	3.60	-3.54	85
Andhra Pradesh	3.18	2.69	59	Assam	1.65	0.95	86
Gujarat	**5.09**	**0.48**	**64**	All India	3.62	1.8554	60

Note: States are ranked by percentage of rainfed area.
Source: Planning Commission, GOI, 2008.

The growth rate in NSDP from agriculture during the period 1995-96 to 2004-05 in every state had showed a dismal performance and was negligible or even negative in some states. The states of Gujarat and Rajasthan had experienced the less than 0.5 percent rate of growth during second period. The growth rate in the agricultural sector has always lagged behind the overall growth rate of the economy. Indian agriculture was in a state of crisis and one of the major challenges is to reverse deceleration in agricultural growth rates so as to successfully achieve a higher broad based growth. Realizing the gravity of the situation and steep fall in growth rates in SDP from agriculture, a number of schemes/programmes were initiated to revive and accelerate growth in agriculture and allied sectors during the Eleventh plan. Further, National Development Council (NDC), in its meeting held on 29th May, 2007 resolved that a special Additional Central Assistance Scheme (Rashtriya Krishi Vikas Yojana-RKVY) be launched. In order to overcome the above weaknesses and give a major boost to the agricultural sector, the RKVY aimed at providing assistance to the states to ensure a holistic development of agriculture. Thus, RKVY was launched during 2007-08 to incentivize the states to enhance public investment to achieve 4 percent growth rate in agriculture and allied sectors during XIth

Five Year Plan (FYP) period. The NDC resolved specifically that agriculture development strategies must be reoriented to meet the needs of farmers and called upon the Central and State governments to evolve a strategy to rejuvenate agriculture (see, Box 1.1).

Box 1.1: **Resolution with respect to the Additional Central Assistance scheme**

Introduce a new Additional Central Assistance scheme to incentivise States to draw up plans for their agriculture sector more comprehensively, taking agro-climatic conditions, natural resource issues and technology into account, and integrating livestock, poultry and fisheries more fully. This will involve a new scheme for Additional Central Assistance to State Plans, administered by the Union Ministry of Agriculture over and above its existing Centrally Sponsored schemes, to supplement the State-specific strategies including special schemes for beneficiaries of land reforms. The newly created National Rainfed Area Authority will on request assist States in planning for rainfed areas.

Source: GOI (2007).

1.3 About Rashtriya Krishi Vikas Yojana:

As mentioned earlier, among several schemes, a centrally sponsored scheme RKVY with an allocation of Rs. 25,000 crores was introduced during Eleventh FYP to enable agriculture to achieve goals of bridging the yield gaps in important crops, maximize returns to the farmers and incentivize states to spend more on agricultural sector and address the problems of agriculture and allied sectors in an integrated manner. RKVY is a State Plan scheme, which is administered by the Union Ministry of Agriculture. The pattern of funding under this scheme is 100 percent Central grant. The eligibility for assistance under the scheme depends upon the amount provided in the State Plan budgets for agriculture and allied sectors, over and above the base line percentage expenditure incurred by the State Governments on agriculture and allied sectors. The baseline share of agriculture in total State Plan expenditure (excluding the assistance under the RKVY) must be at least maintained, and upon its doing so, it will be able

to access the RKVY funds. The base line is a moving average, and the average of the previous three years is taken into account for determining the eligibility under the RKVY, after excluding the funds already received (GOI, 2007). The main objective of RKVY is to give boost to the agricultural sector to that yield gaps can be reduced and potential growth of the state/district can be capitalised (Box 1.2). The scheme focuses on agriculture and allied sectors including infrastructure, extension services and capacity building (see. Box 1.3).

Box 1.2 Basic Features of the RKVY

The RKVY aims at achieving 4 per cent annual growth in the agriculture sector during the XI Plan period, by ensuring a holistic development of agriculture and allied sectors. The main objectives of the scheme are :

(i) To incentivise the states so as to increase public investment in agriculture and allied sectors.

(ii) To provide flexibility and autonomy to states in the process of planning and executing agriculture and allied sector schemes.

(iii) To ensure the preparation of agriculture plans for the districts and the states based on agro-climatic conditions, availability of technology and natural resources.

(iv) To ensure that the local needs/crops/priorities are better reflected in the agricultural plans of the states.

(v) To achieve the goal of reducing the yield gaps in important crops, through focused interventions.

(vi) To maximize returns to the farmers in agriculture and allied sectors.

(vii) To bring about quantifiable changes in the production and productivity of various components of agriculture and allied sectors by addressing them in a holistic manner.

Source: GOI (2007).

1.3.1 Comprehensive District Agricultural Plan:

The need for integrated local area plans, based on specific endowments and needs of each area, was stressed from the beginning of planned development. However, despite several reports and studies, only sporadic efforts and isolated cases of such planning could be located. It was therefore decided by the Government of India that the 'District Plan Process'

should be an integral part of the process of preparation of State's next Five Year Plan. In order to get assistance from the RKVY scheme, it is mandatory to prepare a 'Comprehensive District Agricultural Plan' (C-DAP) for every district in the state and finally prepare a State Agricultural Plan (SAP).

Box 1.3 Areas of focus under the RKVY

(a) Integrated development of major food crops such as wheat, paddy, coarse cereals, minor millets, pulses, oilseeds
(b) Agriculture mechanization
(c) Activities related to enhancement of soil health.
(d) Development of rainfed farming systems in and outside watershed areas, as also integrated development of watershed areas, wastelands, river valleys
(e) Support to State seed farms
(f) Integrated Pest Management
(g) Encouraging non-farm activities
(h) Strengthening of market Infrastructure and marketing development
(i) Strengthening of Infrastructure to promote Extension Services
(j) Activities relating to enhancement of horticultural production and popularization of micro irrigation systems
(k) Animal husbandry and fisheries development activities
(l) Special schemes for beneficiaries of land reforms
(m) Undertaking concept to completion projects
(n) Grant support to the State Government institutions that promote agriculture/horticulture
(o) Study tours of farmers
(p) Organic and bio-fertilizers
(q) Innovative schemes

Source: GOI (2007).

C-DAP is a document which encompasses the vision for development of the district in a holistic manner and also the strategies to achieve the same so that there is human development, infrastructure development and higher growth rates which will generate more employment. A district plan was to describe what a district will try to achieve over a medium term of five

years and how it intends to achieve it. The plan contains an analysis of the current situation of the district and particularly its needs and potentials. The district is taken up as the planning unit, with the plan process starting from below so that all stakeholders in the district are incorporated. Essentially, the main aim of C-DAP is to prepare an agricultural development plan from Gram Panchayat upward to the District level, i.e. bottom up approach. District Plan includes schemes under Stream I (innovative schemes) and Stream II (ongoing scheme). C-DAP shall clearly identify the main causes for backwardness of the district and address these issues. C-DAP will also conduct a SWOT analysis so that the drivers of growth in the district are identified and full potential of the district is realized. RKVY is available to the states in two distinct streams. At least 75 per cent of the allocated amount shall be proposed under Stream-I for specific projects. The amount under Stream- II, will be available for strengthening the existing state sector schemes and filling the resource gaps (Kalamkar and Shroff, 2011).

1.4 Plan Outlay by Heads of Development during IXth, Xth & XIth FYP:

The Eleventh Plan strategy of inclusive growth rests upon substantial increase in public sector outlay. The eleventh five year plan was formulated with a total public sector outlay of Rs. 36,44,718 crores with share of centre and states including union territories respectively amounting to Rs. 2,15,6571 crores and Rs. 14,88,147 crores at 2006-07 prices. The revival of agricultural growth and raising it to 4 percent per annum has been identified as one of the important strategies for achieving faster and inclusive growth and accomplishing an overall target of 9 per cent GDP growth per annum in the 11th FYP period. The actual allocation to agriculture and allied sectors, irrigation and flood control and rural development respectively was amounted to Rs. 136381 crores, 210326 crore and 301069 crores respectively during eleventh five year plan (Table 1.2). And out of the total plan outlay, these three heads accounted for 17.77 percent. The plan expenditure on these three heads together increased from Rs. 166493 crore in ninth plan, Rs. 284176 crore in tenth plan, Rs. 647776 crore in

eleventh plan and projected to Rs. 1242749 crore in the end of twelfth plan. As has been highlighted in earlier section, the government had initiated measures to incentivize State Governments to increase investment in agriculture sector by provision of Rs 25,000 crores additional assistance to States over the plan period through the RKVY. However, in terms of percent share of these three heads in total outlay during ninth to twelfth plan could not changed much, as it ranges between 16-19 percent of total outlay during these periods (Table 1.3). It indicates that while increasing the plan outlay for agriculture and related sectors, outlay on other heads of economy were also increased relatively.

Table 1.2: Plan Outlay by Heads of Development in India: IXth to XIIth Five Year Plans

Amount in Crore

Head of Development	IX Plan (1997-2002)	X Plan (2002-07)	XI Plan : 2007-12 at 2006-07 prices	XI Plan : 2007-12 realisation at current prices	XII Plan (2012-17) Projected at current prices
I. Agricultural & allied activities	37456	58933	136381	162849	363273
II. Rural development	73439	121928	301069	285008	457464
III. Special area programmes	3649	20879	26329	44138	80370
IV. Irrigation & flood control	55598	103315	210326	217563	422012
V. Energy	215545	403927	854123	652173	1438466
VI. Industry and minerals	69972	58939	153600	179943	377302
VII. Transport	121324	225977	572443	612058	1204172
VIII. Communications	47616	98968	95380	53108	80984
IX. Science, technology & environment	25529	30424	87933	67141	167350
X. General economic services	15038	38630	62523	84487	305612
XI. Social services	182005	347391	1102327	1172540	2664843
XII. General services	11940	16328	42283	51759	107959
XIII. Total (I to XII)	859301	1525639	3644717	3582767	7669807

Source: GOI (2014) and http://planningcommission.nic.in/data/datatable/0814/comp_databook.pdf

Table 1.3: Head-wise share in total plan outlay in India: IXth -XIIth Five Year Plans

Head of Development	IX Plan (1997-2002)	X Plan (2002-07)	XI Plan : 2007-12 at 2006-07 prices	XI Plan : 2007-12 realisation at current prices	XII Plan (2012-17) Projected at current prices
I. Agricultural & allied activities	3.86	3.74	4.55	4.74	3.86
II. Rural development	7.99	8.26	7.95	5.96	7.99
III. Special area programmes	1.37	0.72	1.23	1.05	1.37
IV. Irrigation & flood control	6.77	5.77	6.07	5.50	6.77
V. Energy	26.48	23.43	18.20	18.75	26.48
VI. Industry and minerals	3.86	4.21	5.02	4.92	3.86
VII. Transport	14.81	15.71	17.08	15.70	14.81
VIII. Communications	6.49	2.62	1.48	1.06	6.49
IX. Science, technology & environment	1.99	2.41	1.87	2.18	1.99
X. General economic services	2.53	1.72	2.36	3.98	2.53
XI. Social services	22.77	30.24	32.73	34.74	22.77
XII. General services	1.07	1.16	1.44	1.41	1.07
XIII. Total (I to XII)	100.00	100.00	100.00	100.00	100.00

Source: GOI (2014) and http://planningcommission.nic.in/data/datatable/data_2312/DatabookDec2014%2039.pdf

It was reported that during the XI plan, Rs. 22408.76 was released to States out of which Rs. 21586.6 crore was utilized in implementing 5768 projects in certain broad categories namely crop development, horticulture, agricultural mechanization, natural resource management, marketing and post harvest management, animal husbandry development, fisheries, extension, etc (GOI, 2014). By the virtue of these enhanced investments, agriculture and allied sectors could achieve an annual growth rate of 3.64 percent during XIth plan against a growth rate of 2.46 percent per annum in the X plan period.

1.5 Statewise Allocation, Release, Expenditure of the States under RKVY:

The RKVY Guidelines recognize and build on the need for convergence and integration of the various programmes implemented at District/State level into District Agriculture Plans (DAPs) and State Agriculture Plan (SAP). Each district is required to formulate a District Agriculture Plan by including the resources available from other existing schemes, District, State or Central Schemes such as Backward Region Grant Fund (BRGF), Swarnajayanti Gram Swarozgar Yojana (SGSY), National Rural Employment Guarantee Scheme (NREGS), Bharat Nirman and tied and untied grants from the Central and State Finance Commissions etc. The District Agriculture Plans are not to be the usual aggregation of the existing schemes but would aim at moving towards projecting the requirements for development of agriculture and allied sectors of the district. These plans present the vision for agriculture and allied sectors within the overall development perspective of the district. The District Agriculture Plans would reflect the financial requirement and the sources of financing the agriculture development plans in a comprehensive way. The DAP will include animal husbandry and fishery, minor irrigation projects, rural development works, agricultural marketing schemes and schemes for water harvesting and conservation, keeping in view the natural resources and technological possibilities in each district. Each State is further required to prepare a comprehensive State Agricultural Plan (SAP) by integrating the DAPs. The State will have to indicate resources that can flow from the State to the district.

During XII Plan, RKVY funding is provided through three streams viz. production growth (35%), infrastructure & Assets and sub-schemes (20%). The remaining 10% is provisioned as flexi fund from which states can undertake either production growth or infrastructure & assets projects depending upon States needs & priorities. Looking at the requirement of increasing investment, Government has recently done way with 35 per cent requirement in production stream thus paving the way for 100 per cent allocation in investments for infrastructure buildings & creation of assets.

The States have been provided flexibility and autonomy in the process of selection, planning, approval and execution of schemes to make investments in interventions as per their priorities and agro-climatic requirements so that the outcomes are as envisaged in the RKVY objectives. The projects of the State Governments are approved by the State Level Sanctioning Committees (SLSCs) under the Chairmanship of Chief Secretary of the respective States. The funds are routed through the State Agriculture Department, which is the nodal Department for the scheme.

The six sub-schemes were implemented as sub-schemes under RKVY during 2014-15 (http://www.rkvy.nic.in/). These sub-schemes and their allocations are:

i) **Bringing Green Revolution to Eastern Region:** - This programme was initiated in 2010-11 targeting the improvement in the rice based cropping system of Assam, West Bengal, Orissa, Bihar, Jharkhand, Eastern Uttar Pradesh and Chhattisgarh. Allocation for this scheme in 2010-11 & 2011-12 was Rs. 400 crore each, which has been enhanced to Rs. 1000.00 crore in 2012-13 & 2013-14. The allocation for the year 2014-15 was Rs.1000.00 crore.

ii) **Initiative on Vegetable Clusters:** - Growing demand for vegetables was proposed to be met by a robust increase in the productivity and market linkage. For the purpose, an efficient supply chain needed to be established, to provide quality vegetables at competitive prices. The allocation for this sub-scheme was Rs.300.00 crore each in 2011-12 & 2012-13. The allocation for the year 2013-14 was Rs. 200.00 crore and 2014-15 was Rs. 175.00 crore.

iii) **National Mission for Protein Supplements:** - National Mission for Protein Supplements was launched with an allocation of Rs.300 crore during 2011-12 to take up activities to promote animal based protein production through livestock development, dairy farming, piggery, goat rearing and fisheries in selected blocks. During 2012-13 & 2013-14 an

amount of Rs. 500 crore & Rs. 400.00 crore were allocated for 2014-15, Rs. 300.00 crore has been earmarked for this scheme.

iv) **Saffron Mission:** - The Scheme was initiated in 2010-11 with an overall Government of India budgetary support of Rs.288.06 crore over four years. Allocation has been Rs. 39.44 crore in 2010-11, Rs.50.00 crore each in 2011-12 & 2012-13. The mission was meant to bring economic revival of J&K Saffron. Outlay for the year 2013-14 was Rs. 100.00 crore. An amount of Rs.100.00 crore is earmarked for 2014-15.

v) **Vidarbha Intensive Irrigation Development Programme:** - The Scheme was initiated in 2012-13 which seeks to bring in more farming areas under protective irrigation. The allocation for the year 2012-13 & 2013-14 was Rs. 300.00 crore each. For 2014-15 Rs. 150.00 crore has been allocated for VIIDP.

vi) **Crop Diversification:** - The original Green Revolution States have the problem of stagnating yields and over-exploitation of water resources. The answer lies in crop diversification. An amount of Rs.500.00 Crore was allocated for 2013-2014 to the start a programme of crop diversification that would promote technological innovation and encourage farmers to choose crop alternatives. For 2014-15 Rs. 250.00 crore has been allocated for this scheme.

The Planning Commission has approved an outlay of Rs. 63,246 crore for implementation of RKVY for XII Plan. For the year 2014-15, allocation under the scheme was made of Rs. 9954.00 crore. The state-wise allocation, release, expenditure of the states under RKVY is presented in Table 1.4 and 1.5 as well as Fig 1.1 and 1.2. It can be seen from these tables that Andhra Pradesh, Bihar, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh and West Bengal accounted each for more than 5 percent of total expenditure made under RKVY in India during 2007-2012, accounting together about 69 percent of total during this period. During 2012-13 to 2014-15 period, Chhattisgarh and Tamil Nadu joined group of having share of more than 5 per cent in total expenditure.

Table 1.4: State-wise Allocation, Release, Expenditure of the States under RKVY 2007-08 to 2011-12

Sir No	Name of the State/U.T.	State-wise Allocation, Total Release, Expenditure of the States under RKVY 2007-08 to 2011-12 (Rs. in Crore)														
		2007-08			2008-09			2009-10			2010-11			2011-12		
		A	TR	E	A	TR	E	A	TR	E	A	TR	E	A	TR	E
1	Andhra Pradesh	93.1	61.1	61.1	316.6	297.2	297.2	410.0	410.0	410.0	393.5	432.3	432.3	727.7	734.2	734.2
2	Arunachal Pradesh	2.9	1.9	1.9	6.9	0.0	0.0	16.1	16.0	16.0	39.1	29.0	29.0	8.3	10.7	10.7
3	Assam	23.8	0.0		142.6	144.1	144.1	79.9	79.9	79.9	256.9	216.9	216.9	227.8	227.8	227.8
4	Bihar	64.0	57.8	57.8	148.5	148.5	148.5	110.8	110.8	110.8	380.9	415.1	415.1	506.8	506.8	506.8
5	Chhattisgarh	60.5	53.0	53.0	116.5	117.5	117.5	131.8	136.1	136.1	461.0	503.4	503.4	230.6	212.6	210.5
6	Goa*	2.3	1.7	1.7	6.9	0.0	0.0	11.9	0.0	0.0	11.3	7.1	7.1	49.6	24.8	24.8
7	Gujarat	53.7	49.8	49.8	243.4	243.4	243.4	386.2	386.2	386.2	353.5	388.6	388.6	515.5	515.5	515.5
8	Haryana	23.1	21.5	21.5	74.0	39.5	39.5	112.8	112.8	112.8	204.7	226.8	226.8	168.9	176.9	176.6
9	Himachal Pradesh	17.4	16.2	16.2	15.1	15.1	15.1	33.0	33.0	33.0	94.9	94.9	94.9	99.9	99.9	99.9
10	J &K	6.9	0.0	0.0	16.2	1.2	1.2	42.1	42.9	42.9	162.2	96.4	96.4	103.0	63.0	59.3
11	Jharkhand	61.7	55.7	55.7	58.6	29.3	29.3	70.1	70.1	70.1	161.0	96.9	96.9	168.6	174.6	174.6
12	Karnataka	172.0	154.3	154.3	316.6	314.1	314.1	410.0	410.0	410.0	284.0	284.0	284.0	595.9	595.9	595.9
13	Kerala	61.4	55.4	55.4	60.1	30.1	30.1	110.9	110.9	110.9	192.4	149.7	149.7	173.9	182.9	182.5
14	Madhya Pradesh	110.0	101.6	101.6	146.1	146.1	146.1	247.4	247.4	247.4	589.1	559.2	559.2	398.4	398.4	398.4
15	Maharashtra	142.2	128.2	128.2	269.6	261.8	261.8	407.2	404.4	404.4	653.0	653.0	653.0	727.7	735.4	735.4
16	Manipur	1.4	0.0	0.0	4.1	0.9	0.9	5.9	5.9	5.9	24.8	15.5	15.5	22.3	22.3	22.3
17	Meghalaya	7.0	6.4	6.4	13.5	6.8	6.8	24.7	24.7	24.7	46.1	46.1	46.1	14.7	20.4	20.4
18	Mizoram*	1.1	0.0	0.0	4.3	0.8	0.8	4.2	0.0	0.0	7.5	3.8	3.8	34.6	36.6	36.6
19	Nagaland	9.5	3.2	3.2	13.9	7.0	7.0	20.4	20.4	20.4	13.2	13.3	13.3	37.5	37.5	37.5
20	Orissa	46.6	39.3	39.3	115.4	115.4	115.4	121.5	121.5	121.5	274.4	274.4	274.4	357.0	357.0	357.0
21	Punjab	39.9	36.1	36.1	87.5	87.5	87.5	43.2	43.2	43.2	179.1	179.1	179.1	138.9	145.9	145.9
22	Rajasthan	71.7	55.8	55.8	233.8	233.8	233.8	186.1	186.1	186.1	572.5	628.0	628.0	685.0	692.1	692.1
23	Sikkim	2.8	2.8	2.8	11.4	5.7	5.7	15.3	15.3	15.3	6.6	6.6	6.6	20.1	24.6	24.6
24	Tamil Nadu	188.2	153.6	153.6	140.4	140.4	140.4	127.9	127.9	127.9	225.7	250.0	250.0	333.1	333.1	332.7
25	Tripura	4.7	4.2	4.2	34.0	16.1	16.1	31.3	31.3	31.3	116.9	116.5	116.5	18.0	25.6	25.6
26	Uttar Pradesh	116.2	103.9	103.9	316.6	316.6	316.6	391.0	391.0	391.0	635.9	695.4	695.4	757.3	762.8	762.8
27	Uttarakhand	30.5	28.3	28.3	20.6	10.3	10.3	71.4	71.5	71.5	2.6	1.3	1.3	131.8	128.8	128.8
28	West Bengal	60.9	54.9	54.9	147.4	147.4	147.4	147.4	147.4	147.4	476.2	336.0	336.0	476.7	486.7	486.7
	Total States	**1475.1**	**1246.4**	**1246.4**	**3080.5**	**2876.3**	**2876.3**	**3770.3**	**3756.5**	**3756.5**	**6818.7**	**6719.0**	**6719.0**	**7729.2**	**7732.8**	**7725.7**
	Total UTs	**14.6**	**0.5**	**0.4**	**31.2**	**8.8**	**6.1**	**29.7**	**3.0**	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0
	DAP	0.0	0.0	0.0	53.9	0.0	0.0	6.8	0.9	0.9	0.0	0.0	0.0	0.0	0.0	0.0
	Admin Contingency#	0.0	0.0	0.0	0.0	1.7	1.7	0.0	1.4	1.4	60.0	1.0	1.0	81.6	61.3	0.0
	Grand Total	**1489.7**	**1246.9**	**1246.8**	**3165.7**	**2886.8**	**2884.1**	**3806.7**	**3761.8**	**3758.8**	**6878.7**	6720.1	6720.1	7810.9	7794.1	7725.7

Notes: A- Allocation, TR-Total Release and E.-Expenditure,; *These states are ineligible for the year 2009-10; # Admin Contingency to NIRD (National Institute of Rural Development), ISEC (Institute of Economic and Social Change, Bangalore); IIM-CMA (Indian Institute of Management-Centre for Management in Agriculture, Ahmedabad); DAP- District Agricultural Plan.
Source: http://agricoop.nic.in

Table 1.5: State-wise Allocation, Release, Expenditure of the States under RKVY 2012-13 to 2014-15

Sir No	Name of the State/U.T.	State-wise Allocation, Total Release, Expenditure of the States under RKVY 2012-13 to 2014-15 (Rs. in Crore)												Total 2007-08 to 2014-15		
		2012-13			2013-14			2014-15 (31.08.2015)			2015-16					
		A	TR	E	A	TR	E	A	TR	E	A	TR	E	A	TR	E
1	Andhra Pradesh	602.0	577.8	577.8	483.2	456.9	456.9	267.1	263.5	244.4	92.6	46.3	-	3293.2	3232.9	3213.8
2	Arunachal Pradesh	40.3	24.9	24.9	33.0	33.0	33.0	27.8	13.9	13.9	5.9	3.0	-	174.4	129.4	129.4
3	Assam	399.6	399.6	399.6	440.0	218.9	206.5	483.5	267.7	175.7	188.2	94.1	-	2054.0	1554.8	1450.4
4	Bihar	724.0	700.2	687.4	527.7	254.3	246.6	564.6	545.7	403.2	222.4	111.2	-	3027.3	2739.2	2576.2
5	Chhattisgarh	581.1	571.2	570.9	407.6	233.8	231.7	385.4	341.8	327.3	157.2	78.6	-	2374.6	2169.4	2150.3
6	Goa*	62.4	35.3	35.0	21.9	10.4	0.0	25.6	0.0	0.0	8.3	0.0	-	191.9	79.3	68.6
7	Gujarat	586.9	610.9	610.9	557.0	476.9	476.9	593.6	290.0	100.2	216.4	108.2	-	3289.7	2961.3	2771.5
8	Haryana	199.5	179.9	179.6	318.6	159.3	158.2	372.0	254.7	152.5	134.5	67.3	-	1473.6	1171.3	1067.4
9	Himachal Pradesh	73.5	59.3	59.3	77.4	77.4	77.4	86.1	86.1	86.1	27.7	13.8	-	497.3	481.9	481.9
10	J &K	112.1	103.2	102.0	148.0	88.5	86.9	150.5	78.3	31.8	62.2	31.1	-	740.9	473.5	420.4
11	Jharkhand	241.6	219.4	216.2	294.2	147.1	103.5	306.9	153.2	29.5	119.8	59.9	-	1362.6	946.2	775.8
12	Karnataka	586.5	549.2	549.2	794.6	467.3	465.4	884.2	632.2	209.0	322.8	167.7	-	4043.7	3407.0	2982.0
13	Kerala	282.3	253.0	252.7	270.8	256.2	254.2	321.4	300.7	287.3	113.0	56.5	-	1473.2	1338.9	1322.7
14	Madhya Pradesh	448.1	448.1	448.1	545.2	276.3	276.3	547.6	511.8	352.7	196.0	98.0	-	3031.8	2688.8	2529.8
15	Maharashtra	1025.8	1050.8	1050.8	1154.9	959.7	959.7	1013.5	942.1	312.6	386.6	193.3	-	5394.0	5135.4	4505.9
16	Manipur	52.9	48.0	48.0	41.0	23.7	23.7	43.0	43.0	43.0	13.8	6.9	-	195.3	159.1	159.1
17	Meghalaya	105.3	22.7	22.7	60.9	38.0	38.0	68.8	60.6	34.2	24.3	0.0	-	341.0	225.7	199.2
18	Mizoram*	200.9	184.7	184.7	132.0	77.4	77.4	113.9	113.9	37.3	38.8	19.4	-	498.4	417.2	340.7
19	Nagaland	85.8	85.8	85.8	52.6	30.1	30.1	52.8	52.8	52.8	16.4	8.2	-	285.6	249.9	249.9
20	Orissa	503.1	468.3	468.3	508.4	529.4	529.4	504.1	482.1	369.8	201.1	100.6	-	2430.5	2387.4	2275.1
21	Punjab	146.9	86.8	86.8	448.2	229.4	229.4	508.7	413.7	156.1	168.3	84.1	-	1592.5	1221.8	964.2
22	Rajasthan	363.1	348.2	348.2	735.2	735.2	729.0	740.6	695.3	651.8	268.7	134.4	-	3587.9	3574.4	3524.6
23	Sikkim	29.5	15.2	15.2	20.2	10.2	10.2	19.0	9.5	8.0	4.3	0.0	-	124.7	89.8	88.4
24	Tamil Nadu	659.7	613.3	613.3	301.5	270.0	270.0	299.0	299.0	259.7	105.0	52.5	-	2275.4	2187.2	2147.5
25	Telangana	-	--	-	-	-	-	180.9	179.6	150.3	67.8	33.9	-	180.9	179.6	150.3
26	Tripura	56.4	56.4	56.4	74.3	70.5	70.5	80.3	80.3	24.2	27.1	13.6	-	415.8	400.8	344.8
27	Uttar Pradesh	432.3	294.5	294.5	746.7	561.1	525.5	704.9	589.5	439.7	248.0	124.0	-	4100.8	3714.7	3529.3
28	Uttarakhand	44.4	8.2	8.2	88.0	44.0	44.0	95.4	80.7	47.6	33.9	17.0	-	484.7	373.1	340.0
29	West Bengal	464.8	374.6	374.6	508.1	265.1	265.1	598.6	582.3	475.2	236.1	75.3	-	2880.0	2394.3	2287.2
	Total States	**9110.7**	**8389.4**	**8371.0**	**9864.0**	**7000.0**	**6875.2**	**9864.0**	**8363.9**	**5475.9**	3707.2	**1798.7**	-	51712.6	46084.3	43046.0
	Total UTs												-	75.5	12.3	6.5
	DAP				72.6								-	133.4	0.9	0.9
	Ad.Cont.#	106.6	10.6	0.0	90.0	52.5	52.5	0.0	0.0	0.0			-	338.2	128.5	56.5
	Grand Total	**9217.3**	**8400.0**	**8371.0**	**9954.0**	**7052.5**	**6927.7**	**10039.6**	**8363.9**	**5475.9**	**3707.2**	1798.7	-	52362.6	46226.1	43109.9

Note: - Not Available.
Source: http://agricoop.nic.in

Fig. 1.2 :State-wise Allocation, Release, Expenditure of the States under RKVY- Total during 2007-08 to 2011-12

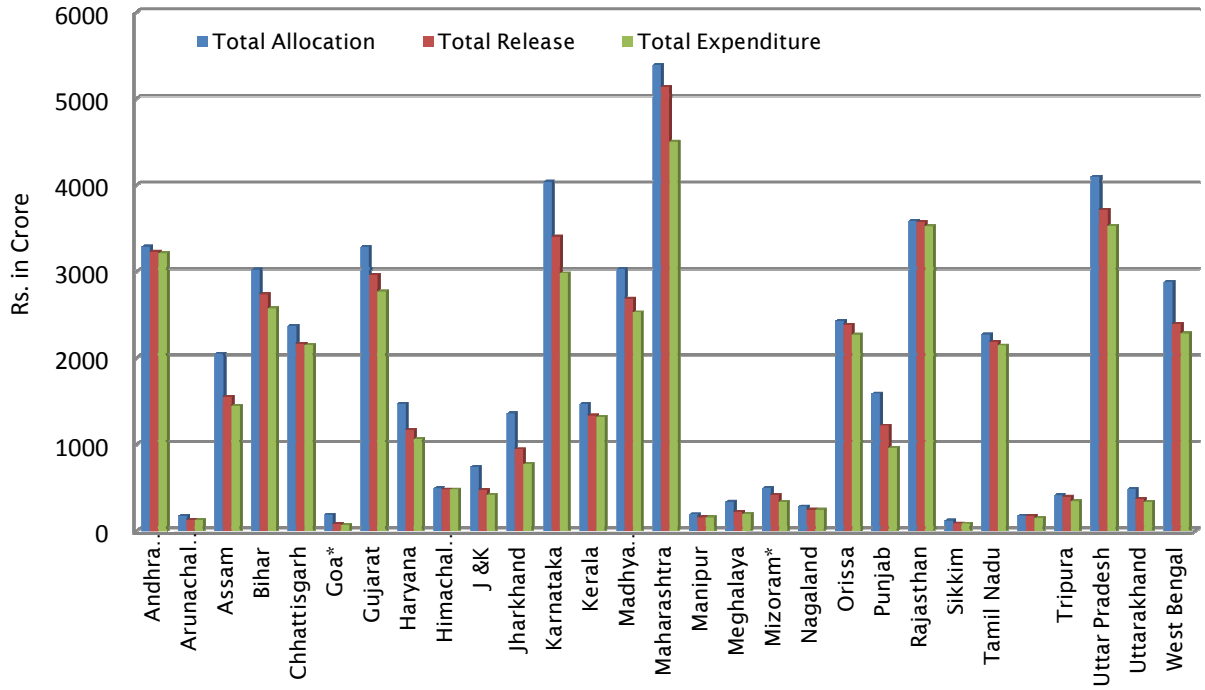
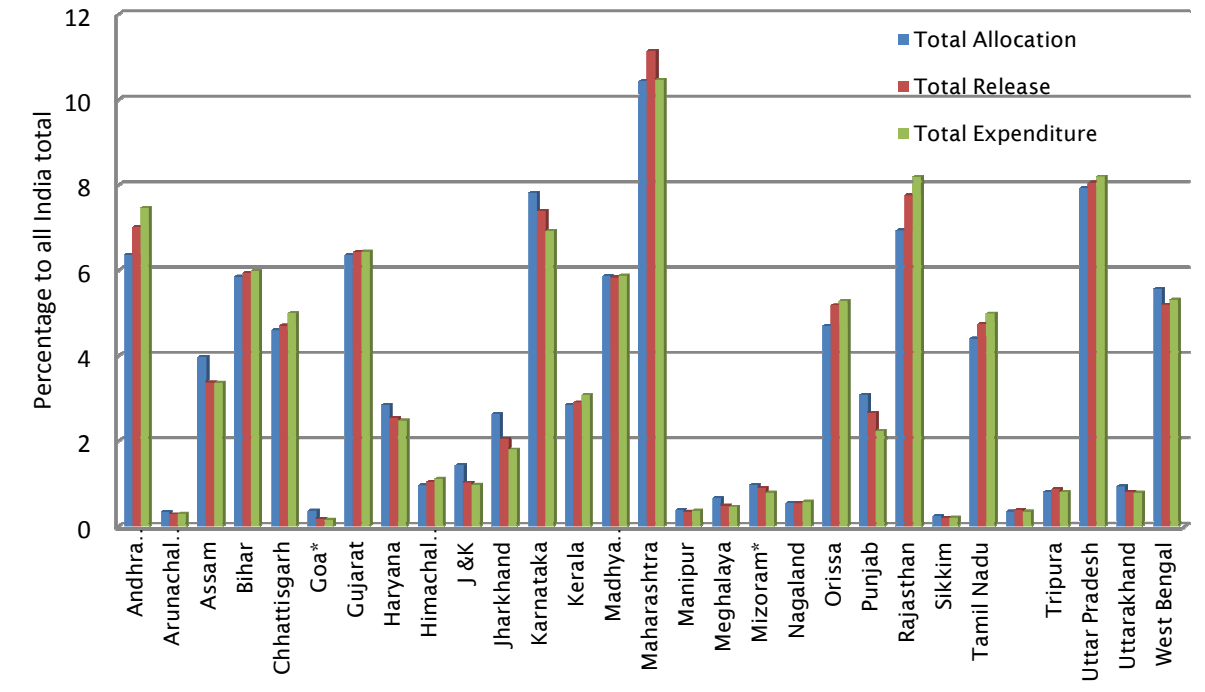


Fig. 1.3 :State-wise share in total Allocation, total Release, total Expenditure of the States under RKVY during 2012-13 to 2014-15



1.6 Growth in Indian Agricultural Sector:

The Eleventh Plan addresses itself to the challenge of making growth both faster and more inclusive. The target of doubling the rate of growth of agriculture to 4 per cent in the Eleventh Plan is critical for achieving greater inclusiveness (Planning Commission, 2008a). The deceleration in agriculture, which began in the Ninth Plan period and continued in the Tenth Plan period, has been a major area of concern from the point of view of inclusiveness. With half our population deriving the greater part of their income from agriculture, faster growth in agriculture is necessary to augment their incomes. Rising incomes in agriculture will also boost non-agricultural income in rural areas, thus helping redress the rural–urban imbalance. The Eleventh Plan has therefore set a sectoral target of doubling agricultural growth to 4 per cent per year. In this context, it may be noted that agricultural growth increased from less than 1 per cent in the first three years of the Tenth Plan to average more than 4 per cent in the last two years of tenth five year plan and maintained it during first year of the Eleventh Plan also. However, poor monsoons during 2009-10 have a setback to the agricultural sector. Thus in order to sustain a growth rate of 4 per cent per annum, priority on irrigation and watershed has to be given.

As per the estimates of GDP for 2005-06 to 2013-14, released by the Central Statistical Organisation (CSO), the economy was grown at the rate of 4.74 per cent in 2013-14, with the industrial sector growing abysmally low by 0.35 per cent while service sector would grow by 7.00 percent. Despite of decline in rate of growth in agriculture during 2012-13, this sector registered robust growth during 2013-14 (Table 1.6). The exception, as anticipated, is agriculture and allied sectors where the growth rate was estimated to be minus 0.27 per cent in 2008-09 over 2007-08. In terms of sectoral shares, the share of agriculture and allied sectors in GDP at factor cost has declined gradually from 19.03 per cent in 2004-05 to 13.94 per cent in 2013-14 (at 2004-05 prices). During the same period, the share of industry has remained between 26- 28 per cent, while that of services has gone up from 53.3 per cent in 2004-05 to 59.93 per cent in 2013-14. Therefore, for growth to be all inclusive, the agricultural strategy must focus on 85 per cent of small and marginal farmers

who are increasingly female, and who find it difficult to access inputs, credit, and extension services or to market their output. While some of these farmers may ultimately exit from farming, the overwhelming majority will continue to remain in the sector and the objective of inclusiveness requires that their needs are attended to. The negative growth in agriculture during the year 2008-09 and less than 0.5 percent during 2009-10 was due to severe drought in several parts of the country. The country as a whole received 23 per cent less rainfall as compared to the long period average in 2009. Despite low rate of growth in agriculture, investment in the agricultural sector increased significantly. While the overall growth of investment in India was in the range of 15 to 16 per cent per annum during the last few years, it plunged to - 2.4 per cent in 2008-09 as a result of the external shock-led slowdown. However, there was a welcome rebound in the growth rate of investment in the agricultural sector, which grew at 16.5 per cent and 26.0 per cent in 2007-08 and 2008-09 respectively. This is in contrast to the growth rate of 1.4 per cent recorded in 2006-07. Despite rise in investment, agriculture and allied sector showed poor performance, while growth rate in the first year of eleventh five year plan was impressive, the same could not be sustained in 2008-09 and 2009-10 due to poor monsoon. Opposite to recorded earlier, first year of 12th FYP period was with slower rate of growth in agriculture sector, while second year 2013-14 recovered the decline in rate of growth.

