ANNUAL REPORT
2018-19

Agro-Economic Research Centre

For the states of Gujarat and Rajasthan

(Ministry of Agriculture & Farmers Welfare, GOI)

H.M. Patel Institute of Rural Development
Opp. Nandalaya Temple, Post Box No. 24

Sardar Patel University

Vallabh Vidyanagar 388120, Anand, Gujarat (India)

Ph. No. +91-2692-230106, 230799, 292865; Fax +91-2692-233106
Email: director.aerc@gmail.com; directoraercgujarat@gmail.com
Websites: www.aercspu.ac.in, *www.spuvvn.edu*

- More Crop Per Drop
- Effective use of Inputs
- Reducing Post-Harvest Losses
- Value Addition
- Reforms in Agriculture Marketing
- Risk, Security, and Assistance
- Allied Activities

Doubling Farmers' Income by 2022

Doubling farmer's income 7 points strategy

ANNUAL REPORT
2018-19

Agro-Economic Research Centre

For the states of Gujarat and Rajasthan

(Ministry of Agriculture & Farmers Welfare, GOI)

H.M. Patel Institute of Rural Development
Opp. Nandalaya Temple, Post Box No. 24

Sardar Patel University

Vallabh Vidyanagar 388120, Anand, Gujarat (India)

Ph. No. +91-2692-230106, 230799, 292865; Fax +91-2692-233106
Email: director.aerc@gmail.com; directoraercgujarat@gmail.com
Websites: www.aercspu.ac.in, *www.spuvvn.edu*

Annual Report 2018-19

Published by
The Director
Agro-Economic Research Centre
For the states of Gujarat and Rajasthan
(Ministry of Agriculture & Farmers Welfare, Govt. of India)
H.M. Patel Institute of Rural Development,
Opp. Nanadalaya Temple, Post Box No. 24,
Sardar Patel University,
Vallabh Vidyanagar 388120, Dist. Anand, Gujarat.
Ph. No. +91-2692-230106, 230799, 292865
Fax- +91-2692-233106
Email: director.aerc@gmail.com; directoraercgujarat@gmail.com
Websites: www.aercspu.ac.in; www.spuvvn.edu

Published in September 2019

Prepared by
Director and Professor
Agro-Economic Research Centre
Sardar Patel University
Vallabh Vidyanagar 388120, Dist. Anand, Gujarat

Compiled by

P. A. to Director, AERC

CONTENTS

Dr. Shirish Kulkarni, VC of our University felicitating Prof. Vijay Paul Sharma on September 26, 2018

Release of book on 'Pressurized Irrigation System in India' at the hands of Dr. Shirish R. Kulkarni, Vice Chancellor of University, Prof. Vijay Paul Sharma, Chairman, CACP, New Delhi, and Prof. Mahesh Pathak on September 26, 2018.

VICE CHANCELLOR'S / CHAIRMAN'S STATEMENT

It gives me immense pleasure to take note of the achievements of the Agro-Economic Research Centre (AERC) of our University for the year 2018-19. I am pleased to note that the Centre has continued the tempo of academic activities for the 58th year in succession. The Annual Report 2018-19 presents a fairly comprehensive account of the various academic activities of the Centre. It also describes the activities of the faculty members and researchers at the Centre. Right from its inception, this Centre has undertaken a number of research studies on major agriculture development programmes enjoying high national priority. This centre has, in its own modest way, strived to build bridges of understanding between ground realities and macro public policies. It has provided worthwhile feedback in the formulation of policies relating to agriculture and rural development in the states of Gujarat and Rajasthan. Collection of high quality field data has been a widely recognized hallmark of our field research.

The year was marked by some important events such as organization of International Conference on 'Emerging Global Economic Situation: Impact on Trade and Agri-business in India' during September 28-29, 2018 (jointly with BJVM, Vallabh Vidyanagar); State Level Stakeholders Meet and Workshop-cum-Training Program for field staff of Cost of Cultivation Scheme; AERC Foundation Day Lecture 2018; H. M. Patel Memorial Lecture 2019 and many other academic activities. The Centre has completed seven research projects for Ministry of Agriculture and Farmers Welfare, GOI and nine projects are in progress. Besides, three special research studies are undertaken on topics of national importance, on the request, for NDDB, Anand and Gujarat Economic Association Silver Jubilee Trust, Vadodara and Ministry of Rural Development, MORD, GOI (at our University level-interdisciplinary project).

Apart from undertaking the research studies, the faculty of Centre participated in seminars, conferences, workshops, group discussions on field and various meetings. The wide ranging activities of the Centre as summarized in the report are truly gratifying. I congratulate the Director, faculty as well as office and field staff of the Centre for their excellent performance and sincere efforts in realizing the objectives of the Centre.

I hope that the Ministry of Agriculture and Farmers Welfare, GOI will not only ensure regular funding to this Centre on permanent basis, but also provide necessary support in developing this Centre as a Centre of Excellence. Also Ministry should immediately establish the process and mechanism for regular release, calculation, authentication and release of pension amount to eligible retired staff. I am sure, Centre will make efforts to upgrade the quality of its research output and publications as well as shall undertake more collaborative work.

Prof . (Dr) Shirish R Kulkarni
Vice Chancellor, Sardar Patel University, VVN &
Chairman, Advisory Body AERC

Meeting with Prof. Vijay Paul Sharma, Chairman, CACP, GOI at his office June 18, 2018

National Meeting of CACP, GOI at Krishi Bhavan on June 18, 2018

FROM THE DIRECTOR'S DESK

I am happy to present before you annual report of the Centre for the period from April 2018 to March 2019. The report serves twin objectives of self-appraisal of our performance and of sharing information about the academic activities of Centre with our well wishers, supporters and other interested groups and individuals. A wider circulation of this document helps us in getting valuable feedback from our well-wishers & policy makers for making our studies and dialogues more relevant to the emerging needs.

I feel privileged to prepare this document and present it before you. The activities of the Centre during the year under report include both research programmes and other academic activities aimed at the dissemination of knowledge gained though research. The faculty members have participated in several academic activities. During the year under report, Centre has submitted seven research study reports to the Ministry. Besides, the Centre has organized one International Conference; State Level Stakeholders Meet and Workshop cum Training Workshop for field staff in CCS; AERC Foundation day Lecture; H. M. Patel Memorial Lecture; many other academic activities and staff recreational activities such as Blood Donation Camp, Yoga Session, etc.

We continue to strive for attaining new goals and open up new avenues for our academic endeavors. This is possible only though the hard work of all staff members, guidance received from the esteemed members of the Advisory Committee / Governing Body of AERC, and the support as well as appreciation from a number of individuals as well as organizations within and outside the country.

I wish to express my grateful thanks to the Honorable Vice Chancellor of our University / Chairman and members of the Advisory Committee / Governing Body; Economic and Statistical Adviser, Advisers and officers of (AER & CS Divisions) of Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, New Delhi; Agriculture Department, Government of Gujarat, Gandhinagar; Agriculture Department, Government of Rajasthan, Jaipur; research Institutions like IASRI, New Delhi, ISEC, Bengaluru, IWMI, Anand, NDRI, Karnal, NDDB Anand; Officers of our University, several government and non-government organizations and individuals for their support in various ways to the Centre. I wish to place on record my appreciation of the excellent work done by the faculty and useful support provided by the supporting staff of the AERC and CCS, who worked hard during the year for achieving greater heights of academic attainments.

Prof. (Dr.) S.S. Kalamkar
Director & Professor

International Conference, Sept 27-29, 2018

HIGHLIGHTS OF THE YEAR

- The Centre has completed seven research projects for Ministry of Agriculture and Farmers Welfare, GOI and twelve projects are in progress.
- Besides, three special research studies are undertaken on topics of national importance for NDDB, Anand and Gujarat Economic Association Silver Jubilee Trust, Vadodara and Ministry of Rural Development, MORD, GOI (at our University level-interdisciplinary project).
- Prof. Vijay Paul Sharma, Chairman, Commission for Agricultural Costs and Prices, Ministry of Agriculture and Farmers Welfare, GoI & Professor, Centre for Management in Agriculture, Indian Institute of Management, Ahmedabad delivered AERC Foundation Day Lecture 2018 on "Transforming Indian Agriculture : Key Challenges and Policy Choices" on September 26, 2018.
- Organized State Level Stakeholders meet and Workshop cum Training programme on "Field Data Collection and Data Imputing in New Record Types (RTs) & FARMAP 2.0 Computer Software", for the technical/field staff of CCS at the Centre from September 24, 2018 to September 27, 2018.
- Organized International Conference on 'Emerging Global Economic Situation: Impact on Trade and Agribusiness in India' during September 28-29, 2018 jointly with BJVM, Vallabh Vidyanagar. Conference was supported by NABARD, Regional Office, Ahmedabad.
- Dr Sudarshan Iyengar, (Former Vice Chancellor, Gujarat Vidyapeeth, Ahmedabad) delivered the 6th H.M. Patel Memorial Lecture on "Valued Cherished and Pursued by Mohan, The Gandhi" on February 06, 2019.
- The Best Fieldman Award for the year 2017-18 was awarded to Shri A. P. Rabadiya, Fieldman, Cost of Cultivation Scheme for Gujarat, SPU on September 26, 2018.
- Shri Dadabhai Navroji Prize for a paper on 'Solar Power Generation and usage in Irrigation: lessons from a Novel Cooperative Initiative in India" (as a Best paper published in the calendar for the year 2017-18 from Sardar Patel University, Vallabh Vidyanagar (SPU Notification No. G/25-G/2591, dated 30.07.2018) received by Dr Sonal Bhatt and Dr. S. S. Kalamkar.'
- SOED Best Paper Award' for a paper on 'Impact of Tarakpur Check Dam in Khambhat Area of Gujarat' published in Indian Journal of Economics and Development (Volume 13, No 2, 2017 pp. 229-242) at 5th National Seminar of the Society of Economic and Development, held at Punjab Agricultural University, Ludhiana on April 5, 2018, received by Dr. S.S. Kalamkar, H.P. Trivedi, D.J. Chauhan and Dr. S.R. Bhaiya.
- Prof. V. S. Vyas Felicitation Award/Prize (2016-18) received for the best research report conducted at the Centre (during 2016-18) on "Working of Pressurized Irrigation Network Systems (PINS) in India (Consolidated Report)", prepared by Mrutyunjay Swain, S. S. Kalamkar and Hemant Sharma (SPU Notification No. G/22-G/3054, dated 16.08.2018).
- National Conference on Agro-Economic Policy and Research organized by the 15 Agro-Economic Research Centres & Units under the Ministry of Agriculture and Farmers Welfare,

Government of India at Centre for Management in Agriculture, Indian Institute of Management (IIM), Ahmedabad during January 10-11, 2019.

- Organized 'Yoga Sessions' for all staff (Sept 25-27, 2018) with support of 'Art of Livings' Shri Miteshbhai Patel on open space of Gyanodaya Bhavan of our University.
- Organized 'Health Check-up' of all field staff of the Centre during the period September 24 to 27, 2018.
- Blood Donation camp was organized on September 26, 2018 as a part of AERC Foundation Day Celebrations & total 21 donors have donated blood.
- Staff Celebrated Kite festival together on January 8, 2019.





ABOUT THE GOVERNING BODY

The Governing Body meets once a year under the Chairmanship of Vice Chancellor to discuss wide ranging issues including technical administrative and financial matters of the Centre.

Composition of the Governing Body
(up to December 31, 2019)

- **Prof. (Dr.) Shirish R. Kulkarni** (Chairman)
  Vice Chancellor,
  Sardar Patel University,
  Vallabh Vidyanagar -388120, Anand, Gujarat.

- **The Economic and Statistical Adviser**
  Directorate of Economics & Statistics,
  Department of Agriculture and Cooperation,
  Ministry of Agriculture, Government of India,
  Krishi Bhavan, New Delhi -110 001.

- **Dr. V. S. Vyas**
  Professor Emeritus, Institute of Development Studies, Jaipur, Rajasthan; Former Member, Economic Advisory Council to the Prime Minister (expired on December 12, 2018)

- **Dr. Y. K. Alagh**
  Professor Emeritus,
  Sardar Patel Institute of Economic and Social Research,
  Ahmedabad, 380 054; & Chancellor, Central University of Gujarat, Gandhinagar.

- **Dr. Amrita Patel**
  Former Chairman, NDDB &
  Chairman, Charutar Arogya Mandal
  Gokal Nagar, Karamsad – 388 325, Anand, Gujarat.

- **Shri Sanjay Prasad**
  Principal Secretary,
  Department of Agriculture and Cooperation,
  Government of Gujarat, New Sachivalaya,
  GANDHINAGAR – 382010, GUJARAT.

- **Mrs. Neel Kamal Darbari**
  Principal Secretary, Department of Agriculture,
  Government of Rajasthan,
  Sachivalaya, Jaipur 302 005, Rajasthan.

- **Dr. Tushaar Shah**
  International Water Management Institute (IWMI),
  C/o Indian Natural Resources Economics and Management
  (INREM) Foundation, Behind IRMA Mangalpura
  Anand 388 001, Gujarat, India.

- **Dr. Sudarshan Iyengar**
  Former Vice Chancellor,
  Gujarat Vidyapith,
  Ahmedabad - 380 014, Gujarat.

- **Dr. S. S. Acharya**
  Professor Emeritus,
  Institute of Development Studies, Jaipur (Raj.)
  Former Chairman, Commission for Agriculture,
  Cost and Prices (CACP), Govt. of India.

- **Dr. H. P. Trivedi**
  Professor and Head,
  Post Graduate Department of Economics,
  Sardar Patel University,
  Vallabh Vidyanagar 388 120, Anand, Gujarat

- **Dr. Mahesh Pathak**
  Honorary Advisor,
  Agro-Economic Research Centre
  Sardar Patel University,
  Vallabh Vidyanagar 388 120, Anand, Gujarat.