Table 1.6: Sector-wise Rate of Growth at Factor Cost in India (at 2004-2005 prices) (%)

Sector	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Agriculture and Allied services	**5.14**	**4.16**	**5.80**	**0.09**	**0.81**	**8.60**	**5.02**	**1.42**	**4.71**
Agriculture	5.53	4.13	6.34	-0.27	0.41	9.54	5.34	0.91	4.93
Industry	9.72	12.17	9.67	4.44	9.16	7.55	7.81	0.96	0.35
Mining and Quarrying	1.31	7.47	3.69	2.14	5.89	6.54	0.10	-2.16	-1.38
Manufacturing	10.10	14.32	10.28	4.33	11.30	8.86	7.41	1.14	-0.71
Services	10.91	10.06	10.27	9.98	10.50	9.67	6.57	6.96	7.00
GDP	9.48	9.57	9.32	6.72	8.59	8.91	6.69	4.47	4.74

Source: http://planningcommission.nic.in/data/datatable/0814/comp_databook.pdf

1.7 Main Objectives and Scope of the Study

The RKVY is extended to 12th Five Year Plan due to its success in achieving the targeted goal of production enhancement. It is essential to evaluate and measure the extent to which the programme and approach has stood up to the expectations. The study enlightens the policy makers to incorporate necessary corrections to make the programme more effective and successful during and after the 12th Five Year Plan. Given the above broad objectives, the study intends to achieve the following specific objectives listed below:

1) To assess the impact of RKVY on input use, production, income and employment among the beneficiary farmers in Gujarat;
2) To identify factors influencing the adoption of major interventions (improved technologies) under RKVY and
3) To identify the constraints hindering the performance of this programme in Gujarat.

The results of the study will provide useful insights on the impacts of the RKVY on farming communities and can suggest policy recommendations for improving the efficacy of the program. It is also expected that this study will provide valuable insights into various factors influencing the decision of the farmers on adoption of recommended package of good agricultural practices for increasing production and productivity of selected crops. This may help the policy planning authorities to consider making suitable changes in the development and implementation of policy on promotion of agriculture sector in general and the identified crops in particular, in the country.

1.8 Data and Methodology

The study is based on secondary and primary level data. The secondary data on fund allocation, release, expenditure and related parameters were collected from the RKVY website (*http://rkvy.nic.in*) and other publications of Ministry of Agriculture, Government of India.

The primary survey data were obtained from 449 selected sample beneficiary farmer households from eight RKVY districts of the Gujarat State (as shown in Table 1.7) mostly focused on the following heads:

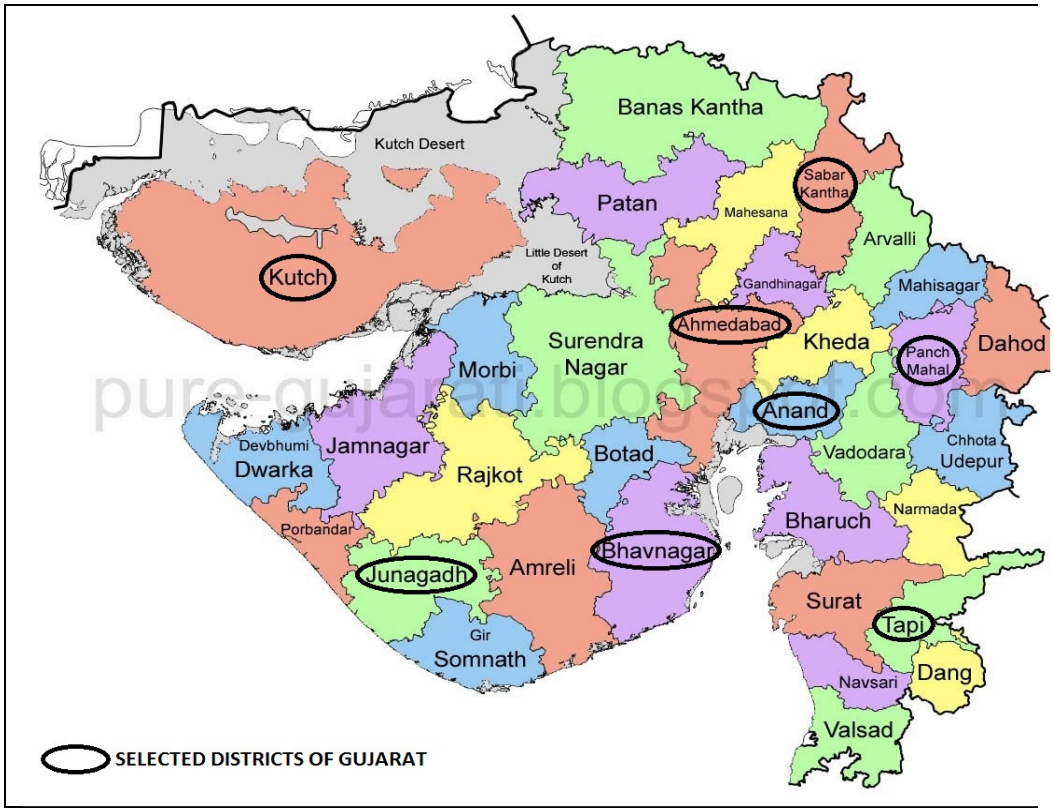
- Agriculture Mechanization
- Micro/Minor Irrigation
- Animal Husbandry
- Natural Resource Management
- Fisheries
- Organic Farming / Bio Fertilizers
- Crop Development
- Sericulture
- Horticulture
- Co-operatives/ Co-operation
- Integrated Pest Management
- Information Technology
- Other Sector (if any)

For the selection of beneficiary farmer household, a multi-stage sampling design was employed. At the first stage, eight districts were selected based on the information provided by the nodal officer of RKVY in the state. The Department of Agriculture has been nominated as the nodal department for coordinating the RKVY activities and one project director has been looking after the work of RKVY in the state. At the first stage, with discussion with the project director of RKVY in Gujarat state, on the basis of performance of district, eight RKVY districts in Gujarat were selected for primary data collection (Map 1.1).

At the second stage, two talukas from each selected district were selected based on the intensity of activities carried out across different components/line departments as per the information provided by the nodal officer. At the third stage, a group of contiguous villages or cluster of villages was selected from each taluka to collect the data from

minimum 25 farmer beneficiary households. For the selection of households, a beneficiary list of the households was obtained from the nodal officer and/or the concerned departments who carried out different activities under the RKVY. Due consideration was given while selecting farmer beneficiary households, for proper representation of all major and minor sectors and type of investment made in developing infrastructure on irrigation, soil conservation, organic farming, horticulture and other related activities. Giving representation to different size classes and various socio-economic characteristics was also tried while selecting the beneficiary sample farmers.

Map 1.1: Study Area in Gujarat



The primary data relating to general information about the sample farmers, socio-economic profiles, cropping pattern, details on various inputs used, irrigation details, yield, returns, reasons for adoption/non-adoption of RKVY interventions, constrains faced for availing the benefits, suggestions for improvement, etc., were collected from 449 sample beneficiary farmers using a pre-tested questionnaire, while after scrutiny of data, 422 sample

beneficiary households responses were considered for detailed analysis. The primary household data was collected (in January-March 2014) mainly pertaining to the eleventh five year plan period (2007-08 to 2011-12) and general information was collected for the agriculture year 2012-13.

Table 1.7: List of Selected Villages/Talukas/Districts in RKVY in Gujarat State

Sr. No	Selected Districts	Selected Talukas/ Blocks		Selected Villages
1	Ahmedabad	1	Dholka (4)	Chaloda, Ambaliyara, Badarkha, Utteliya
		2	Viramgam (4)	Jetapur, Vaani, Vasan, Vansava
2	Anand	3	Anand (8)	Gana, Vanskhiliya, Jitodia, Sandesar, Meghva, Mogari, Navali, Ode
		4	Khambhat (12)	Vatadara, Mitali, Golana, Jalsan, Piploi, Neja, Nagra, Jalundh, Kanisha, Feenav, Bhaattalavadi, Rangpur
3	Bhavnagar	5	Botad (4)	Jhamrada, Laathidad, Patti, Kariyani
		6	Mahuva (3)	Bagdana, Jesar, Monpur
4	Junagadh	7	Talala (6)	Dhaned, Ghabha, Ghunisya, Maaljinjva, Samarvav, Umrethi
		8	Junagadh (3)	Jalansar, Makhiyala, Vadal
5	Panchmahal	9	Kalol (3)	Derol, Sureli, Varvada
		10	Lunawada (4)	Dalwaisavali, Kankachiya, Khodaamba, Pattan
6	Sabarkantha	11	Prantij (5)	Ambawada, Jinjhava, Mahadevpura, Pongalu, Vadrad
		12	Khedbrahma (5)	Vartol, Didhiya, Lakshmipura, Galodiya, Karunda
7	Tapi	13	Valod (6)	Baazipura, Hathuka, Degama, Ambach, Sayadala, Mordevi
		14	Songadh (5)	Doswada, Jaamkhedi, Kanala, Junvaan, Chorwad
8	Kutch	15	Mandvi (4)	Bheraiya, Koday, Sheradi, Vaandh
		16	Bhachau (4)	Sukhpur, Gunatitpur, Chhobbari, Kakrava

Note: Figures in parenthesis indicates no. of selected villages in selected taluka of selected district.

The data were also collected from the various institutions those who had received grants under RKVY scheme during eleventh five year plan period (Table 1.8).

Table 1.8: No. of Institutions responded on RKVY fund &its utilization: Gujarat

Sr. No.	Name of the Institution- Gujarat
1	Anand Agricultural University, Anand
2	AMUL, Anand
3	Gujarat State Seed Certification Agency (GSSCA)
4	Gujarat State Agricultural Marketing Board (GSAMB)
5	Junagarh Agricultural University, Junagarh
6	Gujarat Cotton Federation
7	Office of the Dy. Conservator of Forests
	Total

1.9 Organization of Report:

The entire report is organized into nine chapters. Chapter I, which is an introduction, explains briefly the need for Rashtriya Krishi Vikas Yojana. The methodology and the organization of the report are also indicated. Chapter II presents the overview of State of Agriculture in Gujarat state. Allocation and Expenditure of RKVY funds during XI plan period are discussed in Chapter III. The socio-economic profile of selected households is presented in Chapter IV. Chapter V discusses about the RKVY interventions in major sectors and their impact, while impact of RKVY interventions on minor sector is discussed in Chapter VI. Chapter VII presents the details on other achievements and constraints faced in RKVY. Chapter VIII presents information on infrastructure projects undertaken by various Institutions with RKVY funds. Conclusions and policy implications are presented in Chapter IX.

Chapter II

State of Agriculture in Gujarat

2.1 Introduction

Gujarat is the one of the fastest growing states of India. The state has adopted a novel pattern of progress with the strategic development of the key sectors like energy, industry and agriculture for which it has achieved ambitious double digit growth rate since 10th Five Year Plan period. The state constitutes about 6.2 per cent of total geographical area and 4.99 per cent of total population of India. As per Census 2011, about 3.47 crores people of the state live in rural areas forming about 57.4 per cent of its total population (GOI, 2011). About 70.5 per cent of total workers in the state are rural based. Agriculture continues to be the primary occupation for the majority of rural people in the state. About 51.8 per cent of total workers are cultivators and agricultural labourers. Thus, the agriculture in the state has been a major source of labour absorption. Moreover, agriculture provides indirect employment to large portion of population in agro-based occupations. Thus, prosperity and well being of people in Gujarat is closely linked with agriculture and allied activities. The State is divided into 7 sub agro-climatic zones based on the characteristics of their agriculture and climate. The State is endowed with abundant natural resources in terms of varied soil, climatic conditions and diversified cropping pattern suitable for agricultural activities.

Agriculture in Gujarat is characterized by natural disparities such as (i) drought prone areas and lowest annual rainfall amounting to only about 345 mm at the North West end of the states; and assured and highest annual rainfall amounting to about 2500 mm at the South-East end; (ii) well drained deep fertile soils of central Gujarat and shallow and undulating soils with poor fertility in hilly rocky areas in the east; (iii) moisture starved degraded areas and low lying waterlogged and saline areas; (iv) areas prone

to frequent scarcity and areas prone to frequent cyclone or floods or locusts (GOG, 2012a). Thus, output of agricultural sector in Gujarat has been largely dependent on south-west monsoon. The state frequently experiences erratic behaviour of the south-west monsoon, which can partly be attributed to geographic situation.

Out of total reporting area of 18.8 million hectares, 59.2 percent area (11.4 million hectares) is covered under cultivation. About two-third of the area of the state is under arid and semi-arid tropics, where the risk and instability in agricultural production and productivity usually remain quite high. However, these arid and semi-arid areas of the state have clocked high and steady growth at 9.6 per cent per year in agricultural state domestic product since 1999-2000, whereas the GDP from agriculture and allied sectors has increased by less than 3 per cent at national level (2.9 percent) during the same period. The Gujarat government has aggressively pursued an innovative agriculture development programme by liberalizing markets, inviting private capital, reinventing agricultural extension, improving roads and other infrastructure (Shah *et al.*, 2009; Kumar *et al.*, 2010). The mass-based water harvesting and farm power reforms in dry Saurashtra and Kachchh, and North Gujarat have helped energize Gujarat's agriculture. These semi-arid regions have outperformed the canal irrigated South and Central Gujarat.

In this context, this chapter presents the overall performance of agriculture in the State of Gujarat in the recent years and also highlights what could be the future options, given our objectives of accelerated growth, inclusiveness and reduction of poverty.

2.2 Population: Urban, Rural, Cultivators, Agricultural Labour

As per the Census 2011, total population of Gujarat was 6.04 crores, out of which rural and urban population were 57.4 per cent (3.47 crores) and 42.6 per cent (2.57 crores) respectively. The decadal growth rate of the population in the state during 2001-2011 was 19.17 per cent as compared

to 17.64 percent at all India level. The population in rural and urban areas has increased at the rate of 9.23 per cent and 35.83 per cent respectively during the last decade period. The population density in the state has increased by about 18.2 percent (i.e., increased from 258 per sq.km in 2001 to 308 in 2011). The overall sex-ratio of the population in Gujarat (in terms of number of females per thousand males) was lower (918) as compared to all India average (940). The overall literacy rate in the state was 79.3 per cent, whereas male and female literacy rates were estimated to be 87.2 per cent and 70.7 per cent respectively.

Table 2.1: Composition of Total Population in Gujarat (2011)

Sl. No.	T/R/U	Persons		% of Total workers	Males	Females
			No. of cultivators			
1	Total	4,746,956	(100.0)	7.9	4,075,047	671,909
2	Rural	4,571,337	(96.3)	14.5	3,919,258	652,079
3	Urban	175,619	(3.7)	0.6	155,789	19,830
			No. of agricultural labourers			
4	Total	4,491,751	(100.0)	7.4	3,008,961	1,482,790
5	Rural	4,207,186	(93.7)	13.4	2,799,674	1,407,512
6	Urban	284,565	(6.3)	1.0	209,287	75,278
			Total workers			
7	Total	24767747	(100.0)	41.0	18000914	6766833
8	Rural	15570092	(62.9)	49.4	10171584	5398508
9	Urban	9197655	(37.1)	31.8	7829330	1368325
			Total Population			
10	Total	60,439,692	(100.0)	100.0	34,694,609	25,745,083
11	Rural	31,491,260	(52.1)	100.0	17,799,159	13,692,101
12	Urban	28,948,432	(47.9)	100.0	16,895,450	12,052,982

Notes: T, R and U stands for Total, Rural and Urban respectively;
Figures in parentheses are percentages of total population in respective category.

Source: Census of India, GOI 2011.

It can be seen from Table 2.1 that during the year 2011, there were about 47.5 lakhs of cultivators in the state, constituting about 19.2 per cent of total workers. The proportion of cultivators in total workers has sharply

declined from 27.3 per cent in 2001 to 19.2 per cent in 2011 (Swain et al, 2012). Similarly, among the total cultivators, the proportion of female workers has dropped from about 32.7 percent (19.0 lakhs) in 2001 to 14.2 per cent (6.7 lakhs) in 2011. On the other hand, the share of female workers in total agricultural labourers has declined from 51.4 percent in 2001 to 33.0 per cent in 2011. Thus, a clear and significant level of decline in participation in agricultural labour force has been observed over last decade.

2.3 State Domestic Product and Per Capita Income

The Gujarat economy has exhibited a healthy growth path during the recent years. The state's NSDP at current prices has been more than tripled during 2005-06 to 2010-11. It has increased from Rs 206440 crores in 2005-06 to Rs 651916 crores in 2013-14. This has made Gujarat as one of the India's fastest growing States in terms of growth in NSDP. The State's NSDP at constant (2004-05) prices has also increased from Rs 197270 crores in 2005-06 to Rs 315892 crores in 2010-11 and further to Rs 385472 crores in 2013-14 (Table 2.2). Total NSDP at constant prices has grown by 95.4 per cent during the period 2005-06 to 2013-14; whereas the total NSDP at current prices has grown by 215.8 per cent during the corresponding period.

The economic growth rate (at constant prices) has fluctuated widely across last decade. It has gone down to 4.3 per cent in 2008-09 from 14.5 per cent in 2005-06, but then recovered sharply to 14.1 per cent in 2009-10. However, it has exhibited declining trend thereafter reaching 5.8 per cent during 2012-13. The per capita income (NSDP) of the state (at constant prices 2004-05) has increased by around 75 per cent in 2013-14 over 2005-06, i.e. increased from Rs 36102 in 2005-06 to Rs 63168 in 2013-14.

Table 2.2: Sectoral Composition of Net State Domestic Product (NSDP) at constant (2004-05) prices

(Rupees in Crore)

Year	Agriculture		Industries		Services	Total NSDP	Economic Growth Rate (%)	Per Capita Income (Rs)
	Agriculture including animal husbandry	Total primary sector	Manufa-cturing	Total Industries sector				
2005-06	31896	43702	46822	63011	90557	197270	14.5	36102
	(16.2)	(22.2)	(23.7)	(31.9)	(45.9)	(100.0)		
2006-07	31372	43256	52472	69900	100798	213954	8.5	38568
	(14.7)	(20.2)	(24.5)	(32.7)	(47.1)	(100.0)		
2007-08	34750	46581	56893	79475	113197	239253	11.8	42498
	(14.5)	(19.5)	(23.8)	(33.2)	(47.3)	(100.0)		
2008-09	30683	42085	58361	85090	122305	249480	4.3	43685
	(12.3)	(16.9)	(23.4)	(34.1)	(49.0)	(100.0)		
2009-10	29339	40865	77706	108430	135437	284732	14.1	49168
	(10.3)	(14.4)	(27.3)	(38.1)	(47.6)	(100.0)		
2010-11	37769	49680	78321	111614	154598	315892	10.9	53813
	(12.0)	(15.7)	(24.8)	(35.3)	(48.9)	(100.0)		
2011-12 (P)	41779	53547	79554	116487	166853	336886	6.6	56634
	(12.4)	(15.9)	(23.6)	(34.6)	(49.5)	(100.0)		
2012-13 (P)	36566	48309	83332	123930	184239	356477	5.8	59157
	(10.3)	(13.6)	(23.4)	(34.8)	(51.7)	(100.0)		
2013-14 (Q)	44505	56671	84042	128672	200129	385472	8.1	63168
	(11.5)	(14.7)	(21.8)	(33.4)	(51.9)	(100.0)		

Notes: The figures shown in brackets denote percentage of NSDP; P- Provisional Estimates, Q- Quick Estimates.
Source: GOG (2012b)

2.4 Gujarat Agriculture: Performance and Challenges

Agriculture and allied sector plays an important role in the State economy. Though its contribution in NSDP has gradually declined from around 50 per cent during 1970s to around 14.7 per cent in 2013-14, agriculture still considered as a backbone of state economy. More than half of the working population in the state is still dependent on agricultural activities for their livelihood. Thus, a higher priority to agriculture will achieve the goals of reducing poverty and malnutrition as well as of inclusive growth. Since agriculture forms the resource base for a number of agro-based industries and agro-services, it would be more meaningful to

view agriculture not as farming alone but as a holistic value chain, which includes farming, wholesaling, warehousing, processing, and retailing. Agriculture which forms the source of livelihood of the majority in the State is largely dependent on rainfall. Since the rainfall amount is highly erratic that varies widely across the different parts of the State, the expansion of irrigation provisions and efficient water management can further strengthen the agriculture sector in the State.

Though Gujarat agriculture has been performing smartly since 2000s, there are many challenges to overcome so as to facilitate a sustainable development of agriculture in the state. As highlighted by Pathak and Singh (2007), major challenges and tasks for the agriculture sector in Gujarat are: (i) to increase the share of agriculture and allied sectors in total state income; (ii) to increase the public investment in agriculture; (iii) increasing irrigation acreage in rainfed areas through developing micro-level water resources such as check dams, village tanks, farm ponds and recharging of wells under various water conservation programmes; (iv) further increase in irrigation efficiency through more use of micro irrigation systems such as drip and sprinkler;(v) further development in dairy sector; (vi) marketing reforms with contract farming alternatives; (vii) revitalizing the agricultural extension system and (viii) further growth in exports of value added agri-products.

Furthermore, the challenges of climate change and global warming, deteriorating soil health including imbalanced use of fertilizers, micronutrient deficiency, lack of organic matter content, low productivity, unfavorable prices and practically very little value addition, distress sales, rising cost of cultivation, adherence to sanitation and phyto-sanitation (SPS) standards and measures for minimizing the export rejections are some of the other challenging areas to be addressed for further development of agriculture sector in Gujarat.

2.4.1 Structure & Structural Transformation of Gujarat Agriculture

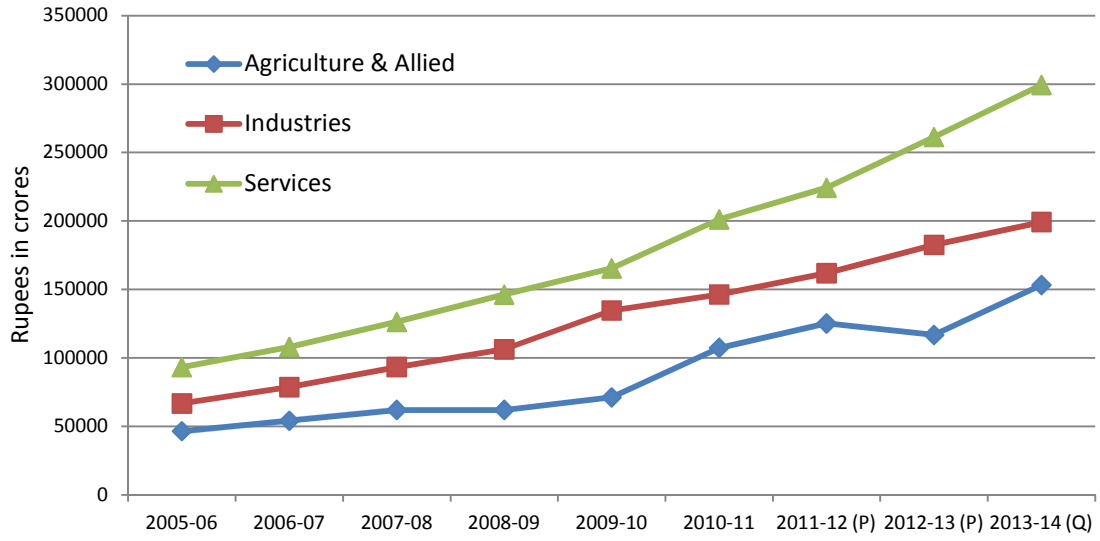
Gujarat economy has undergone considerable transformation in the recent past. While manufacturing and service sectors are growing positively, whereas share of agriculture (including livestock) in the state's NSDP is declining. The services sector contributes around 51.9 per cent in NSDP (at constant 2004-05 prices) followed by the industry (33.4 per cent), whereas agriculture sector contributes hardly 14.7 per cent during the year 2013-14 (see, Table 2.2). During last nine years (2005-06 to 2013-14), the share of agriculture, industry and services sectors in the total NSDP at constant (2004-05) prices has changed from 22.2 per cent to 14.7 per cent, from 31.9 per cent to 33.4 per cent and 45.9 per cent to 51.9 per cent, respectively. Thus, there has been significant reduction in relative share of the agriculture sector in total NSDP, while the contribution of service sector has been constantly increasing during the corresponding period. This indicates a shift from the traditional agrarian economy towards a service dominated one. More importantly, the decrease in agriculture's contribution to NSDP has not been accompanied by a matching reduction in the share of agriculture in employment. About 11 million workers continue to be engaged in farming, out of which majority are small or marginal farmers. Therefore, increasing agricultural productivity (water, land, labour) is critical for the future of the sector in Gujarat.

Though the relative share of agriculture and allied sectors to NSDP has declined significantly, it may be noted from Figure 2.1 that the absolute contribution of agriculture and allied sector has constantly grown. Agricultural NSDP at current prices has been more than tripled (from Rs. 46505 crore in 2005-06 to Rs. 153275 crore in 2013-14).

The analysis on change in cropping pattern in Gujarat reveals that share of area under cotton and wheat crop to total gross cropped area has significantly increased during last two decades. The increase in area under horticultural crops has also contributed considerably towards the change in cropping pattern of the state. The state occupied 4th, 6th and 3rd position at all India level in the production of fruit, vegetable and spices, respectively

(GOG, 2010b). The area under horticultural crops in the state has increased to 14.04 lakh hectares constituting about 10.6 per cent of GCA (Table 6).

Figure 2.1: Sectoral Composition of NSDP at Current Price in Gujarat (2005-06 to 2013-14)



Gujarat is the India's largest producer of cotton, castor, cumin and isabgul. The state is the second largest producer of sesame and groundnut in the country. The agricultural productivity of some crops in the state is highest in India as well as in the World. The productivity of mustard, castor, cotton, onion and potato is highest in the state compared to other states in India. The productivity of groundnut, bajra and banana is the second highest in India. The reliance on livestock has also increased because of risky rainfed agriculture in some parts of the state.

2.4.2 Overall Growth Performance of Agriculture

The growth performance of the agriculture in Gujarat has been fluctuating across the plan periods (Table 2.3). The compound annual growth rate of gross cropped area, total agricultural production and yield has exhibited wide fluctuations during Annual Plan 1990-91 to 11th Five Year Plan. The crop area, yield and production have decelerated drastically during

the annual plan period (1990-91), as well as during the 9th plan period. However, during 10th Five Year Plan period, there has been a significant growth in area, yield and production, which has increased significantly at the rate of 5.3 per cent, 20.5 per cent and 14.5 per cent, respectively. Despite of efforts being taken by the government to achieve 4 percent rate of growth during XI FYP, the rate of growth in crop productivity was meager. The crop yield has increased at the rate of 0.42 per cent per annum, whereas area has increased at the rate of 2.24 percent per annum. The gross cropped area has increased from 115.0 lakh hectares in 2005-06 to 130.9 lakh hectares in 2012-13 (Table 2.4). The pattern and extent of fluctuation in agricultural production and productivity was quite similar as evident from Figure 2.2.

Table 2.3: Plan wise Growth in Area, Production and Yield of Major Crops in Gujarat

(Per cent per annum)

Plan Period	Area	Production	Yield
Annual Plan (1991-1992)	-0.65	-17.05	-16.51
8th Five Year Plan (1992-1997)	-0.06	3.73	3.79
9th Five year Plan (1997-2002)	-3.00	-5.74	-2.82
10th Five year Plan (2002-2007)	5.27	20.54	14.50
11th Five year Plan (2007-2012)	2.90	3.33	0.42

Source: GOG (2011a).

If we look at the growth in gross cropped area during the last two decades (1991 to 2011) in the state, it can be seen from Table 2.4 that the gross cropped area was almost stagnant during first decade (1990-91 to 2000-01), whereas it has increased significantly during second decade (2000-01 to 2010-11). The similar pattern has been noticed in case of crop production in the state. The agricultural production has declined from about 10.5 million tonnes (mt) in 1990-91 to 7.5 mt in 2000-01, whereas it has increased significantly to 28.0 mt in 2010-11. The growth in production was mainly due to both, growth in productivity associated by increase in area

under the crop production. The crop yield which had registered negative growth during 1990-91 to 2000-01 (declined from 1167 kg/ha in 1990-91 to 968 kg/ha in 2000-01), increased significantly during last decade period to about 2535 kg/ha in 2010-11. Afterwards, there has been slight decline in yield of major crops to 2049 kg/ha in 2013-14.

Considering the case of food grains production alone, the annual growth is exhibiting quite fluctuating trend. It can be seen from the Table 2.5 that the food grains production in Gujarat has increased from 4.98 mt in 1990-91 to 10.1 mt in 2010-11, thereafter declined to 6.98 mt in 2012-13. The share of the state in total national food grains production has grown from 2.8 per cent in 1990-91 to 4.2 per cent in 2010-11, and has declined thereafter to 2.7 per cent in 2012-13.

Figure 2.2: Growth in Area , Production and Yield of all Major Crops (1990-91 to 2012-13)

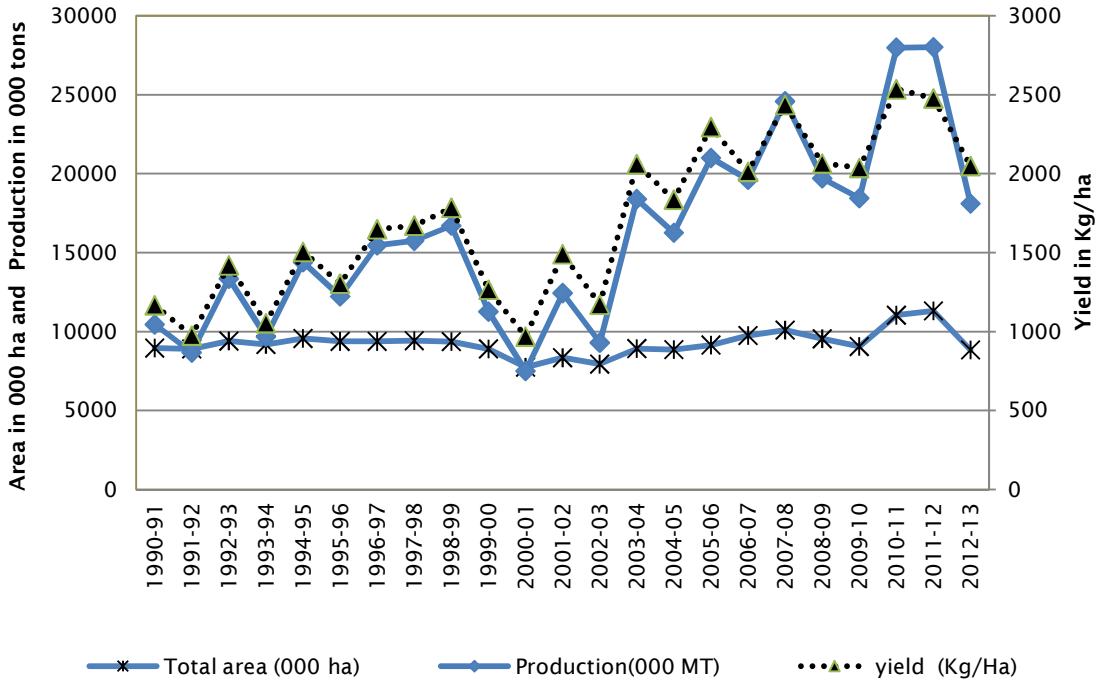


Table 2.4: Area, Yield and Production of Major Crops in Gujarat during 1991-2010

Year	Gross cropped area (000 ha)	All Major Crops		
		Area (000 ha)	Production (000 MT)	Yield (Kg/ha)
1990-91	10635	8956	10453	1167
1995-96	10996	9376	12223	1304
2000-01	10497	7745	7500	968
2005-06	11495	9148	20999	2296
2006-07	11807	9748	19617	2012
2007-08	12110	10092	24582	2436
2008-09	11571	9544	19710	2065
2009-10	11138	9057	18447	2037
2010-11	12247	11038	27984	2535
2011-12	13093	11313	28019	2477
2012-13	NA	8835	18104	2049

Source : GOG (2011a); GOG (2013)

Table 2.5: Food grains Production in Gujarat and India

(million tonnes)

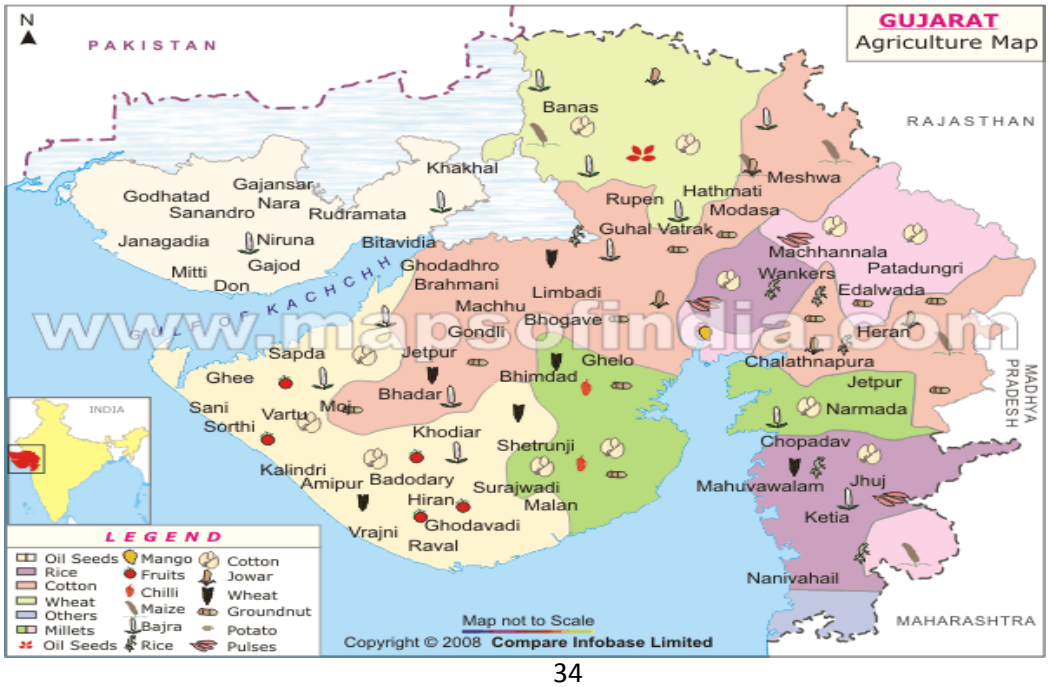
Year	Gujarat	India	% share
1990-91	4.98	176.4	2.8
2000-01	2.54	196.8	1.3
2006-07	5.88	217.3	2.7
2007-08	8.21	230.8	3.6
2008-09	6.35	234.4	2.7
2009-10	5.61	218.1	2.6
2010-11	10.07	241.6	4.2
2011-12	9.26	259.3	3.6
2012-13	6.98	257.1	2.7

Source: GOG (2013) and GOI (2013).

2.4.3 Crop Specific Growth in Gujarat

The major crops grown in different parts of Gujarat are bajra, wheat, jowar, maize, cotton, groundnut, castor, rapeseed mustard, fodder and horticultural crops (Map 2.1). As per the cropping pattern in Gujarat, total cereals, pulses, oilseeds, horticultural crops and fodder crop groups account for about 30.2 per cent, 6.7 per cent, 23.4 per cent, 10.6 per cent and 8.4 per cent of GCA, respectively in 2010-11 (Table 2.6). Among the cereals, wheat (11.9%), bajra (6.6%), rice (6.1%) and maize (4.3%) are the major crops. Among the oilseeds, groundnut (14.4%), caster (3.7%), rapeseed mustard (1.7%), sesamum (1.9%) are the major crops grown during 2010-11. Overall, the share of total cereals, total pulses, total food grains and total oilseeds in GCA has declined during last two decades; whereas the share of commercial crops such as cotton and horticultural crops has increased. Though the area under total cereals has decreased from 35.7 per cent (to GCA) in 1990-91 to 30.2 per cent in 2010-11, the share of wheat and maize in GCA has increased respectively from 5.7 per cent and 3.4 per cent in 1990-91 to 11.9 per cent and 4.3 per cent in 2010-11. However, the share of bajra crop has been considerably declined from 13.1 per cent to 6.6 per cent during the corresponding period.

Map 2.1: Agriculture Map of Gujarat



The share of pulses has declined slightly from 8.9 per cent in 1990-91 to 6.7 per cent in 2010-11. In case of oilseed crops, its share in GCA has also declined from 26.5 per cent in 1990-91 to 23.4 per cent in 2010-11. The share of fodder crops has also declined from 12.5 per cent of GCA during 1990-91 to 8.4 per cent in 2010-11.

Table 2.6: Change in Cropping Pattern in Gujarat

Major crops	1990-91		2000-01		2010-11	
	Area (000' ha)	% of GCA	Area (000' ha)	% of GCA	Area (000' ha)	% of GCA
Rice	623.0	(5.9)	583.5	(5.6)	808.0	(6.1)
Bajra	1394.3	(13.1)	989.2	(9.4)	873.0	(6.6)
Wheat	608.7	(5.7)	286.1	(2.7)	1589.0	(11.9)
Maize	366.2	(3.4)	382.9	(3.6)	566.0	(4.3)
Total cereals	3799.8	(35.7)	2435.6	(23.2)	4014.4	(30.2)
Tur	428.9	(4.0)	317.9	(3.0)	277.0	(2.1)
Total pulses	948.7	(8.9)	634.6	(6.0)	890.1	(6.7)
Total food grains	4748.5	(44.7)	3070.2	(29.2)	4904.5	(36.9)
Sesamum	237.0	(2.2)	356.9	(3.4)	251.1	(1.9)
Groundnut	1826.1	(17.2)	1744.8	(16.6)	1922.0	(14.4)
Rapeseed-mustard	348.6	(3.3)	186.6	(1.8)	222.7	(1.7)
Castor	384.9	(3.6)	458.6	(4.4)	490.6	(3.7)
Total oilseeds	2818	(26.5)	2746.9	(26.2)	3110.0	(23.4)
Cotton	1041.6	(9.8)	1615.4	(15.4)	2623.0	(19.7)
Tobacco	141.6	(1.3)	87.8	(0.8)	148.0	(1.1)
Horticultural crops	337.4	(3.2)	593.34	(5.7)	1404.0	(10.6)
Fodder crops	1325.1	(12.5)	1371.1	(13.1)	1111.8	(8.4)
Other crops	222.6	(2.1)	1012.3	(9.6)	0.0	(0.0)
All crops	10634.8	(100.0)	10497.0	(100.0)	13301.3	(100.0)

Notes: GCA for 2010 is provisional since the area under other crops is assumed to be zero due to unavailability; Area under fodder crops in 2006-07 has been taken as proxy for the same in 2010-11; Figures in parentheses are the percentages of GCA.
Sources: GOG (2011a); GOG (1994), various issues.

On the other hand, the share of area under cotton in GCA has significantly increased from 9.8 per cent in 1990-91 to 19.7 per cent in 2010-11. The share of area under horticultural crops in GCA has increased significantly from 3.2 per cent in 1990-91 to 10.6 per cent in 2010-11. It is worth-mentioning that the cultivation of horticulture and cotton has generated revenue of Rs. 15707 crores and Rs 12067 crores respectively during the year 2010-11 (GoG, 2011a). It is observed that during the plan

periods, the growth rates in area, production and productivity of most of the crops have fluctuated (Swain et al., 2012). However, for all major categories of crops, significant and very high growth rates were observed during the 10th and 11th Five Year Plan periods.

2.5 Drivers of Growth in Agriculture

Agricultural growth in any region can occur because of: (i) growth in crop output; (ii) diversification of agriculture towards high valued crops and livestock products; and (iii) increase in value of the given output (Bhalla and Singh, 2009). Examining these three aspects of agricultural growth in Gujarat, it reveals that the overall growth in agricultural output and yield of major crops in the state is quite impressive since 2000. Though the area under oilseeds, pulses and horticultural crops has increased in absolute term, the share of oilseeds and pulses in GCA has declined. While, share of cash crops like cotton and horticultural crops have increased substantially during the last two decades which proves that the process of diversification of agriculture towards high value, WTO competitive and sustainable crops is in right direction. The only need is to increase the pace of diversification towards these high valued cash crops in the state. National Food Security Mission (NFSM) and the National Horticulture Mission (NHM) have also emerged as the path breaking interventions which have helped in agricultural diversification towards cash crops in the state.

The growth in dairy sector in the state has been revolutionary (which is discussed in detail in separate section). Gujarat is the highest contributor of nation's marine exports both in terms of quantity as well as value (GOG, 2012b). So far as the increase in value of the agricultural output is concerned, it is noteworthy that the exports and domestic prices of agricultural commodities have increased successively over the years in the state resulting in rise in the value of output. However, it is reported that the majority of small and marginal farmers don't get remunerative prices because of constraints in marketing channels and infrastructures resulting in lower value of their output. Farmers are unable to get Minimum Support

Price (MSP) because of monopolistic behaviour of the informal buyers/ traders.

One of the key drivers of State's agricultural growth is investment in agriculture. It may be seen from Table 2.7 that about Rs 8315.6 crores was earmarked as budget outlay for agriculture and allied services for 11th Five Year Plan (FYP) period. The total budget outlay for three major heads (i.e., agriculture and allied services, rural development and irrigation and flood control) related to agriculture sector development put together was Rs. 41286.7crores which accounts for about 37.2 per cent of total budget outlay for the 11th FYP for the state of Gujarat. The examination of expenditure of this budget outlay during the individual years reveals that the expenditure on these three key drivers of agricultural growth has been over 30 per cent. It was as high as 39.4 per cent and 45.2 per cent during 2007-08 and 2008-09 respectively. The investment in these three major sectors has fueled the growth in agriculture in the state during 2000s. Considering the case of agriculture alone, it may be seen that the its share in total annual budget outlay and expenditure was 7.4 per cent and 7.7 per cent respectively during 2009-10, that has slightly come down to about 6.9 per cent each during 2010-11.

Table 2.7: Investment outlay and expenditure on agriculture and allied sectors during 11th Five Year Plan

(Rs in crores)

Sl. No.	Major Heads	Total 11th Plan (2007-12)		Annual Plan (2007-08)		Annual Plan (2008-09)		Annual Plan (2009-10)		Annual Plan (2010-11)		Annual Plan (2011-12)	
		Outlay	Exp.	Outlay	Exp.	Outlay	Exp.	Outlay	Exp.	Outlay	Exp.	Outlay	Exp.
1	Agriculture & Allied Services	8909.7 (6.9)	8626.0 (6.9)	918.2 (5.7)	890.6 (5.7)	1604.9 (7.6)	1388.2 (6.4)	1745.9 (7.4)	1784.0 (7.7)	2062.8 (6.9)	2075.3 (6.9)	2577.8 (6.8)	2487.8 (7.2)
2	Rural Development	4889.4 (3.8)	3966.5 (3.2)	502.5 (3.1)	470.2 (3.0)	682.1 (3.2)	566.9 (2.6)	846.8 (3.6)	834.5 (3.6)	1300.9 (4.3)	1085.4 (3.6)	1557.1 (4.1)	1009.4 (2.9)
3	Special Area Programme (BADP)	549.0 (0.4)	437.7 (0.3)	106.9 (0.7)	190.0 (1.2)	131.3 (0.6)	60.0 (0.3)	161.1 (0.7)	132.1 (0.6)	142.0 (0.5)	95.6 (0.3)	149.0 (0.4)	131.0 (0.4)
4	Irrigation & Food Control	30927.6 (24.1)	30950 (24.7)	4757.8 (29.7)	4814.5 (30.7)	5605.2 (26.7)	7872.4 (36.2)	5570.2 (23.7)	5746.9 (24.8)	5670.2 (18.9)	6185.1 (20.6)	9327.5 (24.5)	6568.4 (19.0)
5	Sub Total (1+2+3)	45275.7 (35.2)	43980.6 (35.1)	6285.3 (39.3)	6365.3 (40.6)	8023.4 (38.2)	9887.6 (45.4)	8324.0 (35.4)	8497.5 (36.7)	9175.9 (30.6)	9441.5 (31.4)	13611.4 (35.8)	10196.6 (29.4)
6	Total	128500.0 (100.0)	125363 (100.0)	16000.0 (100.0)	15680.5 (100.0)	21000.0 (100.0)	21763.7 (100.0)	23500.0 (100.0)	23161.5 (100.0)	30000.0 (100.0)	30097.1 (100.0)	38000.0 (100.0)	34659.8 (100.0)

Source:GoG(2013)

It is worth mentioning here that the marginal returns evident in terms of poverty alleviation or accelerating agricultural growth are much lower from input subsidies than from investments in rural roads or agri-R&D or irrigation (Shenggen *et al.,* 2008). Thus, agricultural subsidies should be targeted more towards poor farmers, public investment in agriculture should be accelerated for sustained long-term agricultural growth. This would help in expansion of irrigation facilities which is very critical for agricultural growth in Gujarat keeping in view of the fact that the major part of cultivable area is rainfed and the annual average rainfall in Gujarat is very erratic in nature.

2.6 Marketing and Warehouse Facilities

As discussed in the preceding section, adequate returns on agricultural output is one of the driving forces for better agricultural growth. Better marketing channels and warehouse facilities are essential for ensuring adequate returns on agricultural output of famers. It may be seen from Table 2.8 that the total warehousing capacity under Gujarat State Warehousing Corporation (GSWC) has come down from 2.1 lakh tonnes in 2006-07 to 1.5 lakh tonnes in 2012-13. It is astonishing to find that the level of utilization of the existing warehousing capacity has been very low. The utilization has also come down from 66.9 per cent in 2006-07 to 49.6 per cent during 2010-11, and has increased thereafter to 63.9 per cent in 2012-13. It may also be noted that during the period of last seven years, the Corporation has recorded loss during three years. This may be due to under utilization of the storage capacity.

The Gujarat State Warehousing Corporation (GSWC), whose main activity is to build godowns and warehouses in the state (for scientific storage of agricultural produces, manures, fertilizers, agricultural implements and other notified commodities of the farmers, co-operative societies, traders, government and other institutions) is operating 201 godowns across 22 districts of the state. There are 205 market committees

in 26 districts of the state, which includes 199 main yards and 201 sub-market wards (GOG, 2013).

Table 2.8: Warehousing Capacity under Gujarat State Warehousing Corporation

Year	Owned capacity (MT)	Hired capacity (MT)	Total capacity (MT)	% of utilization	Profit (+)	Loss (-)
2006-07	129373	81,011	2,10,384	66.9	(+)077.00	-
2007-08	1,29,373	10,557	1,39,930	45.9	-	(-)023.17
2008-09	1,29,373	29,523	1,58,896	68.7	(+) 066.54	-
2009-10	1,35,908	39,396	1,75,304	59.7	(+) 027.10	-
2010-11	1,45,056	45,013	1,90,069	49.6	-	(-) 65.46
2011-12	1,45,056	3,100	1,48,156	61.4	-	(-) NA
2012-13	1,45,056	3,100	1,48,156	63.9	(+) 200.40	-

Source: http://gswc.gujarat.gov.in/go-down-information.htm

Gujarat Sate Seeds Corporation Ltd., established in April 1975 is primarily engaged in production, processing and marketing of seed of more than 30 crops and 100 varieties and hybrids in almost all categories i.e. cereals, pulses, oilseeds, fibre crops, fodder, green manuring crops. It has 13 Branches across the Gujarat and one Sales Depot.

2.7 Emerging Demand-Supply Imbalances

With the change in taste and preference of consumers and higher expenditure elasticity for fruits & vegetables and livestock as compared to cereals, there is an increasing pressure on the prices of such high value perishable commodities. The per capita monthly consumption of cereals in the rural areas of India has declined from 14.80 kg in 1983-84 to 12.11 kg in 2004-05 and further to 11.35 kg in 2009-10. In urban areas of the country, it has declined from 11.30 kg in 1983-84 to 9.94 kg in 2004-05 and to 9.37 kg in 2009-10 (GOI, 2012a). Similarly, the per capita monthly consumption of total cereals in Gujarat state has also marginally declined from 10.19 kg in 1999-2000 to 10.06 kg in 2004-05; whereas the per capita

monthly consumption of fruits and vegetables has increased from 0.1 kg and 4.08 kg in 1993-94 to 0.4 kg and 5.23 kg in 2004-05 respectively (NSSO, 1993; 2000; 2004). The consumption of cereals and pulses has grown by 5 per cent and 4 per cent respectively during the period 1996-97 to 2002-03. On the other hand, consumption of dry fruits, fresh fruits and beverages has increased by 38 per cent, 11 per cent, 14 per cent, respectively during the same period (Robo India, 2005). Thus, there has been increase in demand for agro-processed foods in the state. Though the state has made remarkable progress in agro-processing and agricultural exports, the agricultural production basket in the state is still not fully aligned to the emerging demand patterns.

2.8 Natural Resource Management

Land, water resources, soil and biodiversity which are the natural resources for agriculture are under considerable strain. The demand for meeting food and water for a growing population from shrinking natural resource base has shifted the focus to enhance agricultural production in sustainable manner.

2.8.1 Agro-Climate and Soils

Gujarat has varying topographic features though a major part of the state was dominated by parched and dry region. The distinctive features of agro-climatic zones are briefly presented in Table 2.9. The average rainfall in the state varies widely from 250 mm to 1500 mm across various zones. Out of 8 agro-climatic zones, five are arid to semi-arid in nature, while remaining three are dry sub-humid in nature. Dry back to medium black soils dominate the soil types in the state.

Table 2.9: Salient Features of Agro Climatic Zones of Gujarat State

Zone	Climate	Districts Covered	Rainfall (mm)	Major Crops	Soil
1	2	3	4	5	6
South Gujarat (Heavy Rain Area.)	Semi-arid to dry sub-humid	Navsari, Dang, Valsad and Valod, Vyara, songadh and Mahuva taluks of Surat.	1500 and more	Rice, Sorghum, Ragi, Kodra, Seasamum, Pigeonpea, Groundnut,Cotton, Sugarcane, Chillies, Wheat, Gram	Deep black with few patches of coastal alluvial, laterite and medium black
South Gujarat	Semi-arid to dry sub-humid	Surat and Amod, Ankleshwar, Broach, Dekdopada, Honsot, Jhagadia, Nanded, Sagbara and Valia talukas of Bharuch.	1000-1500	Rice, Wheat, Gram, Perlmillets,Sorghum, Maize, Kodra, Ragi, Pigeonpea, groundnut, Sesamum, Castor, Cotton, Sugarcane, Chillies,	Deep black clayey
Middle Gujarat	Semi-arid	Panchmahals, Baroda and Anand, Balasinor, Borsad, Kapadvanj, Kheda, Matar, Ahmedabad, Nadiad, Petlad and Thasara and taluks of Kheda.	800-1000	Rice, Wheat, Gram, Perlmillets,Sorghum, Maize, Kodra, Ragi, Pigeonpea, groundnut, Sesamum, Castor, Cotton, Sugarcane, Potato, Rapeseed & Mustard.	Deep black, medium black to loamy sand
North Gujarat	Arid to semi-arid	Sabarkantha, Gandhinagar, Dehgam, Daskroi, Sanand talukas of Ahmedabad, Deesa, Dhenera, Palanpur, Dandta, Wadgam taluks of Banaskantha and Chanasma, Kadi, Kalol, Kheralu, Mehsana, Patan, Sidhpur, Visnagar, Vijapur taluks and Mehsana.	625-875	Rice, Wheat, Gram, Perlmillets,Sorghum, Maize, groundnut, Sesamum, Castor, Cotton, Sugarcane, Cumin, Rapeseed & Mustard.	Sandy loam to sandy
Bhal & Coastal Area	Dry sub-humid	Bhavnagar (Vallabhipur, Bhavnagar talukas), Ahmedabad (Dholka, Dhanduka talukas), and Vagra, Jambusa talukas of Bharuch.	625-1000	Rice, Pearl millets.	Medium black, poorly drained and saline
South Saurashtra	Dry sub-humid	Junagadh, Ghodha, Talaja, Mahava taloukas of Bhavnagar Kodinar, Rajula and Jafrabad talukas of Amerli and Dhoraji, Jetpur, Upleta talukas of Rajkot.	625-750	Rice, Maize, Sugarcane Wheat, Gram Pearl millets ,Sorghum, Groundnut, Seasamum,Cotton, Pulses, rapeseed & mustard	Shallow medium black calcareous
North Saurashtra	Dry sub-humid	Jamnagar, Rajkot, Chotila, Limdi, Lakhtar, Muli, Sayla, Wadhwan talukas of Surendranagar and Gadheda, Umrala, Botad, Kundla, Dihor, Garidhar, Palitana talukas of Bhavnagar and Amreli, Babra, Lathi, Lalia, Kunkavav, Khamba, Dhari taluks of Amreli.	400-700	Pearlmillets, Sorghum, Groundnut, Seasamum, Castor, Cotton, Pulses.	Shallow medium black

1	2	3	4	5	6
North West Zone	Arid to semi-arid	Kutch, Rajkot, Malia Halvad, Dhrangdhra, Dasada taluks of Surendranagar, Sami and Harij taluks of Mahsana, Santhalpur, Radhanpur, Kankrej, Deodar, Vav, Tharad taluks of Banaskantha and Viramgam taluka of Ahmedabad.	250	Rice, Wheat, Gram, Perlmillets,Sorghum, Maize, Pigeon pea, groundnut, Sesamum, Castor, Cotton, Rapeseed & Mustard , barley.	Sandy and saline

Source: Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Govt. of Gujarat, Gandhinagar (http://gujecostat.gujarat.gov.in/)

2.8.2 Land Use Pattern and Cropping Intensity

Total reporting area in Gujarat was 190.7 lakh hectares in 2010-11 (Table 2.10). The net sown area (NSA) and gross cropped area (GCA) accounted for about 49.4 per cent and 56.2 per cent of reporting area, respectively. The districts namely Kheda, Amreli, Gandhinagar, Surat, Mehasana, Patan, Anand and Bhavnagar have more than 70 per cent of their area under cultivation. It is encouraging to note that the share of NSA has depicted an increasing trend since 1990-91, whereas it is disheartening to note that the share of area sown more than once has been falling since 2007-08. The forest area has hovered around 6 per cent of total reporting area.

During the last two decades, net area sown has grown from 93 lakh hectares (1990-91) to 103 lakh hectares (2010-11). Comparatively, the gross cropped area in the state has fluctuated more during last two decades. It has increased from 105.8 lakh hectares in 1990-91 to 122.5 0lakh hectares in 2010-11. Interestingly, the land put to non-agricultural uses has not increased during last two decades. In fact, the non-agricultural area has declined slightly from 11.2 lakh hectares in 1990-91 to 10.1 lakh hectares in 2010-11. The cropping intensity in the state has increased slightly from 113.8 per cent in 1990-91 to 118.9 per cent in 2010-11. It may be noted that the gross irrigated area has also increased from 29.1 lakh hectares in 1990-91 to 56.2 lakh hectares in 2010-11. However, the net

irrigated area has increased successively to 43.4 lakh hectares. The irrigation intensity in the state has increased slightly from 119.4 per cent in 1990-91 to 136.0 per cent in 2010-11.

Table 2.10: Land Use Pattern in Gujarat

(Area in lakh hectares)

Year	1990-91		2000-01		2010-11	
Total Reported Area	188.2	(100.0)	188.1	(100.0)	190.7	(100.0)
Forest	18.8	(10.0)	18.7	(9.9)	18.3	(10.0)
Area under Non-Agricultural uses	11.2	(6.0)	11.4	(6.1)	10.1	(6.0)
Barren & Un-Culturable land	26.1	(13.9)	25.5	(13.6)	37.2	(13.9)
Permanent Pastures and other Grazing Land	8.5	(4.5)	8.5	(4.5)	8.5	(4.5)
Land under Misc.-Tree Crops & Grooves	0.0	(0.0)	0.0	(0.0)	0.0	(0.0)
Culturable Waste Land	19.7	(10.5)	19.8	(10.6)	19.6	(10.5)
Fallow Land Other than Current Fellows	0.5	(0.3)	0.1	(0.1)	0.2	(0.3)
Current Fellows	10.4	(5.5)	9.2	(4.9)	3.8	(5.5)
Net Sown Area	93.0	(49.4)	94.9	(50.4)	103.0	(49.4)
Aera Sown More than once	12.8	(6.8)	10.1	(5.4)	8.5	(6.8)
Gross Cropped Area	105.8	(56.2)	105.0	(55.8)	122.5	(45.9)
Net Irrigated area*	24.4	(26.2)	28.1	(29.6)	42.3	(41.1)
Gross Irrigated Area**	29.1	(27.5)	33.4	(31.8)	56.2	(45.9)
Cropping Intensity (%)	113.8	-	111.3	-	118.9	-
Irrigation Intensity (%)	119.4	-	119.1	-	136.0	-

Notes: (1) Figures in parentheses are percentages of total reported area.
(2) * Figures in parentheses are percentages of NSA and **Figures in parentheses are percentages of GCA.
Sources: GOG (1994), various issues; GOG (2010a); GOG (2011a).

2.8.3 Operational Land Holdings and Land Ceiling Limit

Though several factors are attributed for lowering of agricultural productivity in some parts of the state, many consider skewed distribution of agricultural land, small size of operational holding, high incidence of share tenancy and rural poverty as the major impediments to agricultural growth. The size-wise distribution of operational holdings and area operated (Table 2.11) shows that in the year 2005-06, a majority of farm

operators belonged to marginal and small farmer categories cultivating less than 2 hectares of land. Though they constituted about 62.9 per cent of total number of operational holdings, they operated only 26.8 per cent of total operational area. On the other hand, the large farmers (operating land area more than 10 hectares) and medium farmers (with operating land area of 4 - 10 ha) constituting only 24 per cent of total holdings occupied a substantial proportion (i.e., 43.9%) of total operational area. Thus, the distribution of land area has been much skewed in favour of large farmers. The average size of operational holdings was 2.2 hectares. The average size of land holdings in the case of large farmers and medium farmers was 16.72 hectares and 5.81 hectares respectively, while that in the case of marginal and small farmers was just 0.50 hectares and 1.46 hectares respectively in Gujarat.

Table 2.11: Land Holding Pattern in Gujarat (2005-06)

Sl. No.	Size Class	Total Holdings				Average Size of Holdings (ha)
		Number		Area (Ha)		
1	Marginal (0-1 ha.)	1585042	(34.0)	792149	(7.7)	0.50
2	Small (1-2 ha.)	1345348	(28.9)	1959288	(19.1)	1.46
3	Semi medium (2-4 ha.)	1080611	(23.2)	3004213	(29.3)	2.78
4	Medium (4-10 ha.)	582229	(12.5)	3380443	(32.9)	5.81
5	Large (10 ha >)	67784	(1.5)	1133171	(11.0)	16.72
6	All Size Group	4661014	(100.0)	10269264	(100.0)	2.20

Note: Figures in parentheses are percentages of total.
Source: GOG (2013).

The distribution of land holdings and average size of operational holdings in the state clearly indicate that there is disparity and inequality. Large number of marginal and small size cultivators owing relatively less land, while big land owners, smaller in number owning larger acreage of land. It leads to disparities in the incomes in the rural areas. In view of this, our policy makers/leaders in the earlier days thought of land reform measure. The first Five-Year Plan emphasizes that there should be an absolute limit to the amount of land which any individual may hold. As

stated in Table 2.12, the actual land ceilings in Gujarat have been earmarked keeping in view the suggested national guidelines of 1972. The ceiling limit for irrigated lands with one crop is 4.05 to 7.29 hectares, whereas the same for irrigated lands with two crops is 6.07 to 10.93 hectares. The ceiling limits have been fixed with a range of 8.09 hectares to 21.85 hectares.

Table 2.12. Ceiling Limits on Land Holdings

(in hectares)

	Irrigated with two crops	Irrigated with one crop	Dry land
Suggested in National Guidelines of 1972	4.05 to 7.28	10.93	21.85
Actual Ceilings in Gujarat	4.05 to 7.29	6.07 to 10.93	8.09 to 21.85

Source: www.indiaagronet.com

2.8.4 Water Resources

The state divides naturally into three regions: (i) Gujarat mainland, (ii) Saurasthtra and (iii) Kachhch. Water resources in Gujarat are concentrated primarily in the southern and central part of the mainland. Saurashtra and Kutch region in the northern mainland with exceptionally high irrigation needs, have limited surface and groundwater resources. A significant percentage of the water in the state (both surface and groundwater) is consumed by the agricultural sector for irrigation purposes. The major rivers flowing in Gujarat are Narmada, Sabarmati, Tapi, Purna, Damanganga, Rukmavati etc. As presented in Table 2.13, the ultimate irrigation potential through the surface water is assessed at 39.4 lakh hectares which includes 17.9 lakh hectares through Sardar Sarovar Project. Similarly in respect of ground water resources, it is estimated that about 25.5 lakh hectares (24.7% of NSA) can be irrigated. Thus, total ultimate irrigation potential through surface and ground water is estimated to be 64.9 lakh hectares. Out of this, about 32.2 lakh hectares of irrigation potential has been created by June 2011. About 75.8 per cent of total irrigation potential created has been utilized in the state. It may be seen that the irrigation potential created and

utilization through surface water has increased successively. The irrigation potential created has increased from 21.91 lakh hectares in 2007-08 to 31.31 lakh hectares in 2011-12. Similarly, the utilization of irrigation potential created has increased from 17.0 lakh hectares in 2007-08 to 23.2 lakh hectares in 2011-12. On the other hand, the irrigation potential created through ground water has declined sharply from 20.4 lakh hectares in 2007-08 to 0.9 lakh hectares in 2011-12 resulting in overutilization by 137.9 per cent.

Table 2.13: Water Resources Development in Gujarat

(In Lakh Hectares)

Year	Surface Water				Ground Water				Total			
	Ultimate Irrigation Potential	Irrigation Potential created upto June 2011 (cum)	Maximum Utilisation upto June 2011		Ultimate Irrigation Potential	Irrigation Potential created upto June 2011 (cum)	Maximum Utilisation upto June 2011 (cum)		Ultimate Irrigation Potential	Irrigation Potential created upto June 2011 (cum)	Maximum Utilisation upto June 2011 (cum)	
			(cum)	(%)			(cum)	(%)			(cum)	(%)
2007-08	39.4	21.9	17.0	(77.5)	25.5	20.4	20.3	(100.0)	64.9	42.3	37.3	(88.3)
2008-09	39.4	23.6	17.9	(75.7)	25.5	18.2	19.6	(107.7)	64.9	41.8	37.4	(89.6)
2009-10	39.4	30.1	22.6	(75.0)	25.5	0.9	1.2	(137.9)	64.9	31.0	23.8	(76.8)
2010-11	39.4	30.8	22.7	(73.8)	25.5	0.9	1.2	(137.9)	64.9	31.7	23.9	(75.6)
2011-12	39.4	31.3	23.2	(74.1)	25.5	0.9	1.2	(137.9)	64.9	32.2	24.4	(75.8)

Note: Figures in parentheses are the percentages of total potential created in the respective category.
Source: GOG (2012b), various issues

The Government of Gujarat has been giving due attention to accelerate the pace of water resources development in the state so as to increase the net water availability by creating additional storage, completion of ongoing projects, improvement in water use efficiency, bridging the gap between the potential created and its utilization, restoration and modernization of old irrigation system, conjunctive use of ground and surface water, promoting participatory irrigation management, large scale people's participation in water conservation programmes and inter-basin transfer of water (GOG, 2012b).

A water conservation scheme called "Sardar Patel Participatory Water Conservation Scheme" (SPPWCS) is being implemented by the State Government through which a total of 69433 check dams have been constructed. Out of this, 5980 check dams and 1490 check dams have been

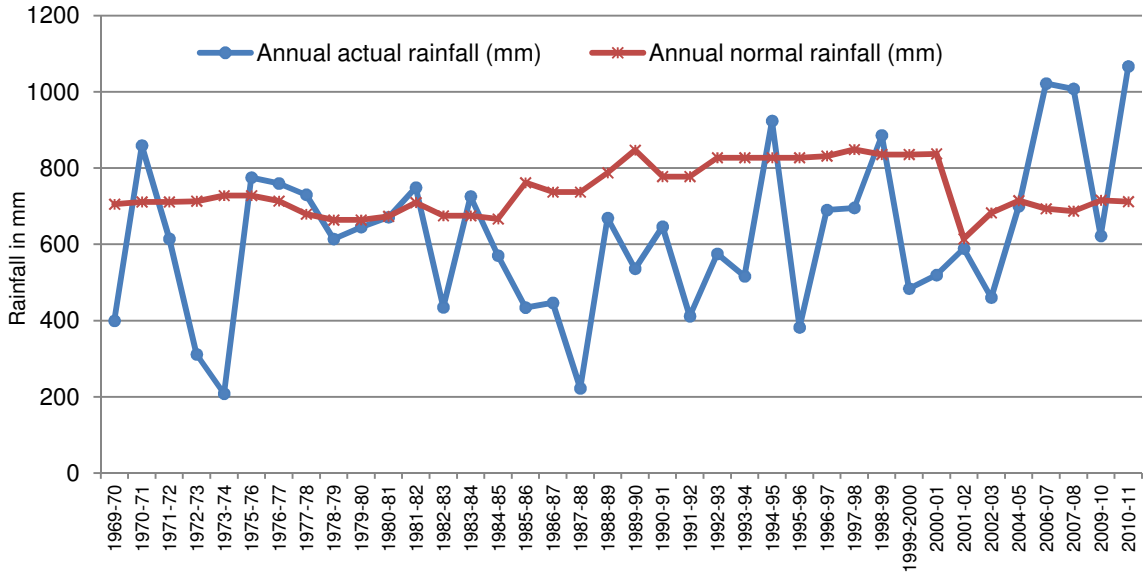
constructed respectively during 2010-11 and 2011-12. Thus, under various programmes, a total of 147305 check dams have been constructed in the state so far (GOG, 2012b). In North Gujarat and other area of the State, where suitable sites are not available for the construction of check dams, deepening of existing ponds / tanks have been promoted with financial contribution ratio of 90:10 (Government: Beneficiaries). During the year 2010- 11 and 2011-12 (up to Nov-11), about 738 and 425 ponds respectively have been deepened by Water Resources Department.

For promoting Participatory Irrigation Management in the state, the government has passed "*Gujarat Co-Operatives and Water Users Participatory Irrigation Management Act-2007*". Under this scheme, 51308 ha and 18630 ha area has been covered during 2010-11 and 2011- 12 respectively. Approximately 427156 ha area has been covered under this scheme till 2011-12 (GOG, 2012a).

2.8.5 Weather and Climate

As discussed earlier, broadly, Gujarat has a tropical climate viz., sub-humid, arid and semi-arid, are spread over different regions of the state. Out of total area of the state, 58.6 per cent fall under arid and semi-arid climatic zone. The arid zone contributes 24.94 per cent, while the semi-arid zone forms 33.66 per cent of the total area of the state. The analysis on rainfall pattern in Gujarat reveals that the average annual rainfall over different parts of the state varies widely from 300 mm in the Western half of Kutch to 2100 mm in the Southern part of Valsad district and the Dangs. The average rainfall for the state during 1982-2011 was 798 mm compared to the all-India average of 1100 mm. About 95 per cent of the total annual rainfall is received during three months: July, August and September. Rainfall in the large parts of Gujarat is not only inadequate but also varies widely from year to year (Figure 2.3). The average of deviation of annual rainfall from long-term normal is (-) 15.43 per cent during a period of 1969-70 to 2010-11.

Figure 2.3: Rainfall Pattern in Gujarat (1969-70 to 2010-11)



The number of rainy days in a season varies from one part of the state to another. The range is from minimum of 16 days in Kachhch to maximum of 48 days in Surat and the Dangs (GOG, 2012a). Generally, the number increase as one moves towards the eastern and the southern parts of the state.

As far as the pattern of temperature in the state is concerned, the day temperature in winter is around 28.33ºC and at night is 11.66ºC. Summers are extremely hot with the day time temperature being 46.11ºC and the night temperature being 32.22ºC (WAPCOS, 2011).

2.8.6 Disaster and Calamity Management

The state of Gujarat has been prone to disasters like earthquake, drought, flood, cyclones etc. These disasters have caused extensive damage to life and property and have adversely impacted economic development. In Gujarat, factors which contribute to the vulnerability to various disasters are: (i) having longest coastline of India leading to tropical cyclones and floods, (ii) a larger proportion of arid and semi-arid area with higher frequency of drought occurrence, (iii) many regions of Gujarat come under

zone five which is the most vulnerable zone for earthquake and (iv) very high rainfall in some parts of the state making it prone to floods. The state is thus vulnerable to many disasters largely because of its geographical location and geological factors.

Keeping in view the level of vulnerability of the state to different kind of natural disasters, the Government of Gujarat has adopted a multi-hazard holistic approach to disaster Management with a focus on reducing risk and vulnerability through policy, legislation, capacity building, education and communication to mitigate the impact of Disaster and achieve better preparedness. Since the state falls in the high intensity Seismic zones III, IV & V, the state has set up an Institute of Seismological Research (ISR) of international standard. With a view to impart training to Government officials at various levels, NGOs and communities on a continuous on-going basis, the State Government also set up Gujarat Institute of Disaster management (GIDM) at Gandhinagar. In the aftermath of the Gujarat Earthquake of 2001, the Gujarat Government has enacted the Gujarat State Disaster Management Act 2003 and in accordance with the provisions of this Act, the state Government has constituted the Gujarat State Disaster Management Authority (GSDMA). The GSDMA has already taken active measures for the construction of "District Emergency Operation Centers" (DEOCs) and to make it well-equipped in all the 26 Districts of Gujarat.

2.9 Farm Inputs and Management

2.9.1 Seeds and Fertilizer

Seed is considered to be a catalyst of change in agriculture. The Green Revolution adopted in India during the late sixties and early seventies bears witness to this truth. And lately, during the decade of 2000s, *Bt* cotton seeds and hybrid maize seeds have shown spectacular results, particularly in Gujarat (GoI, 2012b). To complement with good agricultural growth in the state, the availability of quality/certified seeds has been made available as required in various part of Gujarat.

As stated in Table 2.14, there was significant level of surplus in availability of quality/certified seeds in Gujarat during both the seasons of 2008-09 and 2011-12. Such kind of abundant availability of quality/certified seeds has helped in enhancing agricultural production and productivity. However, the seed replacement rate (SRR) for majority of crops has been quite low. Even in the case of cotton and groundnut which are the pride of Gujarat, SRR has been as low as 25.5 per cent and 24.9 per cent respectively (Figure 2.4). Besides mustard and bajra, the SRR needs further improvement in case of other crops.

Table 2.14: Seeds Requirement and Availability

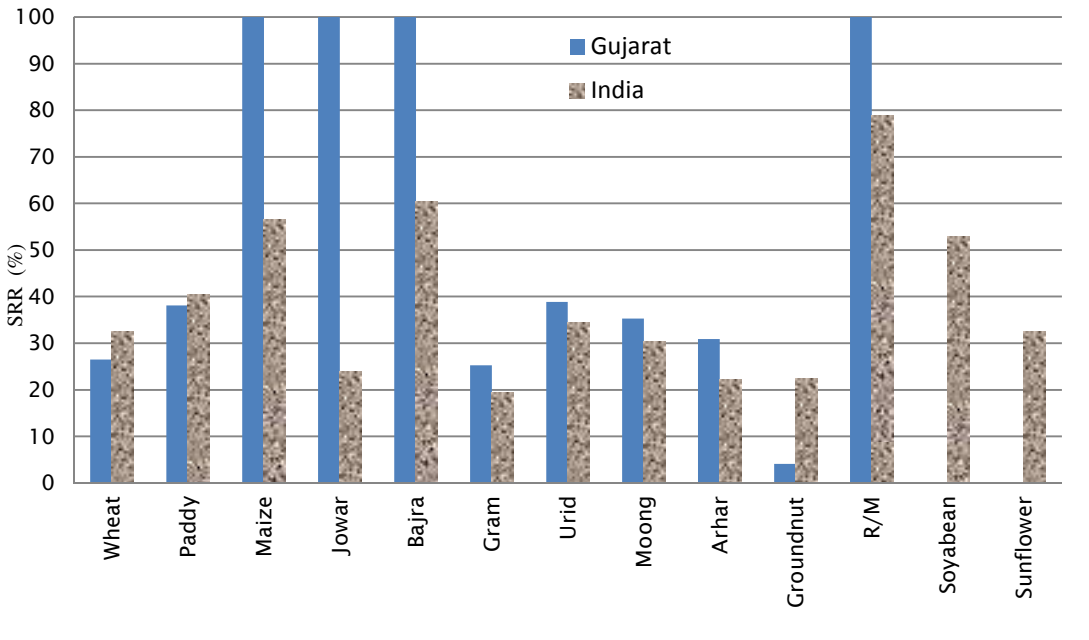
Crops	2008-09			2011-12		
	Requirement (In Qtls.)	Availability (In Qtls.)	Surplus(+)/ Deficit(-)	Requirement (In Qtls.)	Availability (In Qtls.)	Surplus(+)/ Deficit(-)
Kharif crops						
Paddy	56500	84845	28345	85500	86000	500
Bajara	28206	34354	6148	26250	27006	756
Moong	12750	14883	2133	15000	15300	300
Arhar	15500	15965	465	20000	20100	100
Groundnut	98500	99535	1035	517621	517621	0
Castor	22150	30848	8698	2500	36864	34364
Cotton	70942	102573	31631	74508	74990	482
Total	304548	383003	78455	741379	777881	36502
Rabi crops						
Wheat	322500	572092	249592	425000	432500	7500
Bajara	7500	17868	10368	15000	17762	2762
Moong	9600	22341	12741	12000	22100	10100
Gram	18000	21003	3003	26500	27004	504
Groundnut	30350	31050	700	36500	38700	2200
Mustard	7500	7765	265	5500	5610	110
Total	395450	672119	276669	520500	543676	23176

Source: GOG (2011b)

Fertilizer is another important input for crop growth and increasing productivity. It may be noted from Table 2.15 that the consumption of NPK in Gujarat state has increased from 3.57 lakh metric tonnes in 1980-81 to

19.39 lakh metric tonnes in 2010-11, implying an increase by 5.4 times. The NPK consumption per hectare of gross cropped area (GCA) has also increased by 16.5 per cent, from 32.6 kg in 1980-81 to 138.1 kg in 2010-11. But it has declined thereafter to 109.0 kg/ha in 2012-13. The total consumption of NPK in the state has also decreased from 19.39 lakh metric tonnes in 2010-11 to 13.42 lakh metric tonnes in 2012-13.

Figure 2.4: Seed Replacement Rate (%)
of Selected Crops in Gujarat and India (2011)



The decline in fertiliser consumption during the later period may be partly due to increased awareness generated by the Soil Health Card (SHC) programme in the state about the negative consequences of application of overdoses of fertiliser and positive effects of balanced fertiliser application on soil health. However, it is estimated that per hectare use of fertiliser has increased to about 127.7 kg/ha in 2013-14, indicating the reversal of trend in fertiliser use in the state.

Table 2.15: Fertilizer Consumption in Gujarat State (1980-81 to 2013-14)

(in 000' tonnes)

Sr. No	Year	Nitrogenous (N)	Phosphate (P2O5)	Potassic (K2O)	Total NPK	Per Ha Consumption of NPK (Kg/Ha)
1	1980-81	204.12	117.22	0.00	356.86	32.58
		(57.2)	(32.8)	(0.0)	(100.0)	
2	1990-91	430.75	217.15	58.49	706.39	67.26
		(61.0)	(30.7)	(8.3)	(100.0)	
3	2000-01	498.96	195.67	56.01	750.64	69.56
		(66.5)	(26.1)	(7.5)	(100.0)	
4	2010-11	1241.22	518.00	179.94	1939.16	138.08
		(64.0)	(26.7)	(9.3)	(100.0)	
5	2011-12	1183.30	417.02	132.74	1733.06	132.59
		(68.3)	(24.1)	(7.7)	(100.0)	
6	2012-13	1007.70	257.82	76.46	1341.97	108.99
		(75.1)	(19.2)	(5.7)	(100.0)	
7	2013-14 (est.)	1234.17	403.03	114.89	1752.08	127.65
		(70.4)	(23.0)	(6.6)	(100.0)	
CAGR (1980-81 to 1990-91)		7.75	6.36	NA	7.07	7.52
CAGR (1990-91 to 2000-01)		1.48	-1.04	-0.43	0.61	0.34
CAGR (2000-01 to 2010-11)		9.54	10.23	12.38	9.96	7.10
CAGR (1980-81 to 2013-14)		5.78	3.93	NA	5.10	4.36

Note: Figures in parentheses are the percentages of total.