- **Dr. S.S. Kalamkar**
  Director & Professor,
  Agro-Economic Research Centre,
  Sardar Patel University,
  Vallabh Vidyanagar 388 120, Anand, Gujarat.

ABOUT THE ADVISORY BODY

The Advisory Body meets once a year under the Chairmanship of Vice Chancellor to discuss wide ranging issues including technical administrative and financial matters of the Centre.

Composition of the Advisory Body as per Ministry's Recommendations
(w.e.f. January, 2019)

- **Prof. (Dr.) Shirish R. Kulkarni** (Chairman)
  Vice Chancellor,
  Sardar Patel University,
  Vallabh Vidyanagar -388120, Anand, Gujarat.

- **The Economic And Statistical Adviser** (Ex. Officio Member)
  Directorate Of Economics & Statistics,
  Department Of Agriculture And Cooperation,
  Ministry Of Agriculture, Government Of India,
  Krishi Bhavan, New Delhi -110 001.

- **The Financial Adviser** (Ex. Officio Member)
  (addl. Secretary & Financial Adviser), Des,
  Department Of Agriculture, Cooperation And
  Farmers Welfare, Moa & Fw, Goi

- **The Joint Secretary** (Ex. Officio Member)
  (economic Administration), Des, Department
  Of Agriculture, Cooperation And Farmers
  Welfare, Moa & Fw, Goi

- **Prof. Satish Y. Deodhar** Member Nominated By Hon VC, SPU
  Indian Institute Of Management (IIM),
  Vastrapur, Ahmedabad 110012, Gujarat

- **Prof. J. P. Sharma** Member Nominated By Hon VC, SPU
  Joint Director (Extn),
  Indian Agricultural Research Institute (IARI), New Delhi 110012

- **Shri Tushar Majmudar** (Ex. Officio Member)
  Registrar (I/C)
  Sardar Patel University
  Vallabh Vidyanagar - 388 120

- **Shri N. K. Bhatt** (Ex. Officio Member)
  Chief Accounts Officer
  Sardar Patel University,
  VALLABH VIDYANAGAR 388 120,

- **Prof. H. P. Trivedi** (Ex. Officio Member)
  Head,
  Post Graduate Department of Economics,
  Sardar Patel University,
  Vallabh Vidyanagar 388 120

- **Dr. S.S. Kalamkar** (Ex. Officio Member/ Convener)
  Director & Professor,
  Agro-Economic Research Centre,
  Sardar Patel University,
  Vallabh Vidyanagar 388 120

- **Dr. Kinjal Ahir** (Ex. Officio Member)
  Deputy Director /Associate Professor (Hon)
  Agro-Economic Research Centre,
  Sardar Patel University,
  VALLABH VIDYANAGAR 388 120

ABOUT THE CENTRE

The Agro-Economic Research Centre (AERC) for the states of Gujarat and Rajasthan was established in July 1961 at the Sardar Patel University, Vallabh Vidyanagar by the Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, New Delhi. It was late Shri H.M. Patel (ICS retd.) who not only provided the vision for establishing such an Institute but also ensured the much needed support and encouragement for its growth at Vallabh Vidyanagar. AERC as a part of University has now completed 58 glorious years (1961-2019) of its journey marked by both achievements and challenges. During these years, the Centre has emerged as a strong policy feedback centre of the Ministry of Agriculture, Government of India due to hard work and strong commitment of the staff in the Centre. The focus of research effort in the initial stage was on comprehensive village surveys and resurveys in order to understand the process and direction of change at the village level. Subsequently, the emphasis of research has shifted to problem oriented studies. The Centre has by now completed 176 problem-oriented studies, 21 village surveys and 4 village resurveys. Most of these research projects have been taken up by Centre on the recommendation of the Government of India and State Governments of Gujarat and Rajasthan. Some of the projects have also been sponsored by other national and international organizations. During its long journey, the Centre has brought remarkable improvement in every aspect of research including methodological base of the studies. The studies have come out with useful findings and policy implications for agricultural and rural development of the states of Gujarat and Rajasthan. Many seminars and conferences were organized by the Centre (jointly with Department of Economics) during these years. Ever since its inception, the Centre has been working in close collaboration with the Post-graduate Department of Economics of the S. P. University and so far it has helped/supported about 44 scholars to successfully complete their Ph. D. work in agricultural economics. The principle objectives of the Centre have been as follows:

1. To make continuous study of the change in rural economy by means of surveys of villages each year, to be repeated after an interval of five years.
2. To conduct ad-hoc investigation on problems of interest to the Ministry of Agriculture and Irrigation and the State Governments under their jurisdiction.
3. To undertake research on fundamental problems relating to the agricultural economy of the country, and
4. To give technical advice to the Government of India and to the State Governments on such important issues as, with mutual agreement, may be referred to the Centre.

Since 1970, the Centre has been also organizing the work of *Comprehensive Scheme to Study Cost of Cultivation of Principal Crops in Gujarat* entrusted to the University by the Ministry of Agriculture, Govt. of India.

COST OF CULTIVATION SCHEME

Studies on cost of production of agricultural commodities have been of interest to research workers and policy-makers. The need for reliable and representative estimates about cost of production of agricultural crops is obvious for formulating an appropriate strategy for planned agricultural development.

In a vast country like India with marked variations in agro-climatic conditions, it becomes essential to collect State-wise, region-wise data on cost of production of various crops on a continuous basis. Recognizing the importance of such studies, the Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, evolved a permanent arrangement for collection of cost of cultivation data on a continuous and uniform basis for all important crops in the country. The Directorate of Economics & Statistics decided to establish the Comprehensive Scheme for studying the cost of cultivation of principal crops in different states of India in 1968-69. The Directorate entrusted one such cost scheme to the Sardar Patel University for collecting cost of cultivation data in Gujarat. The University entrusted this Scheme to the Agro-Economic Research Centre. Since 1970, the Agro Centre and the Comprehensive Scheme are working together in close collaboration for serving the needs of the Directorate of Economics and Statistics of MoA, Government of India.

The data base generated through the "Comprehensive Scheme for Studying Cost of Cultivation of Principal Crops" is used not only for the primary purpose of providing cost estimates for determination of Minimum Support Prices (MSP) but for a wide variety of other important purposes like 'Compilation of National Accounts Statistics', Wholesale Price Indices (WPI) and research studies relating to cost of cultivation and farm income.

Up to 1982, cost of cultivation data in Gujarat were collected from 480 sample cultivators spread over 40 clusters of villages through cost accounting method. Under the old arrangement (known as single crop approach) the clusters were changed every year retaining only a sub-sample of 10 to 20 clusters. Since 1983, the single crop approach has been replaced by crop complex approach under which the number of clusters has been increased from 40 to 60 thereby providing a wider and varied base for generation of reliable estimates. Now sixteen principal crops of Gujarat viz., Paddy, Bajra, Maize, Ragi, Wheat, Tur, Moong, Urad, Gram, Groundnut, Sesamum, Rapeseed Mustard, Cotton and Sugarcane, Onion, Potato are being studied continuously and simultaneously for three consecutive years in the same clusters of villages. At present, there is a sample of 600 cultivators (10 each from selected clusters) drawn from different size groups of holdings. The five size groups are: below 1.0 hectare, 1.0 to 2.0 hectare, 2.0 to 4.0 hectare, 4.0 to 6.0 hectare, 6.0 hectare and above. The work of Scheme is being looked after by 78 persons of which 60 are permanently posted in the villages spread over entire State of Gujarat. This Scheme is being fully financed by the Ministry of Agriculture & Farmers Welfare, Government of India.

TEACHING/Academic Staff / Faculty Members

A) AERC

Name	Post	Qualification	Specialization
Dr. S. S. Kalamkar (dearshri@gmail.com, director.aerc@gmail.com)	Director/ Professor	M. Sc. (Agril. Econ) Gold Medal, Ph. D. in Agricultural Economics DIT, MSCIT	Agricultural Production and Resource Economics, Agricultural Development Policy, Food Security and Sustainable Development, Biotechnology in Agriculture, Contract farming, Organic Farming
Dr. Kinjal V. Ahir (kinjalahir@gmail.com) (w.e.f. 01.09.2017)	Hon. Deputy-Director/ Associate Professor	M.A (Eco.Gold Medal), NET, PhD	Agricultural Economics, Organic Farming, Solar Seawater Desalination
Dr. Mrutyunjay Swain (mrutyunjay77@gmail.com) (up to June 08, 2018)	Assistant Professor/ Research Officer	M.A. (Eco.), M. Phil. (Eco.), Ph.D. (Eco.), UGC (NET)	Agricultural and Resource Economics, Food Security and Sustainable Development, Climate Change, Disaster Management.
Dr. Hemant Sharma (sharmah007@gmail.com) (w.e.f. January 1, 2015)	Assistant Professor/ Research Officer	M.Sc. (Agri), Ph. D. in Agricultural Economics	Agriculture Marketing and Production Economics.

(B) CCS

Dr. S.R. Bhaiya (foccsguj@gmail.com)	Field Officer	M.A. (Eco.), M. Phil. (Eco.), Ph.D. (Eco.)	Agricultural Economics, Cost of Cultivation, Research Methodology

Meeting with IASRI Research Staff at Centre on April 23, 2018

PROJECTS COMPLETED

(i) **Title of the Project** : **Study of the Implementation and Enabling Conditions for the Central Crop Insurance Scheme – Pradhan Mantri Fasal Bima Yojana (PMFBY) in Gujarat**

Principal Investigators : M. Swain, S.S. Kalamkar and K. Kapadia

Entrusted/Sponsored by : Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, GOI

Coordinating Centre : Centre for Management, Indian Institute of Management (IIM), Ahmedabad

Date of Completion : November 2018

Summary :

India is an agrarian economy and agriculture is primarily a gamble of monsoon. As a result, farmers are exposed to a variety of climatic and economic risks. Millions tonnes of agricultural produce are damaged by these risk factors each year across the country. On account of failure of crops, indebtedness, illness, frustration, family dispute, etc. are also increasing among the farmers. The failure of crops and indebtedness are major cause of farmers' suicide across the country. Since, agriculture is highly susceptible to natural calamities such as floods, droughts, heavy rains, hail-storm, pests/insects, diseases etc., it is necessary to protect the farmers from the adversities which occur frequently across the country. Agricultural insurance is considered as an important mechanism to address the risk of output and income resulting from various natural and manmade events. A number of crop insurance schemes like Pilot Crop Insurance Scheme (PCIS), Comprehensive Crop Insurance Scheme (CCIS), Experimental Crop Insurance Scheme (ECIS), Pilot Scheme on Seed Crop Insurance (PSSCI), Farm Income Insurance Scheme (FIIS), Sookha Suraksha Kavach (SSK), National Agricultural Insurance Scheme (NAIS), Weather Based Crop Insurance Scheme (WBCIS), etc. have been implemented in the country over a period of time. Looking at changing needs of the farmers, Pradhan Mantri Fasal Bima Yojana (PMFBY) is launched and implemented since Kharif 2016, replacing NAIS and modified NAIS.

The new scheme compulsorily covers the farmers that avail the seasonal crops loan (loanee farmers), whereas it was optional for non-loanee farmers. All major Kharif and Rabi crops are notified under PMFBY. The premium rate of Kharif crops is fixed @ 2% of sum insured to be paid by farmers, while it is @ 1.50% of the value of sum insured for Rabi crops. In case of commercial and horticultural crops, 5% of the sum is insured to be paid by the farmers. From sowing to threshing of crops, everything is covered under PMFBY. It is a new scheme which had been uniformly started throughout the country. A number of agencies are involved in the process of PMFBY. In Gujarat, for season kharif-2016, two insurance companies namely Agricultural Insurance Company (AIC) and HDFC Ergo were involved for implementation of the scheme and for season Rabi 2016-17, United India Insurance Company (UIIC) was involved for implementation of the scheme.

The present study was undertaken (i) to assess the performance and functioning of the PMFBY scheme in Gujarat; (ii) to examine the role of different stakeholders such as insurance companies (known as the implementing agencies), the financial institutions (nodal and lending banks), insurance agents and farmers/cultivators for efficient functioning of the scheme in the state; (iii) to assess the extent of adoption of PMFBY by the farmers, the benefits realised and the constraints faced by the farmers; and (iv) to assess the willingness to pay by the farmers and necessary modifications required in the scheme so as to make it more effective for the farmers. The study was conducted in two phases. In the 1st phase, the process of implementation at the state level was comprehensively mapped. In the exercise, nine AERCs were involved including AERC, Vallabh Vidyanagar. The study was involved mixed methods of data collection involving both secondary and primary sources of data.

The phase I study was intended to focus mainly on performance of PMFBY and implementation issues in the state. As per the stated distribution, a total of 150 households were covered under the detailed survey. Out of 150 households, 110 households were loanee farmers (beneficiary farmers), 10 households were non-loanee farmers and another 30 households were control farmers. In the phase II, two districts (Anand and Vadodara) were selected for the survey. From each of the district, 72 households were selected from two blocks and 6 villages. From each block, three villages were selected. In total, 144 households were selected from 12 villages covering 4 blocks of two selected districts.

The data were analysed with the help of simple statistical tools. However, during the second Phase, Generalised Multi-Nomial Logit (GMNL) model was used for making a parametric estimation of the likelihood of a farmer opting for a crop insurance scheme such as PMFBY. The dependent variable was a categorical - representing farmers with and without crop insurance. Explanatory variables included some utility parameters such as coverage period of crop insurance, loss determination method, certainty of payment and sum insured. The Ordinary Least Square (OLS) Method was also used to assess the strength of factors affecting the willingness to pay.