Sources: Statistical Outline of Gujarat (1980-81 to 1990-91); Statistical Abstract 2009, DES, Department of Gujarat, Gandhinagar; unpublished data, Department of Agriculture, GoG.

2.9.2 Farm Mechanization

There is a strong correlation between farm mechanization and agricultural productivity. States with a greater availability of farm power show higher productivity as compared to others (GOI, 2012a). Among various types of farm machinery, tractors, power tillers and diesel engines and electric motors are the major ones. India is the largest manufacturer of tractors in the world, accounting for about one-third of the global production. The pace of farm mechanization has been satisfactory during last couple of decades. The share of agricultural workers and draught animals have come down from 63.5 per cent in 1971-72 to 13.67 percent in 2009-10 whereas that of tractors, power tillers and diesel engines and electric motors has gone up from 36.51 per cent to 86.33 per cent during the same period in India (Singh et al., 2011).

The sale of tractors and power tillers has increased from 296.1 thousands and 22.3 thousands in 2005-06 and further to 545.1 thousands and 55 thousands in 2010-11 respectively in India. Out of the total sale of tractors, central states of Madhya Pradesh and Gujarat accounts for 21 per cent. The electric power consumption is one of the major aspects of the farm mechanization. Compared to 20.43 per cent of total power consumption in agriculture in India, Gujarat consumes about 36.75 per cent of its total electricity for agriculture alone (GOI, 2011a). Similarly, the use of ploughs and carts has been reduced by 2.68 per cent and 6.25 per cent respectively between 1997 and 2003 in Gujarat (Table 2.16).

Table 2.16: Agricultural Implements in Gujarat

(Figures in '00')

Details	Year 1997		2003		2007		% Change in 2003 over 1997
Ploughs	17673	(15.8)	17199	(14.6)	17835	(14.7)	-2.68
Carts	5711	(5.1)	5354	(4.5)	4527	(3.7)	-6.25
Oil Engines with Pump sets (used for Irrigation)	3672	(3.3)	4367	(3.7)	NA		18.93
Electric Pump/ Sub-mersible pump set used for Irrigation	4072	(3.6)	4683	(4.0)	NA		15.00
Tractors (used for agricultural purpose)	1221	(1.1)	1476	(1.3)	NA		20.88

Notes: Figures in parentheses is the number per ha of GCA in respective years; NA- Not Available.
Source :GOG(2011a).

On the other hand, the use of tractors, oil engines with pump sets and electric pump sets for agriculture purpose has increased considerably by 20.88 per cent, 18.93 percent and 15.0 per cent respectively during the same period. Seed-cum-fertilizer drill, zero till drill, lazer levelers and various farm implements and tools need to be popularized along with bullock drawn implements for small and marginal farmers (GOG, 2012c). Seed dressers, sprayers, weeding implements, and other drudgery reduction implements are to be popularized. Custom hiring system is to be promoted and popularized using the concept of Agri-Clinics.

2.9.3 Irrigation

Out of 126.7 lakh ha of cultivated land, about 42.3 lakh hectares area was irrigated during the year TE 2012-13 (Table 2.17). Thus, about 47.0 per cent of gross cropped area in the state was under irrigation. Moreover, the cropping intensity and irrigation intensity at the state level has increased to some extent in 2010-11 as compared to 1990-91. As data reported by the government department, the net irrigated area in the state was 43.36 lakh ha during TE 2009-10, which has declined marginally to 42.3 lakh ha during TE 2012-13. During TE 2009-10, cropping intensity was 120.7 percent and irrigation intensity was 122.2 percent, which has increased to 122.6 per cent and 140.4 per cent, respectively during TE 2012-13. Gujarat farmers rely on different sources of irrigation that include canals, tube wells, open wells and tanks. It may be noted from Figure 2.5 that the share of canal irrigated area has remained unchanged at the level of 19 per cent during the year 1990-91 and 2012-13. The combined irrigated area through tube wells and open wells has slightly declined from 79 per cent in 1990-91 to 78 per cent in 2012-13. However, the tube wells and open wells have been the major sources of irrigation in the state. Thus, the pressure on groundwater exploitation has considerably increased in Gujarat. In fact, ground water has been over utilized in the state.

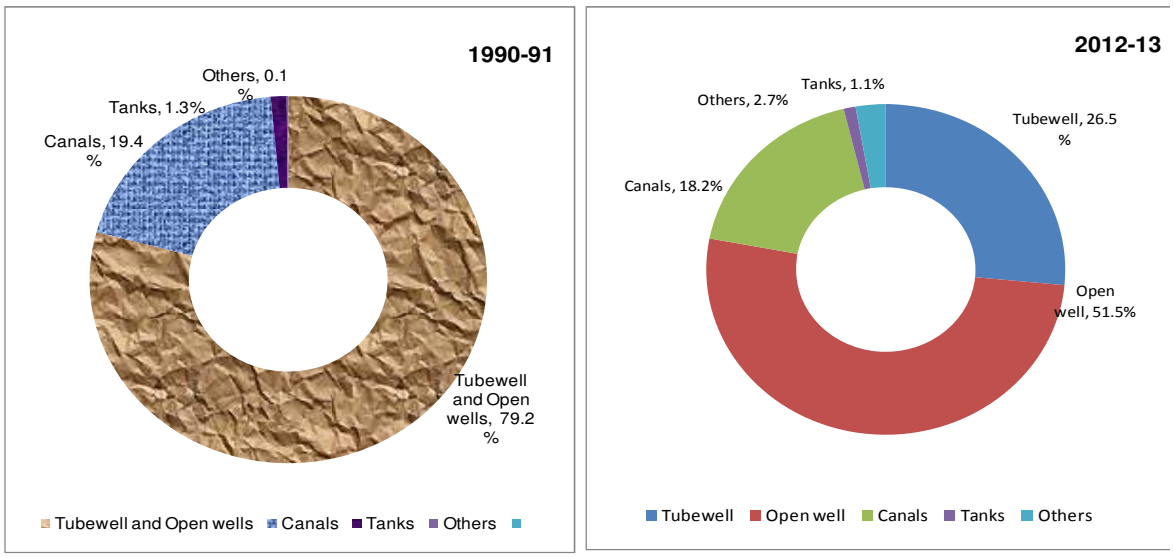
Table 2.17: Irrigated Area in Gujarat during 2007-08 to 2012-13

(Area in '000 ha.)

Sl. No.	Year	Gross irrigated area (GIA)	Net irrigated area (NIA)	Gross cropped area (GCA)	Net sown area (NSA)	GIA as % to GCA	NIA as % to NSA	Cropping intensity	Irrigation intensity
1	2007-08	5684.0	4336.0	12110.0	9801.0	46.9	44.2	123.6	131.1
2	2008-09	5278.0	4336.0	11571.0	9801.0	45.6	44.2	118.1	121.7
3	2009-10	4935.0	4336.0	11138.0	10302.0	44.5	42.1	120.5	113.8
4	TE 2009-10	5299.0	4336.0	11606.7	9968.0	45.7	43.5	120.7	122.2
5	2010-11	5616.0	4233.0	12247.0	10302.0	45.9	41.1	118.1	132.7
6	2011-12	6305.0	4233.0	13093.0	10302.0	48.2	41.1	127.1	148.9
7	2012-13	5913.0	4233.0	NA	10302.0	NA	41.1	NA	139.7
8	TE 2012-13	5944.7	4233.0	12670.0	10302.0	47.0	41.1	122.6	140.4

Source: GOG (2011a), various issues.

Figure 2.5: Irrigation Coverage by Sources in Gujarat (1990-91 and 2012-13)



2.9.4 Labour and Agricultural Wages

The total working population in Gujarat was 247.68 lakh that constitutes around 5 per cent of total working population in India (Census 2011). About 72.7 per cent of total working population in the state was male workers. As discussed earlier, the total number of cultivators in the state was 47.5 lakhs constituting about 19.2 per cent of total working population in the state (see, Table 2.1), as compared to around 30 per cent of total working population at all-India level. Cultivators in rural areas were 45.7 lakhs in number. The state's share in total number of cultivators in India is about 4 per cent. On the other hand, the total number of agricultural labourers in Gujarat was 44.9 lakhs, out of which, 14.8 lakhs were women constituting about 33.0 percent of total agricultural labourers in the state. The agricultural labourers constitute about 18.1 per cent of total workers in the state.

As far as the prevailing agricultural wages is concerned, the minimum agricultural wages for all operations was Rs 100 in 2010 that has increased to Rs 135 with effect from January 2011. However, the actual wage rates for agricultural works vary from Rs 150 to Rs 200 per man days in different parts of the state. Especially after implementation of Mahatma Gandhi

National Rural Employment Guarantee Act (MNREGA) in 2006, the availability of farm labourers has been reduced considerably (Shah et. al, 2011), mainly at the time of intercultural operations and harvesting of the crops. However, the wage rates for agricultural labourers for various agricultural operations have significantly increased after implementation of MNREGA in the state.

2.9.5 Credit and Insurance

Credit availability and agricultural insurances are important drivers of growth in agriculture. However, the formal credit is readily available to elite class people such as large and wealthy farmers who are trusted by the institutional lenders because of their greater repayment capacity, on the other hand, the access of poor marginal and small farmers to institutional credit is quite limited (Swain, 2001; Swain and Swain, 2007). If we look at the disbursement of institutional credit in rural Gujarat, there have some programmes through which credit has been made available to farmers in the state. Among these programmes, the *Rashtirya Krishi Vikas Yojana* (RKVY), Kisan Credit Card Scheme (KCC) and Agricultural Technology Management (ATMA) programme are the major ones. It is evident from Table 2.18 that about Rs 60257 lakh has been spent under RKVY during last five years, out of which Rs 33100 has been spent during the year 2010-11.

Table 2.18:Credit Disbursed under Rashtirya Krishi Vikas Yojana (RKVY)

(Rs. In lakhs)

Year	Earmarked Grant	Grant Released by GoI	Expenditure	Expenditure as a % of grant
2007-08	5151.0	4761.0	4761.0	100.0
2008-09	24339.0	24339.0	22654.3	91.1
2009-10	38619.0	38619.0	27652.3	71.6
2010-11	38863.0	38863.0	37142.8	95.6
2011-12*	50090.0	25000.0	33100.0	132.4
Total	100754.0	89472.0	60258.0	95.2

Note: * Up to August 2011.
Source: GOG (2011b).

The analysis on the progress and composition of agricultural credit disbursed by different sources under KCC scheme reveals that the total number of cards issued and amount sanctioned under the scheme has increased 216.8 thousands and Rs 4454.6 crores in 2007 to 22,622 and Rs 43723 crores in 2010 respectively (Table 2.19). Out of this Rs 43723 crores, commercial banks and cooperative banks disbursed Rs. 22622 crores (51.7%) and Rs. 18457 (42.2%), respectively.

Table 2.19: Credit Disbursed under Kisan Credit Card Scheme in Gujarat

(Rs. in Crores and Number of Cards Issued in '000)

Year	Co-operative Bank		Regional Rural Banks		Commercial Banks		Total	
	Cards issued	Amount Sanctioned	Cards issued	Amount Sanctioned	Cards issued	Amount Sanctioned	Cards issued	Amount Sanctioned
2007	65.0	3314.9	25.9	286.3	125.8	853.4	216.8	4454.6
2008	2.5	97.0	22.4	425.4	120.4	1083.9	145.3	1606.3
2009	1182.0	18378.0	242.0	25902.0	1377.0	20712.0	2801.0	41680.0
2010	1206.0	18457.0	248.0	2644.0	1543.0	22622.0	2997.0	43723.0
2011	61.0	389.0	11.0	100.0	171.0	1840.0	243.0	2329.0

Source: rbidocs.rbi.org.in

As far as the status of agricultural insurance and weather based crop insurance is concerned, it may be noted from Table 2.20 and Table 2.21 that the weather based crop insurance has performed better compared to National Agricultural Insurance Scheme (NAIS) in the state. The number of farmers insured under the weather based crop insurance has increased from 5.91 lakh during Rabi 2007 to 6.59 lakh during Rabi 2010. Similarly, the number of farmers insured under the same scheme has increased from 0.19 lakh during Kharif 2008 to 35.15 lakh during Kharif 2011. On the other hand, the growth in number of farmers insured and area insured under NAIS has grown from 8.25 lakh and 17.49 lakh hectares during Kharif 2007 to 9.76 lakh and 20.84 lakh hectares during Kharif 2011 respectively. The growth in number of farmers insured and area covered has been much better in case of weather based crop insurance compared to NAIS.

Table 2.20: Performance of National Agricultural Insurance Scheme in Gujarat

Amount is in Crore

Sl. No.	Season	No. of Farmers Covered ('000 ha)	Area Insured (000 ha)	Sum Insured	Gross Premium	Premium Subsidy (Rs.in Crore)	Claims (Rs.in Crore)	No. of Farmers Benefited ('000)
1	Kharif 2007	825.0	1749.0	2216.0	82.0	3.0	23.0	35.0
2	Rabi 2007-08	14.0	26.0	35.0	0.7	0.0	1.0	2.0
3	Kharif 2008	813.0	1794.0	2324.0	83.0	2.0	467.0	283.0
4	Rabi 2008-09	28.0	56.0	76.0	1.0	0.0	11.0	22.0
5	Kharif 2009	915.0	1996.0	2944.0	104.0	3.0	796.0	521.0
6	Rabi 2009-10	34.0	67.0	111.0	2.0	0.1	5.0	7.0
7	Kharif 2010	927.0	1990.0	3323.0	116.0	4.0	68.0	70.0
8	Rabi 2010-11	39.0	81.0	145.0	3.0	0.1	3.0	7.0
9	Kharif 2011	976.5	2083.8	4127.5	143.8	4.5	316.5	259.8
	Rabi 2011-12	33.3	72.2	152.2	2.3	0.1	2.5	5.8
	Kharif 2012	1143.8	2472.8	6065.1	233.5	30.2	2190.6	850.6
	Rabi 2012-13	32.8	71.2	158.2	2.8	0.1	11.7	16.0
	kharif 2013	1005.1	2136.5	5778.1	264.4	71.3	38.1	42.5
	Rabi 2013-14	27.1	61.8	162.7	2.9	0.1	0.0	0.3
	Kharif 2014	538.9	1112.0	3485.4	146.7	3.1	0.0	0.0
	Kharif Total	13975.1	32080.7	40405.6	1622.6	156.5	6460.7	4846.9
	Rabi Total	356.1	693.9	1062.8	19.3	0.9	42.8	99.2
	Grand Total	14331.2	32774.6	41468.4	1641.9	157.4	6503.4	4946.1

Source: http://www.aicofindia.com

Table 2.21: Performance of Weather based Crop Insurance Scheme in Gujarat

Sl. No.	Crop/Season/Year	Farmers Insured (Lakh No.)	Farmers Benefitted (Lakh No.)	Sum Insured (Rs. in Crore)	Premium Paid (Rs in Crore)	State Share (Rs in Crore)	Central Share (Rs in Crore	Claims (Rs in Crore)
1	Rabi 2007	5.91	1.67	1626.4	46.13	51.36	51.36	83.49
2	Kharif 2008	0.19	0.06	40.45	1.51	2	2	1.94
3	Rabi 2008	0.24	0.1	157.09	3.52	5.66	5.66	8.19
4	Kharif 2009	3.2	2.42	517.52	18.8	20.58	20.58	44.58
5	Rabi 2009	6.59	2.42	1161	33.52	50.14	50.14	105.9
6	Kharif 2010	35.15	7.81	2728.9	93.23	104.96	104.96	37.09
7	Rabi 2010	27.33	11.71	4257.8	99.46	117.95	117.95	228.3
8	Kharif 2011	47.38	12.1	4288.5	131.79	150.05	150.05	90.79
Rabi Average		10	4	1801	46	56	56	106
Kharif Average		21	6	1894	61	69	69	44

Source: http://www.aicofindia.com

2.10 Agricultural Research, Education and Extension

With a view of rising population pressure on land, there is lesser chance of increasing area under cultivation substantially to increase the agricultural production. Thus it is highly desirable to increase the crop

productivity through use of befitting technologies for developing better crop varieties, better methods of cultivation and better methods of reduction in cost of cultivation. Considering the growing importance of agricultural research for inclusive growth and development, the state Government has accorded highest priority to enhance productivity and production through improved research and value addition.

There are four State Agricultural Universities (SAUs), 28 Krishi Vigyan Kendra (KVKs) and 10 agricultural research centres located at various parts of the state those are involved in R&D activities concerning agriculture sector in the state. The state-specific agricultural research systems are proposed to be revisited and reoriented to achieve desired goals for sustainable agriculture.

Various initiatives taken in the recent past have led to a reversal in the decline of quality in agricultural education and in some cases substantial improvement was effected but the situation presently is much below the expectations of the stakeholders (GOI, 2012a). The pace and quality of technology generation and human capacity building in most of the SAUs have slackened. There is need for integrating agricultural education with job creation, revision of course curricula for producing human resource that are professional service providers and address the demand of client groups. There is also a need to up-scale the technologies for large scale adoption in crops, livestock, horticulture, fisheries, agro-forestry and agro-processing sectors of agriculture, and women empowerment. The emergence of globalization in agriculture and challenges of climate change have necessitated to emphasize on raising the level of efficiency and resilience in agriculture that should be kept as the priority areas of agricultural research in the SAUs, KVKs and ATCs in the state.

As far as the quality and availability of extension services is concerned, there has been noticeable progress in the state. To strengthen the extension education system in the state, the Extension Education Institute (EEI) was established in 1962 in Anand which is one of the four premier institutes for training of extension personnel in India. With the

advent of green revolution, in 70s, the extension set up of the state was reorganized under National Agriculture Extension Project. The extension functionaries were made more specialized in agricultural technologies with full attention towards agricultural development through training and visit system. Afterwards, the extension workers have taken up a holistic farming system approach to fulfill the requirements of the farmers in the state under the broad based extension system that maintains close linkages and co-ordination with the line department and helps in need based and location specific production. As part of the system, the centrally sponsored scheme "Support to State Extension Programmes for Extension Reforms" is an ongoing scheme being implemented since 2005-06. Under the scheme, Agriculture Technology Management Agency (ATMA) is responsible for coordination and management of agricultural extension related work in the District. The State has also launched the state wide project namely Soil Health Card under the project, with which soil samples have been drawn and analyzed and soil health card have been provided to the concerned farmers in the state. Based on soil stratus, farmers have been advised to grow the suitable crops, and recommended fertilizers thereof.

Krushi Mahotsav (Farmers' Fair), an annual event since 2005, has further strengthened the agricultural extension in the state. The critical components of the *Mahotsav* include Krushi Mela, Exhibition Seminars/Talks and distribution of agricultural kits to the farmers. Experts from agricultural universities directly interact with farmers at the village level and area specific and crop specific issues and concerns of farmers are attended to. There are two kinds of schemes are implemented at the time of *Krushi Mahotsav.* They are individual beneficiary scheme and community beneficiary scheme. Under individual beneficiary scheme, the farmers are distributed agriculture kits, horticulture kits, animal husbandry kits, Soil Health Cards, Kishan Credit Cards, animal health check up and vaccination, provision of drip irrigation and tree sapling etc. under the community beneficiary scheme, the farmers community are benefitted by provision of check dams, village ponds, watersheds, establishment of new milk co-

operative societies and new credit co-operative societies and creation of model farms. During *Krushi Mahotsav 2012*, the numbers of farmers benefitted by agriculture kits, horticulture kits, animal husbandry kits, Soil Health Cards were 1.54 lakhs, 1.3 lakhs, 0.89 lakhs and 3.36 lakhs respectively. About 56 lakh farmers were benefitted by animal vaccination programme during the *Mahotsav* (GOG, 2012d). About 4196 check dams, 2784 village ponds and 1266 watersheds have been created during *Krushi Mahotsav* 2012. As a result of this programme, the state has achieved impressive growth. The *Mahotsav* has also led to heightened awareness amongst farmers about the advantages of scientific farming and animal husbandry, benefits of drip irrigation and built a bridge between agri-scientists and the farming community in the state.

2.11 Animal Husbandry, Dairying and Fisheries

Animal Husbandry is not only a subsidiary source of livelihood in rural Gujarat, it is a major economic activity, especially in the arid and semi-arid regions of the state. This sector plays a vital role in the rural economy of the state and has significant impact on employment generation for marginal, sub-marginal and landless farmers. The Eighteenth Livestock Census (2007) of India has placed total livestock population at 529.7 million and total of poultry birds at 648.8 million (GOI, 2009), out of which, there are 235.15 lakhs livestock (4.44%) and 133.52 lakhs poultry (2.06%) in the state of Gujarat. It may be seen from Table 2.22 that the milk production in the state has increased by 17.8 per cent (from 7911.73 thousand tonnes in 2007-08 to 9320.84 thousand tonnes in 2010-11). The growth in egg production has been better compared to milk production in the state. The egg production in the state has increased by 60.7 per cent from 8256.34 thousand tonnes in 2007-08 to 1269.23 thousand tonnes in 2010-11. The wool production has declined by 2.6 per cent during the corresponding period.

Table 2.22. Performance of Fisheries and Dairy Sector in Gujarat

Year	Milk Production ('000 Tonnes)	Eggs Production (In Lakh No.)	Wool Production ('000 Kgs.)
2007-08	7911.73	8256.34	2996.00
2008-09	8387.18	12675.2	2854.00
2009-10	8842.84	12761.9	2918.67
2010-11	9320.84	13269.2	2917.91
2011-12	9816.51	14269.2	2819.34
2012-13	10314.6	14558.4	2663.96
2013-14	11112.7	15550.2	2577.93

Source: GOG (2014)

The data presented in Table 2.23 indicate that the total fish production and its value in the state has increased by 41.9 per cent and 911.5 per cent during last two decades(1990-91 to 2010-11). Gujarat is the highest contributor of nation's marine exports both in terms of quantity as well as value. Gujarat holds the highest share in total fish production in the country with 22.35 per cent share during 2006-07. Gujarat contributes 30.71 per cent to nation's marine exports in quantity and 15.12 per cent as revenue. Gujarat exports more than 50 per cent of its marine product to China (GOG, 2012b).

Table 2. 23: Marine and Inland Fish Production

Year	Fish Production (in tonnes)			Value (Rs. crores)
	Marine	Inland	Total	
1990-91	500462	45687	546149	410.39
2000-01	620474	40261	660735	1374.10
2007-08	680848	78780	759628	2844.01
2008-09	683855	82047	765902	3063.23
2009-10	687445	84071	771516	3493.74
2010-11	688930	85972	774902	4151.05
2011-12	692488	91231	783719	4604.80
2012-13	693560	94930	788490	5130.68
2013-14	695580	102913	798493	5402.30

Source: GOG (2014)

2.12 Post Harvest Management and Value Addition

Agriculture has become demand driven rather than supply driven. It is essential to produce and process agricultural commodities keeping in view the changing pattern of taste and preferences. Though increase in agricultural production and productivity is the priority of the agriculture sector today, improved post-harvest handling and processing is essential to ensure high-quality products and further value addition. Value of agricultural output can be increased considerably by following improved methods of post harvest practices.

The agricultural food industry contributes nearly 35 per cent to GDP in India which is the second largest producer of food next to China. India is one of the largest producers of cereals and milk, cotton, fish, and psyllium husk; 2nd largest producer of rice, wheat, sugar, fruits and vegetables. The food processing industry in India ranks fifth in size, growing at 7 per cent annually.

Gujarat stands fourth in the country in terms of per capita agricultural output. The horticulture sector is the supplier for large number of agro based industries which has high avenues for generation of skill full employment and self employment opportunities both in rural and urban areas of the state. Better technology for post harvest management and market linkages are essential for increase in revenue from agro-products. The present scenario of existing and potential market linkages in the state reveals that there are no food parks in the state. Two food parks are planned at Hazira and Dahej. There are two Agri-Export Zones (AEZs) in the state. One is for mango and vegetables and another for onions. The AEZ for mangos and vegetables is in central and southern Gujarat where about half of total mango production is produced. There are about 25 processing units and 100 cold storages in the region (GOG, 2012b). Exports from this region are primarily to Middle East and UK. The AEZ for onions has about 18 units

out of which about 6 are HACCP certified. Onions in this zone are primarily exported in the dehydrated form to Europe and USA.

There are about 20 value addition centres (cold), 70 grading centres in the state. The processing units exist primarily for mango pulp, pickles, tomato ketchup, dehydration of onion and tutti-frutti. There are around total 16,400 food processing units in the state, out of which the total number of registered processing units is 56 with a capacity of 11.78 lakh quintals. Among these processing units, oilseeds processing, milk processing units, fruits and vegetable processing units and fish processing units are major ones. There are 185 cold storages in Gujarat having total capacity of 8.1 lakh metric tonnes, used primarily for potatoes and vegetables. The key issues with low level of processing in the state are poor post harvest infrastructure. It is estimated that Rs. 800 crores per annum are lost due to lack of post harvest infrastructure and processing (GOG, 2012b). The post harvest loss for various fruits and vegetables is between 25 per cent and 30 per cent. Thus it is import to strengthen and expand the existing post harvest infrastructure and processing units.

Chapter III

Allocation and Expenditure of RKVY Funds during XIth Plan

3.1 Introduction

Gujarat is one of the most industrialized states in India. In terms of agricultural development, Gujarat is known for the cultivation of tobacco, cotton, and groundnut. The net area sown was 103 lakh hectares of which 41 per cent was irrigated in 2011-12. The State Government had initiated many irrigation development programmes since early 2000s for improving the irrigation facilities. This along with reforms in the power sector led to considerable expansion of irrigated area in the state. Apart from the crop sector, Gujarat occupies an important place in development of dairy industry in the country. Milk production was 93.2 lakh tonnes with a share of about 7.6 per cent to national production in 2010-11. Although share of agriculture in the state income has declined over time, it still plays important role on overall economic growth. In fact, share of agriculture declined from 16.1 per cent in 2004-05 to 12.9 per cent in 2011-12. While the share of industry increased to 41.1 per cent from 40.0, contribution of services sector rose from 43.9 per cent to 46.0 per cent between the same period. With more or less stagnant industrial sector, agriculture still holds the key for socio-economic development of rural people in the state.

RKVY was launched in August 2007 with the objective of incentivizing the state Government of Gujarat to accelerate the growth in agricultural sector. The state government prepared comprehensive agricultural plans at the district and state level taking into account the felt needs of the farmers and other stake holders. These meant for facilitating the state government to prioritize the developmental activities and take up the investments accordingly to promote growth in agriculture and allied sectors. In addition to certain specific problems, RKVY has also provided

scope for launching projects for special needs of different areas within the state.

Table 3.1: Year over Year Growth in the Agricultural Economy of Gujarat

(at 2004-05 Prices)

Year	Growth in agricultural GSDP (%)	Growth in overall GSDP (%)	Net sown area (lakh ha)	Gross cropped Area (lakh ha)	Cropping Intensity (%)	Land Productivity* (Rs/ha)
2002-03	-6.8	8.1	95	106	112.1	26447
2003-04	39.9	14.8	99	114	115.9	35603
2004-05	-6.8	8.9	97	113	115.5	33555
2005-06	23.1	14.9	97	115	118.2	41413
2006-07	-0.7	8.4	98	118	120.5	40778
10th Plan Average	**9.7**	**11.0**	**97**	**113**	**116.5**	**35560**
2007-08	8.7	11.0	103	121	117.5	42182
2008-09	-7.2	6.8	103	117	113.1	39157
2009-10	-0.7	11.2	103	111	108.1	38868
2010-11	21.0	10.0	103	122	118.9	47042
2011-12	6.3	8.5	103	122	118.9	50015
11th Plan Average	**5.6**	**9.5**	**103**	**119**	**115.3**	**43453**

Source: Directorate of Economics and Statistics, GOI
Note:*land productivity = agricultural GSDP/ha of NSA**)**

The impact of RKVY can be seen from the growth in agricultural income and other related indicators at the macro level. Annual average growth in agricultural GSDP during the 10th plan was 9.7 per cent and in the 11th plan was 5.6 per cent (Table 3.1). Although the rate of growth appears to be lower during the 11th plan during which the RKVY was implemented, still it is highly remarkable given vagaries of rainfall pattern. It is also important to observe that out of five years, three years registered negative growth in agricultural GSDP during the 10th plan while only two years showed negative growth during the 11th plan. Further, average net sown area increased from 97 lakh hectare to 103 lakh hectare between the 10th plan and 11th plan. Gross cropped area also

increased from 113 lakh hectare to 119 lakh hectare during same period. The per hectare land productivity showed increasing trend from Rs. 26447 in 2002-03 to Rs. 40778 in 2006-07 and then to Rs. 50015 in 2011-12. It is clear from the analysis of these outcome indicators that the performance of agriculture in Gujarat during the 11th plan was relatively good.

3.2 Allocation and Expenditure of RKVY Funds (XIth Plan)

Enhanced public investment accelerates growth in agricultural sector. Under RKVY, state governments are given flexibility to design the development projects for improving the conditions of the farming. In the state of Gujarat, 330 projects were implemented during the XI Five Year Plan (Table 3.2). These projects are spread across 19 sectors and have accounted for total expenditure of Rs. 2018.83 crore. The expenditure incurred under different sectors indicates the priority given by the State Government to these sectors for achieving high growth rate in the agriculture. Apart from total expenditure for each sector, per project expenditure has been worked out to examine the magnitude of expenditure incurred on projects implemented across sectors in the state. It can be observed that there are sectors with a few projects with higher amount of expenditure and vice versa. This indicates the level of scatter or concentration of projects and expenditure across the sectors in the states.

It is clear from the Table 3.2 and Figure 3.1 that natural resource management has accounted for the highest proportion of expenditure (26 per cent) followed by marketing and post harvest management (11per cent), and agricultural mechanization (9 per cent). Combining these with expenditure on crop development (7.2 per cent), animal husbandry (6.5 per cent), dairy development (6.2 per cent) and horticulture (5.5 per cent), total amount spent on all these projects constituted about 70 per cent of the total expenditure on agriculture and allied sectors under RKVY. Natural resource management appears to be an important sector for the State Government of Gujarat and it has covered activities like water

conservation structures and watershed development, land reclamation and treatment for acidic, alkali and water logged soils.

Table 3.2: Sector-wise Expenditure under RKVY in Gujarat during 11th FYP

Sectors	No. of projects	% of project	Expenditure (Rs. crore)	% of expenditure	Expenditure per project (Rs. crore)
Animal Husbandry	45	13.6	131.40	6.5	2.9
Natural Resource Management	36	10.9	522.21	25.9	14.5
Horticulture	32	9.7	111.81	5.5	3.5
Seed	30	9.1	63.37	3.1	2.1
Crop Development	28	8.5	146.03	7.2	5.2
Dairy Development	25	7.6	124.42	6.2	5.0
Marketing & PHM	24	7.3	214.51	10.6	8.9
Others	18	5.5	133.67	6.6	7.4
Agriculture Mechanization	14	4.2	172.82	8.6	12.3
Research	11	3.3	50.24	2.5	4.6
Organic Farming / Bio Fertilizer	11	3.3	115.58	5.7	10.5
Integrated Pest Management	10	3.0	34.11	1.7	3.4
Fertilizers & INM	10	3.0	25.33	1.3	2.5
Extension	9	2.7	18.42	0.9	2.0
Micro/Minor Irrigation	9	2.7	78.85	3.9	8.8
Fisheries	8	2.4	41.30	2.0	5.2
Non Farm Activities	6	1.8	24.59	1.2	4.1
Sericulture	2	0.6	0.57	0.0	0.3
Cooperatives And Cooperation	2	0.6	9.60	0.5	4.8
Grand Total	**330**	**100**	**2018.83**	**100**	**6.1**

Source: http://www.rkvy.nic.in/

The average expenditure per project was also found be high at Rs. 14.5 crore under natural resource management. The average expenditure per project under agricultural mechanization was the second highest with Rs. 12.3 crore followed by organic farming/bio-fertilisers with Rs. 10.5 crore. There were nine projects implemented under micro/minor irrigation and per project average expenditure Rs. 8.8 crore. However, in case of marketing and post harvest management, there were 24 projects implemented with average expenditure of Rs. 8.9 crore per project.

3.3 Trends in Budgetary Expenditure

Trend in various indicators of agricultural development showed that the agriculture in the state of Gujarat has more or less performed consistently over time. In fact, land productivity has almost doubled from 2002-03 to 2011-12. This consistent performance can be attributed to increase in public investment made through state budgetary resources. The allocation of financial resources under RKVY to various states is contingent upon the enhanced allocation of resources on agriculture in the state budget. It can be observed from Table 3.3 that state total expenditure in agriculture increased from Rs. 3747 crore in 2002-03 to Rs. 4991 crore in 2006-07. The total expenditure during the 10th plan was Rs. 20853 crore. However, in 2007-08 total expenditure was Rs. 4720 crore, which increased to Rs. 6094 crore in 2011-12 with overall amount of Rs. 28719 crore during the 11th plan. Interestingly, there was about 37.7 per cent jump in expenditure between the 10th plan and the 11th plan.

The capital expenditure in agriculture showed increasing trend over time. The rise in capital expenditure is a good sign and it is likely to sustain the growth momentum in agriculture. Total capital expenditure during the 10th plan was Rs. 11052 crore, which increased considerably by 61.4 per cent to reach Rs. 17838 core during the 11th plan. The revenue expenditure increased by 11 per cent only. However, share of agricultural expenditure in the total state budget was lower during the 11th plan than its share in the

10th plan. The corresponding share was 19.6 per cent and 21.7 per cent. In terms of share of total expenditure in agricultural GSDP, it increased marginally from 12.3 per cent in the 10th plan to 13.0 per cent in the 11th plan. The share of agricultural expenditure in agricultural GSDP was 10.9 per cent in 2007-08, which increased to 19.0 per cent in 2008-09 and thereafter showed declining trend. Although total expenditure in agriculture increased in absolute terms, per cent share in total state budget and agricultural GSDP was not significantly high.

Table 3.3: Trend in Budgetary Expenditure on Agriculture and Allied Sector (at 2004-05 prices)

Year	Revenue expenditure (Rs crore)	Capital expenditure (Rs crore)	Total (Rs. Crore)	Total State budget (Rs crore)	% agri. Expenditure to State budget	% agri. Expenditure to agri GSDP	Percentage of RKVY expenditure to agri. expenditure
2002-03	2748	999	3747	16400	22.8	14.9	
2003-04*	3145	2285	5430	19315	28.1	15.5	
2004-05	1312	1877	3188	18150	17.6	9.7	
2005-06	1232	2266	3497	20001	17.5	8.7	
2006-07	1365	3626	4991	22117	22.6	12.5	
10th Plan	**9802**	**11052**	**20853**	**95982**	**21.7**	**12.3**	
2007-08	1798	2922	4720	22622	20.9	10.9	
2008-09	2131	5537	7668	28840	26.6	19.0	
2009-10	2500	3083	5582	30569	18.3	13.9	
2010-11	1897	2758	4655	32466	14.3	9.6	**3.9**
2011-12*	2556	3538	6094	33928	18.0	11.8	
11th Plan	**10882**	**17838**	**28719**	**148425**	**19.6**	**13.0**	
% change over 10th plan	**11.0**	**61.4**	**37.7**	**54.6**			

Source: State Finances, RBI

Note: *Revised estimates, rest all accounts. Agriculture and allied activities includes irrigation and flood control. Budgetary expenditure is accounts only Developmental expenditure. Percentage of RKVY expenditure to agriculture expenditure=RKVY expenditure/agriculture expenditure*100.

3.4 Recent Trends in Input use

Trend in input use in Gujarat is given in Table 3.4. The availability as well as intensity of use of important inputs such as irrigation, fertilisers and seeds determines the level of crop output. Net irrigated area showed increasing trend overtime. The net irrigated area increased from 32.1 per cent in 2002-03 to 41.1 per cent of net sown area in 2011-12. The average net irrigated area to net sown area was 37.2 per cent in the 10th plan and 41.7 per cent in the 11th plan. Similarly, gross irrigated area to gross sown area was 38.9 per cent during the 10th plan and 43.3 per cent in the 11th plan. There is considerable increase in irrigated area during the 11th plan, which may be attributed to irrigation development works carried out through natural resource management and micro/minor irrigation projects. In fact, amount spent under these sectors was relatively high.

Table 3.4: Trend in Inputs Use in Gujarat

Years	Net irrigated Area (lakh ha)	Gross irrigated Area (lakh ha)	% net irrigated to net sown area	Irrigation intensity (%)	%gross irrigated to gross sown area	Fertilizer consumption (Kg/ha of GCA)
1	2	3	4	5	6	7
2002-03	30.5	36.4	32.1	119.4	34.2	77.7
2003-04	33.9	41.1	34.4	121.3	36.0	94.7
2004-05	35.3	42.8	36.2	121.3	38.0	99.5
2005-06	39.1	47.6	40.2	121.9	41.4	111.1
2006-07	42.4	52.8	43.2	124.6	44.7	113.2
X Plan Average	36.2	44.1	37.2	121.7	38.9	99.2
2007-08	43.4	56.1	42.1	129.5	46.4	132.8
2008-09	43.4	53.1	42.1	122.5	45.6	140.5
2009-10	43.4	49.3	42.1	113.6	44.2	147.2
2010-11	42.3	56.2	41.1	132.7	45.9	174.1
2011-12	42.3	42.3	41.1	100.0	34.6	155.6
XI Plan Average	42.9	51.4	41.7	119.7	43.3	150.0

Note: Column 4 = Net irrigated area /Net sown area*100; Column 6= Gross irrigated area /Gross cropped area*100
Source: Directorate of Economics and Statistics, GOI.