Progress in Implementation of PMFBY in Gujarat

PMFBY is a flagship scheme of crop insurance implemented since Kharif 2016 with an ambition of covering 50 percent of the farmers in India within 5 years. The majority of the farmers insured under PMFBY belong to four states namely Maharashtra, Rajasthan, Madhya Pradesh and West Bengal constituting about more than 72 percent of the total farmers covered in India. Uttar Pradesh, Bihar, Karnataka, Gujarat contributes 10 to 15 percent each in the total number of farmers insured under PMFBY in India, while the coverage is very low in all the other states. As far as area insured under PMFBY is concerned, Rajasthan occupies the major share followed by Madhya Pradesh, Maharashtra and Uttar Pradesh. Chattishgarh, Odisha, Gujarat, West Bengal constitutes about 6-8 percent share each in the total area insured under PMFBY in India. In Gujarat, around 4 lakh of farmers were insured with 6.8 lakh hectares area under PMFBY in the year 2016-17. Among the implementing agencies, Agricultural Insurance Company Limited (AIC) cluster has covered major share of the farmers. There was a common complaint about the earlier schemes that they provided cover to crop loans rather than to crop losses, as the participation rate of non-loanee farmers was very low. Hence, more emphasis was given on the coverage of non-loanee farmers under PMFBY. In Gujarat, among the total farmers covered during Kharif 2016 season, around 0.02 lakh farmers were non-loanee farmers. Around 10 percent share in premium was paid by farmers for Kharif season whereas during Rabi season, around 45 percent share in premium was borne by the farmers during 2016-17. About 90 percent of total premium for Kharif season and 55 percent in Rabi season were paid by the State and Central Government jointly.

During Kharif 2016 season, the applications for claims in the State were mostly made by the farmers from the districts of Junagadh, Rajkot, Surendranagar and Jamnagar. The farmers of Rajkot, Junagadh, Amreli, Jamnagar and Devbhumi Dwarka received the maximum claims. A total of 44335 farmers got benefit with claim settlements in the Kharif season. For Rabi season, the applications for claims were mostly made by the farmers of Junagadh, Jamnagar and Rajkot district. Of these, highest benefits of claim settlement was realized by farmers from Junagadh district, i.e. total 39564 farmers got benefited for claim in Rabi season of 2016-17. Thus a total of 482899 farmers were benefited with receipt of claims under the PMFBY in 2016-17. Though the coverage under new scheme has increased, several factors have contributed to the scheme slowing down. Some of them are insufficient time for enrolment, disputes between the states and insurance companies on yield data and compensation resulting in delay in settlement and more focus on impractical targets/goals without much stress on quality of implementation. The central government has been citing reason of poor implementation by the states for the lackadaisical response to the scheme. State officials say that the bid of private insurance companies for more profit and delay in settlement of claims are crucial factors for the decline.

Insurance Behaviour of Sample Farmers

Since the premium rates and insurance details varies from crop to crop, two major Kharif crops, viz. cotton and groundnut and one major Rabi crop, i.e. wheat were considered for understanding the insurance behavior of sample farmers. About 54.2 percent and 27.7 percent of loanee insured farmers had taken crop loan with crop insurance from Cooperative bank or society and Bank of Baroda respectively. Remaining farmers had taken crop loan with insurance from Central Bank, Cooperation Bank, Dena Bank, PNB, SBI and Union Bank of India; whereas all non-loanee insured farmers had taken crop insurance from Agricultural Insurance Company Ltd (AIC). Among different kinds of events of losses in cotton crop, the highest of 53.0 percent of event of losses were due to drought, dry spells, flood, pest attacks and diseases etc.; while 20.5 percent of event of losses were because of prevented sowing/planting due to deficit rainfall or adverse weather and remaining events of losses were due to post harvest losses, localised calamities (cyclone, landslide).

As far as compensation received from insurance companies is concerned, on an average of Rs. 13523.4 and Rs. 15480.0 were paid to the cotton grower farmers against the crop loss for loanee insured farmers and non-loanee insured farmers respectively. Thus, the compensation for crop losses was more to the non-loanee farmers compared to the loanee farmers. Average premium paid by loanee and non-loanee groundnut farmers was Rs. 1323.3 and Rs. 1470.7 per household respectively. In case of loanee farmers, about 90.0 percent events of losses were because of drought, dry spells, flood, pest attacks and diseases etc and remaining events of losses were due to prevented sowing/planting due to deficit rainfall or adverse weather. In case of entire non-loanee insured farmers, the crop yield loss was due to drought, dry spells, flood, pest attacks and diseases etc.

As far as compensation received from insurance companies is concerned, an average of Rs. 34039.7 and Rs. 23220.0 were paid to the groundnut grower farmers against the crop loss for loanee insured farmers and non-loanee insured farmers respectively. Thus, the compensation for crop losses was much higher in case of loanee farmers compared to non-loanee farmers.

As regards to Rabi crops, in case of wheat, average amount of premium paid by the loanee and non loanee farmers was estimated to be Rs. 4800.0 and Rs. 3525.0 respectively. It is worth-mentioning that, during Rabi season (wheat crop) both categories of sample farmers had no claim against any event of crop losses, thus did not receive any compensation.

Assessment of the overall experience of sample farmers with PMFBY reveals that about 36.4 percent loanee insured farmers reported that they were never insured under earlier crop insurance scheme, 45.5 percent of them mentioned that PMFBY is better than earlier schemes whereas 70 percent non-loanee insured farmers opinioned that it is better than earlier schemes. About 70 percent loanee insured farmers informed that they have informed the authorities about the event of losses. Among them, 37.3 percent and 24.5 percent loanee insured farmers had informed about the event of losses directly to local government officials and others (Gram Sevak and Agriculture Officer), respectively. In case of non-loanee farmers, all of them had informed about the event of losses directly to local government officials.

Of the total loanee insured farmers, 27.3 percent said that their farm was visited during Crop Cutting Experiment (CCE) while 40.9 percent said that their farm was not visited for CCE. Among non-loanee insured farmers, 20 percent said that their farm was visited during CCE while 80 percent said that their farm was not visited for CCE. Of the total loanee insured farmers, 26.4 percent said that they were aware about yield assessment of CCE while 41.8 percent were not aware about yield assessment of CCE.

Among the loanee insured farmers, about 31.8 percent farmers suggested to provide timely compensation, 22.73 percent suggested for more accurate assessment due to crop losses, 18.1 percent expressed the need of more awareness about the crop insurance scheme. About 8.1 percent suggested to reduce official complexity and emphasized on less time requirement and less paper work for enrolment and claim disbursement.

Regarding extent of awareness about PMFBY and the non-uptake of the same by the control farmers, it is revealed that, about 73.3 percent of the control farmers had heard about PMFBY and 26.6 percent control farmers of them had no idea about PMFBY. As regards the sources of awareness, about 43.3 percent, 16.6 percent, 10 percent and 3.3 percent of control farmers got the information about PMFBY from cooperative society, media, farmer's friend and gram sevak respectively. About 33.3 percent of control farmers expressed that they are not interested in this scheme, while 20 percent of them believed that the claim settlement process is tedious. About 13.3 percent of them believed that they may not get compensation due to crop losses, whereas only 6.7 percent farmers expressed that no sufficient time was there for getting enrolled for the crop insurance, even if they were interested to get enrolled for the same.

Willingness to Pay for Crop Insurance by Sample Farmers

The extent of willingness to pay for crop insurance products and services was assessed by the use of discrete choice experiments (DCEs), which DCE is an attribute-based survey method for measuring benefits (utility). Since it was entirely different kind of experiment where the name of PMFBY scheme was not disclosed, entirely new set of sample households were surveyed from the sample districts of Gujarat. However, all farmers were asked to share their experiences of enrolling for PMFBY after the end of the experiments. In total, 144 farmers were chosen for the experiment from 12 villages of 4 talukas of 2 districts (Anand and Vadodara) of the state.

The results from estimating the utility function (a generalized multinomial logit function) reveal that all the estimated coefficients of variables such as sum insured, certainty of payment, insurance coverage, loss determination are statistically significant at 1 percent level of significance. Thus, all these factors significantly influence the willingness to pay for the crop insurance. It is found that a farmer would be willing to pay Rs. 889 on an average for increase in the certainty of payment made to him as against the base category.

The analysis on the willingness to pay for an attribute on several household characteristics like age, farming experience, caste, gender, etc. with Ordinary least square regression revealed some interesting results. The study finds that, for 'Coverage: Pre-Planting', if the area cultivated in Kharif 2017 rises by 1 acre then the willingness to pay rises by Rs. 621 on an average. Likewise, if age of the farmer rises by 1 year, then he would be willing to pay Rs. 617 on average extra for 'Coverage period: Sowing to harvesting'.

Policy Implications

The study reveals some interesting results on uptake, adoption and performance of PMFBY in Gujarat. It was observed that this scheme was better than NAIS because lesser premium was paid by farmers and claim settlement process was more scientific which was decided through CCEs data. For main crops, CCEs were conducted at Gram Panchayat level and for other secondary crops, CCEs were conducted at block level. However, there are a number of areas where the present scheme can be further improved. There is a need to address issues such as delay in claim settlements; generating sufficient awareness in farmers about formulation and implementation of risk reduction strategies, developing suitable crop insurance product and effective implementation strategies and infrastructure, investing in R&D on insurance product design in collaboration with private insurance service providers, substituting relief payments with crop insurance system, covering the price risk along with weather risk and substituting relief payments with crop insurance system.

Based on findings of the study and interaction with various stakeholders, following suggestions are made for improving the adoption and performance of the PMFBY in Gujarat.

At present, the enrolment of loanee farmers under PMFBY is compulsory and that of non-loanee farmers is optional. Several farmers and farmer organizations, leaders etc. have suggested to make the scheme voluntary for the loanee farmers also.

- At present, the scheme covers major food crops (cereals, millets and pulses), oilseeds and annual commercial/ horticultural crops. It is suggested that the perennial horticulture crops should also be included under the scheme.
- Pests and diseases come under preventable risks and insurance companies do not consider for claims where losses occur due to pests and disease. Thus, it is necessary to clearly define the non-preventable risks or disease and pest should be considered as non-preventable risks. The unseasonal rain should be defined clearly in Operational Guidelines of PMFBY.
- Localized calamities are required to be clearly defined because insurance companies categorically deny the claims under local risks. Some of the risk factor like crop losses through wild animals should be incorporated in the guidelines. The operational guidelines should be in local languages for better understanding of the farmers.
- Majority of farmers do not have proper knowledge about crop insurance. Even the farmers do not know that they have been insured under the scheme. The farmers are unaware that the amount of crop insurance premium is automatically deducted from their account. Thus necessary awareness programmes should be organized periodically.
- In case of loanee farmers, the premium amount deducted is stated in their Saving Bank Passbook. In some other cases, the same has not been stated in Bank Passbook (i.e., Bank of Baroda, Dena Bank). Thus, some farmers suggested that the premium deduction receipt should be provided to them for their record. There should be a document provided to the farmers like premium deducted receipt, insurance document, crop loss coverage criterion, guidelines, contact list of company etc., which will help them at the time of loss assessment and claim settlement.
- Because of less number of banks available in the nearly areas, farmers fail to get insured their crops. Thus, it is suggested to increase the number of bank branches. There should be at least one nationalized bank branch for every five villages.
- Some farmers complained that they were not given compensation even if they had incurred heavy crop losses due to no loss assessment or delayed loss assessment. In that case, farmers demanded that the amount deducted as a premium should at least be given back to them since the claim was not settled by the respective company. In the case delay in claim settlement, the additional interest amount should also be paid to the farmers.
- The control farmers expressed that they couldn't avail crop insurance since the land settlement was in process. Some of them came for enrolment after the due date. They suggested that timely information should be passed on to them. They further suggested that the paper work and official procedure should be reduced or simplified for successful implementation the crop insurance scheme.
- It is also clear from the discussion that PMFBY would not be sufficient to cover all the pure risks arising from agricultural activities. To protect farmers against various kinds of climatic risks, a comprehensive risk mitigation strategy needs to be planned rather than just focusing on crop insurance.

(ii)	**Title of the Project**	:	**Solarisation of Agricultural Water Pumps in Gujarat**
	Principal Investigators	:	Sonal Bhatt, S. S. Kalamkar and M. Makwana
	Entrusted/Sponsored by	:	Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, Government of India
	Coordinating Centre	:	AERC, Vallabh Vidyanagar
	Date of Completion	:	January 2019

Summary :

A complex set of factors including global warming, competitive land use and lack of basic infrastructure is creating new challenges for India's vast agrarian population. The ever increasing mismatch between the demand and supply of energy in general and electricity in particular, is posing challenges to farmers located in remote areas and makes them vulnerable to risks, especially the small and marginal farmers. Indian farmers and the national and sub-national governments both face several challenges with regard to irrigation. Electricity in India is provided at highly subsidized low tariffs, mostly at flat rates, and this has led to widespread adoption of inefficient pumps. Farmers have little incentive to save either the electricity, which is either free or highly subsidized, or the water being pumped, resulting in the wastage of both. Although the government heavily subsidizes agricultural grid connections, grid electricity in rural India is usually intermittent, fraught with voltage fluctuations, and the waiting time for an initial connection can be quite long. Besides, the power shortages, coal shortages and increasing trade deficit, put food security of nation at the risk. The generation of solar energy and irrigation for agriculture could be intricately related to each other. This is because India is a country that is fret with an irregular and ill-spread monsoon. Hence, irrigation is a pre-requisite for sustaining and increasing agricultural output. This is particularly true for the western states of India and especially Gujarat and Rajasthan, where rainfall is often scanty, uneven and irregular; whereas perennial rivers are few. The role of canal irrigation becomes very crucial in this scenario. However, in the absence of sufficient and reliable canal water supply, the only other option that remains with the farmers is that they irrigate their fields with the help of ground water withdrawn through either electricity or diesel-driven pumps. Provision of power for irrigation and other farm operations therefore, is a high priority area for the States. However, providing farmers reliable energy for pumping is as much of a challenge as is making the availability of water, sufficient. Currently, India uses 12 million grid-based (electric) and 9 million diesel irrigation pump sets. However, the high operational cost of diesel pump sets forces farmers to practice deficit irrigation of crops, considerably reducing their yield as well as income.

Currently, India has 26 million groundwater pump sets, which run mainly on electricity that is primarily generated in coal-fired power plants, or run by diesel generators. Irrigation pumps used in agriculture account for about 25 per cent of India's total electricity use, consuming 85 million tons of coal annually, and 12 per cent of India's total diesel consumption, more than 4 billion liters of diesel. Scarcity of electricity coupled with the increasing unreliability of monsoon forces the reliance on costly diesel-based pumping systems for irrigation. Hence, the farmers look for alternative fuels such as diesel for running irrigation pump sets. However, the costs of using diesel for powering irrigation pump sets are often beyond the means of small and marginal farmers. Consequently, the lack of water often leads to damaging of the crop, thereby, reducing yields and income. In this scenario, environment-friendly, low-maintenance, solar photovoltaic (SPV) pumping systems provide new possibilities for pumping irrigation water. Solar powered pumps are emerging as an alternative solution to those powered by grid electricity and diesel. Diesel and electric pumps have low capital costs, but their operation depends on the availability of diesel fuel or a reliable supply of electricity. Saving of 9.4 billion liters of diesel over the life cycle of solar pumps is possible if 1 million diesel pumps are replaced with Solar Pumps. Using solar power for irrigation pumps can cut a carbon footprint of Indian agriculture and bolster the country's role in the war against climate change.

Solar power could be an answer to India's energy woes in irrigated agriculture. Solar power generation on the farm itself through installation of solar PV (photovoltaic) panels; and using it to extract groundwater could just be the solution for the above concerns. Solar pumps come with a user-friendly technology and are economically viable. They are easy to use, require little or no maintenance, and run on near-zero marginal cost. Solar power is more reliable, devoid of voltage fluctuations and available during the convenient day-time. India is blessed with more than 300 sunny days in the year, which is ideal for solar energy generation, aptly supported by promotional policies of the Government of India.

The Ministry of New & Renewable Energy (MNRE) has been promoting the Solar-Off Grid Programme since two decades. The programme size has increased many folds with the advent of Solar Mission, giving much impetus to various components of the programme in which solar pumping is one of the major component. Solar Pumping Programme was first started by MNRE in the year 1992. From 1992 to 2015, 34941 of solar pumps have been installed in the country. This number is minuscule, if we compare with the total number of pumps in agricultural sector. High costs of solar modules during these years resulted in low penetration of solar pumps. However, in recent times the module costs have started decreasing and are presently hovering around one fourth of the price in those days. As a result, the programme has become more viable and scalable. Therefore, present study was undertaken with aim to study the important issues concerning large scale adoption of solar irrigation pumps, its economics/feasibility and problems in adoption of same.

Literature suggests that application of solar energy in irrigation could have myriad benefits. The primary benefit is that it is 'free'. However, the generating apparatus comes with high initial fixed costs like that of capital equipment, costs of installation, depreciation, interest, protection from theft, vandalism etc. Nevertheless, the marginal costs are indeed 'near zero' (operation, maintenance, repairs). The costs of expansion in irrigated area like that of hose pipes for transporting water across fields is also much lesser compared to operating a diesel pump or getting another electricity connection. Hence, solar pumps could not only provide cheaper irrigation but also expand irrigated area and thus increase the returns on agriculture. It could also extend the farming beyond the kharif season (monsoon); by harnessing ground

water and thus aid the diversification of crops. Solarization could also unshackle the farmers from the shortage of electricity supply and its inconvenient timings. They would be able to irrigate not only their own land, but also become irrigation service providers to their neighbouring farmers and also supplement their own incomes in the process. Solarized pumps could promote conjunctive irrigation by promoting ground water extraction in flood-prone regions like north Bihar, coastal Orissa, north Bengal, Assam and eastern Uttar Pradesh. The government has acted positively in this matter and during the last five years, considerable progress ha s been made in installation of Solar Pumps.

In the light of above, attempt is made to study the status and prospects of solarisation of agricultural pumps in selected districts of Gujarat. The data were collected from three distinct groups of farmers, viz. farmers who had adopted SIPs with the help of subsidy by the government, farmers who had adopted SIPs without any support in the form of subsidy by the government, and the farmers who had not adopted SIPs. The first group was of 100 sample farmers (25 from each of the four districts under study, i.e. Sabarkantha, Bhavnagar, Narmada and Dahod) who had installed Solar Irrigation Pumps (SIP) with the support of subsidy from the government (beneficiary farmer households). The second group consisted of 4 sample farmers (1 from each of the four districts) who had installed SIPs on their own without any support in the form of subsidy (non-beneficiary farmers). The third group included 20 sample farmers (5 each from four districts under study) who had not yet adopted solarized irrigation (non-adopters). They were still using other conventional fuels for powering their irrigation pumps when they were visited by the researchers. Thus, total sample consisted of 124 selected farmers. Case study on first ever cooperative formed by farmers for decentralized solar power generation and usage in irrigation i.e. Dhundi Saur Urja Utpadak Sahakari Mandali or DSUUSM registered in May 2016 by six farmers of Dhundi village of Kheda district of Gujarat studied earlier is presented in this report.

Policies supporting Solar Power Irrigation in Gujarat

The Gujarat government encourages solar power generation projects as a means of socio-economic development. Gujarat is rich in solar energy resources with substantial amounts of barren and uncultivable land, solar radiation in the range of 5.5-6 kilowatt-hour (kWh) per square meter per day, an extensive power-grid network and DISCOMS with reasonably good operational efficiency. It has the potential for development of more than 10,000 MW of solar generation capacity. State has decided to promote measures for energy efficiency, adopt efficient management techniques and build capabilities for more energy secure future. Government of Gujarat had decided to take the lead in this regard by framing Solar Power Policy in 2009 which spelt out the development of solar power production targets, financing mechanisms and incentives offered for the same. The policy of purchasing solar power from the small producers by connecting them to the grid has also contributed to boost up the interest of producers and investors in this sector. The Solar Power Policy 2009 had aimed to generate 716 MW of solar power. Allocations of 365 MW of SPV and 351 MW of CSP have already been made to 34 developers. Gujarat Energy Development Agency (GEDA) established by the Government of Gujarat disseminates information on opportunities for the generation of solar energy and plays a catalytic role in the development and promotion of renewable energy technologies in the state. It undertakes on its own or in collaboration with other agencies, programmes of research and development, applications and extension as related to various new and renewable energy sources. GEDA plays a key role in facilitation and implementation the

solar power policy 2009. It facilitates and assists project developers through a number of activities. These include identifying suitable locations for solar projects, preparing a land bank, assessing the connecting infrastructure, arranging right of way and water supply at project locations, obtaining clearances and approvals which fall under the purview of state or local governments etc. Gujarat Solar Power Policy 2015 was framed with an aim to scale up the solar power generation in a sustainable manner.

Gujarat is one of India's most solar-developed states, with its total photovoltaic capacity reaching 1,262 MW by the end of July 2017. Gujarat has been a leader in solar-power generation in India due to its high solar-power potential, availability of vacant land, connectivity, transmission and distribution infrastructure and utilities. The state has commissioned Asia's largest solar park near the village of Charanka in Patan district. The park is generating 2 MW of its total planned capacity of 500 MW, and has been cited as an innovative and environment-friendly project by the Confederation of Indian Industry (CII). The Gujarat government has also tried to encourage urban roof-top solar power generation in the capital city of Gandhinagar. Under the scheme, it is planned to generate 5 MW of solar power by putting solar panels on about 50 state-government owned buildings and 500 private buildings in Gandhinagar. In another innovative project, the government of Gujarat put solar panels along the branch canals of the Narmada river. As part of this scheme, the state has commissioned the 1 MW Canal Solar Power Project on a branch of the Narmada Canal near the village of Chandrasan in Mehsana district. Not only is this project expected to generate solar power, but also prevent about 90,000 liters of canal water from evaporating. In addition to the existing solar power policy, the Gujarat government has also come up with solar-wind hybrid policy.

Government has successfully implemented pilot projects of solar power generation which is gaining traction at several grassroots-level interventions. Grassroot Trading Network for Women (GTNfW), an initiative by Self-Employed Women's Association (SEWA), is in the process of implementing one such project by setting up a unique solar park of 2.7-megawatt (MW) capacity. The project has roped in saltpan workers from Little Rann of Kutch (LRK) for solar power generation. Around 1,100 saltpan workers in LRK have been using solar-powered pumps for drawing saline water used for extracting salt. As salt production season typically runs from October to March, the solar panels remain unused for the remaining part of the year. To enable saltpan workers to optimally use solar panels round the year, a plan has been made to set up a solar park in the vicinity of the LRK, where solar panels could be mounted for the remaining part of the year to generate power. A petition for this has already been filed with Gujarat Urja Vikas Nigam Limited (GUVNL) recently. GTNfW is in the process of identifying land to set up the solar park and aims to begin generating power by April 2019. Currently, only 1,100 out of 35,000 salt farmers in the LRK region, own close to 8,500 solar panels. These collectively produce around 2.7MW power. The potential to generate power will only go up as more saltpan workers begin using solar panels. Looking at the cost savings by using solar pumps, more saltpan workers are inclined to use solar pumps. By using solar pumps, saltpan workers are not just adopting clean energy, but also saving 40% - 100% of their expenditure on diesel. Conservative estimates indicate that the solar park will help generate an additional income of around Rs 40 lakh during the off-season for the saltpan workers.

Suryashakti Kisan Yojna (SKY):

Gujarat has considerable deployment of irrigation pump sets. Taking this into consideration, the State Government, in collaboration with the Central Government/ MNRE/ MoP/ Multilateral Agencies undertook measures to provide solar powered pump sets through subsidy support. To enable farmers generate their own power for captive consumption and make an extra buck by selling the surplus power, Gujarat government has launched Suryashakti Kisan Yojna, popularly known as SKY. According to this scheme, which is the first of its kind in the country, farmers having existing electricity connections are given solar panels according to their load requirements. Of the total cost of installing solar system, farmers have to bear only 5 per cent cost and rest comes through state and central government subsidy (60%) and affordable loan (35%). The government estimates suggest that a farmer with metered connection of 5 horsepower (HP) earns Rs 11,612 per annum during the loan period of seven years. After that, the amount goes up to Rs 26,900 every year. With an outlay of Rs 870 crore, the pilot project will cover 12,400 farmers and have a connected load of 175 MW. As many as 137 separate feeders are planned to be set up under the pilot for agriculture energy consumption. The first feeder has already been commissioned at Pariaj in Bharuch and 10 farmers have joined in. For the first 7 years, farmers will get a per unit rate of Rs 7 (Rs 3.5 by GUVNL and Rs 3.5 by state government). For the subsequent 18 years, they will get the rate of Rs 3.5 for each unit sold.

Gujarat government is also giving subsidy for solar pumps. As many as 12,742 solar water pumps have been installed so far. A provision of Rs 127.50 crore has been made for installing 2,780 solar pumps in the current year. The state government has also allocated Rs 20 crore for converting existing agricultural electricity connections to solar-based irrigation pumps. By the end of 2016-17, the total number of installed solar pumps in Gujarat through GGRC and GVNL was 7739.

The Gujarat Green Revolution Company Limited, Gujarat as per the directions of Ministry of New and Renewable Energy (GoI), has implemented the installation of 1400 numbers of solar water pumps for irrigation under "Solar Water Pumping Programme for Irrigation and Drinking Water" in the state of Gujarat with the following types of pumps and subsidy norms. As per subsidy Norms for Solar Powered Irrigated Pumps in Gujarat State as per the Energy & Petrochemicals Department, Government of Gujarat, Gandhinagar GR No. BJT-2014-1447-K1 dated 25th September, 2014, subsidy norms per hp irrigation pump is Rs. 1000/- for SC&ST households and Rs.5000/- for general category. To avail the benefit of installation of SPY water pumps for irrigation under this scheme, beneficiary farmers normally should have drip irrigation under MIS scheme implemented by GGRC in the state of Gujarat. The Government of Gujarat has released general resolutions (GRs) from time to time in order to spread the coverage of solar irrigation pumps in the state.

Policy Implications:

- Majority of the beneficiary farmers suggested that solarized irrigation could be expanded in Gujarat if the SIPs were made more user-friendly in terms of their requirement of space, technical features as well as financing; including that for insurance.
- Non-adopters of SIPs underlined the need to increase the awareness about SIPs amongst farmers through concerted efforts for communicating the same. They also opined that the portability of the solarized engines instead of fixation at a certain point, would greatly enhance their utility for the users.
- Further, if the individual SIPs were to be connected with the grid in order to evacuate the surplus

power generated therefrom into the grid, it could not only prevent the wastage of solar power but also provide the farmers with a supplementary source of income by way of selling solar power.

- The farmers were also in need of assistance for taking insurance against risks of damage of SIPs or theft of their solar panels.
- Also, the procedure for availing subsidy should be simplified and the criteria for eligibility should be relaxed so as to include more farmers as beneficiaries
- The amount of subsidy should be increased in order to encourage more adoption of this technology.
- SIPs are not accompanied by micro-irrigation systems or efforts to raise the ground water tables as envisaged in the policy. The 'push' factors such as costs and hassles of procuring farm fuels such as diesel and electricity are more important than 'pull' factors of solar power in attracting farmers towards solarization of their irrigation pumps.
- Clearly, more needs to be done in the direction of convincing the farmers about the advantages of solarized irrigation per se, so that they would come forward to adopt in large numbers, regardless of the subsidy onoffer or the initial capital costs thereof.