3.5 Recent Trends in Crop Production

It can be observed from Table 3.5 that yield of most crops in the state registered considerable growth rates. Barring other pulses, castor, sugarcane and total fibres, all other crops registered positive growth in yield during the 11th plan as compared to 10th plan period. However, many crops registered negative growth in area during the 11th plan. Despite a fall in area, a higher growth in yield resulted in appreciable growth in production of most crops. Except other pulses, rapeseed & mustard, castor, total fibres and sugarcane, all other crops recorded a positive growth in production. In case of rapeseed &mustard, and castor, fall in both area and yield led to negative growth in production. A similar pattern was also observed for other pulses and total fibres.

Table 3.5: Average Annual Growth in Area, Production and Yield of Major Crops (Per cent)

Particulars	X Plan			XI Plan		
	Area	Production	Yield	Area	Production	Yield
Rice	4.6	19.3	7.7	3.0	5.8	2.9
Wheat	24.0	31.9	2.2	4.7	11.7	5.1
Jowar	-6.4	-5.0	-0.1	1.7	9.7	7.9
Bajra	0.3	2.0	-0.4	-0.1	6.5	6.4
Maize	3.3	-11.1	-14.8	0.5	21.8	24.7
Ragi	-2.4	-6.4	-2.0	2.5	10.0	7.0
Small Millets	40.2	149.9	34.3	31.7	67.9	17.4
Coarse Cereals	0.6	-4.8	-6.5	0.0	10.5	10.5
Total Cereals	6.2	11.6	2.5	1.9	9.2	6.0
Gram	48.5	86.7	13.1	2.8	9.9	5.9
Arhar/Tur	-2.3	4.8	8.7	-3.1	4.8	8.8
Other Pulses	7.1	13.8	2.4	-20.0	-5.4	-5.6
Total Pulses	7.7	15.2	5.7	-0.1	8.0	8.1
Total Foodgrains	6.5	11.9	2.7	1.4	9.1	6.5
Groundnut	-1.1	42.9	45.1	-0.9	29.8	29.4
Sesamum	-0.9	-6.0	-8.9	-5.5	20.8	28.4
Rapeseed & Mustard	12.7	22.8	4.6	-9.9	-6.4	5.0
Castor	0.2	10.9	7.3	-8.2	-6.1	-18.3
Soyabean	60.0	45.8	-3.9	1.4	17.9	14.1
Total Oilseeds	0.1	29.4	25.8	2.2	21.4	18.3
Total Fibres	7.1	45.7	38.4	-18.0	-15.4	-17.8
Sugarcane	4.5	5.0	0.6	0.5	-3.4	-2.4

Source: Directorate of Economics and Statistics, GOI (2012-13)

3.6 Recent Trends in Livestock Production

Animal husbandry and dairying is an important sub-sector within agriculture and its contribution has been increasing overtime. Changes in consumption pattern to animal based products and rising income have led to intensification of animal production activities. Notwithstanding, livestock rearing is a major livelihood activity in dry land regions of the state. Gujarat is well known for leading the way for milk revolution in the country through cooperative model of milk marketing. Milk production in the state registered a respectable growth rates during the X plan and XI plan (Table 3.6). The annual average growth in milk during the X plan was 5.2 per cent, which increased to 5.5 per cent during the XI plan. The growth in milk production during 2007-08 to 2010-11 was more or less consistent as compared to the previous period.

Table 3.6: Average Annual Growth in Production of Livestock Products and Fishery (Per cent)

Year	Milk	Meat	Egg	Fish
2002-03	3.9	0.0	4.0	10.9
2003-04	5.5	0.0	15.5	-15.8
2004-05	5.0	18.2	13.2	-3.0
2005-06	3.2	38.5	14.8	15.5
2006-07	8.2	0.0	34.3	1.8
10th plan	**5.2**	**11.3**	**16.4**	**1.9**
2007-08	5.0	-5.6	6.4	-3.4
2008-09	6.0	11.8	53.5	6.1
2009-10	5.5	10.5	0.7	0.7
2010-11	5.4	4.8	4.0	0.4
2011-12	-	-	-	1.1
11th plan*	**5.5**	**5.4**	**16.2**	**1.0**

Source: BAHS, www.Indiastat.com
Note: *For Milk, Meat and Egg 2011-12 data are not available

Annual growth in meat and eggs production was also appreciable in the state. In particular, growth rates were considerably higher during the

recent years. Overall, analysis of data at the macro level shown that the performance of agriculture and allied sectors was reasonably good during the XI plan where the RKVY was introduced as compared to the X plan period.

Chapter IV

Socio-Economic Profile of Selected Households

4.1 Socio Economic Profile of the Sample Households

The number of districts, taluks, villages and beneficiary households selected for field survey is given in Table 4.1. In Gujarat, 8 districts were covered for survey. They were Anand, Ahmedabad, Bhavnagar, Junagarh, Panchmahal, Sabarkantha, Tapi and Kutch. From these districts, 16 taluks were selected based on the intensity of RKVY interventions. From these sample districts, 80 villages were selected based on coverage of various interventions under the programme. The list of beneficiary households compiled from the state RKVY Nodal Officer/respective line departments were utilized for interviewing of the farmers. Overall, 422 beneficiary farmers were interviewed from the selected villages (Table 4.1).

Table 4.1: Details on Selected Households in Gujarat

Particulars	Number
No. of Districts Covered	8
No. of Taluks covered	16
No. of Villages Covered	80
No. of Beneficiaries Covered	422

Source: Field survey data.

The distribution of selected RKVY beneficiary farmers across sectors is given in Table 4.2. However, some of the sample households benefited from more than one programme implemented under RKVY and hence the number has increased to 467. The highest proportion of farmers surveyed benefited from agriculture mechanization followed by crop development activities. Thus, more than 78 percent of farmers have benefited under these two projects. Around 14 per cent each of total sample farmers benefited from horticulture and micro/minor irrigation projects. Farmers benefited under animal husbandry constituted about 3.3

per cent. Only one farmer beneficiary was found to be covered under natural resource management/ organic farming/bio fertilizers and under cooperatives and cooperation. Although number of projects implemented and amount spent was relatively high for natural resource management activities followed by animal husbandry activities at the macro level, it appeared that not many recorded beneficiaries were found in the field. It is because there were overlapping or same kind of activities carried out under micro/minor irrigation and natural resource management. Many of the beneficiaries may possibly be classified under the natural resource management activities.

Table 4.2: Sectorwise Distribution of Selected Households (broad classification)

Sl. No.	Sectors	% of total beneficiaries	% of total beneficiaries (Multiple entries)*
1	Agriculture Mechanization	52.8	53.3
2	Animal Husbandry	2.8	3.3
4	Crop Development	21.8	25.4
5	Horticulture	10.4	14.5
7	Micro/minor Irrigation	11.6	13.7
8	Natural Resource Management	0.2	0.2
9	Cooperatives and Cooperation	0.2	0.2

Note: Some Sample households benefited from more than one programme implemented under RKVY.
Source: Field survey data.

The distribution of sample beneficiaries by age groups is provided in Table 4.3. It can be observed that over 50 per cent of the beneficiaries belonged to age group between 40 and 60 years. About a quarter of sample farmers were in the age group of above 60 years. Only 20 per cent of farmer beneficiaries belonged to age group of less than 40 years. It is understandable that only older age population is involved in agriculture, which has implication for the adoption of modern agricultural technologies. Further, over 90 per cent of the respondents were male, while the remaining were female respondents/beneficiary farmers in the state of Gujarat.

Table 4.3: Age and Gender classification of Sample Beneficiaries

(Percentage to total sample)

Sr. No.	Category	Percent
1	Age Below 40 Years	20.4
2	Age Between 40 to 60 Years	54.3
3	Age Above 60 years	25.4
4	Total	100.0
5	Male	90.8
6	Female	9.2

Source: Field survey data.

For assessing the extent of reach of RKVY interventions to different sections of society, it is important to understand the distribution of farmer beneficiaries by social groups in the state. Among social categories, others/General constituted about 58 per cent of the total sample beneficiaries (Table 4.4). The OBC beneficiary farmers accounted for the next highest proportion with 31 per cent. The ST farmers constituted about 8 per cent, while the SC beneficiary farmers accounted for 4 per cent only. It implies that the programme as largely benefitted the dominant caste groups, while socially backward farmers have been neglected.

Table 4.4: Classification of Beneficiaries based on Caste

(Percentage to total sample)

Sl. No.	Category	Per cent
1	SC	3.8
2	ST	7.8
3	OBC	30.8
4	Others/General	57.6
	Total	100.0

Source: Field survey data.

Information related to educational status of sample beneficiaries is given in Table 4.5. Illiterate farmers accounted for about 26 per cent of the sample beneficiary farmers in the state of Gujarat. However, it is interesting to observe that over 50 per cent of the sample beneficiaries educated up to matriculation/secondary level. About 10 per cent of the beneficiaries studied up to higher secondary level. The sample beneficiaries received degree and above degree constituted 6 per cent and 4 per cent of sample beneficiaries, respectively.

Table 4.5: Classifications of Sample Beneficiaries based on Education Status

(Percentage to total sample)

Sl. No.	Category	Per cent
1	Illiterate	25.6
2	Primary	22.4
3	Middle	18.0
4	Matriculate	14.8
5	Higher Secondary	10.0
6	Degree	5.6
7	Above Degree	3.6
	Total	100.0

Source: Field survey data.

Table 4.6 provides occupation details of the sample beneficiaries in Gujarat. The average family size was worked out at 6.9. Average number of household members engaged in farming activities was estimated at three members. It can be observed that 95 per cent of the sample beneficiaries involved in agriculture and allied activities. Out of total sample households, 3.3 per cent of them were engaged in service sectors, 0.7 per cent in self business and one per cent in other activities. Analysis of occupation details revealed that the diversification of occupation among farm households appear to be limited. Further, despite the industrialization drive in the state of Gujarat, vast majority of rural population are still involved in agriculture and related activities only.

Table 4.6: Occupation details of Sample Beneficiaries

Sl. No.	Category	Per cent
1	Average Family Size (Nos.)	6.9
2	Average No. of members working in Agriculture (Nos.)	3.2
3	Occupation details	
a)	Agriculture and allied Activities (%.)	95.0
b)	Self business (%.)	0.7
c)	Service (%.)	3.3
d)	Others (%)	1.0
	Total (%)	100.0

Source: Field survey data.

4.2 Land Holding Pattern of the Sample Households

Land holding pattern of the sample households are analysed and presented in Table 4.7. It can be observed that almost all sample household beneficiaries owned some amount of land. Only 0.2 per cent of the non-land owning sample respondents benefitted from the RKVY interventions. Average land owned per household was 9.1 acre. However, average operational area of the sample households was 9.4 acre. Out of this operational area, about 86 per cent was irrigated and remaining was dry land. Cropping intensity was worked out at 120 per cent. It appears from the analysis of land holding pattern of sample beneficiaries that RKVY has largely benefitted land owning farmers and that too irrigated regions of the state.

Table 4.7: Land holding details of sample beneficiaries

Sl. No.	Category	Per cent
1	Beneficiaries owning Land (%)	99.8
2	Owned land per households (Acres)	9.1
3	Operational area (irrigated) per HH in Acres	8.1
4	Operational area (un-irrigated) per HH in Acres	1.3
5	Operational area (irrigated +un-irrigated) per HH in Acres	9.4
6	Cropping intensity	120

Source: Field survey data.

4.3 Sources of Irrigation for Sample Households

The proportion of net area irrigated by sources of irrigation is provided in Table 4.8. Among sources of irrigation, tube well emerged as the dominant source irrigating about 53.6 per cent of the net operated area in the state. Open well was the second major source of irrigation with 32.2 per cent of net operated area. In fact, open well and tube well together have accounted for about 85.8 per cent of irrigate area in the state of Gujarat. The third important source of irrigation of the sample farmers was canal water, whose share was 9.4 per cent of the irrigated area. Tanks constituted less than one per cent, while other sources accounted for about 4.4 per cent. Overall, groundwater was the important source of irrigation to the sample beneficiary farmers in Gujarat.

Table 4.8: Sources of Irrigation

(percentage of area irrigated)

Source	Category	Per cent
Open well	Beneficiaries covered	34.1
	Area irrigated	32.2
Tube well	Beneficiaries covered	51.7
	Area irrigated	53.6
Canal	Beneficiaries covered	5.6
	Area irrigated	9.4
Tank	Beneficiaries covered	1.8
	Area irrigated	0.4
Others	Beneficiaries covered	6.7
	Area irrigated	4.4

Source: Field survey data.

4.4 Land Holding Size distribution

From the point of view of analyzing the extent of reach of RKVY interventions, it is also important to examine the distribution of sample beneficiaries by farm size groups. Based on the size of operated area,

farmer households were grouped in four categories viz., marginal farmers (less than 2.5 acres), small farmers (2.5 to 5.0 acres), medium farmers (5.0 to 10.0 acres) and large farmers (more than 10.0 acres). This grouping of farmers was carried out after the data were collected in order to understand which type of farmers benefited more from the RKVY interventions. It can be seen from the Table 4.9 that medium and large farmers constituted about 31 per cent and 30.1 per cent of total sample beneficiaries, respectively. These farmers group accounted for about 87.4 of the sample operated area. The marginal farmers constituted about 12.1 per cent, while small farmers about 26.3 per cent. The proportion of area operated by marginal farmers was 2.3 per cent and for small farmers it was 10.4 per cent. It is clear from the analysis that RKVY interventions have largely benefited the medium and large farmers. These farmers are influential at local level and have close link with the officials of the Department of Agriculture. These influential farmers could extract maximum level of benefits from the implementation of RKVY in the state.

Table 4.9: Distribution of Beneficiaries by Farm Size Holdings

(Percentage)

Particulars	Category	Per cent
Without Land (%)		0.5
Marginal	No.	12.1
	Area	2.3
Small	No	26.3
	Area	10.4
Medium	No.	31.0
	Area	24.8
Large	No.	30.1
	Area	62.6
Total	No.	100.0
	Area	100.0

Source: Field survey data.

4.5 Details on holding of Livestock and Farm Assets

Details about the number of livestock owned and its market value were captured for the sample beneficiary famers through field survey. Distribution livestock and its average value are provided in Table 4.10. Most sample farmers owned cow, buffalo and their youngstock. Average herd size of cow was 1.6 and for buffalo it was 1.3. Average herd size of youngstock was 1.4. The average value of cow was estimated at Rs. 45,901 and value of buffalo was Rs. 38,597. The sample farmers also owned draught animals particularly in dry land areas like Kutch. Average herd size was 0.4 and average value was Rs. 5728. Sample farmers also reared sheep, goat, pig and poultry.

Table 4.10: Livestock Holding by Sample Households

(No/Value per household)

Particulars	Livestock holding	
	No.	Value
Cow	1.6	45901
Buffalo	1.3	38597
Youngstock	1.4	4867
Male draught	0.4	5728
Sheep	0.1	202
Goat	0.0	91
Pig	0.1	126
Poultry	0.4	52
Others	0.2	2741
Total	5.4	98305

Source: Field survey data.

Ownership of the farm assets indicates the economic status of sample farm households in the state of Gujarat. Farm asset holding by sample households is given in Table 4.11. The sample households had tractor and related equipments, weedeer, sprayers, thresher, pumpsets, irrigation equipments and agro-processing machineries. Among these machineries and equipments, average value of tractor was the highest at Rs.

199008 and the average number was 0.6 tractors. Interestingly, almost all the sample households owned manual/power sprayers. Similarly, all households had weeder with average value of Rs. 2907 per household. A few sample farmers also owned cane crusher with average value of Rs. 50210 and rice flour mills with average value of Rs. 35382.

Table 4.11: Farm Assets Holding by Sample Households

(No./Value per household)

Particulars	No.	Per cent
Tractor	0.6	199008
Trolley / Trailer and other implements	1.0	55484
Weeder	1.1	2907
Manual / Power Sprayers	0.9	102180
Threshers	0.4	10180
Electrical Pumpsets	0.3	33959
Diesel Pumpsets	0.1	366
Sprinkler sets / Drip Irrigation Equipments	0.2	4063
Cane Crusher / Agro-processing Equipments	0.6	50210
Rice flour mills	0.6	35382
Fodder Choppers	0.0	71
Bullock cart	0.0	0
Farm house (Cattle Shed)	0.0	0
Others	0.0	0
Total	5.8	493811

Source: Field survey data.

4.6 Cropping Pattern of Selected households

Cropping pattern of sample households is provided in Table 4.12. It can be observed that cotton occupied the highest proportion of the gross cropped area followed by wheat, paddy and groundnut. Out of the gross cropped area, cotton accounted for 19.1 per cent, wheat 14.5 per cent, paddy 13 per cent and groundnut 8.4 per cent. Area of these four crops taken together constituted about 55 per cent of the gross cropped area. Other oilseeds, pulses and spices accounted for 8.2 per cent, 5.9 per cent

and 5.0 per cent of total cropped area, respectively. The proportion of area under jowar, bajra and maize was 4.2 per cent, 4.3 per cent and 2.8 per cent, respectively. It was observed in the field, area under coarse cereals has been declining over time. There is considerable diversion of area for growing of vegetables with 5.9 per cent and fruits with 2.8 per cent of total area. Farmers also allocated considerable proportion of area under fodder crops with 4.3 per cent for feeding of dairy animals. Area under pulses was low at 2.5 per cent only. The proportion of area allocated for cultivation of gram was 1.2 per cent and for growing of tur was 0.8 per cent only.

Table 4.12: Cropping Pattern among Selected Households

(% to gross cropped area)

Sl. No.	Crop	% to gross cropped
1	Paddy	13.0
2	Wheat	14.5
3	Jowar	4.2
4	Bajra	4.3
5	Maize	2.8
6	Tur	0.8
7	Gram	1.2
8	Other pulses	0.5
9	Groundnut	8.4
10	Soybean	0.1
11	Other Oilseeds	8.2
12	Cotton	19.1
13	Sugarcane	1.5
14	Fruits	2.8
15	Vegetables	5.9
16	Spices	5.0
17	Plantation	0.0
18	Fodder	4.3
19	Others	3.5
	Total	100.0

Source: Field survey data.

4.7 Details on Sources of Household income

Occupational diversification of sample households can be analysed from the share of household income from different activities. It is possible that one or two household members are engaged in non-farm activities and/or agricultural activities. It can be seen from Table 4.13 that income

from agriculture, that is crop cultivation, constituted the highest share of 71.3 per cent. Allied activities such as animal husbandry, dairying and small ruminants contributed about 17.8 per cent of the total household income. Interestingly, share of income from non-agricultural activities was 10.8 per cent. It is clear that agriculture and allied sectors still contributes a higher proportion of household income of the sample beneficiary households.

Table 4.13: Details of Household Income from various Sources

(Rs per household)

Sr. No.	Sources of households income (2012-13)	Amount (Rs)	Percentage
1	Agriculture per HH (Rs.)	195224	71.3
2	Allied activities per HH (Rs.)	48869	17.8
3	Non-agri activities per HH (Rs.)	29701	10.8
4	Aggregate all sources	273794	100.0

Source: Field survey data.

Further, it is also important to understand the details of area, productivity and net returns from crop cultivation at the aggregate level of sample farmers. The average cultivated area per household was 9.4 acre indicating that medium and large farmers have benefitted mostly from the RKVY interventions (Table 2.14). Average value of production per acre was estimated at Rs.34138 and cost of cultivation at Rs. 12939. Net income was worked out at Rs. 21199 per acre. It is clear that crop cultivation among the sample beneficiary farmers was profitable.

Table 4.14: Details of Area, Productivity and Net Returns (2012-13)

Sr. No.	Category	Share/Value
1	Cultivated area Per HH (Acres)	9.4
2	Value of Production Per Acre (Rs)	34138
3	Cost of Cultivation Per Acre (Rs)	12939
4	Net income Per Acre (Rs)	21199

Source: Field survey data.

4.8 Level of Crop Yield

Crop profitability is determined by, among others, crop yield, input cost and output price. Yield of major crops grown by sample beneficiary farmers is provided in Table 4.15. Average reported yield of cereals is really appreciable. Among crops, average yield of paddy was 37.8 quintal and 19.6 quintal for wheat. Although area under coarse cereals was low, yield was considerably high. Average yield of jowar was 24.8 quintal, maize 29.5 quintal and bajra 17.5 quintal. Among pulses, yield of tur was 2.5 quintal and that of gram was 6.1 quintal. In case of oilseeds, reported yield of groundnut was 6.3 quintal. Among commercial crops, yield of sugarcane was as high as 143 quintal and cotton 8.2 quintal.

Table 4.15: Crop Yield among the Selected Households (Quintals per acre)

Sl. No.	Crop	Yield (Qtl/acre)
1	Paddy	37.8
2	Wheat	19.6
3	Jowar	24.8
4	Bajra	17.5
5	Maize	29.5
6	Ragi	0.0
7	Minor Cereals	0.0
8	Tur	2.5
9	Gram	6.1
10	Other pulses	5.5
11	Groundnut	6.3
12	Sunflower	0.0
13	Soyabean	4.8
14	Rape & Mustard	0.0
15	Other Oilseeds	9.7
16	Cotton	8.2
17	Jute & Mesta	0.0
18	Sugarcane	143.3
19	Fruits	119.2
20	Vegetables	60.3
21	Flowers	30.0
22	Spices	6.0
23	Plantation	21.1
24	Fodder	77.5
25	Forest species	0.0
26	Others	37.6
	Total	27.4

Source: Field survey data.

Crop profitability per acre is presented in Table 4.16. Among crops, profitability from the cultivation of flowers, plantations, fruits and vegetables was relatively high. Profitability from the cultivation of flower was the highest at Rs. 90000 per acre. Average profitability of cotton cultivation was estimated at Rs. 18660 per acre and that of paddy and wheat was Rs. 14040 and Rs. 12760 per acre. Profitability of bajra was Rs. 14866 and for maize it was Rs. 9461 per acre. Per acre profitability of groundnut was Rs. 11586. For tur and soybean, profitability was estimated low. Although cultivation of horticultural crops is capital as well as labour intensive, profitability is higher than field crops.

Table 4.16: Crop Profitability among the Selected Households (Rs per acre)

S. No	Crop	Profitability (Rs/acre)
1	Bajra	14866
2	Sugarcane	14369
3	Paddy	14040
4	Other pulses	13704
5	Wheat	12760
6	Groundnut	11586
7	Maize	9461
8	Gram	7595
9	Jowar	7341
10	Tur	6420
11	Soyabean	4643
12	Flowers	90000
13	Plantation	50602
14	Fruits	46158
15	Vegetables	39489
16	Other Oilseeds	24128
17	Spices	23679
18	Others	21115
19	Cotton	18660
20	Fodder	15352
	Total	**18065**

Source: Field survey data.

4.9 Awareness about RKVY programme

Before analyzing the impact of RKVY interventions on different sub-sectors of agriculture, it is important to examine the awareness about the programme by the farmer beneficiaries. As part of detailed information collected to know about extent of reach of the programme and its benefits to the intended beneficiaries, farmers were asked whether they were aware of about the RKVY. It can be observed from the Table 4.17 that like any other agricultural development programmes, majority of the sample farmers did not know about the RKVY. Only a limited proportion of the sample farmers mentioned that they were aware of the RKVY under which they received some benefits.

Table 4.17: Awareness about RKVY Programme

% Beneficiaries Aware of RKVY (% to sample size)		38.8
Source of awareness (% of beneficiaries to beneficiaries who are aware)	News Paper	2.4
	Agri Dept	69.3
	SAU	0.2
	KVK	0.2
	Friends	25.5
	Input suppliers	0.2
	Agri Exhibitions	1.2
	ZP / TP /GP	1.0
	Total	100.0

Source: Field survey data.

Lack of awareness can be attributed to low level of literacy among farmers and lack of promotional activities from the Department of Agriculture and other related departments.

Notwithstanding, source of information about the programme was asked from the farmers who had some knowledge about the RVKVY activities. Among the sources, agriculture department emerged as the most important source of information. It can be observed that 69 per cent of reported beneficiary farmers mentioned agriculture department as the main source of the information. The next important source was friends within the village and about 25.5 per cent of the farmers mentioned them a source of information about RKVY. About 2.4 per cent of reported farmers mentioned news paper as the source of information.

CHAPTER V

RKVY Interventions in the Major Sectors & their Impact

5.1 Interventions under Mechanization

Distribution of agricultural machineries under mechanization, a subcomponent of RKVY, and subsidy details are given in Table 5.1. Out of sample beneficiary households, about 53.3 per cent availed the benefit under mechanization. The average cost of agricultural machineries per household was estimated at Rs. 49343. The proportion of subsidy at the aggregate level was Rs. 20233, which accounted for 41 per cent of the cost. It can be observed that the highest proportion of sample farmers received subsidy for purchase of rotavator (17.8 per cent) followed by sprayer (8.1 per cent) and pumpset (6.4 per cent). About 4 per cent of the sample farmers availed subsidy for purchase of thresher. Among machineries, average cost was relatively high for land development equipment like laser leveler at Rs. 350000. Similarly, average cost of rotavator was Rs.76099, for harrow Rs. 34000 and for seed drill Rs. 31400. Average amount of subsidy on agricultural machineries varied from Rs. 1306 to Rs. 180000. In terms of per cent share of subsidy in cost of machineries, it varied from 17.9 per cent to 51.4 per cent. The share of subsidy was the highest for laser leveler machine and lowest for thresher. Sample farmers also received subsidy close to 50 per cent on purchase of machineries/equipments such as cutters, pumpset, other water lifting implements (drip/sprinkler system) and other equipments. Average subsidy on rotavator and sprayer was 40 per cent and 42.4 per cent, respectively. It can be seen that except pumpset and rotatvator, almost all machineries distributed under RKVY were reportedly in working conditions. The sample farmers mentioned that 85 per cent of pumpsets and 97.3 per cent of rotavator were in working conditions as there seems to be some problems in the quality of these machineries distributed under subsidy scheme.

Table 5.1: Interventions made under Agricultural Mechanisation - Implement details

Sl No	Name of the implements	% Power operated	% of Beneficiaries availed	Average Cost (Rs. Per HH	Average Subsidy (Rs. Per HH)	Subsidy as a per cent of cost	% of equipment in working condition
1	Rotavator	96.0	17.8	76099	30422	40.0	97.3
2	Cultivators	100.0	1.4	16650	7246	43.5	100.0
3	Ploughs	100.0	1.9	30239	12548	41.5	100.0
4	Harrow	100.0	0.2	34000	15000	44.1	100.0
5	Other land development, tillage & seed bed preparation equipments	100.0	0.5	350000	180000	51.4	100.0
6	Seed drill	100.0	1.2	31400	13300	42.4	100.0
7	Sprayers	20.6	8.1	3081	1306	42.4	94.1
8	Cutters	100.0	0.7	25667	12833	50.0	66.7
9	Thresher	100.0	4.0	67176	12000	17.9	100.0
10	Pumpset	88.9	6.4	13426	6589	49.1	85.2
11	Other Water lifting implements	100.0	1.2	26600	13144	49.4	100.0
12	Others	88.1	10.0	55776	27498	49.3	97.6
	Total	83.1	53.3	49343	20233	41.0	95.6

Note: *% of beneficiaries to total may not tally with figures presented earlier due to multiple entries within sector.
Source: Field survey data.

Farmers have been facing problems of labour scarcity and higher wage rates during the recent years. Under RKVY, farmers are encouraged to go for mechanization with a view to address the problem of labour scarcity and also enhance productivity through timeliness in operation. Apart from department of agriculture, other line departments such as horticulture and watershed also provide subsidy to farmers for purchasing agricultural

machineries and equipments. In order to understand the usage of machineries distributed through subsidy under RKVY, sample farmers were asked to provide information about number of days used, area covered and rental income earned.

Table 5.2: Usage of Farm Equipment procured under Agricultural Mechanisation

Sl No	Name of the implements	No. of days used per implement per annum	Area covered (acres per implement)	Imputed value own use in (Rs. per implement per annum)	Rented value (Rs. per implement per annum)	Percentage increase in productivity (Modal Value)
1	Rotavator	45.8	29.8	22489	40585	10 % to 20 %
2	Cultivators	36.2	29.7	7350	6367	Less than 10 %
3	Ploughs	33.4	33.8	19225	38200	No change
4	Harrow	44.8	45.7	6000	12500	10 % to 20 %
5	Other land dev. tillage and seed bed preparation equip.	5.3	73.7	7500	52500	10 % to 20 %
6	Seed drill	86.7	43.1	20520	24800	Less than 10 %
7	Sprayers	33.1	5.7	3274	294	Less than 10 %
8	Cutters	53.7	7.8	2500	0	No change
9	Thresher	19.7	21.7	22494	13388	10 % to 20 %
10	Pumpset	48.5	12.6	10023	1437	Less than 10 %
11	Other Water lifting implements	48.0	7.8	17780	0	10 % to 20 %
12	Others	46.0	8.5	3874	3152	Less than 10 %
	Total	42.3	19.6	13474	17947	10 % to 20 %

Source: Field survey data.

Details about use of farm equipments are provided in Table 5.2. Seed drill was used for about 87 days per annum covering an average of 43 acres per equipment. In fact, seed drill is reportedly used for maximum number days in a year. After seed drill, cutters, pumpset and other water lifting implements were used for about 54 days, 49 days and 48 days, respectively. Among ploughing machineries, such as rotavator and

harrow were used for about 45 days per year and covered an average area of 30 acres and 46 acres, respectively. Cultivators and plough were reportedly used for over 30 days in a year. Besides own use, farmers tend to hire out machineries in other farmers' field, which fetches extra income for them. The average annual rental income earned was the highest for laser leveler with Rs. 52500 followed by rotavator (Rs. 40585) and plough (Rs. 38200). Rental income from use of seed drill was also high at Rs. 24800 and for thresher it was Rs. 13388.

Table 5.3: Impact of Agricultural Mechanisation on Crop Productivity

(% to total responses)

Sl No	Name of the implements	No change	Less than 10%	10% to 20%	20% to 30%	30% to 50%	Above 50%
1	Rotavator	16.0	24.0	34.7	20.0	2.7	2.7
2	Cultivators	16.7	33.3	33.3	16.7	0.0	0
3	Ploughs	37.5	25.0	25.0	12.5	0.0	0
4	Harrow	0.0	0.0	100	0.0	0.0	0
5	Other land development, tillage and seed bed preparation equipments	0.0	0.0	50.0	50.0	0.0	0
6	Seed drill	0.0	60.0	20.0	20.0	0.0	0
7	Sprayers	5.9	50.0	38.2	2.9	2.9	2.9
8	Cutters	33.3	33.3	33.3	0.0	0.0	0
9	Thresher	23.5	17.7	41.2	0.0	11.8	11.8
10	Pumpset	11.1	25.9	25.9	7.4	11.1	14.8
11	Other Water lifting implements	0.0	20.0	60.0	20.0	0.0	0
12	Others	4.8	40.5	21.4	16.7	7.1	7.1
	Total	12.4	31.6	32.4	13.3	4.9	5.3

Source: Field survey data.

Impact of use of agricultural machineries and equipments on crop productivity is provided in Table 5.3. Overall crop productivity is provided in different ranges by type of machineries and equipments. Almost equal proportion (32 per cent) of the sample beneficiaries mentioned that the mechanization helped to increase crop productivity by less than 10 per cent and 10-20 per cent. Some farmers (23.5 %) also indicated positive impact on crop productivity by more than 20 per cent. However, about 12.4 per cent of sample beneficiaries mentioned no change in crop productivity due to mechanization.

Impact of individual machineries and equipments is quite varied. Almost all the sample farmers indicated that use of harrow in the cultivation of crops increases the productivity in the range of 10-20 per cent (Table 5.3). Similarly about 60 per cent and 50 per cent of the sample beneficiaries mentioned that other water lifting implements and other land development equipments improve the crop productivity, respectively in the same range. In fact, 50 per cent of the sample farmers also mentioned that other development equipments tend to increase crop productivity in the range of 20-30 per cent. Seed drill helped to increase the crop productivity less than 10 per cent as reported by 60 per cent of the beneficiary farmers.

The sample beneficiary farmers under mechanisation were also asked indicate the benefits of mechanization in terms of solving labour shortage, enable timely operations, save water, control of weeds, less drudgery, low cost of cultivation and increase in cropping intensity. At the aggregate level, about 58 per cent of sample farmers mentioned that mechanization helped to solve labour problem and 28 per cent indicated that it enabled timely operations (Table 5.4). Interestingly, 4.8 per cent of sample farmers reported control in weeds and 3.9 per cent reported reduced cost of cultivation. Almost all the sample farmers indicated that use of harrow, seed drill and cutter helped to solve labour problem. Overall, mechanization appears to have impacted crop productivity positively and helped to solve labour problem and weed problems, and enable timely operations.

Table 5.4: Benefits derived from Agricultural Mechanisation (% of hh)

Sl No	Name of the implements	Solved labour problem	Enabled timely operation	Saved water	Helped in controlling weed	Helped in good plant growth	Reduced Drudgery	Reduced cost of Cultivation	Increased Cropping intensity
1	Rotavator	68.5	20.6	1.4	5.5	0.0	1.4	1.4	1.4
2	Cultivators	33.3	50.0	0.0	0.0	0.0	0.0	16.7	0.0
3	Ploughs	62.5	25.0	12.5	0.0	0.0	0.0	0.0	0.0
4	Harrow	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	Other land developme nt, tillage and seed bed preparation equipments	50.0	0.0	0.0	50.0	0.0	0.0	0.0	0.0
6	Seed drill	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	Sprayers	40.0	30.0	3.3	16.7	0.0	0.0	10.0	0.0
8	Cutters	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	Thresher	76.5	23.5	0.0	0.0	0.0	0.0	0.0	0.0
10	pumpset	58.3	29.2	4.2	0.0	4.2	0.0	4.2	0.0
11	Other Water lifting implements	40.0	60.0	0.0	0.0	0.0	0.0	0.0	0.0
12	Others	38.2	47.1	5.9	0.0	0.0	2.9	5.9	0.0
	Total	58.2	28.4	2.9	4.8	0.5	1.0	3.9	0.5

Source: Field survey data.

5.2 Interventions under Crop Development

Under crop development, RKVY focused on improving crop productivity through efficient use of inputs and better management of natural resources through improving soil health by balanced use of micro and major nutrients, use of bio-fertilizer and bio agents, adoption of high yielding variety seeds and adoption of area based incentive approach. Details of benefits received by sample beneficiaries under crop development are provided in Table 5.5. It can be observed that about a quarter of total sample households received some benefits under crop development. Average cost of inputs supplied stood at Rs. 2700 and amount of subsidy was Rs. 2002. The share of subsidy in total cost was relatively high at 74.1 per cent.

Table 5.5: Interventions made under Crop Development

Sl No	Benefits	% of beneficiaries	Area covered per HH in acres	Quantity supplied per HH in Kgs.	Actual cost (Rs. Per HH)	Subsidy (Rs. Per HH)	Subsidy as a per cent of actual cost	% increase in productivity
1	Seeds / planting materials	7.6	1.5	19.3	5262	3174	60.3	10 % to 20 %
2	Fertilizers and plant protection	10.0	2.4	193.0	1829	1731	94.6	10 % to 20 %
3	Micro nutrients	3.1	1.1	146.7	1397	1397	100.0	No change
4	Bio-fertilizers and bio-control agents	3.8	1.1	73.2	1381	1162	84.2	10 % to 20 %
5	Area based incentives	0.2	0.0	0.0	253	253	100.0	NO RESPONSE
6	Others	0.7	0.0	3.3	1050	966	92.0	NO RESPONSE
	Total	25.4	1.7	110.4	2700	2002	74.1	10 % to 20 %

Note: *% of beneficiaries to total may not tally with figures presented earlier due to multiple entries within sector as well as merging of different groups within sector.
Source: Field survey data.

Among benefit types, about 10 per cent of the sample farmers obtained fertilizers and plant protection chemicals, and 7.6 per cent of the farmers received seeds/planting materials. Organic inputs such as biofertilisers and bio-control agents are also promoted under RKVY. About 3.8 per cent of the farmers obtained these inputs at subsidized rates. Micronutrients were supplied to 3.1 per cent of the sample farmers. Among benefit types, average cost per household was relatively high at Rs. 5262 for seeds and planting materials, and for plant protection chemicals it was Rs 1829. The share of subsidy in total cost was 100 per cent for micronutrients and area based incentive approach where credit was given free of interest to farmers. For fertilizers and plant protection chemicals, share of subsidy was 94.6 per cent and for biofertilises and biocontrol agents it was 84.2 per cent. Although share of subsidy for seeds/planting materials was relatively low at 60.3 per cent, it has

benefitted a large number of farmers. Seeds of crops such as Bengal gram, bajra, maize, paddy and jowar were distributed under RKVY.

Impact of interventions under crop development on crop productivity is given in Table 5.6. Crop productivity is given in ranges by type of benefits. Among those responded, 22.4 per cent of the sample beneficiaries mentioned the impact of yield from 10 per cent to 20 per cent. About 10.3 per cent of the sample farmers reported increase in yield by less than 10 per cent. Some farmers also mentioned the impact of crop developmental interventions on crop productivity up to 30 per cent. However, about 7.5 per cent of sample farmers reported no change in productivity due to interventions under crop development. Among the type of benefits, most farmers indicate visible impact of use of improved good quality seeds on crop productivity. About 25 per cent of the sample farmer reported less than 10 per cent and 43.8 per cent reported 10-20 per cent increase in crop productivity due to use of improved crop varieties.

Table 5.6: Impact of Crop Development Interventions on Crop Productivity

Sl No	Benefits	No change	Less than 10%	10% to 20%	20% to 30%	30% to 50%	Above 50%	Not responded
1	Seeds / planting materials	12.5	25.0	43.8	9.4	3.1	3.1	3.1
2	Fertilizers and plant protection	7.1	7.1	19.1	11.9	9.5	2.4	42.9
3	Micro nutrients	7.7	0.0	7.7	0.0	0.0	0.0	84.6
4	Bio-fertilizers and bio-control agents	0.0	0.0	6.3	6.3	0.0	0.0	87.5
5	Area based incentives	0.0	0.0	0.0	0.0	0.0	0.0	100.0
6	Others	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Total	7.5	10.3	22.4	8.4	4.7	1.9	44.9

Source: Field survey data.