(iii) Title of the Project : Solarisation of Agricultural Water Pumps in Rajasthan

Principal Investigator : S. S. Kalamkar and H. Sharma

Entrusted/Sponsored by : Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, Government of India

Coordinating Centre : AERC, SPU, Vallabh Vidyanagar

Date of Completion : January 2019

Summary :

The study attempts to study the status and prospects of solarisation of agricultural pumps in selected districts of Rajasthan. The data were collected from three distinct groups of farmers, viz. farmers who had adopted SIPs with the help of subsidy by the government, farmers who had adopted SIPs without any support in the form of subsidy by the government, and the farmers who had not adopted SIPs. The first group was of 100 sample farmers (25 from each of the four districts under study, i.e. Jaipur, Bikaner, Udaipur and Sriganganagar) who had installed Solar Irrigation Pumps (SIP) with the support of subsidy from the government (beneficiary farmer households). The second group consisted of 5 sample farmers from four districts who had installed SIPs on their own without any support in the form of subsidy (non-beneficiary farmers). The third group included 20 sample farmers (5 each from the four districts under study) who had not yet adopted solarized irrigation (non-adopters). They were still using other conventional fuels for powering their irrigation pumps when they were visited by the researchers. Thus, the total sample consisted of 125 selected farmers.

Policies supporting Solar Power Irrigation in Rajasthan

The state of Rajasthan has 10 per cent of India's land, 5 per cent of its population and only

1 per cent of its water resources, a disadvantage by a factor of the for supply of irrigation water vis-a-vis agriculture area. Acute water shortage, erratic rainfall and recurring droughts in every district have exacerbated the situation. Over 60 per cent of the population depends for livelihood on agriculture or horticulture, often marred by low productivity due to unreliable, inadequate or non availability of irrigation. About 70 per cent irrigation is done through wells or tube-wells energized mainly by grid-power or diesel generators. Approximately 60,000 farmers are waiting for grid-based electricity connections for irrigation. Extension of electric-grid is not feasible in far-flung areas; almost 70 per cent area in the State is classified as desert. Moreover, ground water has deteriorated rapidly in the last two decades. Out of 249 blocks, nearly 200 are in the highly critical zone. Almost 90 per cent of groundwater withdrawal in the State is utilized through flood or furrow-irrigation methods with mere 35 to 45 per cent water-use-efficiency.

Rajasthan is blessed with one of the best solar insolation on earth (6-7 kWh/m2/day) combined with maximum sunny days in a year, about 325, which makes it one of the most attractive destinations for harnessing solar energy for various purposes, especially irrigation. It was thus envisaged that an integrated solar water pump scheme formulated by combining various stand-alone government schemes would be indeed beneficial for the region as well as its farmers. Subsidies available under various programs were clubbed and the State committed to grant the total subsidy up to 86 per cent of the capital cost. The departments of agriculture, finance and energy of the State, and Union government's Ministries for Agriculture (MoA) and New and Renewable Energy (MNRE) worked in tandem along with various stakeholders to make it is seamless and successful project.

Rajasthan has been pioneer in promoting solar water pumps by adopting suitable policies with an aim to increase solar pump coverage in the state. The solar pump scheme for irrigation began in Rajasthan in 2010 – a combination of the Jawaharlal Nehru National Solar Mission (JNNSM), Rashtriya Krishi Vikas Yojana (RKVY), the water harvesting structure (WHS) scheme under the National Horticulture Mission (NHM), and various other State resources. Under the scheme, farmers are provided with subsidies from RKVY and the Ministry of New and Renewable Energy (MNRE). In the inception year, a subsidy figure of 86% was arrived at (30% from MNRE and 56% from RKVY), through calculations of a base price for the manufacturing and installation of a solar water pump set. The remaining 14 per cent, equivalent to the cost of just the pump set, was to be paid by the farmer, which would amount to about Rs. 56000-63000. In 2010-11, 50 farmers were targeted, which was scaled up to 500 in 2011-12, and 10,000 in 2012-13, eventually covering all 33 districts of the State. There are three, very transparent eligibility criteria for the subsidy –(1) the farmer should own at least 0.5 Ha of land; (2) the land should have a diggi/farm pond or other water storage structure; (3) drip irrigation system should be installed in a portion of the farm. Progressively, the scheme was amended to include the usage of mini-sprinklers as criteria for areas where land holdings are relatively smaller and diggi construction is unfeasible or impractical. This inclusion widened the scope for the popularization of efficient irrigation methods, increasing the water use efficiency in many regions significantly. On the other hand, the subsidy figure was reduced from 86 per cent to 70 per cent to an even lower 60 per cent over the years, and this reduction in the subsidy amount is presently the major cause for farmers backing out from the scheme. Farmers who already have electric connections for irrigation shall be provided with a smaller figure of subsidy, amounting to about 30% of the total cost of the solar pump set. This calls for a study of the efficacy of the scheme and a detailed evaluation of the impact that these solar water pumps have actually had on

farmers already using them, to enable us to ascertain why we should be moving towards this green, efficient, cheap, and emission-free energy source, and/or explaining how the scheme may be further improved for a much wider acceptance and preference among those that require such alternative solutions desperately.

In the year 2008-09, Government of Rajasthan had started scheme of 100 per cent subsidy on solar water pump for government farm then after in 2010-11, pilot project was started and covered only 6 districts to installed solar water pump. To harness the vast amount of energy, the Rajasthan government subsidized 86 percent solar-powered irrigation in 2011-12 and introduced 3 HP DC submersible pumps. MNRE and the Ministry of Agriculture through the financial assistance of the state government had supported. Jawaharlal Nehru National Solar Mission (JNNSM) provides 30 percent of the state government, Rashtriya Krishi Vikas Yojana (RKVY) and the Ministry of New and Renewable Energy offers a 56 per cent subsidy. The solar water pump scheme was scaled up from a mere target of 50 in 2010-11 to 500 (900 per cent increase) in 2011-12; to 2,200 (over 340 per cent increase) for 2012-13; and, to 10,000 (354 per cent increase) for 2013-14. Implementation at large scale was initiated in year 2011-12 when out of 33 districts, 14 districts were covered. Next year i.e. 2012-13 the scheme covered all the 33 districts in the State. In the year 2014-15, all 33 districts were also included, but this time only 2900 solar water pump was kept in the target as the subsidy rate had been reduced, but still achieved a lot of achievement and 242 percent more solar pumps installed than targeted. The good achievement in the next year 2015-16 and 31 percent more installed than the targeted solar pump. After year 2013-14, Rajasthan has also begun targeting high ROI beneficiaries by prioritizing farmers without electric connections. The state has three subsidy slabs—75 per cent for those willing to give up their place in the queue for electric connections, 60 per cent for farmers without an electric connection, and only the 30 per cent MNRE subsidy for those unwilling to give up their electric connection/place in the queue.

Despite water scarcity, Rajasthan is actively pushing for solar pumps. Its horticulture department provides 86 per cent subsidy on pumps, while the rest is borne by the farmer. Government of Rajasthan brought a new momentum in the space of solar irrigation pumps by introducing 3 HP DC submersible pumps in an 86 percent subsidy scheme launched in 2011-12. There was also a 2 HP DC submersible pump option, but there have been few takers for it. The initial estimates of costs at the Rajasthan level 3 were Rs.6.16 lakh for 3 HP pump and almost Rs. 18-20 lakh for a 10 HP pump. Government of Rajasthan's aggressive policy of subsidizing solar pumps is helping to increase the numbers but there is some evidence that the current subsidy is discouraging cost reduction. Farmers are viewing solar pumps as an all purpose solution to their energy needs and government has came out the suitable policy towards same. The top five districts having highest coverage of solar pumps are Bikaner, Jaipur, Sri Ganganagar, Hanumangarh and Sikar.

The solar pump subsidy was only available to farmers who had farm ponds (diggi), did horticulture in at least 0.5 hectare (ha) land and used drip irrigation. The farmer also had to own a minimum of 0.5 ha of land. Further the farmers who owned up to 2 ha of land could apply for 2200 Wp pump and those who had more than 2 ha of land could apply for 3000 Wp pump. The eligibility criterion for solar power pump has been changing every year.

Farmers have to apply to the Horticulture department along with a demand draft for Rs. 10000,

land ownership record, a tri-partite agreement among the farmer, preferred empanelled supplier and the horticulture department, a quotation from the selected empanelled firm, and a technical drawing of the structure. Once all the applications are collected at Tehsil level, these are verified for compliance with the eligibility criteria. If the applications are more than the quota, a lottery is conducted in the presence of District Collector. A seniority/waiting list is created. If a farmer's name features in the lottery list, he/she has to deposit his 14 percent share minus Rs.10000 with the select firm. Based on the confirmation of the receipt of farmer's share work orders are issued by the Horticulture Department of the state government.

Policy Implications:

- Both the central and state governments have policies and incentives place to grow the use of solar pumps in the irrigation sector. However there is a felt need for raising awareness among farming community and for putting project delivery mechanism in place.
- Presently, cost of solar pump appears to be high for individual farmer. Large scale adoption and production will lead to cost cutting. Community based projects can reach out to marginal farmers and other low-income group individuals.
- Feasible costing and assistance from state/ central government will encourage more farmers to opt for the technology. With partnership of state energy departments, Vidyut Vitaran Nigams, and private partners, technology can be disseminated at large scale.
- Portability of grid connectivity to solar irrigation pumps should be made and awareness about solar irrigation pump scheme need to be increased.
- Majority of the beneficiary farmers suggested that solarized irrigation could be expanded if the SIPs were made more user-friendly in terms of their requirement of space, technical features as well as financing; including that for insurance.
- Solar cooperative need to established and individual SIPs in group under cooperative structure can be connected with the grid in order to evacuate the surplus power generated there from into the grid, it could not only prevent the wastage of solar power but also provide the farmers with a supplementary source of income by way of selling solar power.
- The farmers were also in need of awareness about insurance and its coverage against risks of damage of SIPs or theft of their solar panels.
- Also, the procedure for availing subsidy should be simplified and the criteria for eligibility should be relaxed so as to include more farmers as beneficiaries
- Clearly, more needs to be done in the direction of convincing the farmers about the advantages of solarized irrigation per se, so that they would come forward to adopt in large numbers, regardless of the subsidy on offer or the initial capital costs thereof.
- There is a need of innovative policies for governing ground water level in a sustainable way. There is a need for metering agriculture water use and total water extraction by farmers using solar, electric or diesel pump.

Field Survey Work of eNAM and GST Project

(iv)	**Title of The Project**	:	**Price Volatility and Major Issues in Demand and Supply Management of Onion in Gujarat**
	Principal Investigator/s	:	S.S. Kalamkar & H. Sharma
	Entrusted by	:	Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, GOI
	Coordinating Centre	:	AERU, ISEC, Bengaluru
	Date of Completion	:	February 2019
	Summary	:	

Onion is one of the most important commercial and important vegetable grown in India which is next to Potato, which is used either in raw or dehydrated form to add flavor and taste to Indian cousin. Since onion has medicinal values, it is used in some pharmaceutical preparation also. Onion is consumed all over the country and is an important constituent of Indian daily diet. Onion is typically cultivated thrice a year and all three crops are available for export, with rabi having the longer shelf life. Out of total production of about 24 million tones of onion, two third of total production is rabi crop while 20 per cent is late kharif and rest is kharif crop. The diverse agro-climatic conditions enable to India to produce onion in one or the other part round the year. Onion is largely grown in the western, northern and southern parts both in rabi and kharif seasons. Its supply is available throughout the year albeit with different volumes. India produces all three varieties of onion, i.e. red, yellow and white. In the northern part of the country, onion is usually grown in the winter (rabi) season. While in the southern and western states of Andhra Pradesh, Karnataka, Tamil Nadu, Gujarat and Maharashtra, it is grown in winter (rabi) as well as in the rainy (kharif) seasons. Currently, onion cultivation in kharif is gaining ground in the northern part of the country. The major onion producing states are Maharashtra, Madhya Pradesh, Karnataka, Bihar, Rajasthan, Andhra Pradesh, Haryana, West Bengal, Gujarat and Uttar Pradesh in the country. These States account for almost 90 per cent of the total onion production of the country.

The onions from India are famous for their strong flavor. India export its considerable quantity of onion to countries like Malaysia, Singapore, Sri Lanka, Bangladesh, Pakistan, Indonesia, UK, Gulf countries, etc. Our exports generally hover around 1.5-2.5 million tonnes per annum. As onions have no substitutes, demand for it is completely inelastic. It is also exported in the form of dehydrated onion, canned onion and onion pickle. Dehydrated onions are seen as a potential valued product in world trade and India is the second largest producer of dehydrated onions in the world.

Onion Price Volatility

Onion is a politically-sensitive commodity which is one of the closely monitored agricultural commodities produced in India. Onion is the only vegetable that can bring down a government from power, as prices of onion have direct bearing on the common man's consumption basket. Therefore, this commodity is always in focus of the government. Though there is always a surplus production,

fluctuating domestic and export demand often creates demand supply mismatch leading to spiral effect on the prices of onion. The prices sometimes fall below cost of production making it uneconomical for the farmers. Central Government uses Minimum Export Price (MEP) as a tool to ensure regulated exports so that there is an adequate supply of onion in the domestic market. State Governments with the support of Central Government also implement as and when require Market intervention Scheme (MIS) in view of possible glut in market. Month-wise arrival of onion during last five years indicates high fluctuation in arrival of onion in markets across months that to year to year and month wise arrival is not consistent.

Due to its highly volatile prices, during May 2014, Central Government brought onion under the Essential Commodities Act, 1955 imposing stock holding limits. Despite of same, wide variation in average wholesale prices of onion are recorded during last four years which is presented in Figure 1. The prices remained quite high in 2015, 2017 and 2018, especially during July to December. Average wholesale prices fell sharply in September 2016 below Rs. 1060/Qtl. After some improvement during remaining months of 2016 and beginning of 2017, the onion prices again crashed in May 2017 below Rs. 1010/-. The picture is more worrisome when we compare wholesale prices of onion across the states. During January 2018 prices were very high as compared to December 2018 and January 2019 and about 60 per cent deviation is recorded. This spiral effect of onion prices led to heavy losses to the farmers. While the middlemen take advantage of price movements, it affects farmers and consumers badly. The high fluctuation in prices of onion can be attributed to hoarding by traders with expectation of price rise, higher retailers' mark up, changes in MEP by Government and lack of proper forecasting system.

The onion export brought under Canalization Scheme through National Agricultural Cooperative Marketing Federation of India Limited (NAFED) in 1974 by Government of India, which substantially increased export of quality produce and also the foreign exchange earnings. However, it was felt by NAFED and onion exporters that there is need to improve both production and quality of onion for export as well as to meet the domestic needs for which research and developmental programmes are to be undertaken. But spiralling price of onion is always a cause for concern. The prices rise sky high in years of deficit production and nose dip when there is glut. Wide price fluctuations make it a risky crop discouraging large scale adoption of input intensive production techniques and good management practices by farmers. Therefore, onion is generally referred as a high risk, high return crop for the farmers and traders. The high price variability affects both producers and consumers through a spillover effect to the other sectors thereby leading to high inflation in the economy.

The Government of India has approved Operation Greens, the Central sector scheme aimed at the integrated development of value chain for three commodities, viz. tomato, onion and potato (TOP). It aimed at the stabilisation of the prices of these commodities, which have seen serious volatility in the past and reduction in post-harvest losses by way of farmgate infrastructure. TOP scheme also aim on value addition to increase the shelf life of the product, as well as enhance the value addition. Besides, emphasis would be on creation of a market intelligence network to collate real-time data on demand and supply in order to check the localised gluts of TOP crops. The government wants it to be implemented in a two-pronged strategy, the first being a short-term strategy focussed on price stabilisation and the second being a long-term one focussing on the development of integrated value chain development. The National

Agricultural Cooperative Marketing Federation of India (NAFED) will be the nodal agency for the price stabilisation measures, which will create an e-platform for demand and supply management of TOP crops based on market intelligence inputs. Under the scheme, the clusters for onions includes Nashik in Maharashtra; Gadag and Dharwad in Karnataka, Bhavnagar and Amreli in Gujarat and Nalanda in Bihar.

Gujarat has achieved considerable growth rate in horticulture during last five years because of serious efforts made by the State Government. The area and production of horticulture crop was 4.80 lakh ha and 43.03 lakh tons in 1994-95 which increased up to 16.87 lakh ha and 234.35 lakh tons respectively in 2017-18. It accounts for about 11.76 per cent of total area under vegetable crops and 11.84 per cent of total vegetable production in the state. The state of Gujarat is the eighth largest onion producing states in India, which accounts for about 2.3 percent of production of the country from area share around 4.0 percent. It was estimated that during the year 2017-18, total onion production in the state was 14.16 lakh tones and major onion producing district were Bhavnagar, Gir Somanath, Rajkot, Junagarh, Amrelai and Junagadh.

Against this backdrop and given that market structure, degree of competition and efficiency at the various levels of the supply chain has impact on the final prices paid by the end consumers with respect to agriculture products; the study proposes to price volatility and major issues in demand and supply management of onion in Gujarat. Irrational speculative driven bubbles and hoardings by trader lobbies have sometimes been blamed for episodes of high price volatility in India, but with no clear implications in terms of which possible policies could effectively prevent repetition of such crisis. This study aims to find major issues/ factors affecting onion price volatility with specific focus on supply chain management and infrastructure in Gujarat.

The study has been carried out by utilizing both secondary as well as field survey data collected in Gujarat. The secondary level data has been collected from the various published sources and websites. The primary data survey were carried out from the one of the largest onion producing districts of Gujarat, i.e. Bhavnagar (Producer market, Map 1.1). Primary survey was carried out with a structured questionnaire for farmers and market intermediaries for the year 2017-18. Data were collected from 10 sample farmer households; 2 Trader, 2 Commission Agent, 2 warehouse owner and 1 Onion Processor. Besides data were also collected from 2 commission agent from Sevana APMC of Ahmadabad and 2 APMC Mahuva (Bhavnagar) and Sevana (Ahmadabad) this makes a total of 21 households. A focus group discussion with the committee members of APMC and with market functionaries was also held in order to get a clear picture of market charges, market practices, etc. The co-integration analysis were carried out using monthly wholesale prices of five onion dominated markets i.e. Ahmadabad, Gondal, Rajkot, Mahuwa and Surat markets of Gujarat for the period from 2005 to 2017.

Consumption of Onion

Historically, onion consumption per capita in India reached an all time high of 13.5 kg in 2013. Consumption of onion in India is subject to fluctuation on account of religious considerations. The monthwise per capita onion consumption as per NSSO survey indicate that consumption of onion during 2011-12 in rural area was relatively lower of 0.84 kg while in urban area, same was 0.95 kg. India

produced enough onion, leaving a record surplus of about 2.92 MMT. Surplus onion was exported to a number of other countries. Gupta, et al (2015) estimated that onion consumption in the rural area was estimated to be 48.10 g/person/day while same was 50.97 g/person/day in urban side.

Cost of Cultivation and Income from Onion

Cost of cultivation of onion in Gujarat is estimated to be 125082.69 per hectare as C2 cost during 2015-16 while per quintal cost of production is estimated to be Rs. 722.97. Among various components of operational costs, cost of labour accounted for the highest share of 37.5 per cent in total cost of cultivation followed by seed (27 per cent). The cost of cultivation and production varies considerable across the years and thus negative profit per hectare and quintal of onion was observed during the year 2005-06, 2007-08 and 2011-12.

External Trade Scenario

India is a traditional exporter of fresh onions. Although there has been an increasing trend in the quantum and value of exports of onions from the country, the ex-ports are subject to wide fluctua¬tions from year to year. This may be attributed to the fact that the exports of onions have not been free but are canalised through National Agricultural Cooperative Marketing Federa¬tion (NAFED) and now through some other agencies. Indian onions are famous for their pungency and are available round the year. Indian onion has two crop cycles, first harvesting starts in November to January and the second harvesting from January to May. There is a lot of demand of Indian Onion in the world, the country has exported 1588985.72 MT of fresh onion to the world for the worth of Rs. 3088.82 crores / 479.32 USD Millions during the year 2017-18. Major export destinations (2017-18) are Bangladesh, Malaysia, Sri Lanka, United Arab Emeritus and Nepal, which is not stable since last one and half decade period.

India mainly exports fresh onions to foreign countries followed by dehydrated onion. During 2017 (Jan-Sept), fresh onion export from India recorded USD 216.95 million which represented 70.29% of the total onion exports while it was USD 72.49 million (23.49%) for dehydrated onion. The varieties of onion in India that exports are Podisu onion, Red Onion, White Onion, Krishnapuram rose onion, Bangalore rose onion etc. The major onion varieties found in India are Agrifound Dark Red, Agrifound Light Red, NHRDF Red, Agrifound White, Agrifound Rose and Agrifound Red, Pusa Ratnar, Pusa Red, Pusa White Round. There are certain varieties of yellow onion which are suitable for export in European countries namely Tana F1, Arad-H, Suprex, Granex 55, HA 60 and Granex 429.

There are 23 states of India which are exporting onion to other countries. The major onion exporting states are Maharashtra, Gujarat, Tamil Nadu, Karnataka, West Bengal, Andhra Pradesh, Kerala, Delhi, Bihar and Jammu & Kashmir. Maharashtra and Gujarat together registered 80 per cent value of the onion export. Maharashtra (mainly Nashik) stood as largest onion exporter state in India and recorded USD 191.09 million in 2017 which represents 62% of the total's output. Gujarat and Tami Nadu recorded USD 56.41 million and USD 33.09 million from onion export. During Jan-Sept 2017, it is recorded that more than 1100 onion suppliers in India are supplying different varieties of onions to foreign countries. Jain Farm Fresh Foods Limited is one of the largest onion suppliers in India. It did onion export business worth of USD 20.46 million which represents approximately 7% of the total onion export value. The major onion

Pvt. Ltd.; Pride Fresh Produce; Sanghar Exports and Oceanic Foods Limited. India is exporting onion to foreign countries from around 40 ports. JNPT is the biggest Indian port which departs the maximum number of onion shipments. India recorded 60% value of onion export from JNPT only in 2017 i.e. USD 186.37 million. JNPT is followed by Mundra Sea, Pipavav, Bhusawal ICD and Chennai Sea.

Onion can be processed to paste and dried products like powder, flakes and grits. There are about 75 onion dehydration units in Gujarat (86% in Mahuva, Bhavnagar) and one large export oriented dehydration unit at Jalgaon. India produces about 65,000 MT of dehydrated onion, of which 85 per cent is exported. The local demand for processed onion is limited but is on rise. In export market, India competes with Turkey and China and they offer dehydrated onion at a very low rate ($1700 -2500 per MT) as against the Indian rate of $2600 per MT. Due to spiraling prices of onion, raw material prices go up, making onion processing unprofitable. During 2014-15, more than 75 per cent of onion dehydration units remained shut due to high raw material prices. Jain Irrigation Systems Ltd. has set up a modern dehydration unit at Jalgaon with full backward integration with farmers for producing processing quality white onion. The company has a total installed capacity of 14,000 MT/ annum, of which 9,500 MT/ annum is in Jalgaon. The company is connected to more than 6,000 farmers through contract farming for supply of onion in Maharashtra and Gujarat. Since the entire value chain of onion is addressed by the company, it has been able to become a market leader in dehydrated onion. As the domestic demand for dehydrated onion is very limited, growth of onion dehydration industry is moving at snail's pace.

Seasonal Behaviour in Prices of Onion

Monthly seasonal indices were calculated in order to ascertain the long run seasonal variations in arrivals and prices of onion. The results revealed the existence of seasonality in all the markets. Higher indices of market arrivals of onion were noticed immediately after harvest in the selected markets arrivals reached peak during April (262.72) in Mahuva which decrease to 6.05 in October and relatively shoot up in March. In Gondal market the peak indices was found in February (172.41) followed by March (169.77). Ahmadabad market showed lowest arrivals in September (75.87) while it peaked during March (116.30). Surat market witnessed the lowest arrivals in October (70.12) and highest during May (135.19). Arrivals reached a peak during December (151.90) in Rajkot market while they were the lowest in August (69.87). The higher market arrival indices were observed (more than 100) in the months of to December to April and lower arrival indices was found during July to October (less than 100).

The pattern of market prices showed slight differences among the selected markets. The price index in Mahuva market was the highest in the month of December (127.76) and relatively higher during the months of August to January. Gondal market witnessed peak price during October (152.81). The indices in other months varied from 57.18 to 121.95. A peak of 135.56 in index was observed during December in Ahmadabad market followed by October (134.96) and November (133.0). However, the price index of other months was between in 61.54 to 143.61. Surat market witnessed highest price index of 143.61 in October month. The market prices of onion in Rajkot found to be the highest in October (157.13). The lowest index was seen in May (60.19). Price index was between in 67.04 to 136.80 during other period. Price indices were more than 100 in the months of August to January. Lower indices were observed during

May. The majority of the produce was sold soon after the harvest probably for want of cash or lack of storage facilities. However, farmers who are financially sound can store for longer time to look forward for advantageous period and higher prices. To analyze the arrivals pattern of onion during different months of the year and their impact on price, seasonal indices were computed adopting 12 months moving averages. Onion crop were sown in the month of October to December. It comes to harvest during Feb to April. Thus, fluctuation in the monthly indices of onion arrivals was more than the monthly indices of prices in selected market during the study period. The price movement also demonstrates significant seasonal fluctuations in the selected markets. As a short term fluctuations, one will notice a general finding that the price is low when the arrivals were large and the price being high when the arrivals were low.

Status and Potential of Onion Infrastructure

Lack of adequate and appropriate storage facility is one the major constraint which enforces distress sale on farmers. The present storage capacities are either in adequate or unscientific. As a result of glut situation the price variability has been too high in the recent past. To improve the situation, GOI desired to create appropriate storage structures for onion, both at farm level as well as at market places. It drew a capital subsidy programme for the infrastructure development in which NABARD has been playing a pivotal role. The present storage capacity for onion is about 4.6 lakh tonnes. This is quite inadequate compared to our total production. Even most of the structures available are traditional and unscientific. If 40 per cent of the stocks are earmarked for scientific storage the potential for new storage structures is about 12.6 lakh tonnes. However, it has been projected by the Expert Committee on Cold Storage and Onion Storage that about 1.5 lakh tonnes on-farm capacity in production areas and 3.0 lakh tonnes capacity at APMCs and other market places are required in next 5 years. Thus, there remains a vast potential to be tapped.

Post Harvest Losses:

The total storage losses in onion in different storage structures in ranges between 3.46 per cent to 13.75 percent, while in cold storage, losses were only 5 per cent after 4 month of storage from may and October. While the storage losses in ambient storage conditions during the same period were 34 per cent. The weight loss, i.e. moisture loss and shrinkage were around 5 per cent and 21 per cent in cold storage and ambient store respectively. There was no diseases infection and sprouting in the cold stored onion, while around 11 per cent rotting and 2 per cent sprouting was notices in ambient storage. Higher infection of black mould was also found in ambient stored bulbs.