5.3. Interventions under Horticulture

Horticulture is an important sector for which a relatively large number of projects and substantial amount of resources has been allocated for implementation. Interventions made for horticulture can be broadly grouped under two categories. First, creation of infrastructure including establishment of green house, shade net, poly house and field nursery in farmers field. Second, distribution of inputs such as seeds/planting materials, fertilisers and plant protection chemicals, micronutrients and bio-fertilisers, and bio-control agents to horticulture farmers.

Despite implementation of a relatively large number of projects for accelerating growth in horticulture production in the state of Gujarat, field survey team could not locate many farmers in the selected districts. Discussion with taluka level officials revealed that these projects were scattered across villages with one or two beneficiaries in a particular village. Even with adoption of cluster village approach for selection of beneficiary farmers, survey team could interview only 1.4 per cent of the farmers who received subsidy for establishing any kind of infrastructure for cultivating horticultural crops (Table 5.7). Sample farmers received subsidy for establishing green house, shade net and drip irrigation system (others). Average cost of shade net was Rs. 60,000 and was provided with 100 per cent subsidy. The share of subsidy for establishing green house was 33.6 per cent. The sample beneficiary farmers reported increase in productivity, income and decrease in post harvest losses due to establishment of shade net and green house.

Details of impact of horticultural infrastructure created under RKVY on productivity, income and cost are given in Table 5.8. It can be observed that 33.3 per cent of the sample beneficiaries mentioned increase in productivity by over 50 per cent in their farms. A similar proportion of the farmers also indicated that these infrastructure facilities helped to increase farm income by over 50 per cent. However, about a half of the sample farmers reported no change in income. About 50 per cent of the farmers mentioned decrease in cost of cultivation and decrease in post harvest

losses by 10 per cent. Overall, the sample beneficiary farmers indicated positive impact of the infrastructure facilities created under RKVY. But, spread of the benefits seems to be thin in the state of Gujarat. Further, it also requires farmers to make initial investment in the farm for availing the subsidy.

Table 5.7: Interventions made under Horticulture Infrastructure

Sl No	Details of infrastructure created	% of beneficiaries	Actual cost per HH (Rs.)	Subsidy as a percent of actual cost	increase in productivity	Decrease in cost	increase in income	Decrease in post harvest losses
1	Shadenet	0.2	60000	100.0	Above 50 %	20 % to 30 %	Above 50 %	30 % to 50 %
2	Green house	0.2	5200	33.6	Above 50 %	No change	Above 50 %	Above 50 %
3	Others	1.0	51000	41.5	Less than 10 %	Less than 10 %	No change	Less than 10 %
	TOTAL	1.4	44867	54.4	Less than 10 %	Less than 10 %	No change	Less than 10 %

Note: *% of beneficiaries to total may not tally with figures presented earlier due to multiple entries within sector as well as bifurcation of sector in different groups.
Source: Field survey data.

Table 5.8: Overall impact of horticultural infrastructure intervention

Sl No	Impact of intervention	No change	Less than 10%	10% to 20%	20% to 30%	30% to 50%	Above 50%
1	Increase in Productivity	16.7	33.3	16.7	0.0	0.0	33.3
2	Decrease in cost	16.7	50.0	16.7	16.7	0.0	0.0
3	Increase in income	50.0	0.0	16.7	0.0	0.0	33.3
4	Decrease in post harvest losses	16.7	50.0	0.0	0.0	16.7	16.7

Source: Field survey data.

Unlike establishment of infrastructure facilities which involves high capital cost, distribution of material inputs for promotion of horticultural crops has reached a relatively large number of farmers. It can be seen from the Table 5.9 that about 13.0 per cent of the sample farmers benefited from interventions made under horticulture crop development. Average cost of interventions was estimated at Rs. 18361 and the share of subsidy was 88.5 per cent. Among the type of benefits, a higher proportion (10.4 per cent) of the sample farmers obtained subsidized seeds/planting materials. Average cost of seeds/planting materials distributed per household was Rs. 22680 and share of subsidy in cost was 88.3 per cent. Farmers obtained fertilizers and plant protection chemicals, micronutrients and bio-fertilisers and bio-control agents with 100 per cent subsidy.

Table 5.9: Interventions made under Horticulture Crop Development

Sl No	Benefits received	% of Beneficiaries	Area covered per HH in acres	Quantity supplied per HH in Kgs.	Actual cost (Rs. Per HH)	Subsidy as a per cent of actual cost	% increase in productivity	% Decrease in cost
1	Seeds / planting materials	10.4	1.2	1.6	22680	88.3	No change	No change
2	Fertilizers and plant protection	1.0	0.0	0.0	350	100.0	10 % to 20 %	Less than 10 %
3	Micro nutrients	1.0	0.6	0.0	1875	100.0	Less than 10 %	Less than 10 %
4	Bio-fertilizers and bio-control agents	0.7	1.2	16.7	1007	100.0	10 % to 20 %	Less than 10 %
	Total	13.0	1.1	2.2	18361	88.5	10 % to 20 %	Less than 10 %

Note: *% of beneficiaries to total may not tally with figures presented earlier due to multiple entries within sector as well as bifurcation of sector in different groups.
Source: Field survey data.

Impact of horticultural crop development interventions on productivity is given in Table 5.10. Among those sample beneficiary farmers responded, at the aggregate level 22.4 per cent reported increase in productivity in the rage of 10-20 per cent and 10.3 per cent mentioned rise in productivity less than 10 per cent. Some farmers also indicated increase in productivity in the range of 20-30 per cent. Notwithstanding, 7.5 per cent of the beneficiary farmers reported no change in productivity because of these interventions. Among the input types, seeds/planting materials seem to have made considerable impact on productivity the range of 10-20 per cent.

Table 5.10: Overall Impact of Horticultural Crop Development Intervention

S No	Benefits received	% beneficiary reported increase in productivity						
		No change	Less than 10%	10% to 20%	20% to 30%	30% to 50%	Above 50%	Availed but not responded
1	Seeds / planting materials	12.5	25.0	43.8	9.4	3.1	3.1	3.1
2	Fertilizers and plant protection	7.1	7.1	19.1	11.9	9.5	2.4	42.9
3	Micro nutrients	7.7	0.0	7.7	0.0	0.0	0.0	84.6
4	Bio-fertilizers and bio-control agents	0.0	0.0	6.3	6.3	0.0	0.0	87.5
5	Area based incentives	0.0	0.0	0.0	0.0	0.0	0.0	100.0
6	Others	0.0	0.0	0.0	0.0	0.0	0.0	100.0
	Total	7.5	10.3	22.4	8.4	4.7	1.9	44.9

Source: Field survey data.

5.4 Interventions under Micro and Minor Irrigation

For conservation of water and improving recharging of groundwater level, various micro and minor irrigation interventions were made under RKVY. It can be seen from Table 5.11 that 1.9 per cent of the sample farmers benefited from drip irrigation system promoted mainly for field crops. Average area covered by a drip system is estimated at 3.2 acres.

Average cost of drip irrigation system is estimated at Rs. 57675 and share of subsidy in cost was 45.5 per cent. The sample farmers mentioned increase in income due to drip irrigation by 20-30 per cent. The sample farmers reported rise in crop productivity and decrease in cost of cultivation.

Table 5.11: Interventions made under Micro/Minor irrigation

	Details of intervention	% of beneficiaries	Average irrigated area per beneficiary HH in acres	Average increase in % irrigated area per beneficiary HH	Average Cost per HH in Rs	Subsidy as a percent of cost	% Increase in productivity	% decrease in cost	% increase in income
1	Drip irrigation	1.9	3.2	19.3	57675	45.4	20 % to 30 %	20 % to 30 %	20 % to 30 %
	TOTAL	1.9	3.2	19.3	57675	45.4	20 % to 30 %	20 % to 30 %	20 % to 30 %

Note: *% of beneficiaries to total may not tally with figures presented earlier due to multiple entries within sector as well as bifurcation of sector in different groups.
Source: Field survey data.

Details of impact of micro/minor irrigation on crop productivity, cost of cultivation and farm income are provided in Table 5.12. About 37.5 per cent of the sample farmers indicated increase in productivity due to micro irrigation by 20-30 per cent. The same proportion of farmers also reported decrease in cost of cultivation. Interestingly, about 75 per cent of the farmers mentioned increase in farm income in the range of 20-30 per cent. With respect to expansion of irrigated area, about 75 per cent of the sample farmers indicated that micro irrigation helped to expand irrigated area by less than 10 per cent. It can be observed that the sample beneficiary farmers reported some positive change in outcome indicators as against no change due to micro irrigation interventions.

Table 5.12: Overall Impact of Micro/Minor Irrigation

Sl No	Details of intervention	No change	Less than 10%	10% to 20%	20% to 30%	30% to 50%	Above 50%
1	Increase in Productivity	0.0	12.5	25.0	37.5	12.5	12.5
2	Decrease in cost	0.0	25.0	25.0	37.5	12.5	0.0
3	Increase in income	0.0	0.0	25.0	75.0	0.0	0.0
4	Increase in irrigated area	0.0	75.0	0.0	0.0	12.5	12.5

Source: Field survey data.

5.5 Intervention under Animal Husbandry and Dairy

Animal husbandry and dairying is an important economic activity helps in supplementing farmers' household income. To encourage the farmers to undertake animal production activities, two kinds of interventions was made under the RKVY. First, supply of superior breeds at subsidized rate to select farmers in the villages. Second, supply of equipments and inputs such as fodder chopper, milking machine, fodder seeds and financial assistance for construction of cattle shed.

Details of interventions made under animal husbandry and dairying in the state of Gujarat are given in Table 5.13. Financial assistance was given to sample farmers to purchase cows, poultry birds, fodder chopper, milking machine and construction of cattle shed. It can be observed that only 3.3 per cent of the sample farmers benefitted from these interventions. Average cost of intervention was Rs. 91157 per household and the share of subsidy in average cost was 59.9 per cent. Among the items, the proportion of beneficiaries received financial assistance for purchase of cows, poultry and construction of modern cattle shed was one cent each. Average cost of construction of cattle shed was Rs. 151250 and share of subsidy was estimated at 66.1 per cent. Average cost of milking machine was Rs. 103000 and it was provided at 45 per cent subsidy. Fodder choppers were supplied at 100 per cent subsidy. The share of subsidy for purchase of

cows was 53.9 per cent. In terms of impact, the sample farmers mentioned that modern cattle shed and use of milking machines helped to increase productivity by 10 per cent. Further, less than 10 per cent of the beneficiary farmers also indicated that cattle shed, milking machine and fodder chopper helped to maintain better cattle health.

Table 5.13: Interventions made under Animal Husbandry and Dairy

S l No	item	% of beneficiaries availed	Average No. per HH	Average cost per HH (Rs.)	Average subsidy per HH (Rs.)	Subsidy as a percent of cost	Increase in productivity (Modal Value)	Fall in labour cost (Modal value)	Better cattle health (modal value)
1	Cows	1.0	19.5	134550	72450	53.9	No change	No Response	No Response
2	Poultry	1.0	25.0	3000	2500	83.3	10 % to 20 %	No Response	No Response
3	Cattle shed	1.0	1.0	151250	100000	66.1	10 % to 20 %	No change	Less than 10 %
4	Fodder Chopper	0.2	1.0	18000	18000	100.0	No change	No change	Less than 10 %
5	Milking instruments	0.2	2.0	103000	46350	45.0	Less than 10 %	No change	Less than 10 %
	Total	3.3	13.2	91157	54582	59.9	10 % to 20 %	No change	Less than 10 %

Note: *% of beneficiaries to total may not tally with figures presented earlier due to multiple entries within sector as well as bifurcation of sector in different groups.
Source: Field survey data.

Impact of animal husbandry and dairying interventions on income derived from the production of livestock products is given in Table 5.14. Only about 1.2 per cent of the beneficiary farmers reported deriving income from the sale of livestock products such as milk, milk products, egg and manure. Most farmers indicated that impact of interventions on income earned through these products was less than 10 per cent. At the aggregate level also, 80 per cent of the sample households reported less than 10 per cent increase in income due to these interventions. Apart from financial assistance for the above mentioned interventions, farmers were also given feed supplements like protein to overcome the nutritional deficiency in animals (Table 5.15). Only 0.2 per cent of the sample farmers received

protein supplements with average cost of Rs. 1000 and share of subsidy was 100 per cent.

Table 5.14: Impact of Animal Husbandry Components on Household Income (% households)

Sl No	Name of the item	% of beneficiaries who are deriving income	No change	Less than 10%	10% to 20%	20% to 30%	Above 30%
1	Milk	0.2	0.0	100.0	0.0	0.0	0.0
2	Milk Products	0.2	0.0	100.0	0.0	0.0	0.0
3	Egg	0.2	0.0	100.0	0.0	0.0	0.0
4	Manure	0.5	0.0	50.0	50.0	0.0	0.0
	Total	1.2	0.0	80.0	20.0	0.0	0.0

Note: *% of beneficiaries to total may not tally with figures presented earlier due to multiple entries within sector as well as bifurcation of sector in different groups.
Source: Field survey data.

Table 5.15: Details of Feed Supplement availed by the Beneficiaries under Animal Husbandry

Sl No	Name of the item	%. of beneficiaries	Quantity per HH in Kgs.	Total cost per household in Rs.	Subsidy per HH in Rs.	Percent subsidy to total cost
1	Protein	0.2	10.0	1000	1000	100.0
	Total	0.2	10.0	1000	1000	100.0

Source: Field survey data.

In the next chapter, RKVY interventions in the minor sectors and its impact are discussed.

CHAPTER VI

RKVY Interventions in the Minor Sectors & their Impact

6.1 Introduction:

Based on the size of interventions (less than 20 per cent of total expenditure), five sectors have been grouped into minor sectors. They are watershed development, integrated pest management, organic farming, sericulture and cooperatives/cooperation. In Gujarat, interventions have been made on integrated nutrient management through soil testing, watershed development and cooperatives. Nature and impact of these interventions have been discussed in the following sections.

6.2 Intervention under Watershed Development

Interventions under watershed development were carried out in the form of construction of farm ponds, check dams, nala bunds, land leveling, bunding and vegetative barrier. It can be observed from the Table 6.1 that 11.9 per cent of the sample farmers benefited from various interventions in the state of Gujarat. Average area treated by these interventions was 3.3 acres per household. Average cost of interventions was Rs. 114086 per household and 100 per cent subsidy was provided under RKVY. Among the interventions, 4.3 per cent of the sample farmers benefited from land leveling, 3.6 per cent from bunding and 2.4 per cent from check dams. Average cost of construction of farm ponds was the highest at Rs. 494000 followed by check dams at Rs. 352185. Interestingly, except for farm ponds, sample beneficiary farmers mentioned 10-30 per cent increase in crop productivity. Increase in crop productivity is reportedly higher for farm ponds followed by nala bunds, check dams, land leveling and bunding. Sample farmers also reported a substantial proportion of increase in income due to interventions under watershed development. The extent of rise in income was higher for farm ponds, nala bunds and land leveling with

30-50 per cent.

Table 6.1: Details of Interventions undertaken under Watershed Development

Sl No		% of beneficiaries	Average area treated per HH (Acres)	Average storage capacity per HH in cu.ft.	Cost per HH in Rs.	Subsidy as a percent of cost	% Increase in crop area	% Increase in productivity	% decrease in cost	% increase in income
1	Farm ponds / Dug wells	0.2	1.2	0.0	494000	100.0	No change	30 % to 50 %	10 % to 20 %	30 % to 50 %
2	Check dams	2.4	4.9	0.0	352185	100.0	10 % to 20 %	10 % to 20 %	10 % to 20 %	20 % to 30 %
3	Nala bunds	1.2	1.8	0.0	16759	100.0	20 % to 30 %	20 % to 30 %	10 % to 20 %	30 % to 50 %
4	Land levelling	4.3	3.1	0.0	25348	100.0	20 % to 30 %	10 % to 20 %	Less than 10 %	30 % to 50 %
5	Bunding	3.6	3.2	0.0	75378	100.0	Less than 10 %	10 % to 20 %	No change	Less than 10 %
6	Others	0.2	2.3	0.0	17721	100.0	Less than 10 %	Less than 10 %	Less than 10 %	10 % to 20 %
	TOTAL	11.9	3.3	0.0	114086	100.0	20 % to 30 %	10 % to 20 %	Less than 10 %	20 % to 30 %

Note: *% of beneficiaries to total may not tally with figures presented earlier due to multiple entries within sector as well as merging/bifurcation in different groups.
Source: Field survey data.

6.3 Intervention under Soil Testing/Integrated Nutrient Management

Under integrated nutrient management, farmers were advised to apply lime or gypsum particularly in problematic soils. Application of gypsum tends to soften the soil, which helps in infiltration of water. It can be seen from the Table 6.2 that only 0.2 per cent of the farmers applied gypsum, which was made available at 100 per cent subsidy. The sample farmers indicated a rise in crop productivity and income by less than 10 per cent. Overall impact of application of gypsum/lime is given in Table 6.3. Almost all the sample farmers reported increase in crop productivity and farm income. However, there was no evidence of decrease in cost of production.

Table 6.2: Details of Intervention under Soil Testing

Sl No		% of beneficiaries	Average area treated in acres	Average cost	Subsidy as a percent of cost	Average % increase in crop productivity	% increase in productivity	% increase in cost	% income in income	% of HH having improvement in soil health
1	Lime / Gypsum applied	0.4	5.7	35000	100.0	0.0	Less than 10 %	No change	Less than 10 %	100.0

Note: *% of beneficiaries to total may not tally with figures presented earlier due to multiple entries within sector as well as merging/bifurcation in different groups.
Source: Field survey data.

Table 6.3: Overall Impact of Intervention under Soil Testing

		No change	Less than 10%	10% to 20%	20% to 30%	30% to 50%	Above 50%	Availed, but not responded	TOTAL
1	Increase in crop productivity	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
2	Decrease in cost of production	100.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
3	Increase in income	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0

Source: Field survey data.

6.4 Intervention under Cooperatives

In order to undertake certain group based activities, farmers' cooperatives/self help groups were constituted. These groups were mainly involved in creation of savings habit among the farmers and lending to them at the lower rate of interest. Under RKVY, seed money was given to this farmers' group to make them functional. However, only 0.2 per cent of the sample farmer was found to be the members of such

groups as the number of farmers' groups formed was limited and they were geographically widespread (Table 6.4). There seems to be a positive impact of group activities on income earned by the farmer households.

Table 6.4: Details of Intervention under Co-operatives

Sl. No.	Components	Share
1	% beneficiaries who are member of cooperatives	0.2
2	Average amount of assistance received in Rs. (cash + value of kind)	500000
3	Fee / interest charged as percent of assistance (cash + value of kind) received	0.1
4	Average additional earnings PER HH by using assistance (Rs.)	50000

Source: Field survey data.

`The next chapter discuses other achievements and constraints faced .

CHAPTER VII

Other Achievements and Constraints

7.1 Introduction

Apart from distribution of material inputs at subsidised rate to farmers, RKVY has also focused on bringing qualitative changes in farmers through training, and method and/or results demonstrations. All these interventions have resulted in both direct and indirect benefits to the farmers, and intended to contribute to overall development of agriculture in the state. Information related to direct and indirect benefits of RKVY interventions were captured appropriately through primary survey. Besides increase in yield and income, access to technical and marketing information, capacity building, provision of marketing and transport facilities, and increased employment were the other benefits recorded during the survey. In this section, field observations on these aspects along with the discussion on the constraints faced by the farmers in availing RKVY scheme have been provided. Other useful information related to different sectors, perception of beneficiaries on the program and suggestions provided by the sample farmers during the survey are discussed here. The field survey also captured the details of benefits availed by the sample farmers from other agricultural developmental schemes/programs.

7.2 Training to Beneficiaries

Training is an important means for transfer of technology to farmers. Training imparts skills and educate the farmers about the use of technologies. Type of training conducted varies by nature of technologies promoted and duration. In general, trainings are provided by the officials of the Department of Agriculture, Krishi Vigyan Kendras and State Agriculture Universities. Autonomous bodies of the government such as marketing boards and commodity boards also conduct training to farmers. Trainings

are given in various forms such as method/result demonstration, field visit and Krishi Mela.

Details of trainings attended by the sample participants are given in Table 7.1. It can be observed that about 30 per cent of the sample beneficiaries participated in any training program organised by various agencies. The participants attended on an average about two days in training programme. Among type of training, about 37 per cent of the sample farmers participated in Krishi Mela and 39 per cent of the farmers attended in village meetings. In village meetings, information about crop cultivation, crop protection measures and soil testing were reportedly given to the farmers. Further, about 14 per cent of the sample farmers also participated in field visits and 9.8 per cent in demonstrations. It is interesting to note that about 75 per cent of the sample farmers who participated in any of the training programme reported useful and enabled them to adopt in their field.

Table 7.1: Trainings participated by the beneficiaries

Percentage of beneficiaries undergone training		28.9
Avg. no of days of training		2
Type of training (%)	Demonstration	9.8
	Field visit	13.9
	Krishi mela	36.9
	Others	39.4
Percentage of farmers who found training helped adoption		75.4

Source: Field survey data.

7.3 Information Technology (IT)

Information technology is a boon for transfer of massive knowledge to millions of people. Mobile phone has emerged as effective medium of communication. Mobile phone technology has reached all sections of society in rural and urban areas. Among the sample beneficiaries, 85 per cent owned mobile phones (Table 7.2). Among them,

27 per cent subscribed to receive agricultural related information. Type of information received included weather details, crop sowing time, incidence of pests and diseases, and output price details. Among those subscribed, about 80 per cent received voice message and remaining text messages. Although text messages are sent in local language, it was difficult to the farmers to comprehend the information due to low level of literacy. It was also quite interesting to note that about 21 per cent of the subscribers pay monthly charges for receiving agricultural related information. Average amount paid was Rs. 11.70 per month.

Table 7.2: Details on usage of mobile phone for agriculture related information

% of beneficiaries covered to their respective sample size	100.0
%. of beneficiaries owning mobile to interviewed farmers	85.1
%. of beneficiaries receiving agricultural related SMS (% to those who own	26.7
%. of beneficiaries receiving text messages (to those receiving SMS)	24.0
%. of beneficiaries receiving voice messages	80.2
% Receving text message in local language (to those who receiving text	100.0
% Not receving text message in local language	0.0
% of beneficiaries paying for SMS	20.8
Average amount paid per month for SMS (Rs.)	11.7
	100.0

Source: Field survey data.

7.4 Employment Generation under RKVY

The RKVY interventions in various sectors such as crop development, horticulture, micro and minor irrigation, agriculture mechanization, organic farming, bio-fertilizers, information technology, and other agriculture allied activities like livestock production, marketing and post harvest management have directly or indirectly helped in generating employment and additional income to farmer households at the village level. Some of these activities contributed to bring about quantifiable changes in agricultural production and productivity in terms of educating the farmers, creating awareness and updating farmers about the new technologies in various fields. Most of these interventions created both farm and non-farm employment but in some cases like agricultural mechanization also introduced labour

saving technology. However, under agricultural mechanization, adoption of farm mechanisation especially tractor and other implements may lead to increased operational land holdings and rise in cropping intensity, which in turn help in creation of on-farm employment opportunities. In addition, demand for agricultural labour for manufacturing, services, distribution, repair and maintenance as well as other ancillary activities substantially increased due to mechanization. Further, farm mechanization led to increase in use of inputs due to a rise in cropping intensity, larger area, and increased productivity of farm labour.

Interventions in horticulture sector helped to create some additional employment opportunities through increase in area under fruits and vegetables. Just like horticulture, crop development sector also provided seeds and other inputs for expansion and enhancement of yield of various crops that possibly also created opportunities for additional employment. Micro and minor irrigation helps farming community in improving water efficiency and hence enables them to expand their farming activities with the limited water availability. Marketing and post-harvest management sector creates employment and increases farm returns in terms of accessibility, minimization of post-harvest losses, quality production and better farm prices. In marketing and post-harvest management, there is tremendous scope for the construction of godowns, roads and auction platforms at market yards, setting up of wholesale and primary rural markets, installation of processing units, strengthening of regulated markets, agro processing units, promotion of storage bins, plastic crates etc., which directly and indirectly generate employment. In addition, many other agriculture and subsidiary activities such as dairying, livestock production and fisheries help in employment generation.

Details of annual employment generation for sample households under RKVY are presented in Table 7.3. Number of days of employment generated was derived from all relevant RKVY interventions, which have implications for farm employment, made under RKVY. It does not refer to any specific type of interventions. It can be observed from the table that all

the sectors taken together created an average number of 13 days of additional employment per household. Total employment comprised own labour for five days and hired labour for eight days labour annually. With respect to the households' opinion about the increase in employment as a result of RKVY intervention, the selected beneficiaries indicated either no change or only 10 per cent increase in employment. It implies that major focus of the RKVY was on enhancing crop productivity and not much on employment generation.

Table 7.3: Annual employment generation under RKVY per household

Employment generated (days/annum)	Own	5
	Hired	8
	Total	13
Modal Response	% increase in employment_ own	No Change
	% increase in employment_ hired	< 10 percent

Source: Field survey data.

7.5 Agricultural Marketing details

Various interventions on crop sectors have helped to increase yield and hence output available for sale in the market. Therefore, it is important to understand the level of marketed surplus at the aggregate level and marketing channels through which produce was moved from farmers to market. Here, marketing channels refer to the first point of sale of crop produce by the sample farmers. Details of marketing of crop produce at the aggregate level is provided in Table 7.4. Average amount of sale of crop produce per sample household was estimated at Rs. 22,699. The sample households sold crop produce at different points of sale such as village market, APMC mandi and private markets. Among these points of sale, the highest amount was sold at village market (45.8 per cent) followed by APMC mandi (36.7 per cent) and private market (14.4 per cent).

In the market, sample beneficiary farmers sold their produce to different agents. They included commission agent, government agency and, private traders and others. A high proportion of sample farmers sold their

produce to private traders and others. In fact, about 51.1 per cent of sample farmers sold crop produce to private traders and 31.8 per cent to commission agent. Some farmers also sold directly government agency such as civil and food supplies corporation/food corporation of India. Average distance covered for sale of crop produce was estimated at 11.6 km.

Table 7.4: Agricultural Marketing details of RKVY beneficiaries

Avg. amount of sale (Rs per hh)		22699
% of beneficiaries marketing channels	Village market	45.8
	APMC Mandi	36.7
	Private and others	14.4
% of beneficiaries selling through different agents	Commission agent	31.8
	Govt. Agency	13.1
	Private traders and other	51.1
Average distance covered for the sale		11.6

Source: Field survey data.

7.6 Constraints Faced under RKVY

In order to examine whether sample beneficiary farmers faced any problem in accessing the benefits/subsidised inputs, information on various constraints were compiled through field survey. These constraints were captured in the form of both quantitative and qualitative responses. Information related to transaction cost including cost of getting information about the programme, preparation and submission of documents, and other costs incurred for availing the benefits under RKVY were also recorded. Details of constraints faced in availing RKVY benefits are provided in Table 5.5.

It can be observed that about 61 per cent of the sample farmers reported problem of getting too many documents for availing subsidy under RKVY. About 48.3 per cent of the sample farmers indicated that contact details of the department which provides subsidy are not easily available. This problem was mostly reported by the marginal and small farmers. In fact, large and influential farmers have easy access to

department officials through some connections with people in urban areas. Further, 44.8 per cent of the sample farmers mentioned that information about the RKVY are not easily available. Even if fellow farmers are aware of programme, they do not share with other farmers fearing that they may not get full subsidy and further, material inputs may not be supplied to them at the desired quantity. About 39.8 per cent of the sample farmers also indicated that eligibility or other criteria for availing subsidy are not known and therefore they refrain from approaching the agriculture department for more details. Farmers also indicated that procedure for obtaining subsidy under RKVY was very tedious and hence take lots of time.

Table 7.5: Constraints faced in availing RKVY benefit

S.N.	Particulars	No. of beneficiaries reported the constraint	% of beneficiaries reported the constraint
1	Information about RKVY programme details not easity available.	189	44.8
2	Contact details of the department which pay subsidy not available.	204	48.3
3	Eligibility or criteria for availing subsidy not known.	168	39.8
4	Procedure for the subsidy is very tedious.	159	37.7
5	No.of documents required for availing subsidy are too many.	257	60.9
6	Subsidy paid after purchase while initial payment remains highest problem.	98	23.2
7	Prescribed machinery asset is not easily available in the market.	129	30.6
8	Institutional financing facility not available.	76	18.0
9	Capacity building technical advice not privided.	71	16.8
10	Long time gap between purchase and receiving subsidy amount.	108	25.6
11	Biased towards large land owners.	35	8.3
12	Poor quality of materials / machinery are supplied.	53	12.6
13	Implementing agencies are located far away.	102	24.2
14	Others - 1.	13	3.1

Source: Field survey data.

Even after going through the difficult process for getting the subsidised inputs, about 30.6 per cent of the sample farmers reported that prescribed machinery/equipment is not available in the market. Further, there is a long time gap between purchase of machinery and receiving of subsidy amount as reported 25.6 per cent of the sample farmers. Since subsidy amount constituted only a certain proportion of total cost of the machinery farmers had to make initial investment, which was reportedly higher for about 23.2 per cent of the farmers. Farmers also mentioned that implementing agencies are located far away from the villages and most times their visit to the concerned department turned out to be in-fructuous. Sample farmers indicated non-availability of institutional financing facility, lack of technical knowledge and poor quality of materials supplied as constraints in availing subsidy under RKVY.

7.7 Sources of Funds

Under RKVY, most material inputs and machineries were provided to farmers on cost sharing basis. That is, beneficiary farmers share some proportion of the total cost of the items supplied to them and rest of the amount is borne by the state government through funding made available through this programme. The subsidy amount varied by material inputs, type of machinery and animals supplied. In this context, it is important to examine how the beneficiary farmers contributed to the initial investment and sources of financing. The average amount of beneficiary investment was estimated at Rs. 17,798 (Table 5.6). Sources of finance comprised own funds, institutional borrowings and non-institutional borrowings. Among the sources of investment, own funds accounted for the highest share of 69 per cent followed by institutional loans at 31 per cent for the beneficiary farmers in the state of Gujarat. Interestingly, beneficiary farmers did not rely on exploitative non-institutional sources for borrowing.

Table 7.6: Source of investment borne by the households for the RKVY intervention

Average amount of beneficiary investment (Rs.)		17,798
% Contribution by Source	Own Funds	69
	Institutional Borrowings	31
	Non-institutional Borrowings	0

Source: Field survey data.

7.8 Views and Opinion of the Beneficiaries about RKVY

In the farmer survey, farmers' opinion about the RKVY were sought to understand how farmers viewed this programme from the perspective of overall development of agriculture. The beneficiary farmers considered the programme as one that provides financial assistance, building infrastructure, capacity building and provision of subsidy on inputs. Most farmers (73 per cent) considered RKVY a subsidy oriented programme, which helped in obtaining improved inputs and other technologies for improvement of yield (Table 5.7). Provision of the subsidised inputs was one of the major components of the programme. About a half of the sample farmers treated RKVY as a financial assistance oriented programme. In fact, financial assistance was provided for start-up activities such as building infrastructure for marketing and storage. Further, about 24 per cent of the sample farmers viewed it as capacity building programme, where farmers are trained for using new technologies and impart general skills in farming.

Table 7.7: Opinion of beneficiary households about RKVY programme (% of beneficiaries)

Financial assistance	53.3
Building infrastructure	32.5
Capacity building	24.4
Subsidy provision	73.0
Others	13.5

Source: Field survey data.

7.9 Suggestions for the Better Implementation of RKVY Programme

Suggestions from the farmer beneficiary households for improving the usefulness of RKVY programme in terms of better output and outcome were captured through field survey. For analytical purpose, various suggestions were grouped in 10 broad categories which are described as below:

1. Capacity building: conducting training programs for capacity building should be focused on one specific topic instead of covering many subjects in a single training programme.
2. Subsidy related: timely availability, simple procedure of availing subsidy, enhancing the coverage and hike the percentage of subsidy should be given.
3. Production and input related: timely provision of good quality seeds, availability of appropriate and required fertilizers, pesticides and other inputs.
4. Integration of schemes and wider coverage of schemes: integrating MGNREGA with crop production, provision of crop insurance and credit, post-harvest facilities like cold storage and procurement, and enhanced services for animal husbandry and dairying activities.
5. Irrigation related: provision of pump sets, construction of tanks and ponds, availability of electricity/diesel for operating pump sets, flood control measures in chronically flood affected areas.
6. Farm mechanization: availability of farm machineries and equipments to deal with labour problems and ensure timely farm operations.
7. Access to credit: simpler documentation and bank procedures to avail loans.
8. Market facilitation: price information, identifying market and provision of transportation.
9. Feed supplements: provision of feed supplements like protein supplements, mineral bricks and good quality cattle feeds at

subsidized rates.

10. General suggestions – supply of weather related information, information on animal diseases, mobile veterinary clinics under RKVY schemes, provision of medicines, continuation of RKVY, organic manure, better infrastructure facilities, soil testing facility and integrated approach for improving farm income.

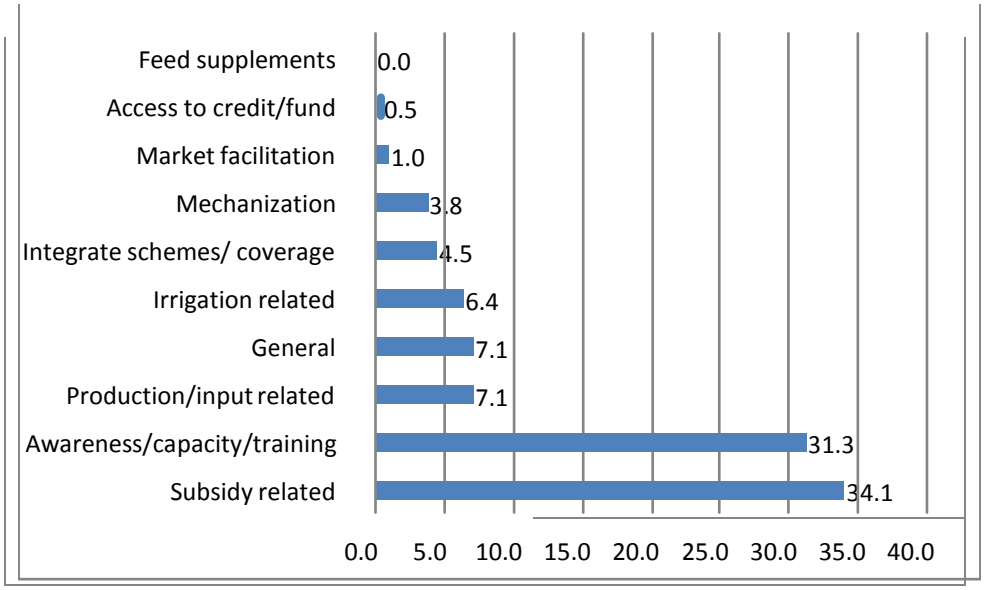


Figure 7.1: Suggestions of beneficiaries on RKVY programme

Suggestions provided by beneficiary farmers are provided in Figure 7.1. About 34 per cent of the sample farmers mentioned that procedure for availing subsidy should be streamlined. Farmers also suggested that small land holders should be given priority in accessing subsidy benefits. About 31 per cent of the sample farmers indicated a need for creating awareness about the programme and also details of subsidy components. There is a need for building capacity of farmers in using new technology through field visits and training programmes. Timely availability and quality of inputs are very important for improving crop yield as suggested by some sample beneficiary farmers.

7.10 Benefits availed by RKVY Beneficiaries from Other Govt. Schemes

There are many agricultural developmental programmes being implemented in the state of Gujarat. Farmers received some benefits from one or other programme, but did not know under which programme they received benefits. RKVY was not an exception. Details of government programmes/schemes implemented in the sample villages were captured in the field survey. There are state sector schemes, central plan and centrally sponsored schemes being implemented in the field. Some of the prominent schemes implemented in Gujarat included National Horticulture Mission (NHM), Macro Management in Agriculture (MMA), National Food Security Mission (NFSM), MGNREGA and other minor schemes. It can be observed from Table 7.8 that seven farmers benefited from MGNREGA, three farmers from NFSM and two farmers from NHM. The average amount of subsidy was relatively high for interventions of MMA and low for NFSM. Notwithstanding, it is clear that only a few sample beneficiary farmers obtained benefits from other schemes as well.

Table 7.8: Benefits availed from other government schemes by RKVY beneficiaries

Sl No	Particulars	No. of beneficiaries	Total investment in Rs.	Total subsidy in Rs.	%. of beneficiaries benefitted	Average COST per HH in Rs.	Average subsidy per HH in Rs.
1	National Horticulture mission (NHM)	2	0	5000	0.8	0.0	2500
2	Macro Management in Agriculture (MMA)	1	0	12000	0.4	0.0	12000
3	National Food Security Mission (NFSM)	3	0	2120	1.2	0.0	707
4	Watershed programme	1	0	4000	0.4	0.0	4000
5	Livestock insurance	1	0	4063	0.4	0.0	4063
6	MGNREGA	7	0	51459	2.8	0.0	7351
7	Others	3	0	177520	1.2	0.0	59173
	Total	18	0	256162	7.2	0.0	14231

Source: Field survey data.

7.11 Effect of various Subsidy Programmes- Regression Analysis

In order to quantify the effect of various subsidy programmes under taken by the state government to create infrastructure and provide better quality seed and other inputs on productivity of various crops grown by the farmers we tried to establish a quantitative relationship between output produced by the farmers and the subsidy received by them under RKVY. As we also had information about the quantum of intervention under taken by the farmer we sought to establish relation between the subsidy received and productivity enhancement. The relation between volume of intervention and productivity increase was not attempted as with respect to investment there could be possibility of inverse causality as high productivity also leads farmers to invest more and so on. In our field survey we enquired the farmers about their opinion on percentage of increase in their productivity as a result of intervention carried out under RKVY programme. The tabular analysis in different section has interpreted the field survey findings on how RKVY programme has helped farmers in achieving higher productivity, enhancement in their income and reduction in their cost and spoilage as a result of interventions carried out under RKVY.