Post harvest loss in onion cultivation is believed to be very high, reportedly as much as 25 to 30 percent. Physical injury during and after harvest, greening of onion due to exposure to sunlight, sprouting and injuries during storage due to ammonia, controlled-atmosphere storage, and freezing also cause postharvest losses. Postharvest diseases on onion such as bacterial soft rot, black mould, bulb rot, neck rot, and smudge, cause significant losses in the quantity and quality of onions during storage.

Cold Storages Facility

The present storage capacity for onion is quite inadequate and inefficient in preventing post harvest losses. The structures available are traditional and unscientific. Onion cold storage system is used in

many countries of the world to store Indian onion. As Gujarat ranks second in Onion production and increasing area under onion require additional Onion cold storage facility to prevent post harvest losses, which is currently around 20-25 per cent of production and in value terms approximately INR 300 to 350 million every year. The cold chain industry in Gujarat is growing rapidly and now there are 625 cold storages with capacity of 23.2 lakh metric tonnes of which about two third of utilization was recorded by horticultural produce followed by animal husbandry and processed food. Mahuva APMC in Bhavanagar district of Gujarat has constructed cold storage from the APEDA's grant in which 1200 tonnes of dehydrated onions can be stored.

As per State Department of Horticulture of Government of Gujarat, about 500 on farm structures of 25 to 35 mt ech has been created with support of MIDH have been created. Storage facilities are established by processors as well as traders, farmers and cooperatives. It is estimated that 1.5 lakh mt storage is available for open market. There is the highest storage gap is recorded in Maharashtra followed by in Karnataka and Gujarat state.

Policy Recommendations:

- The price spikes of onion in many ways cannot be explained fully by the fundamentals of demand-supply. High inflation of food commodities cannot always be attributed to risks, exogenous shocks and mismatch of demand and supply, it can also be caused by market inefficiencies, weak supply chains and monopolies in the market. States Government must act against hoarders. Central government must reduce transportation bottleneck by making available railway wagons/racks for transport of onions. Besides, there is a need to create regional storages to cater need of the region as per requirement.
- The available regulated markets are inefficient to handle the buffer produce of onion. Also inadequate facilities at market and inappropriate steps at APMC level for efficient marketing of produce are the major difficulties for farmers to sell out their produce. Therefore, the appropriate policy decision and arrangement should be made for remunerative prices to onion growing farmers in order to safeguard their interest in production of onion. NAFED or any other notified procurement agency/ies should procure onion at least 5 per cent of produce from open market and should store it.
- Though, India holds premier positions in area and production, the productivity of onion is very low compared to other countries. There is need to increase productivity by making them available quality seed (suitable to soil and weather condition) to farmer at reasonable rate by the concern State Agricultural University/State Seed Corporation.
- There is a poor post-harvest management at farm level. The total storage losses in onion in different storage structures estimated to be about 15 percent. Effective crop planning and creation of post-harvest management infrastructure for onion will go a long way to solve the issues related to onion supply chain. Efforts will have to be made to improve the present post-harvest processing and storage systems and educating the farmers and traders in handling/processing the produce hygienically and efficiently.
- It was observed in the study that most of the onion crop is sold in APMC and farmers preferred this

channel because they were familiar with the system which was practiced over the years and they received timely payments. Marketing infrastructure in the Mahua market was very good, whereas at other places, infrastructure up-gradation is required as per requirement.

- Marketing information is needed by farmers in planning production and marketing, and equally needed by other market participants in arriving at optimal trading decisions. Therefore, agricultural marketing extension system needs to be strengthened.
- Onion dry product needs to be promoted in the market. The adequate number of processing/dehydration units needs to be created/installed to increase the onion demand in market. The awareness about use of dried/dehydrated onion among the consumer needs to be made though consumer awareness programme.
- The advance information on weather should be made available to the farmers by the nearby Meteorology department of Agricultural University. Also crop insurance facility should be provided to the farmers.
- Farmers suggested that in case price of onion falls to unduly levels, the government must step in and purchase the produce to avoid distress sales. Market Intervention Scheme should be implemented in time as and when prices drastically fall below the minimum level. On Pilot basis, Government support scheme with minimum assured purchase price to farmers for any future date purchase declared in advance can be attempted so that farmer can keep stock it.
- The difference in freight charges at different port should be removed. Proper storage facility at port on minimal rate should be provided. The loan arrangement at subsidies rate on the basis of quantum of export should be provided to the exporters. Also insurance facility should be provided to exporters in order to cover the loss due to cancellation of order and delay in delivery in respective countries.
- A visit was made to Mahua APMC and discussions were held with concerned market functionaries. It was quite clear from the discussions that some traders also stored onions in anticipation of higher prices. After making purchases from farmers, they sometimes stored the onions instead of immediate sales. These commission agents also indicated that they stored onions. However, when an attempt was made to find out the quantity stored by them, they were very reluctant to disclose the quantity stored and only complained of transport bottlenecks because of which they were forced to store.
- The discussion with market functionaries and stakeholders reveal that even the media plays a role in causing sudden rise or downfall in prices by publishing certain news for which they are paid. For example, there may be sudden news of very high auction prices in upcountry markets which immediately lead to spiraling of prices in urban centres. In reality only one transaction may have been at very high price, but the media hypes it up, and wholesalers and retailers jack up the prices. Conversely, the media may talk about falling demand for onions and low prices prevailing in several markets. This acts as a downward pressure on prices and onion growers may have to make distress sales.

- Meeting with traders revealed that it is mostly the retailers who charge higher prices than warranted to the consumers. There is no regulation on prices charged by retailers and at times their rates are exorbitant, especially when the produce is in short supply.
- A meeting with wholesalers and exporters revealed that there are several bottlenecks in onion trade, transportation is major one. Another major problem facing traders is the export ban which is sometimes imposed when onion prices show an upward trend. Exporters lose their credibility in export markets as irregular suppliers in international markets. Added to this is the practice of fixing Minimum Export Prices (MEP) for onions. At times the MEP is fixed at very high levels and exporters actually sell at prices below MEP though the L/C (letter of credit) is prepared at MEP. Therefore the profit realized by exporters shows an inflated figure leading to higher tax liability. Also fixation of MEP makes exporters reluctant to export which sometimes leads to excess supplies in domestic markets, leading to fall in prices. Farmers also loose when prices show downward trend. In view of these difficulties, export ban on onions coupled with fixation of MEP must be discouraged.
- A large number of exporters meet their export requirements from APMCs in Bhavnagar, Junagarh. However, their produce is often not cleared at port for 3 to 4 days. They therefore refrain from entering the local markets till their export commitments are dispatched. Since supply is choked up, exporters do not enter the market till their consignments are dispatched leading to price fall. Hence, if export orders are timely dispatched, it is possible that volume of exports may increase which will benefit farmers.
- Farmers normally store onions in onion meda/chawls (temporary storage structure) to benefit from lean season rise in prices. However, this method of storage leads to deterioration in quality, spoilage and shrinkage. Often storing of onions leads to losses of 30-40 percent. Traders therefore stated that storing of onions in meda/chawls is a very rudimentary method of storage and there is urgent need for technology such as well designed cold storage which will enable the crop to remain in the same condition without spoilage or shrinkage. This will help to even out supplies throughout the year and also lead to better production planning of the crop and more stability in prices.
- Onion cooperatives and FPOs must be encouraged to form and work in study area because presence of cooperatives would help the farmers to receive better prices and help to prevent collusion amongst traders not to bid beyond a certain price and also discipline prices.
- Besides, Farmer Producers Organization should be promoted to create required storages structures with support of subsidy. Government should assign the work, provide resolving fund or help for pledge loan and compensate interests.
- Sprouting of onion during storage in high humidity and low light conditions is a major constraint leading to huge losses to the farmers/ traders. Irradiation, a cold preservation method is highly effective in controlling sprouting of onion. Govt. of India had approved irradiation of onion, potato and spices in 1994 for internal marketing and consumption. Department of Atomic Energy (DAE) has set up two 500 kg/hr capacity demonstration plants at Lasalgaon and Navi Mumbai. Commercial units have also been set up in Karnataka and Rajasthan. More such facilities need to be created to arrest large spoilage of onion in the country.

There is a dearth of cold chain infrastructure for onion. It should be stored at low temperature (2oC) and 75-80 per cent RH condition. Onion requires special type of cold storage having facility for maintaining desired humidity during storage, drying of onion after off-loading at 20-25oC to avoid sweating (moisture accumulation on the surface) leading to faster decay. Onion can also be stored for a long period without any spoilage under ultra-low oxygen controlled atmosphere (CA) storages.

(v)	**Title of the Project**	:	**Assessment of the Status of Dairying and Potential to Improve Socio Economic Status of the Milk Producers and Convergence of all Central and State schemes at district level in India** All India Report covering states of Assam, Bihar, Chhattisgarh, Jharkhand, Odisha, Eastern UP (27 districts), West Bengal, Gujarat and Rajasthan
	Principal Investigator/s	:	S. S. Kalamkar and H. Sharma
	Entrusted by	:	Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, GOI
	Coordinating Centre	:	AERC, Vallabh Vidyanagar
	Date of Completion		February 2019

Summary :

Livestock sector occupies a pivotal position in the Indian economy and its contribution to the agricultural sector is the highest, the plan investments made so far do not appear proportionate with its contribution and future potential for growth and development. This suggests that public investment in the livestock sector should be enhanced to help the smallholder livestock producer, which deprives their larger share of income from the livestock sector. The livestock services like artificial insemination/natural service, vaccination, de-worming, etc are time-sensitive and government institutions are not able to deliver in time due to financial as well as bureaucratic constraints. Therefore, there is a need to re-orient the government policy for delivery of livestock services and involve major stakeholder.

- The major constraint in milk marketing is the involvement of the unorganized sector. Changing the dairy-cooperative laws and regulations can reduce the unorganized sector's role in milk marketing. Strengthening the infrastructure for milk collection, transportation, processing, packaging, pricing, and marketing through dairy co-operatives can also change the minds of the milk producers.
- Producers are not receiving a remunerative price for their produce because of the presence of middlemen in milk marketing. By reducing the number of middlemen between producer and consumer, the consumers' share to the producer can be increased. In other words, bridging the gap between the producer and the consumer can increase the producer's share.

- Shortage of quality fodder and feeds is another major constraint for India's livestock sector growth. The gap between the requirement and availability of feed and fodder is increasing due to decreasing area under fodder cultivations and reduced availability of crop residues as fodder. Also there is continuous shrieking of common property resources leading to over grazing ion the existing grass land. Therefore, there is a need to work out the strategies for sufficient good quality feed and fodder for efficient utilisation of genetic potential; of the various livestock species and for sustainable improvement in productivity.
- It was observed that the awareness about the dairy schemes among selected households was very poor. Therefore, there is a need to increase use advanced technology such as mobile phones in dairying for effective dissemination of livestock related information in general and dairying in particular.
- The selected households seldom aware about the livestock insurance. As insurance of livestock is the best safeguard for minimising the risk especially small holder producers, there is a need to increase the awareness and mandatory provision of the companies to undertaken livestock insurance of interested milk producers.
- Though livestock health situation in India is improving, Foot and Mouth Disease remains the issue of concern. There is a serious need for protection of animals against diseases and parasite which is one of the pre-requisites for sustainable livestock production and milk production.
- The four major infrastructural constraints faced by selected households were unavailability of emergency veterinary services, infrequent visit of veterinary staff, unavailability of cattle feed and fodder seed on credit, and low average milk yield of the milk animals. Non availability of veterinary services at the village level in time is the major constraints. The animal husbandry departments must be rejuvenated to act as drivers of growth for dairy sector.
- Given the fact that stress due to climate variability and availability of feed will be increasing constraints, more emphasis is required in promoting indigenous breeds. The data on animal genetic resources need to be generated and preserved properly for future use.
- The role of institutions in dairy farming especially district dairy cooperatives need to be strengthened and there should be less bureaucratic and political interference in managing cooperative run dairies in India.
- The environmental security and sustainability must be made integral measures taken in the Indian dairy sector in arena of increase in milk production, storage, value addition, improving the genetics of local breed and reducing the risk in operation.
- There is a need of more modern semen stations across India operated by both private and controlled by government agencies. Dairy cooperatives and private players must be allowed too to start their own centers to supply quality semen. Farmers must be educated about the available semen profile which will help them to make informed choice.

- The state and Central Governments have initiated various development programmes and policies for promoting livestock sector in the country. However, a number of concerns about effectiveness and impact of these programmes and policies have been raised.
- The convergence of all state and central government schemes at the implementation level, in a given territory, would bring about improvement in milk production sector in a manner that will be sustainable, while ensuring social and economic improvements of the dairy farmers. As suggested by Working Group for 12th five year plan, all the ongoing schemes should be classified under three mega schemes; a) Animal Production, b) Livestock Health and c) Dairy Development.

Policy Implications for development of dairy sector in Assam

On the basis of the field survey, careful observations and discussions held with stakeholders associated with dairy, the following suggestions are offered for improvement of the dairy sector in Assam.