In this section we present regression results showing the quantum effect of subsidy on farmers' productivity at the aggregate. For this reason, the productivity has been calculated as value of output from all the crops grown by a household in value terms. Two determinant variables namely net area operated by the household and the subsidy received by the household under a specific sector have been considered for the regression analysis. To obtain aggregate impact of subsidy, one regression is done by aggregating subsidy for all sectors together. The results are presented in Table 7.9 below for Gujarat and all India for making a comparison between the state of Gujarat with the all India picture. It is evident from the results that both the operated area and subsidy from various sectors had a positive impact on the value of output produced. The value of coefficient of net operated area in Gujarat turned out less than one which indicates that with

the increase in area under operation, the value of output increases by the less proportion. The implications of the above result is that there is inverse farm size productivity relationship in Gujarat.

Looking at the coefficients of subsidy under various sectors, it is evident that in the case of Gujarat, subsidy coefficient was positive for mechanisation, crop development, horticultural crop development, animal husbandry and watershed development. However, the sign was negative for horticultural infrastructure and micro irrigation. Nevertheless, the coefficient of subsidy was insignificant in the case of mechanisation, animal husbandry and micro irrigation. In other words, the provision of subsidy under these sectors does not seem to having a significant impact on productivity in Gujarat. The crop development subsidy indicates that 10 per cent increase in subsidy amount may lead to around 1.7 per cent increase in farmers output whereas horticultural crop development leads to around 2.2 per cent increase in output indicating better efficiency of horticultural subsidy compared to normal crop development subsidy. Similarly, 10 per cent hike in watershed development showed 1.4 per cent increase in overall productivity. In comparison,looking at the value of the coefficient at the all India level, it clearly shows significant impact of subsidy on the value of productivity. The infrastructure building activities like mechanisation, horticulture infrastructure, micro irrigation and watershed development had clearly significant and higher value of the coefficient of subsidy than that of crop development, animal husbandry, fishery etc., at the all India which either have only short term impact on productivity or otherwise not related to crop sector productivity directly if not indirectly. In the case of Gujarat, it has been seen in our field survey analysis that there were only two major activities under which significant numbers of selected farmers participated under RKVY, i.e., mechanisation and crop development. In all other cases only few households participated in the programme. In the case of animal husbandry, the impact can be seen only on increase in milk productivity and not on the crop productivity.

Table 7.9*: Impact of various sector specific subsidies on value of output at household level
(Dependent variable = Value of output of all crops grown by hh)

	Gujarat					All India			
Equation	Independent variables	Coefficient	t value	R2	No of obs.	Coefficient	t value	R2	No of Obs.
1	NOA	0.84	(10.8)	0.40	207	0.87	(47.4)	0.63	1418
	Mech Subsidy	0.05	(1.0)			0.04	(2.8)		
	Constant	10.05	(21.5)			10.17	(78.7)		
2	NOA	0.68	(4.4)	0.35	52	0.92	(48.0)	0.64	1377
	Crop develop Subsidy	0.17	(1.8)			0.03	(2.1)		
	Constant	9.59	(13.6)			10.15	(96.4)		
3	NOA	0.20	(0.3)	-0.04		71.02	(41.8)	0.73	662
	Animal Husband Subsidy	0.23	(1.3)			0.01	(0.3)		
	Constant	9.01	(4.8)			10.18	(51.7)		
4	NOA	1.06	(7.8)	0.68	40	0.92	(29.0)	0.64	588
	Horti. crop develop Subsidy	0.22	(2.6)			0.08	(3.6)		
	Constant	8.56	(12.2)			10.04	(64.1)		
5	NOA	0.31	(0.4)	0.04		80.88	(39.2)	0.65	1007
	Irrigation Subsidy	-0.15	-(0.4)			0.09	(5.2)		
	Constant	13.51	(3.6)			9.71	(58.8)		
6	NOA	0.95	(6.5)	0.55	52	0.88	(19.8)	0.61	348
	Watershed Subsidy	0.14	(2.2)			0.17	(4.8)		
	Constant	8.32	(13.0)			8.75	(24.4)		
7	NOA	0.87	(15.3)	0.42	362	0.93	(99.2)	0.66	5508
	Total Subsidy	0.04	(1.2)			0.03	(6.3)		
	Constant	10.06	(35.6)			10.16	(220.9)		

* **Note:** All variables in log form
Source: Estimated using Field survey data.

To conclude, the RKVY impact in Gujarat was constrained by limited interventions carried out. We could not see the impact of RKVY in sectors like organic farming, NRM and so on because of a limited numbers of observations as the interventions were limited only to few beneficiary farmers. The findings from aggregate data clearly reveal that subsidy under RKVY has clearly contributed positively, although impact of subsidy given for infrastructure purpose and where there is a gestation period, like in horticultural crops, the full impact may come with a lag period. On the other hand, subsidy given for crop development might show their impact without any time lag as has been seen in the regression results in the state.

CHAPTER VIII

Institutional/Infrastructure Projects in Gujarat

8.1 Introduction:

Public investment plays a greater role in achieving a desirable growth rate through improvement in crop productivity, market infrastructure, soil health and extension support services. RKVY is an important programme initiated by the Government of India, which encourages the state governments to increase public investment in agriculture and allied sectors. RKVY has focused on 21 major areas within agriculture and allied sector with a view to bring about a holistic development of the sector. The programme has been designed so meticulously that interventions in these focus areas benefit not only the landed farmers in rural areas but also agricultural labourers who generally engage in livestock rearing for supplementing their household income. It is interesting to note that all the major focus areas encompass infrastructure development as an important component of the programme. The infrastructure component has been included in most of the sector/area specific projects irrespective of its target group, i.e. farmer beneficiary or institutions. The inclusion of the infrastructure components among the sector specific projects has created tangible assets to be utilised for improving the productivity growth in agricultural sector.

RKVY provides flexibility in funding the projects particularly innovative and infrastructure oriented projects with a strong emphasis on increasing state budgetary allocation for agriculture and allied sectors for availing of funding under the programme. During the 11th plan period, RKVY funds were available to state governments under two distinct streams viz., Stream I and Stream II. Under Stream I, at least 75 per cent of the amount allocated to a particular state should be utilised for undertaking specific projects. Under Stream II, the remaining amount will be used for strengthening the existing state plan projects and also for filling the

resource gaps. Although RKVY is a state plan scheme, central government provides 100 per cent grant for executing the projects/schemes proposed under this programme. The District Agricultural Plan and State Agricultural Plan provide thrust areas for designing of schemes and financial resources required for proper implementation. The projects focusing on creation of infrastructure and assets have been designed and implemented by various institutions in the states. Generally, infrastructure projects have a relatively long duration and more amounts allocated as compared to the normal projects. Therefore, these infrastructure oriented projects under RKVY have been largely implemented by the line departments of agriculture, Agricultural Universities, government owned autonomous corporations, bodies and cooperative organisations. The present chapter analyses the RKVY projects implemented by various institutions located in the state of Gujarat.

8.2 Infrastructure Project by type of Institutions:

Based on the details of the infrastructure projects available from the RKVY web portal and other relevant information compiled from the RKVY nodal agency in Gujarat, questionnaire was sent to the authorities who implemented the infrastructure projects at their respective institutions/ departments. After mailing the questionnaire, the research team at AERC, VVN & ISEC, and Bangalore had followed up with the respondents through telephonic calls and e-mails to get the filled-in questionnaires from them. Among others, questionnaire sought information about the nature and type of project, objectives and their achievement, project partners, funding pattern, budget details and stage of completion. Further, information related to expected output, actual output, expected outcome, actual outcome, implementation constraints and suggestions for effective implementation of the projects by various institutions. The details of the filled-in questionnaire received through survey by regions are given in Table 8.1. Only 53 filled-in questionnaires received from various institutions located within the state, mostly from the Gujarat SAUs.

Table 8.1: Number of Filled-in Questionnaire received

Particulars	No.
No. of filled-in questionnaires received	53

The infrastructure projects have been implemented by various 127rganizations located in the state of Gujarat. These 127rganizations/ institutions have been grouped under two categories viz., State Agricultural Universities/Indian Council of Agricultural Research (ICAR) institutes and state government departments/state government autonomous corporations, boards and cooperatives. These institutions are largely involved in designing and implementing the infrastructure projects. The distribution of the infrastructure projects by type of institutions is provided in Table 8.2. It can be observed that overall state government departments such as Departments of Agriculture, Horticulture, Animal Husbandry, Watershed and Sericulture implemented about 57 per cent of the infrastructure projects in Gujarat. The remaining projects were implemented by the Junagarh Agricultural University, Anand Agricultural University and its affiliated institutions.

Table 8.2: Number of Infrastructure Projects by type of Institutions

Type of institution	No.
SAU's/ICAR Institutes	25 (53.1)
State Govt. Departments	28 (46.9)
Total number of projects	53 (100.0)

Note: Values in the parentheses indicate percentage

Based on the nature of components of the projects that have been implemented by various institutions, institutional projects are broadly grouped under normal projects, infrastructure projects and normal cum infrastructure projects. Generally, normal projects do not contain infrastructure and asset components. They are basically targeted towards individual beneficiaries in the form of training and capacity building, and field trials in the farmers' field. However, infrastructure projects are mainly

meant for creating assets such as construction of laboratory, e- auction system, market yards, cold storage, training hall, warehouse and rain shelter. There are also projects which are both beneficiary and infrastructure oriented.

The distribution of infrastructure projects by type is presented in Table 8.3. The projects are grouped as infrastructure oriented, beneficiary oriented and infrastructure cum beneficiary oriented projects. Out of total number of projects, 43 per cent were infrastructure oriented and 14 per cent were beneficiary oriented and 40 per cent were both infrastructure and beneficiary oriented. The distribution of a higher number of infrastructure oriented projects imply that various implementing institutions have given more importance to creation of tangible assets, which can help the farmers directly or indirectly in improving agricultural productivity. Among states, Gujarat implemented a relatively high number of infrastructure oriented projects.

Table 8.3: Number of Infrastructure Projects by Type

Project type	No. of Projects
Infrastructure oriented	36(67.9)
Beneficiary oriented	12(22.7)
Both	5(9.4)
Total number of projects	53(100.0)

Note: Values in the parentheses indicate percentage

The state and central governments give importance to certain agricultural issues to address them on a priority basis. Perhaps, these issues are such that they are likely to hinder the agricultural growth and crop productivity in the long run if they are not addressed adequately. Therefore, they merit the attention of the policy makers and require designing of suitable schemes/developmental programmes with a higher allocation of financial resources. Such schemes/programmes are called as government flagship schemes/programmes. Under the RKVY also, both state and central governments had designed state flagship and national flagship infrastructure projects for implementation. The number of

infrastructure projects by state and national importance (flagship) is given in Table 8.4. Interestingly, almost all the projects for which details were received through survey had fallen under either state flagship or national flagship projects.

Table 8.4: Number of Infrastructure Projects by National Importance

Importance/Flagship	No.
State Flagship	38(71.7)
National Flagship	20(28.3)
Both	0(0.0)
Total	53(100.0)

Note: Values in the parentheses indicate percentage

8.3 Sectorwise Infrastructure Project

During the 11th plan period, various infrastructure projects under RKVY were spread across different sectors in the state of Gujarat. The number of projects varied across the sectors and they indicate priority set for development of lagging areas in the state. The distribution of the infrastructure projects by sectors is given in Table 8.5.

Table 8.5: Number of Institutional and Infrastructure Projects by Sector

S. No	Sector	Number
1	Agriculture mechanization	1(1.9)
2	Animal husbandry	7(13.2)
3	Cooperatives and cooperation	1(1.9)
4	Crop development	3(5.7)
5	Dairy development	2(3.8)
6	Extension	12(22.7)
7	Fertilizers and INM	1(1.9)
8	Fisheries	1(1.9)
9	Horticulture	1(1.9)
10	Innovative programmes/ training/ capacity building/ others	6(11.3)
11	Marketing and post harvest management	11(20.8)
12	Organic farming / bio fertilizer	2(3.8)
13	Seed	5(9.4)
	Total	53(100.0)

Note: Figures in the parentheses indicate percentage to total

Out of total infrastructure projects, a relatively large number of them were focused on extension. In fact, extension accounted for 23 per cent of the total projects. The second highest number of infrastructure projects were implemented under marketing and post harvest management (21 per cent) followed by animal husbandry (13.2 per cent), innovative programmes/training and capacity building (11.3 per cent) and seed (9.4%).

8.4 Status of Infrastructure Projects

The infrastructure projects have long gestation period and often they are implemented in a phased manner. The status of the implementation of the projects are grouped under completed, ongoing, not implemented and abandoned. Out of the total number of infrastructure projects launched during the 11th Plan, about 74 per cent of them were completed and 17 per cent were ongoing (Table 8.6). Unfortunately, four projects were abandoned and one project was not implemented. Implementing agencies also reported various reasons for abandoning the project. These reasons, among others, included stoppage of funding or refusal to release further grants, and conversion of the projects from Stream I to Stream II category, which required the respective state governments to commit resources for completion of the projects. However, such support hardly came from the state government to fill the resource gap particularly for the infrastructure projects taken up at the Agricultural Universities.

Table 8.6: Status of Institutional and Infrastructure Projects (Numbers)

S.No	Status of the project	**Gujarat**
1	Completed	39(73.6)
2	Ongoing	9(17.0)
3	Not Yet implemented	1(1.9)
4	Abandoned	4(7.6)
	Total	53(100.0)

Note: Figures in the parentheses indicate percentage to total

Due to various factors operating at policy and institutional level affect the completion of the infrastructure projects on time. Even the short duration projects get extended unduly to longer period. The duration of the completion of the infrastructure projects has been grouped into six categories viz., less than one year, 1.0-1.9 year, 2.0-2.9 year, 3.0-3.9 year, 4.0-4.9 year and more than 5.0 year. The distribution of the projects by duration and sector is given in Table 6.7. It can be observed that about 49 per cent of the projects came under the category of the less than 3 years of duration. It can also noted that about 26 per cent of the projects were of 3.0-3.9 year of duration and 13.2 per cent were of 4.0-4.9 years. About 7.6 per cent of the projects fell under less than 2 years. No infrastructure projects were of less than one year duration. Overall, it is clear that a relatively large proportion of the infrastructure projects were of long duration oriented.

Table 8.7: Yearwise Distribution of Institutional & Infrastructure Projects (Nos.)

S. No	Duration	Number
1	Less than one year	0(0.0)
2	1-1.9	4(7.6)
3	2-2.9	26(49.1)
4	3-3.9	14(26.4)
5	4-4.9	7(13.2)
6	5	2(3.8)
	Total	53(100.0)

Note: Figures in the parentheses indicate percentage to total

8.5 Sectorwise cent per cent Objectives Achieved

The successful completion of the projects can be examined from the extent of achievement of proposed objectives during the project period. The extents of completion of objectives of the projects are found to be varied by sectors and regions (Table 8.8). The analysis focused on achievement of all the objectives of projects in relation to the total number of projects

implemented under various sectors. Out of 53 reported infrastructure projects for which fairly good information are available, only 26 projects recorded a hundred per cent achievement of objectives and the remaining projects did not fulfil all the proposed objectives. Among the sectors, about seven projects implemented under extension achieved all the objectives followed by marketing and post harvest management and seed.

Availability of adequate financial resources is very crucial for carrying out all the proposed project activities on time and avoids undue delay in completion. The level of utilization of finances indicates the financial efficiency of the implementing agencies. The details of allocation, release and expenditure under infrastructure/institutional projects are given in Table 8.9. It can be observed that total allocation, as revealed by the implementing agencies, stood at Rs. 219.1 crore in the state of Gujarat. Out of this amount, Rs. 166.4 crore was released and Rs. 165.4 crore was spent. The expenditure performance of the implementing agencies seems to be very impressive, which is evident from the expenditure to release ratio. The overall expenditure to release ratio was 99.4 per cent implying that only 0.6 per cent of the release was not utilised by the implementing agencies.

Table 8.8: Sectorwise cent per cent Objectives Achieved (Numbers)

S.No	Sector	Number
1	Agriculture mechanization	1(3.9)
2	Animal husbandry	1(3.9)
3	Cooperatives and cooperation	1(3.9)
4	Crop development	2(7.7)
5	Extension	7(26.9)
6	Innovative programmes/ training/ capacity building/ others	3(11.5)
7	Marketing and post harvest management	6(23.1)
8	Organic farming / bio fertilizer	1(3.9)
9	Seed	4(15.4)
	Total	26(100.0)

Note: Figures in the parentheses indicate percentage to total

Table 8.9: Allocation, Release and Expenditure (Rs lakhs)

State- Gujarat	Amount
Allocation	21910
Release	16637
Expenditure	16543
E/R (%)	99.4

8.6 Distribution of Expenditure by Sector

Distribution of expenditure by sector is provided in Table 8.10. Among the sectors, animal husbandry accounted for whopping share of 68 per cent of the total expenditure. The next highest amount of expenditure was on the infrastructure projects implemented under marketing and post harvest operations with 15.8 per cent followed by extensions (5.9 per cent). Seed sector accounted for 3.7 per cent of the total expenditure. Overall, the observed expenditure pattern is in congruence with the distribution of projects by sector.

With respect to examining the achievements of the project, it is important to understand the process involved in planning and execution of the projects. Generally, project proposals submitted for approval are supposed to mention the likely contributions of the proposed projects. The contributions can encompass advancement in knowledge generation, varietal development, development of machineries, organic inputs, strengthening of lab facilities, training and capacity building, creation of processing or storage facilities and strengthening of infrastructure facilities in the Agricultural Universities/research institutes. In order to capture various type of contributions, project proposals specify expected output and expected outcomes. After the completion of the projects, the implementing agencies have to provide information about to what extent the expected output and outcomes were translated into actual output and outcomes. The level of fulfilment of expected and actual output and outcomes can be considered for assessing the achievements of the projects

Table 8.10: Sector wise total Budget of the institutional and infrastructure projects

Sl No	Sector	**Amount (Rs. lakhs)**
1	Agriculture mechanization	174.93 (0.3)
2	Animal husbandry	40037.6 (68.0)
3	Cooperatives and cooperation	595.9 (1.0)
4	Crop development	371.5 (0.6)
5	Dairy development	20.51 (0.0)
6	Extension	3472.15 (5.9)
7	Fertilizers and INM	190.6 (0.3)
8	Fisheries	430 (0.7)
9	Horticulture	106.85 (0.2)
10	Innovative programmes/ training/ capacity building/ others	1757.59 (3.0)
11	Marketing and post harvest management	9314.49 (15.8)
12	Organic farming / bio fertilizer	211.67 (0.4)
13	Seed	2175.69 (3.7)
	Total	58859.54 (100.0)

Note: Figures in parenthesis are percentage to total.

However, information received from the implementing agencies through survey are specific to different projects and they are found to be patchy. Further, most of this information is qualitative in nature and density of information is so high that it becomes difficult to interpret them meaningfully.

8.7 Achievements and Constraints

It can be observed that the expected output and outcomes seem to have been achieved across projects implemented under different sectors. Achievement of outputs can be seen in terms of creation of assets such as establishing mobilising laboratories, pesticide and bio-control laboratories, construction of community irrigation facilities, soil and water conservation structures, construction of shallow wells, bore wells, drains, soil testing laboratories, increase in area under improved varieties and so on. Under these projects, farmers were also trained and built capacity to apply new technologies, given certified seeds, organic inputs, improved breeds of animals, tarpaulins, solar lanterns and similar useful inputs. Outcomes of the projects, as reported by the implementing agencies, among others include increase in productivity of various crops, improved soil fertility, improved water infiltration, increased seed germination, reduced cost of cultivation, improved training facilities, increased milk yield, wool production, increase in youth employment and enhanced farmers' knowledge and skill in doing farming activities.

The implementing agencies reported that an important constraint faced while dealing with the nodal agency was accessing fund on time. Though the project was approved for a given budget, the fund released during implementation of the project was considerably less than the allocated amount. At the research institute level, the implementing agencies reported many problems including unavailability of skilled man power, unavailability of full time dedicated Scientists and supporting staffs including Technical Assistants, lab assistant and lab attendees. There was a problem in getting contractual trained persons for the follow up the project activities. Even though the infrastructure facilities for training and capacity building were established, there was a need for involvement of extension specialists to extend those infrastructural facilities to the farmers through some of the schemes implemented by ATMA and Agricultural departments.

The next chapter presents the concluding remarks and broad policy implications.

CHAPTER IX

Conclusions and Policy Suggestions

In Gujarat, annual average growth in agricultural GSDP during the 11th plan was 5.6 per cent as compared to 10th plan growth rate at 9.7 per cent. Although the rate of growth appears to be lower during the 11th plan, still it is highly remarkable given vagaries of rainfall pattern. It is also important to observe that out of five years, three years registered negative growth in agricultural GSDP during the 10th plan while only two years showed negative growth during the 11th plan. Further, average net sown area and gross cropped area increased considerably during the 11th Plan. The per hectare land productivity also showed increasing trend. Trend in these indicators imply that the performance of agriculture in Gujarat during the 11th plan was relatively good.

In the state of Gujarat, 330 projects were implemented during the XI Five Year Plan and they spread across 19 sectors accounting for total expenditure of Rs. 2018.83 crore. Among the sectors, natural resource management has accounted for the highest proportion of expenditure followed by marketing and post harvest management, and agricultural mechanization. The average expenditure per project was also found be high at Rs. 14.5 crore under natural resource management. The average expenditure per project under agricultural mechanization was the second highest with Rs. 12.3 crore followed by organic farming/bio-fertilisers with Rs. 10.5 crore.

Analysis of primary survey data revealed that some of the sample households benefited from more than one programme implemented under RKVY. The highest proportion of farmers surveyed benefited from agriculture mechanization followed by crop development activities. Thus, more than 78 percent of farmers have benefited under these two

projects. Around 14 per cent each of total sample farmers benefited from horticulture and micro/minor irrigation projects. Farmers benefited under animal husbandry constituted about 3.3 per cent. Only one farmer beneficiary was found to be covered under natural resource management and under cooperatives and cooperation. Although number of projects implemented and amount spent was relatively high for natural resource management activities followed by animal husbandry activities at the macro level, it appeared that not many recorded beneficiaries were found in the field. It is because there were overlapping or same kind of activities carried out under micro/minor irrigation and natural resource management. Many of the beneficiaries may possibly be classified under the natural resource management activities.

Distribution of beneficiaries by social categories showed that 'others' group constituted about 58 per cent of the total sample beneficiaries. The OBC beneficiary farmers accounted for the next highest proportion with 31 per cent. The ST farmers constituted about 8 per cent, while the SC beneficiary farmers accounted for 4 per cent only. It implies that the programme as largely benefitted the dominant caste groups, while socially backward farmers have been neglected. Further, land holding pattern of sample households revealed that that RKVY has largely benefitted land owning farmers and that too irrigated regions of the state.

In case of interventions under mechanisations, about 53.3 per cent of sample households availed the benefit. The average cost of agricultural machineries per household was estimated at Rs. 49343. The proportion of subsidy at the aggregate level was Rs. 20233, which accounted for 41 per cent of the cost. It can be observed that the highest proportion of sample farmers received subsidy for purchase of rotavator followed by sprayer and pumpset. Interestingly, sample farmers mentioned that except pumpset and rotatvator, almost all machineries distributed under RKVY were reportedly in working conditions at the time of field survey.

Under crop development, about a quarter of total sample households received benefits on various inputs. Average cost of inputs supplied stood at Rs. 2700 and the proportion of subsidy was estimated at 74.1 per cent. Among benefit types, about 10 per cent of the sample farmers obtained fertilizers and plant protection chemicals, and 7.6 per cent of the farmers received seeds/planting materials. Organic inputs such as biofertilisers and bio-control agents are also promoted under RKVY. Under horticulture, sample farmers received subsidy for establishing green house, shade net and drip irrigation system. However, for animal husbandry and dairying, only 3.3 per cent of the sample farmers benefitted from various interventions. Average cost of intervention was Rs. 91157 per household and the share of subsidy in average cost was 59.9 per cent. Among the items, the proportion of beneficiaries received financial assistance for purchase of cows, poultry and construction of modern cattle shed was one cent each.

Interventions under watershed development were carried out in the form of construction of farm ponds, check dams, nala bunds, land leveling, bunding and vegetative barrier. Analysis of survey data revealed that 11.9 per cent of the sample farmers benefited from various interventions in the state of Gujarat. Average area treated by these interventions was 3.3 acres per household. Average cost of interventions was Rs. 114086 per household and share of subsidy was 100 per cent. Interestingly, except for farm ponds, sample beneficiary farmers mentioned 10-30 per cent increase in crop productivity. Increase in crop productivity is reportedly higher for farm ponds followed by nala bunds, check dams, land leveling and bunding. Sample farmers also reported a substantial proportion of increase in income due to interventions under watershed development. With respect to institutional projects, a relatively large number of them were focused on extension. In fact, extension accounted for 23 per cent of the total projects. The second

highest number of infrastructure projects were implemented under marketing and post harvest management followed by animal husbandry, innovative programmes/training and capacity building and seed. Out of the total number of institutional/infrastructure projects about 74 per cent of them were completed and 17 per cent were ongoing. Achievement of outputs can be seen in terms of creation of assets such as establishing mobilising laboratories, pesticide and bio-control laboratories, construction of community irrigation facilities, soil and water conservation structures, construction of shallow wells, bore wells, drains, soil testing laboratories, increase in area under improved varieties and so on.

The sample farmers reported many problems in accessing the subsidy under RKVY. About 61 per cent of the sample farmers reported problems in getting too many documents for availing subsidy under RKVY. The sample farmers particularly marginal and small farmers indicated that contact details of the department which provides subsidy are not easily available. A higher proportion of the sample farmers also indicated that eligibility or other criteria for availing subsidy are not known and hence they refrain from approaching the agriculture department for more details. The sample farmer indicated a strong need for building capacity of farmers in using new technology through field visits and training programmes. Some sample beneficiary farmers indicated that timely availability and quality of inputs are very important for improving crop yield and achieving higher income.

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Rashtriya Krishi Vikas Yojana (RKVY)

Operational Guidelines For XII Five Year Plan

Department of Agriculture & Cooperation
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CONTENTS

1.	Introduction	1
2.	Objectives of RKVY	1
3.	Eligibility Criteria and Inter State Allocation of Funds	1
4.	Programme Components (Streams)	2
5.	District and State Agriculture Plans	4
6.	State Level Project Screening Committee (SLPSC)	5
7.	State Level Sanctioning Committee (SLSC)	6
8.	Preparation & Sanctioning of Projects	7
9.	Planning & Implementation of RKVY	7
10.	Release of Funds	8
11.	Administrative Expenses & Contingencies	9
12.	Monitoring & Evaluation	9
13.	Convergence	10
14.	**APPENDICES:**	
	Appendix-A Computing Eligibility for allocation of Funds under Rashtriya Krishi Vikas Yojana (RKVY)	11
	Appendix-B Inter State Allocation of the funds under Rashtriya Krishi Vikas Yojana (RKVY)	12
	Appendix-C1 Areas of Focus under RKVY (Production Growth)	13
	Appendix-C2 Illustrative List of projects that can be funded under RKVY (Infrastructure & Assets)	15
	Appendix-D Illustrative List of projects/activities that should not be funded under RKVY	18
	Appendix-E Composition of State Level Sanctioning Committee (SLSC)	19
	Appendix-F Format for Utilization Certificate	20
	Appendix-G Activity mapping for effective devolution of funds etc. to PRIs	21

1. Introduction

1.1 To spur growth in the Agriculture and allied sectors, National Development Council (NDC), in its meeting held on 29th May, 2007 observed that a special Additional Central Assistance (ACA) Scheme be introduced to incentivize States to draw up comprehensive agriculture development plans taking into account agro-climatic conditions, natural resources and technology for ensuring more inclusive and integrated development of agriculture and allied sector.

1.2 In pursuance to aforesaid observation and in consultation with the Planning Commission, Department of Agriculture & Cooperation (DAC), Ministry of Agriculture, Govt. of India launched Rashtriya Krishi Vikas Yojana (RKVY) from 2007-2008, which has been operational since then.

1.3 During XI Plan, Rs. 22,408.76 crore was released to States out of which Rs. 21,586.6 crore was utilized in implementing 5768 projects in certain broad categories namely; crop development, horticulture, agricultural mechanization, natural resource management, marketing & post-harvest management, animal husbandry, dairy development, fisheries, extension etc.

1.4 By virtue of these enhanced investments, agriculture and allied sectors could achieve an annual growth rate of 3.64% during the XI plan against a growth rate of 2.46% per annum in the X plan period.

1.5 Based on feedback received from States, experiences garnered during implementation in XI Plan and inputs provided by Stakeholders; Operational Guidelines of RKVY have been revised to not only enhance efficiency and efficacy of the programme but also its inclusiveness during XII Plan period.

2. Objectives of RKVY

2.1 RKVY aims at achieving and sustaining desired annual growth during the XII Plan period, by ensuring holistic development of Agriculture and allied sectors.

2.2 To recapitulate, the main objectives of the scheme are:

(i) To incentivize the States so as to increase public investment in Agriculture and allied sectors.

(ii) To provide flexibility and autonomy to States in the process of planning and executing Agriculture and allied sector schemes.

(iii) To ensure the preparation of agriculture plans for the districts and the States based on agro-climatic conditions, availability of technology and natural resources.

(iv) To ensure that the local needs/crops/ priorities are better reflected in the agricultural plans of the States.

(v) To achieve the goal of reducing the yield gaps in important crops, through focused interventions.

(vi) To maximize returns to the farmers in Agriculture and allied sectors.

(vii) To bring about quantifiable changes in the production and productivity of various components of Agriculture and allied sectors by addressing them in a holistic manner.

3.0 Eligibility Criteria and Inter State Allocation of Funds:

3.1 RKVY will continue to be implemented as a State Plan Scheme. The list of allied sectors as indicated by the Planning Commission will be the basis for determining the sectoral expenditure, i.e., Crop Husbandry (including Horticulture), Animal Husbandry and Fisheries, Dairy Development, Agricultural

Research and Education, Forestry and Wildlife, Plantation and Agricultural Marketing, Food Storage and Warehousing, Soil and Water Conservation, Agricultural Financial Institutions, other Agricultural Programmes and Cooperation. In addition, expenditures which are directly related to the development of agriculture viz., expenditure on shallow tube well, deep tube well, drip irrigation, sprinkler irrigation, dug wells or other similar irrigation activities which are budgeted under Agriculture Department of the State, authenticated figures of expenditure by Panchayati Raj Institutions (PRI) /Administrative Units on agriculture & allied activities will also be considered for calculating base line expenditure. (Also refer to Appendix-B)

3.2 Eligibility Criteria: A State will become eligible to receive RKVY allocation, if and only if:

a) The base line share of Agriculture and allied sectors in its total State Plan (excluding RKVY funds) expenditure is at least maintained; and

b) District Agriculture Plans (DAP) and State Agriculture Plans (SAP) have been formulated.

The base line level of expenditure will be the "minimum of the percentage expenditure incurred on agriculture and other identified related sectors during three years preceding to previous year". For States to become eligible, "average percentage share of expenditure in agriculture and other identified related sectors during last three years" should be at least equal to base line level (Illustration is at Appendix- A).

3.3 Inter-State Allocation: Once a State becomes eligible for accessing funds under RKVY, the quantum of assistance (or fund allocation) and the process of subsequent allocation to the State will be in accordance with the parameters and respective weights, as explained in Appendix-B.

3.4 There may arise a situation when a particular State becomes ineligible to avail of the funds under RKVY in a subsequent year due to its lowered expenditure on Agriculture and allied sectors. If this were to happen, such States shall be required to commit their own resources for completing the sanctioned/ ongoing projects/schemes under the RKVY.

3.5 RKVY Funds will be made available to the States in two installments of 50% each. Eligibility & Inter-State allocation criteria will not be applied for providing funds under the sub-schemes of RKVY or RKVY Special schemes.

3.6 Release of funds will be made to the State Government only and States may supplement RKVY projects from within their own resources.

4.0 Programme Components (Streams)

4.1 RKVY funds would be provided to the States as 100% grant by the Central Government in following streams.

(a) RKVY (Production Growth) with 35% of annual outlay,

(b) RKVY (Infrastructure and Assets) with 35% of annual outlay;

(c) RKVY (Special Schemes) with 20% of annual outlay; and

(d) RKVY (Flexi Fund) with 10% of annual outlay (States can undertake either Production Growth or Infrastructure & Assets projects with this allocation depending upon State specific needs/priorities).

4.2 RKVY (Production Growth): States can take up any project under this stream to raise production and productivity in agriculture and allied sectors. This will normally include all

food crop activities, including distribution of agricultural inputs, extension, soil health, plant health & Integrated Pest Management(IPM), production & distribution of seeds, animal husbandry, dairying & fisheries, training and skill development of stakeholders, production specific research projects, information dissemination etc. Projects proposed under RKVY (Production Growth) shall normally emanate from the District and State Agriculture Plans. Broad areas of focus for this Stream are at Appendix-C1.

4.3 RKVY (Infrastructure and Assets): Projects under this stream will emanate from State Agriculture Infrastructure Development Programme (SAIDP) (please refer to para 5.7 also). This will normally include projects selected on the basis of normative requirement of infrastructure, actual availability thereof and the gap in agriculture infrastructure in the State viz. setting up of laboratories and testing facilities, storage including cold-storages, mobile vans, agricultural marketing etc. An illustrative list of possible infrastructure and assets which can be funded under this stream is given at Appendix-C2. State Governments will also determine sectoral classification for investment requirements for infrastructure in public, public-private and private sectors and accordingly work out financial support for funding gaps in infrastructure taking into account viability gap which would be based on financial analysis. However, in any case, subsidy will be capped to 25% of total project cost. While a number of infrastructure items are covered under Rural Infrastructure Development Fund (RIDF) and Viability Gap Funding (VGF) of the Ministry of Finance, RKVY funds should supplement those sources and not replace them. In any case, quantum of assistance under RKVY should not exceed assistance under VGF.

4.4 RKVY (Special Schemes): This will comprise of schemes based on national priorities as notified by Govt. of India from time to time. In the event of Government of India not declaring any special subscheme in a year (or not continuing sub-schemes of previous year) or the aggregate amount earmarked for such special sub-schemes falling short of 20% of the RKVY budgetary allocation for the year, the remaining amount will be allocated additionally to RKVY (Production Growth Stream) funds.

4.5 Under RKVY (Production Growth) & RKVY (Infrastructure & Assets) streams, States are free to choose appropriate components/ activities, but it has to be ensured that these are reflected adequately in SAP and DAPs. Scheme(s) administered by the Departments of Agriculture and Cooperation, Animal Husbandry, Dairying and Fisheries, Dept. of Land Resources, Ministry of Water Resources, Ministry of Food Processing Industries etc., already have elaborate guidelines, which ought to be followed by the implementing Agencies for similar activities/project components. However, State must refrain from undertaking activities/components as illustrated in Appendix-D.

4.6 Cost Norm & Pattern of Assistance: Activities/components proposed under RKVY especially under production growth stream are generally covered under various ongoing schemes/programmes of Central Government viz. Dept. of Agriculture & Cooperation, Dept. of Animal Husbandry, Dairying & Fisheries, Dept. of Land Resources, Ministry of Water Resources, Ministry of Food Processing Industries, Ministry of New & Renewable Energy, Ministry of Rural Development etc. Technical requirements / standards and financial norms (cost norms and pattern of assistance) etc. for these activities/ components that have been specified in various schemes/prgrammes will also be applicable for RKVY. In the absence of such criterion in respect of any component in Central Plan Scheme, norms and conditions prescribed by respective State Governments for their schemes may be applied. In cases where no Central / State Govt. norms are available, a certificate of reasonableness of the

proposed project cost along with reasons thereof will invariably be given by State Level Project Screening Committee (SLPSC) in each such case. Even in such cases, financial assistance should not be more than 25% of the project cost (Also refer to para-6.1-6.3).

5.0 District and State Agriculture Plans:

5.1 Districts and State Agriculture Plans will remain as cornerstone of planning and implementation of this scheme.

5.2 District Agriculture Plans (DAPs) are integral to the District Development Plan. Each District will have a DAP after taking into consideration resources that would be available during XII Plan from other ongoing schemes (both State and Central), like Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Swarnajayanti Gram Swarojgar Yojana (SGSY) and Backward Regions Grant Fund (BRGF), Integrated Watershed Management Programme (IWMP), Accelerated Irrigation Benefit Programme (AIBP), Bharat Nirman etc. DAP shall not be the usual aggregation of the existing schemes but would aim at moving towards projecting the requirements for development of Agriculture and allied sectors of the district. These plans will present the vision for Agriculture and allied sectors within the overall development perspective of the district. DAP's would also present their financial requirements in addition to sources of financing the agriculture development plans in a comprehensive way. Since achievement of RKVY's objectives is sequel to proper District Planning, these requirements should be adhered to by the State as far as possible. The States will have to specify the institutional mechanisms evolved by them for District Planning and submit a status report at the stage of the Annual Plan exercise. DAP will include animal husbandry and fishery development, minor irrigation projects, rural development works, agricultural marketing schemes and schemes for water harvesting and conservation, etc. keeping in view the natural resources and technological possibilities in each district.

5.3 District level potential linked credit plans (PLP) already prepared by the National Bank for Agriculture and Rural Development (NABARD) and Strategic Research and Extension Plans (SREP) developed under the Agricultural Technology Management Agency (ATMA) etc. may be referred for revision of DAPs. It should also be ensured that the strategies for convergences with other programmes as well as the role assigned to the Panchyati Raj Institutions (PRIs) are appropriately incorporated in DAPs. States may also engage consultants/consulting agencies to revise / update DAPs and SAP.

5.4 Each State will also have a comprehensive State Agricultural Plan (SAP) for XII Plan by integrating the District Plans. SAPs will invariably have to indicate resources that can flow from the State to the districts.

5.5 Several States/UTs have already prepared comprehensive district and State agriculture plans for XI Plan, which should be revised and updated appropriately for implementing RKVY during XII Plan keeping in view modification proposed for the plan period and emerging needs of the State.

5.6 Revision and updation of SAPs could be a two-way process. Firstly, State nodal department (or Agriculture Department) could get DAPs revised in the first instance to ensure that priorities of the State are properly covered in the district plans. States

should, at this stage of scrutiny, ensure that requirements of districts and priorities of the State are appropriately captured and aligned in DAPs. Alternately, State Nodal Agency could communicate to the districts in the first instance, the State's priorities that ought to reflect in the respective district plans and the districts may incorporate these in their updated district plans.

5.7 Preparation/revision of the DAPs is an elaborate, exhaustive and iterative process and care need be taken by the State nodal department and district agriculture department in ensuring that these plans cover the entire gamut of agriculture & allied sectors.

5.8 State Agriculture Infrastructure Development Programme (SAIDP): Each State will be required to prepare SAIDP in similar manner to that of DAPs and SAPs for identifying shelf of projects for RKVY (Infrastructure & Assets) stream.

SAIDP should ideally be consolidation of requirement of infrastructure identified in DAPs and SAP.

5.9 State Planning Department will provide revised/updated SAP and SAIDP to Department of Agriculture (DAC) and Planning Commission as a part of State's annual State Plan exercise.

6.0 State Level Project Screening Committee (SLPSC):

6.1 A State Level Project Screening Committee (SLPSC) will be constituted by each State for screening RKVY project proposals, which will be headed by Agriculture Production Commissioner or any other officer nominated by Chief Secretary. Other members of SLPSC would be decided by the State Chief Secretary.

6.2 SLPSC will screen all project proposals for ensuring conformity with RKVY guidelines and that they flow from SAP/DAPs besides being consistent with technical requirements / standards and financial norms (cost norms and pattern of assistance) etc. in respect of components that have been specified in relevant Central Government/State Government schemes (As also outlined in para-4.6).

6.3 SLPSC will also screen all Detailed Project Reports (DPRs) prepared by various departments for its suitability, its linkage to DAP, SAIDP and SAP and its adherence to the RKVY guidelines.

6.4 Before recommending projects to SLSC, SLPSC will further examine and ensure that:

a) Funds available under other schemes of the State Government and / or Government of India for the proposed projects have been accessed and utilized before they are brought under the RKVY umbrella;

b) RKVY projects/activities should not create any duplication or overlapping of assistance /area coverage vis-à-vis other schemes/programmes of State/Central Government;

c) RKVY funds are not being proposed as additional or 'top-up' subsidy to other ongoing schemes/programmes of State/Central Government;

d) State Agriculture Infrastructure Development Programme (SAIDP) has been prepared;

e) At least 25% of total value of projects including 'Production growth' and 'Assets & Infrastructure' Streams have emanated from comprehensive

district agricultural plan (CDAP) and have been approved by the District level Panchayati Raj Institutions (PRIs) so that field level gaps are correctly addressed;

f) DPRs have included provision for monitoring and evaluation;

g) For Research Projects proposed under RKVY, clearance of Indian Council of Agriculture Research (ICAR) has been obtained;

h) Convergence with other State/Central Schemes has been attempted; and

i) Recommended projects ensure adequate allocation to allied sectors including Farmer Producer Organizations (FPO).

A checklist containing items at 6.4(a) to 6.4 (i) shall be prepared and enclosed with SLSC agenda note.

7.0 State Level Sanctioning Committee (SLSC):

7.1 A State Level Sanctioning Committee (SLSC) headed by the Chief Secretary of the State is vested with the authority to sanction specific projects recommended by the SLPSC under each stream of RKVY in a meeting attended by representatives of Government of India. The quorum for SLSC meetings would not be complete without the presence of at least one representative from the Government of India. Composition of SLSC is at Appendix-E.

7.2 SLSC may co-opt two more members from Agricultural Research Organizations, reputed NGOs working in the field of Agriculture, District Collectors/Deputy Commissioners of important districts, and leading farmers. The State Governments will notify the constitution of SLSC and consequent changes in its composition/incumbent.

7.3 SLSC will, inter alia, be responsible for

a) Sanctioning the projects under RKVY;

b) Monitoring progress of each project sanctioned by it under each stream of RKVY;

c) Reviewing implementation of the schemes' objectives and ensure that the projects / schemes are implemented in accordance with the guidelines laid down;

d) Ensuring that no duplication of efforts or resources takes place;

e) Commissioning/undertaking field studies to monitor the implementation of projects;

f) Initiating evaluation studies from time to time, as may be required;

g) Undertaking any other project of importance to the State's Agriculture and allied sectors;

h) Ensuring that there are no inter-district disparities with respect to the financial patterns / subsidy assistance in the projects; and

i) Ensuring that all extant procedures and instructions of Govt. of India in addition to RKVY guidelines are followed so that the expenditure incurred on implementation of the projects is barest minimum with due concern for economy in expenditure and also in conformity with the cannons of financial propriety, transparency and probity.

7.4 SLSC shall meet as often as required but

shall meet at least once in a quarter.

8.0 Preparation & Sanctioning of Projects:

8.1 Detailed Project Reports (DPRs): RKVY is a project-based scheme. Thus, Detailed Project Reports (DPRs) shall have to be prepared for each of the RKVY projects incorporating all essential ingredients i.e. feasibility studies, competencies of the implementing agencies, anticipated benefits (outputs/outcomes) that will flow to the farmers/ State, definite time-lines for implementation etc. In case of large projects costing more than Rs. 25 crore, DPRs should be subjected to third party 'techno-financial evaluation' and circulated well in advance to concerned Central Ministries for obtaining comments/observations.

8.2 DPRs for all projects relating to agriculture, animal husbandry, dairying and fisheries etc., should certify that there would be no duplication of funding and/or undertaking similar activities in the same areas under other Plan schemes of Central/State Government. DPRs should clearly indicate the year-wise physical & financial targets proposed under each project.

8.3 It will be permissible for the States to initiate specific projects with definite time-lines, and clear objectives for Agriculture and allied sectors excluding forestry and wild life, and plantations (i.e., Coffee, Tea and Rubber).

8.4 The Nodal Department (refer to para-9.1) will place RKVY project proposals before the State Level Project Screening Committee (SLPSC) which shall, after due consideration, place eligible & scrutinized project proposals before SLSC for approval.

8.5 SLSC's will normally approve projects equal to the amount of State's allocation under RKVY. Under no circumstances, SLSC's may approve projects for more than 150% of the State's allocation under RKVY for funding in a year (after taking into account cost to be funded in the year concerned for multi-year infrastructure projects). In case projects with outlay higher than the allocation for the State is approved by SLSC, priority will be indicated in the Minutes of SLSC meeting inter-alia specifying costs and physical & financial targets that will be taken up for implementation during the year limited to the ceiling of total allocation of funds to the States for the year. In case of projects having implementation period spanning over more than one financial year, financial year-wise phasing of expenditure and the targets/milestones to be achieved will be specifically mentioned in the minutes of SLSC meetings.

8.6 While sanctioning projects under RKVY, SLSC shall also ensure that adequate coverage of small and marginal farmers, Scheduled Castes (SC), Scheduled Tribes (ST), physically challenged, women and other weaker segments of society is ensured so that the benefits of implementation are inclusive and accrue to the intended beneficiaries in accordance with Govt. guidelines and policies. In addition, SLSC shall also ensure that Farmer Producer Organization (FPO) are given desirable support in RKVY projects.

9.0 Planning & Implementation of RKVY

9.1 State Agriculture Department shall be the nodal department for the implementation of the scheme. For administrative convenience and ease of implementation, State governments may identify, or create an exclusive agency for implementing the scheme on

a fast-track. Even where such an Agency is created/designated, the entire responsibility of ensuring proper implementation of RKVY rests with the State Agriculture Department.

9.2 In a situation where the States notify a Nodal agency, the costs of running the agency, will have to be met from within the 1% limit of RKVY allocation (excluding special schemes) and subject to conditionality(s) indicated in para 11 of the guidelines.

States may supplement any administrative expenditure in excess of the 1% limit, from their own resources.

9.3 The Agriculture department/nodal agency will be responsible for the following:-

(i) Preparing State Agriculture Plan (SAP) & State Agriculture Infrastructure Development Programme (SAIDP) and ensuring the preparation of the District Agriculture Plans (DAPs).

(ii) Effectively coordinating preparation and appraisal of projects, implementing, monitoring, and evaluation with various Departments and implementing Agencies.

(iii) Management of funds received from the Central, and State Governments and disbursement of the funds to the implementing agencies.

(iv) Furnishing of utilization certificates and quarterly physical & financial progress reports to the Department of Agriculture and Cooperation. Indicative proforma for submission utilization certificate is at Appendix-F.

(v) Effectively utilizing and regularly updating web enabled IT based RKVY Management Information System (RKVY-MIS).

9.4 The State Level Nodal Agency will forward SLSC meeting notice along with sufficient number of copies (not less than 20) of agenda and project details to Department of Agriculture & Cooperation (DAC) so as to reach at least 15 days before the meeting of SLSC to enable Government of India's representatives to come prepared and to participate meaningfully in the SLSC meeting.

9.5 Once SLSC sanctions the projects, DAC will release funds to State Government only.

9.6 As envisaged in National Policy for Farmers (2007) (para 11-viii), Panchayati Raj Institutions (PRI) should be actively involved in implementation of RKVY especially in selection of beneficiaries, conducting social audit etc. Recommended activity mapping for effective devolution of funds, functions and functionaries to PRIs is at Appendix-G.

10.0 Release of Funds:

10.1 50% of the RKVY annual allocation will be released as first installment to the State, upon the receipt of the minutes of SLSC approving implementation of new projects and/or continuation of ongoing projects during current financial year alongwith lists of projects approved and their entry in RKVY Database (RDMIS).

10.2 In case, total cost of approved project is less than annual outlay, funds to the tune of 50% of approved project cost will be released.

10.3 Release of the second and final

installment would be considered on the fulfillment of the following conditions:

a) 100% Utilization Certificates (UCs) for the funds released upto previous financial year;

b) Expenditure of at least 60% of funds released in first installment during current year; and

c) Submission of performance report in terms of physical and financial achievements as well as outcomes, on a quarterly basis, within the stipulated time frame in specified format.

10.4 If a State fails to submit these documents within reasonable period of time, balance funds may be reallocated to better performing States.

10.5 Nodal Agency shall ensure that Project-wise accounts are maintained by the Implementing Agencies and are subjected to the normal process of Statutory Audit. Likewise, an inventory of the assets created under RKVY Projects should be carefully preserved and assets that are no longer required should be transferred to the Nodal Department, for its use and redeployment where possible.

10.6 Central assistance will be released as per the approved mechanism of the Ministry of Finance.

10.7 Nodal Agency/Department should ensure that the Central Assistance released under the Scheme is utilized in accordance with the approved State and District Plans. Since the amounts of the second and final installment of the allocation will depend upon the progress of utilization of funds, States should ensure that the funds released are utilized promptly, properly and progress reports are sent to DAC at the earliest. Non-utilization of central assistance will hinder further release of funds.

11.0 Administrative Expenses & Contingencies:

11.1 State is permitted to use upto 1% of its total RKVY funds (excluding funds allocated under RKVY sub-schemes) for incurring administrative expenditure that includes payments to consultants, recurring expenses of various kinds, staff costs, etc. However, no permanent employment can be created, nor can vehicles be purchased.

11.2 DAC may retain a proportion of 1% of the RKVY funds (including RKVY sub schemes) at Central level for monitoring, evaluation or for such administrative contingencies that may arise at various times.

11.3 Nodal Agency is authorized to hire consultants/consulting agencies to prepare the DPRs and up to 5% of the funds in the stream can be utilized for the preparation of DPRs.

12.0 Monitoring & Evaluation:

12.1 RKVY-Management Information System (RKVY-MIS): DAC has put in place a web-based Management Information System (MIS) for RKVY to collect essential information related to each project. States will be responsible for timely submission/updating project data online in the system (preferably on a fortnightly basis), which has been designed to provide current and authenticated data on outputs, outcome and contribution of RKVY projects in the public domain (http://www.rkvy.nic.in). As RKVY-MIS report shall be the basis of 'on line monitoring' and judging 'Inter-State performance', States may establish a

dedicated RKVY-MIS cell for this purpose.

12.2 To the extent possible, assets created by this scheme should be captured digitally and be mapped on a GIS platform for future integration onto National-GIS system.

12.3 Twenty five percent (25%) of the projects sanctioned by the State each year under the three streams e.g. RKVY (production growth), RKVY (Infrastructure & Assets) & RKVY (Sub-schemes) shall have to be compulsorily taken up for third party monitoring and evaluation by the implementing States.

12.4 Action plan for monitoring and evaluation will be chosen by SLSC every year in its first meeting based on project cost, importance of the project etc. preferably covering all sectors. The State Government will be free to choose any reputed agencies for conducting the monitoring and evaluation work in their States.

Requisite fees/cost towards monitoring & evaluation will be met by the State Government from the 1% allocation retained by them for administrative expenses.

12.5 DAC will evolve suitable mechanism for concurrent evaluation of implementation of RKVY. DAC may engage suitable agency for conducting State specific/Pan India periodic implementation monitoring and/or mid-term/end-term evaluation of the scheme.

12.6 The performance of the States will be reflected in the Outcome Budget document of this Ministry.

13.0 Convergence:

13.1 RKVY is additional central assistance to the State Plan for Agriculture and allied sectors and thus it is essential to encourage convergence with schemes like Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Swarnajayanti Gram Swarojgar Yojana (SGSY) and Backward Regions Grant Fund (BRGF). States shall also ensure convergence with other Central Schemes of Ministry of Agriculture (e.g. Department of Agriculture & Cooperation & Department of Animal Husbandry, Dairying & Fisheries & Department of Agriculture Research & Education) and other relevant Ministries/Departments viz., Ministry of Food Processing Industries, Ministry of New and Renewable Energy, Department of Land Resources, Ministry of Rural Development, Ministry of Water Resources etc. Ministry of Panchayati Raj shall also be appropriately consulted for ensuring that local/Panchayat level requirements are adequately addressed in District Development Plans. Planning Commission and the Ministry of Agriculture will together examine the States' overall Plan proposals for Agriculture and allied sectors as part of the Annual Plan approval exercise.

14.0 Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India may effect changes in the RKVY operational guidelines, other than those affecting the financing pattern as the scheme evolves, whenever such changes are considered necessary.

15.0 These guidelines are applicable to all the States and Union Territories.

Appendix-A

ILLUSTRATION

Computing Eligibility for Allocation of Funds under Rashtriya Krishi Vikas Yojana (RKVY)

1. Each state will become eligible to receive RKVY allocation, **if and only if:**

   a) The base line share of Agriculture and allied sectors in its total State Plan (excluding RKVY funds) expenditure is at least maintained.

   b) District Agriculture Plans and State Agriculture Plans have been formulated.

2. The base line level of expenditure will be the "minimum of the percentage expenditure incurred on agriculture and other identified related sectors during three years preceding to previous year".

3. For States to become eligible, "average percentage share of expenditure in agriculture and other identified related sectors during last three years" should be at least equal to base line level.

4. Let us consider the following example for State 'A': (Rs. in Crore)

Year	Expenditure in Agriculture & Allied sector (excluding RKVY funds)	Total Plan expenditure	% of total Plan Expenditure Incurred in Agriculture & Allied Sector
2009-10	492	10750	4.6
2010-11	709	11456	6.1
2011-12	605	13500	4.5
2012-13	1135	20000	5.7

5. Baseline percentage expenditure = Minimum percentage expenditure during preceding three (3) years (excluding RKVY funds) (2009-10, 10-11 & 11-12) = 4.5% (2011-12)

6. Average of last three years' share of expenditure in agriculture & allied sector (2012-13, 2011-12 & 2010-11): 16.3/3=5.43%

7. Since, average percentage share of last three years' expenditure (5.43%) is more than baseline percentage expenditure (4.5%); State is eligible for grant under the RKVY for 2013-14 provided it has also formulated District Agriculture Plans (DAPs) and State Agriculture Plan (SAP). Inter-State Allocation under RKVY for 2013-14 will be worked out by the Planning Commission using the parameters and weights indicated in Appendix-B of the Guidelines.

Appendix-B

Inter State Allocation of the funds under Rashtriya Krishi Vikas Yojana (RKVY)

1.0 Annual outlay under RKVY will depend upon the amount provided in State Budgets for Agriculture and allied sectors over and above the base line percentage expenditure incurred by the State Government on these sectors. Inter State allocation of RKVY funds will be based on the following parameters and weights:

Sl No	Criteria/Parameters	Weightage
1	Percentage share of net un irrigated area in a state to the net un irrigated area of all eligible States.	15%
2	Last three (3) years average area under oil seeds and pulses	5%
3	State's highest GSDP for agriculture and allied sectors for the past five years.	30%
4	Increase in expenditure in Agriculture and allied sectors in the previous year over the year prior to that year. (For example, previous year for allocating State's share for 2014-15 would be the year 2012-13 and the year prior to that would be 2011-12.	30%
5	Increase in Plan and non-plan expenditure made by the States from the State Budgets on Animal Husbandry, Fisheries, Agricultural Research & Education in the previous years over the year prior to that year.	10%
6	Inverse of Yield gap between state average yield and potential yields as indicated in the frontline demonstration data	10%

2.0 Ministry of Agriculture, in consultation with the Planning Commission, could modify above criteria/weights depending upon new parameters becoming relevant in future.

3.0 Some of the expenditure which should be excluded for the purpose of parameter concerning expenditure on agriculture and allied sector are:

(a) Expenditure on output subsidies such as that relating to food subsidy, subsidy for procurement of milk, bonus on procurement of food grains and other crops etc.;

(b) Expenditure on Civil Supplies and Public distribution system. However, expenditure on creation of storage and warehouse for agriculture purposes will be considered for the purpose of Parameter 4;

(c) Expenditure on interest subvention, electricity or diesel subsidy etc.;

(d) Direct income support to farmers, debt relief or other one time relief to farmers;

(e) Irrigation except as included in para-4 below.

4.0 Some expenditure which is directly related to the development of agriculture sector may be allowed in the expenditure on agriculture and allied sector for the purpose of parameter 4;

a) Expenditure on watershed development including State's share on Integrated Watershed Management Programme (IWMP);

b) Plan and non-plan expenditure on agriculture and allied sectors;

c) Plan expenditure on Minor Irrigation & Command Area Development; and

d) Expenditure incurred on agriculture and allied sectors out of the funds devolved for the decentralized district planning units or to the autonomous regional/sub-regional development councils set by the States such as Bodoland Territorial Council etc.

Appendix-C1

Areas of Focus under RKVY (Production Growth)

The components / activities which would be eligible for project based assistance under RKVY (Production Growth) are elaborated below. This is an illustrative list and the States may choose other components/activities, but ensure that they are reflected adequately in the SAP and the DAP.

a) **Integrated development of major food crops such as wheat, paddy, coarse cereals, minor millets, pulses, oilseeds:** Assistance can be provided for making available certified/HYV seeds to farmers; production of breeder seed; purchase of breeder seed from institutions such as ICAR, public sector seed corporations, production of foundation seed; production of certified seed; seed treatment; Farmers Field Schools at demonstration sites; training of farmers etc. Similar support would be provided for development of other crops such as sugarcane, cotton or any other crop/variety that may be of importance to the state.

b) **Agriculture mechanization:** Assistance can be provided to individual beneficiaries for farm mechanization efforts especially for improved and gender friendly tools, implements and machinery. However, assistance for large equipment e.g. tractor, combine harvester, sugarcane harvester, cotton picker etc. for which individual ownership may not be economically viable, assistance should only be limited for establishing custom hiring centres under RKVY (Infrastructure & Assets) stream.

c) **Activities related to enhancement of soil health:** Assistance can be provided to the farmers for distributing soil health cards; micro nutrient demonstration; training of farmers for promotion of organic farming including printing of publicity/utility literature; amelioration of soils affected with conditions such as alkalinity and acidity.

d) **Development of rainfed farming systems in and outside watershed areas:** Assistance for promoting integrated farming system (agriculture, horticulture, livestock, fisheries etc.) generating livelihoods for farmers Below the Poverty Line (BPL).

e) **Integrated Pest Management schemes:** This would include training of farmers through Farm Field Schools etc. on pest management practices; printing of literature/ other awareness programmes.

f) **Promoting Extension Services:** This would include new initiatives for skill development and training in the farming community and to revamp the existing State agricultural extension systems.

g) **Activities relating to enhancement of horticultural production:** Assistance will be available for nursery development and other horticulture activities.

h) **Animal husbandry and fisheries development activities:** Assistance will be available for improvement in fodder production, genetic up-gradation of cattle and buffaloes, enhancement of milk production, enlarging raw material base for leather industry, improvement in livestock health, poultry development, development of small ruminants and enhanced fish production.

i) **Study tours of farmers:** Study tours of farmers within the country especially to research institutions, Model farms etc.

j) **Organic and bio-fertilizers:** Support for decentralized production at the village level and their

marketing, etc. This will include vermicomposting and introduction of superior technologies for better production.

k) **Sericulture:** Sericulture upto the stage of cocoon production alongwith extension system for cocoon and silk yarn production and marketing.

The above list is not exhaustive. Therefore, schemes that are important for agriculture, horticulture and allied sector development, but cannot be categorized under (a) to (k) can also be proposed under this stream.

However, projects for creation/strengthening of infrastructure & assets should be funded under RKVY (Infrastructure & assets) stream.

Appendix-C2

Illustrative List of Projects that can be funded under RKVY(Infrastructure & Assets) Stream

Sl. No	SECTOR	DESCRIPTION OF INFRASTRUCTURE
1.	Horticulture	Nurseries Tissue Culture Labs Community tanks/Farm ponds/on farm water resources with plastic/RCC lining Green House/ Poly house/Shade net House structures Sanitary and phytosanitary infrastructure INM/IPM infrastructure such as Disease Forecasting Units, Plant Health Clinics, Leaf/Tissue Analysis labs, Bio-control labarotaries Vermi compost units Controlled atmosphere storage Cold storage/pre cooling/refrigerated van, cold chain infrastructure Ripening/Curing chamber Primary/minimal processing units Terminal/wholesale/Rural market Functional infrastructure for collection, sorting, grading etc. Infrastructure related to Horticulture produce processing as per Ministry of Food Processing Industries (MoFPI) guidelines.
2.	Natural Resources Management	Soil & Water conservation activities (Terracing, Gully Control Measures, Spill Ways, Check Dams, Spurs, Diversion Drains, Protection Walls etc.) Reclamation of problem Soils (Acid/Alkali/Saline/Ravine/Water logged).
3.	Pest Management & Pesticide quality control	Labs for production of bio-control agents State Pesticide Residue Testing Labs State Pesticide Testing Labs Bio-Pesticide Testing Labs Seed Treatment drums & chemicals
4.	Soil Nutrient Management Fertilizers Bio Fertilizers /Organic Farming	Setting up of new soil testing laboratories. Strengthening of existing soil test laboratories with micro-nutrient testing facilities. Setting up of new Fertilizer Quality Control Laboratories (FQCLs). Strengthening of existing FQCLs. Bio fertilizer Production Units. Fruit/Vegetables waste, compost production units.
5.	Animal Husbandry	Semen collection and Artificial Insemination(AI) Units/Production Center Breeding farms Dispensaries/Hospitals for treatment of Animals Vaccine Production Unit Diagnosis Labs, including Mobile Units

Sl. No	SECTOR	DESCRIPTION OF INFRASTRUCTURE
	Dairy	Animal Ambulance Cold Chain for storing and transportation of frozen Semen Tractor fitted with Fodder Block Machine Carcass rendering Plant to collect the fallen animals for processing/utilization in scientific manner Modernization of animal slaughter houses* and markets for livestock /livestock products Milk Collection Centers and Infrastructure : Purchase of milking machines (single/double bucket) Setting up of milk chilling/bulk milk cooling centres (BMC) alongwith automatic milk collection units (AMC) Setting up/modernization/strengthening of milk processing units Strengthening /expansion of cold storage facility for milk and milk product Purchase of insulated/refrigerated transport vehicles Setting up of milk parlor/milk booth Strengthening of lab facility in milk chilling/milk processing unit Establishment of cattle feed storage godown Establishment/strengthening of cattle feed plant Establishment of cattle shed for milch animals Setting /strengthening of ETP at milk chilling/milk processing unit
	Fisheries	Fish Ponds/Reservoirs Fish seed Hatcheries Marketing infrastructure Mobile Transport/Refrigerated vans Cold Storage & Ice Plants
6.	Marketing and Post-Harvest	Fruits & Vegetable Markets/Distribution Centres Market Infrastructural Facilities, including Agricultural Produce Market Committees (APMC) Construction of Specialized Storage Facilities like Onion Storage Godowns Electronic Trading including Spot and Futures Markets and E-auctioning Farmers Service Centres Food Grain Procurement Centres E-Kisan Bhawans / Internet Kiosks Grading including grading line Quality Control Packing
7.	Seeds	Seed Testing Labs Seed Processing Facilities Seed Storage Godowns including Dehumidified Refrigerated Seed Storage Godowns Seed Certification Agencies and Certification Infrastructure Seed Multiplication Farms

Sl. No	SECTOR	DESCRIPTION OF INFRASTRUCTURE
8.	Agriculture Mechanization	Custom Hiring Centers for Agricultural Equipment Agriculture Machines Testing Centers
9.	Agricultural Extension	Kisan Call Centres ATMA Infrastructure Knowledge / Technology Resource Centres
10.	Agriculture Research	Research Infrastructure Strengthening of Krishi Vigyan Kendras (KVKs)
11.	Minor / Micro Irrigation	Shallow Wells & Dug Wells Tube Wells (except in dark/grey /critical zone identified by Central Ground Water Board) Percolation & Minor Irrigation Tanks Farm Ponds Drip & Sprinkler Irrigation System Field Channels Piped Water Conveyance System

* Extant norms of Ministry of Food Processing Industries, Govt. of India / Dept. of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, Govt. of India will apply.

Note:

1. Food processing units, especially those industries which get assistance under various schemes of the MoFPI, should not be eligible for assistance under RKVY.

2. State specific research projects through SAUs/ICARs in any area of agriculture and allied sectors may be undertaken under Production Growth stream only.

3. Infrastructure and Assets stream emphasizes promoting group approach for subsidies. Accordingly, level of subsidies in the case of unspecified projects should be kept to the minimum for higher coverage of beneficiaries/ areas.

4. State should form of stakeholders' groups/Farmer Producer Organizations (FPO) and involve them in planning, execution and future maintenance of the created assets.

Appendix-D

Illustrative List of Projects that should not be funded under RKVY

1. Creation/topping up of any kind of revolving fund / corpus fund ;

2. Expenditure towards maintenance of assets or any such recurring expenses;

3. Expenses towards Salary, Transport, Travelling Allowances (TA), Daily Allowances (DA) of permanent / semi-permanent employees. However, expenses towards hiring of manpower on outsourcing/contractual basis can be met within 1% allocation earmarked for administrative expenses with approval of SLSC.

4. Expenses towards POL (Petrol, Oil, Lubricants);

5. Financing State's share and/or topping up subsidy level in respect with other Central/State Schemes;

6. Foreign Visits/Tours including study tours of farmers abroad;

7. Purchase of vehicles;

8. Financing any kind of debt waiver, interest subvention, payment of insurance premium, compensation to farmers and calamity relief expenditure; additional bonus over & above Minimum Support Price (MSP);

9. Creating/Strengthening assets in Private Sector/NGO's beyond what is permissible under any schemes/programmes of Govt. of India.

Appendix-E

Composition of State Level Sanctioning Committee (SLSC)

Chief Secretary	-	Chairman
Agri. Prod. Commissioner /Principal Secretary (Agriculture)	-	Vice-Chairman
Secretary, Finance	-	Member
Secretary, Planning	-	Member
Secretary, Fisheries	-	Member
Secretary, Animal Husbandry	-	Member
Secretary, Environment and Forests	-	Member
Secretary, Panchayati Raj	-	Member
Secretary, Rural Development	-	Member
Secretary, Water Resources/Irrigation/Minor Irrigation	-	Member
Director, Agriculture	-	Member
Director, Horticulture	-	Member
Director, Animal Husbandry	-	Member
Director, Fisheries	-	Member
Representative of Department of Agriculture & Cooperation, Govt. of India (Officer not below the rank of Joint Secretary)	-	Member
Representatives of Departments of Animal Husbandry, Dairying & Fisheries, Govt. of India (Officer not below the rank of Joint Secretary)	-	Member
Representative of State Agriculture University	-	Member
Representative of Planning Commission	-	Member
Secretary, Agriculture	-	Member-Secretary

Note:

1. SLSC may co-opt two more members from Agricultural Research Organizations, reputed NGOs working in the field of Agriculture, Deputy Commissioners of important districts, and leading farmers.

2. The quorum for the SLSC meeting would not be complete without the presence of at least one representative from the Government of India.

Appendix-F

Form of Utilization Certificate

Sl. No.	Letter No. and date	Amount
	Total	

Certified that out of Rs. _____ of grants-in-aid sanctioned during the year_____ in favour of _____under this Ministry/Department Letter No. given in the margin and Rs._____on account of unspent balance of the previous year, a sum of Rs._____ has been utilized for the purpose of _____ for which it was sanctioned and that the balance of Rs._____remaining unutilized at the end of the year has been surrendered to Government (vide no. _____. dated _____) / will be adjusted towards the grants-in-aid payable during the next year _____.

2. The Utilization Certificate should also disclose whether the specified, quantified and qualitative targets that should have been reached against the amount utilized, were in fact reached, and it not; the reasons thereof. They should contain an ouput-based performance assessment instead of input-based performance assessment.

3. Certified that I have satisfied myself that the conditions on which the grants-in-aid was sanctioned have been duly fulfilled/are being fulfilled and that I have exercised the following checks to see that the money was actually utilized for the purpose for which it was sanctioned.

Kinds of checks exercised

1.
2.
3.
4.
5.

Signature _____

Designation _____

Date _____

Appendix-G

Recommended activity mapping for effective devolution of funds, functions and functionaries to Panchayati Raj Institutions (PRIs)

RKVY FUNCTIONS MAP

Sl. No.	ACTIVITY DESCRIPTION		State Government	District Planning Committee (DPC)	LOCAL GOVERNMENTS AND PLANNING BODIES			User groups. SHGs. Etc.
	Activity Category	Union Government			Panchayati Raj System/Institutions			
					District Panchayat	Intermediate Panchayat	Village Panchayat	
1.	Setting Standards	**DAC**- Issue of guidelines for implementation of RKVY in the States	Issue/translation of guidelines in local language.					
2.	Planning	**DAC & Planning Commission:** To provide framework for preparation of SAP.	Preparation of SAP by integrating the District Agriculture Plans (DAPs)	Will be associated in the formulation of DAP taking into account location specific agro-climatic conditions, natural resources etc.	Districts Agriculture Planning Unit (DAPU) may be actively associated in formulation of Comprehensive District Agriculture Plans	Block/Taluka Agriculture Planning Unit (BAPU/TAPU) may be associated in providing inputs for DAP.	Village Agriculture Planning Unit (VAPU) may be associated in identifying clusters/selection of beneficiaries.	
3.	Implementation of Projects (Crop, Development Horticulture, Micro Mini irrigation, Animal Husbandry, Sericulture etc. as per sectors taken up by each State)	**DAC-** Release of funds to State	Release of funds to implementing Departments/ Agencies.	Prioritise projects based on availability of funds	Will be associated in selection of site/ location of projects in consultation with implementing agencies.	Will be associated in selection of locations/villages for implementation of projects.	Will be associated in selection of beneficiaries based on cluster approach (however, there should not be any repeat beneficiary year after year in RKVY).	Priority should be given to SC/ST, Women and weaker section of the society.

4.	Monitoring & Evaluation of Projects	Impact Evaluation	Concurrent Evaluation	Supervise Implementation	Quarterly review meetings for monitoring progress of RKVY projects in district, providing feedback for policy formulation and planning.	Monitoring progress of RKVY interventions and providing feedback for DAPs.	Social audit shall be done at Gram Sabha level	

DAC- Dept. of Agriculture & Cooperation, Min. of Agriculture, Govt. of India, DAP-District Agriculture Plan, SHG-Self Help Groups, SAP-State Agriculture Plan

RKVY FINANCE MAP

Sl. No.	**Scheme sub-component/funding stream**	**Allocation (Rs. Cr.)**	**Percentage**	**Level to which mapped, based on activity mapping of function (% of allocation)**					**Remarks**
				Centre	State	Local government			User group/civil society	
						District Panchayat	Intermediate Panchayat	Village Panchayat		
Sectoral and district-wise allocation of projects/funds under RKVY shall be done by the States. State may devolve funds to Panchayat bodies as per projects allotted for implementation.										

RKVY DIVISION
Department of Agriculture & Cooperation
Ministry of Agriculture
Government of India

Krishi Bhawan, New Delhi
www.rkvy.nic.in

F. No 9-1/2013-RKVY
Government of India
Ministry of Agriculture
Department of Agriculture & Cooperation
(RKVY Cell)

Krishi Bhawan, New Delhi
Dated the 11th December, 2014

To

Principal Secretary (Agriculture)/ Agriculture Production Commissioner/Secretary (Agriculture)
(All States/ UTs/ As per list)

Subject: Revised guidelines for implementation of Rashtriya Krishi Vikas Yojana (RKVY) during XII Five Year Plan- reg.

Sir,

I am directed to refer to para 4.1 of revised RKVY operational Guidelines (2014) which stipulate that RKVY funds would be provided to the States as 100% grant by the Central Government in following streams.

(a) RKVY (Production Growth) with **35%** of annual outlay,
(b) RKVY (Infrastructure and Assets) with **35%** of annual outlay;
(c) RKVY (Special Schemes) with **20%** of annual outlay; and
(d) RKVY (Flexi Fund) with **10%** of annual outlay (States can undertake either Production Growth or Infrastructure & Assets projects with this allocation depending upon State specific needs/priorities).

Aforesaid distribution is applicable at Central level, out of which outlays for Special schemes are held back by this Department for allocating among Programmes of National priorities e.g. BGREI, VIUC, NMPS etc.

States are provided with allocations under **RKVY (Normal) category** comprising of **Production Growth, Infrastructure & Assets and Flexi Fund streams**.

Out of total allocations available to States under **RKVY (Normal) category** *(excluding allocation under Special Schemes)*, percentage shares of Production Growth, Infrastructure & Assets and Flexi Funds are **43.75%, 43.75% and 12.5%** respectively. Out of these, as per RKVY guidelines, States can allocate a maximum of **56.25%** (43.75%+12.5%-flexi fund) to either Production Growth or Infrastructure & Assets streams. On the other hand, a **minimum allocation 43.75% is stipulated** for both these streams.

On the basis of requests received from State Governments and to bring more flexibility in implementation of RKVY and to further boost creation of agriculture infrastructure & assets, it has now been decided that to **waive off the requirement of minimum allocation of RKVY fund** (*35% at Central Level or 43.75% at State Level*) **to "Production Growth Stream".**

Accordingly, States will be able to allocate beyond 56.25% of their RKVY Normal allocation to Infrastructure & Assets stream. However, minimum stipulated allocation of RKVY fund to 'Infrastructure & Asset stream' (*35% at Central Level or 43.75% at State Level*) shall continue, which means that States have to allocate at least 43.75% of their RKVY (Normal) to this stream. As an illustration, following table may be referred to:

Scenario	Infrastructure & Assets (% allocation)	Production Growth (% allocation)	Total RKVY Normal (excluding Special Scheme) allocation at State Level
1	43.75%	56.25%	100%
2	50%	50%	100%
3	60%	40%	100%
4	80%	20%	100%
5	100%	0%	100%
6	25%	75%	Not allowed. Min. stipulation in Infrastructure is not met.

Yours faithfully,

Vinaya Kumar

(V.K Srivastava)
Under Secretary to the Government of India
Ph. No.011- 23383990

Copy to:

Director (Agriculture) of All States/UTs

Joint Secretary (Coordination), Dept. of Animal Husbandry, Dairying & Fisheries, Krishi Bhawan, New Delhi/ All Joint Secretaries of DAC.

Annexure III

Conversion factors:

Gujarat

Sr No	State	District	Block	1 Bigha = _____Guntha	1 HA= _____ Bigha	1 Acre= ____bigha
				(Figures in Guntha)	(Figures in Bigha)	(Figures in Acres)
1	Gujarat	Anand	Anand	24	4.17	1.67
			Khambhatt	24	4.17	1.67
2	Gujarat	Ahmedabad	Dholka	24	4.17	1.67
			Viramgam	24	4.17	1.67
3	Gujarat	Bhavnagar	Mahuva	16	6.25	2.50
			Botad	16	6.25	2.50
4	Gujarat	Junagarh	Talala	16	6.25	2.50
			Junagarh	16	6.25	2.50
5	Gujarat	Panchmahal/ Godhra	Lunavala	24	4.17	1.67
			Kalol	24	4.17	1.67
6	Gujarat	Sabarkantha	Khed Brahma	24	4.17	1.67
			Prantij	24	4.17	1.67
7	Gujarat	Tapi	Songarh	24	4.17	1.67
			Valod	24	4.17	1.67
7	Gujarat	Kutch	Bhachao	16	6.25	2.50
			Madvi	16	6.25	2.50

Annexure IV

INDEX FOR RKVY SUCCESS STORIES

Sl. No.	Name of the State	Title
1.	Success Stories	1. Forbidden Fruit Fly: Eliminating Male Mates for Saving Fruits using Integrated Pest Management Techniques 2. Cattle Housing for Higher Production, Hygiene and Environmental Friendliness 3. Taking Soil Testing Laboratories to the Farmers: Building Soil Testing Infrastructure in Partnership Mode 4. Speed breaker on Salt March 5. Areas with Farm Ponds Success is Sweeter than Sugarcane, through Precision Farming
2.	Latest Success Stories	1. Establishment of bio-control laboratory for mass production of bio-agents 2. Establishment of laboratory for bioagents mass production and their use in plant diseases manage 3. Establishment of Testing and Training Centre on Farm Machinery at Junagdh

Visit: http://rkvy.nic.in/static/New-Success-Stories.htm