- The State Government should prioritize the strategies for dairy development in the State Plan to make a real breakthrough in the dairy sector.
- Productivity-led growth is essential for accelerated and sustainable growth of this sector. Composition of dairy cattle should be modified with introduction of adequate number of cross -bred cows.
- There is need to evolve a comprehensive dairy development policy in the State through genetic improvement of indigenous milch animals. Process should be initiated for production of good quality semen from high genetic sources. To achieve that, the existing semen stations should be strengthened and upgraded. Larger focus should be on field progeny testing for quality bull production.
- Revival of non functional Milk Unions viz. EAMUL located at Jorhat and CAMUL at Silchar can give a new lease of life to the dairy sector.
- In order to overcome the fodder deficit, the Animal Husbandry and Veterinary Department of the State, being the key player, can take up elaborate programmes for enhanced fodder production throughout the State.
- Establishment of organized network of market can benefit the livestock farmers in getting due share for their products. Networking of village level dairy co-operatives can benefit all the stakeholders on several fronts. Strengthening of market linkages through expansion of cooperatives and facilitating new models of dairy farming would go a long in further improving milk yield in the State.
- Proper monitoring and implementation of dairy schemes/ programmes in the State with specific milestones set for which convergence of some of the existing schemes may bring in more efficiency in to the system. The ongoing schemes and new initiatives should be placed under three mega schemes with wider freedom and flexibility for the State to choose the appropriate components.
- There is need to assist and train the milk producers in the field of breeding, feeding, animal management technique and marketing of milk and milk products in a cost effective manner.
- Some infrastructural development like road communication and transport is needed for transportation of fodder, feed concentrates, veterinary medicines and also transportation of milk to the consuming centres round the year.

- Livestock insurance coverage should be expanded to all types of production systems and species with appropriate incentive framework.
- Well-equipped laboratories for testing of adulterants, antibiotics residues, and food borne pathogens should be established to enhance safety and quality of animal feeds.
- Improving the farmers' access to institutional credit through simplification of procedures, reduction in interest rates, etc.

The status of dairying in Assam is far from satisfactory in terms of production and coverage despite the fact that there lies enormous potential which remains unrealized till date. Development of dairy farming on sustainable basis through optimum utilization of natural resources, adequate health-care facilities for livestock, improvement of breeding programmes through AI, improvement of present milk marketing system and timely vaccination can go a long way in bringing marked changes in the lives of the milk producers of this part of the country.

Policy Implications for development of dairy sector in Bihar

There are following policy implications based on main findings of the study, being intimated to Ministry of Agriculture & Farmers Welfare, Government of India; NDDB and all concerned, given as below:

- The average yield of all types of milch animals was extremely low in Bihar. Hence, state department of animal husbandry and dairying should play decisive roles to raise the milk yield rates in Bihar.
- The larger milk producers should be persuaded to adopt dairying as a small scale dairy industry in study areas.
- The costs of veterinary services and medicines were reported to be high by almost all the milk producers. Hence, Government and other concerned departments should pay attention to reduce these costs.
- Extension services on dairying should be strengthened by providing it on doorstep of milk farmers as majority of milk producers were not at all aware about dairy schemes in Bihar.
- The average price of milk sold was found to be lower than the cost incurred in its production. So, price of milk should be enhanced for milk producers by dairy cooperatives in proportion to the increase in total inputs cost.
- Marketing facilities should be made available at village level for outlets of milk and milk products to removing irregular sales of milk under both DCS and NDCS systems.
- The procedure for sanctioning loans should be made easier and amount of loan for purchasing dairy animals should be increased in proportion to the values of dairy animals.
- The provisions of advance and bonus from cooperative societies and vendors should be properly and regularly designed to boost up milk producers for continuing in milk production enterprise.
- Infrastructure for dairy was very poor at village levels. So, it should be improved to boost-up milk producers.

- Awareness about insurance of animal was found very poor in the study area. So, there is need to increase awareness among farmers explain them about and mandatory provisions of the companies that provide livestock insurance to desired milk producers.
- Milk productivity of the buffaloes and local cows were found lower than crossbred cows across all the categories of dairy farmers. So, there is need to make efforts to increase the productivity of buffaloes and local cows by biologically upgrading the animals and encouraging farmers to adopt scientific dairy practices.

Policy Implications for development of dairy sector in Chhattisgarh

- Chhattisgarh State occupied pivotal position in terms of goat population contributing more than 50 per cent population of the country and found still unorganized in the State. Hence, efforts are required to be made to organize this as an industry through cooperative or producers companies as goat milk has tremendous advantageous and better than the cow milk.
- The convergence of all the state and central government schemes under the umbrella of Chhattisgarh Cooperative Dairy Federation Limited. This will not only bring the improvement in milk production in a sustainable manner but also ensure social and economic improvement of the milk producers with equity. As suggested by the working group for 12th five year plan, all the ongoing scheme should be classified under the mega scheme a) Animal Production, b) Live stock Health and c) Dairy Development. Apart from this it is also suggested that Fodder Development should also be included as a separate sub head for the development of dairy sector in real sense.
- Cropping pattern of the milk producers was not found to be tuned with fodder production. None of the selected respondent cultivates fodder in a scientific manner as they have lack of knowledge about the package and practices of fodder cultivation in the area under study. Hence, efforts should be made to popularize the recent fodder technology to ultimate milk producer because without fodder development a dairy industry will not get its proper shape in the State.
- At village level, infrastructure of dairy cooperative was not found up to the mark. Therefore, there is an urgent need to support all the cooperative societies running in the village level for balance development of dairy sector.
- Several constraints which were found to prevail in infrastructure, economic, marketing, technology, socio-psychological, quality services etc. in the study area. Hence, utmost efforts are required to be made to remove these constraints not only for the development of dairy sector in the State but also to ensure and enhance the income of the milk producers and to stabilize it at higher level.
- It was also observed that awareness about the dairy and other development programmes including live stock insurance etc. among HHs was very poor. Therefore, there is a need to increase publicity of these schemes on mobiles etc. in local language for effective dissemination of livestock related information in general and dairying in particulars.
- There is a need of more modern semen stations across all the districts of the State operated by

both private and Government agencies. Dairy cooperatives and private players must be allowed to start their own centre to supply quality semen. Milk producers must be trained about the profile of available semen to make them more educated about the artificial insemination.

Policy Implications for development of dairy sector in Jharkhand

- Emphasis should be given for making dairying more viable, particularly for marginal, small and landless farmers so that they could feel encouraged for this venture.
- The average milk yield of all milch animals was extremely low in Jharkhand. Hence, state department of Animal Husbandry and Dairying should play decisive roles to raise the milk yield rates of the cattle and buffaloes in the state.
- Large sized milk producers should be persuaded to adopt dairying as a small scale enterprise in the study areas.
- The costs of veterinary services and medicines were reported to be high by almost all the milk producers. So, Government should evolve mechanizations to reduce the costs of these components or make them available at reduced costs.
- Extension services on dairying should be provided on doorsteps, as majority of the milk producers in state were not getting the same at their places.
- The average return on production of milk was found lower than the cost incurred thereon so, prices of milk paid to the DCS members should be reasonably fixed by the milk unions/federation.
- There is need to strengthen the DCS by providing them a good infrastructure, so that it could be made functional for the purpose of sale and purchase of milk and milk products.
- The procedure for sanctioning loan should be made easier preferably by organising 'Dairy Loan Mela' at village panchayat level.
- The provisions of advances and bonus made under Dairy Co-operative Societies should be properly and regularly monitored to boost up the milk producers for remaining in the venture.
- Infrastructure available at dairy farmers' level was found very poor. So, it should be improved for better up-keeping of the dairy animals.
- Awareness in regard to insurance of animals was found very poor in the study area. So, there is need to create awareness for its wider coverage.

Policy Implications for development of dairy sector in Odisha

- The major problem for rearing livestock in the State is scarce availability of green and dry fodder and high cost of cattle feed. Therefore, attempt should be made to increase area under fodder crops along with building regional fodder stocks .
- Poor live stock health care services is another bottleneck in the development of dairy in the State. There're, adequate veterinary services facilities need to created on priority basis.
- Extension services needs to strengthen for creating awareness about dairy development schemes such as live stock insurance scheme.

- No refrigeration facility at village level hinders the conservation and processing of surplus milk. There is a need to create such facilities in milk village.
- Loan sanction procedure should be made easy and marketing facilities be provided at village level

Policy Implications for development of dairy sector in Eastern UP

- Efforts must be made by both Central and State Governments to convert Dairying from subsidiary to Main occupation of marginal and small farmers.
- The larger milk producers must be encouraged to adopt dairying as a Small Scale Dairy Industry in their Areas.
- The average milk yield rate was extremely low among all the milch animals in east U.P. Hence, state department of animal Husbandry and dairying must play some crucial roles to raise the milk yield rates of all milch animals in eastern U.P.
- The cost of veterinary services and medicines was told to be very high by almost all the milk producers. Therefore, government as well others concerned must pay attention to reduce these costs.
- Extension services on dairying must be strengthened on war footing as majority of milk producers were not at all aware about the schemes of dairying in east U.P.
- The quantity of milk drawn yesterday was much lesser by milk producers rearing local cows and buffaloes due to which they had sold minimum quantity of milk to cooperative societies. Therefore, the milk producers of DCS category must be encouraged by all means to increase the quantity of milk to be drawn and sold to cooperative societies.
- The average prices for milk sold in cases of all the milch animals were found to be lower than the cost incurred. Therefore, the prices milk of local cows crossbred cows and buffaloes must be enhanced in proportion of the cost increased.
- To remove the irregular sales of milk under both DCS and NDCS categories, the marketing facilities must be provided at village level for the outlets of milk and milk producers.
- For difficulties in getting loans, the procedures for sanctioning the loans must be made easy and the amount of loans for the purchase of dairy animals must be increased in proportion of the prices of dairy animals.
- To meet the demands of milk producers for advances and or bonus from the cooperative societies and vendors, the societies and vendors must advance properly and regularly to keep the milk producers continuing milk production.
- The delivery systems for both inputs and output must be improved in accordance of the needs of the milk producers with some incentives or bonus by the societies.
- Concentrates and supplements must be made available in remote villages timely and at affordable and cheaper rates.
- Proper A.Is. facilities at village level and affordable EVS (Emergency Veterinary Services) at door step must be provided to all the milk producers for boosting milk production in east U.P.

- On an overall almost all the milk producers had suggested for the development of dairy infrastructure for attracting more and more cultivators towards the adoption of dairy schemes in eastern U.P.

Policy Implications for development of dairy sector in West Bengal

- As against the estimated animals' requirements, feed resources available in West Bengal are lower.
- Poor state of awareness about various dairy developments schemes were observed among the NDCS households. For the DCS farmers knowledge had been imparted by the milk cooperatives and milk unions functioning in the area. For the NDCS farmers, however, source of their awareness had been fellow farmers and neighbours. A dismal scenario was observed as regards to insurance coverage for the cattle in all the villages regardless of DCS or NDCS.
- Innumerable small dairy farms are to be fastened in some sort of milk chain by the cooperative societies. So, there is urgent need to enhance the number of PDCS in each district to reduce the exploitation by private vendors.
- The infrastructure for milk procurement and transportation should be improved at the DCS level.
- Enhanced operation of DCS offering remunerative price to farmers can motivate them in joining the society and at the same time this partnership would be able to make a dent in farmers' economic hardship.
- Service delivery of feed and fodder to be enhanced. Provision for vaccinations and emergency veterinary services including AI needed to be boosted. In this aspect DCSs working at the village level could play an important role.
- Re-orientation and proper implementation of government policies for dairy development at the grassroots must be taken care of. And in view of such re-orientation more autonomy and funds are to be provided to DCS.
- For increasing awareness regarding scientific dairy farming new training programmes need to be arranged especially for the women. These might be able serve twin purposes of imparting improved consciousness among women regarding dairy farming and might as well be supportive for women empowerment in the village society. Department of Animal Husbandry of the State Government along with the milk unions could take up such programmes.
- It remained essential that the farmers be motivated to insure their cattle for it minimized the risk. Procedural changes, if necessary, can be thought of so that the farmers can avail these benefits. Outreach of the facility needs to be provided at the village level. For DCS membership insuring cattle might be made a mandatory criterion.
- The DCSs were of opinion that there had been fluctuations in milk yield across seasons. Proper and scientific dairy practices backed by better awareness supported by government veterinary and DCS staff might be able to bring about a change in such paucity.
- The milk unions be provided with skilled manpower for proper implementation and monitoring of the operations of DCS. More autonomy in MUs' functioning might be necessary and political intervention must be restricted.
- Establishing milk processing plants in the districts are of urgent importance for production of value added milk products that would ensure higher return.

- Offering remunerative price for milk is a decision that depends on the policy of the government. In face of rising cost a hike in procurement price may be thought of which in turn would motivate and improve economic conditions of the farmers.
- As such there are ample central and state sector schemes for development of animal husbandry in general and dairy expansion in particular. Convergences of many of such schemes were found in the survey area of this present study. But the scope and coverage seemed somewhat restrictive. Policy re-orientation might be sought for rejuvenating the dairy sector in the villages of West Bengal.

Policy Implications for development of dairy sector in Gujarat

- It was observed that the awareness about the dairy schemes among selected households was very poor. Therefore, there is a need to increase use advanced technology such as mobile phones in dairying for effective dissemination of livestock related information in general and dairying in particular.
- The selected households seldom aware about the livestock insurance. As insurance of livestock is the best safeguard for minimising the risk especially small holder producers, there is a need to increase the awareness and mandatory provision of the companies to undertaken livestock insurance of interested milk producers.
- The four major infrastructural constraints faced by selected households were unavailability of emergency veterinary services, infrequent visit of veterinary staff, unavailability of cattle feed and fodder seed on credit, and low average milk yield of the milk animals. Non availability of veterinary services at the village level in time is the major constraints. The animal husbandry departments must be rejuvenated to act as drivers of growth for dairy sector.
- The co-operative structure is very weak in Saurashtra and Kachchh regions of the state. Therefore, presence of Milk Producer Company's sales & distribution network is spread across Saurashtra & Kutch region support the dairy development in this regions. Therefore, there is a need to support the MPCs in all the areas for balanced development of dairy sector.
- The major milk supply related constraints faced by selected primary dairy cooperative societies and private dairy units were high numbers of small producers, irregular and inadequate supply of milk, unavailability of fodder throughout the years and low average milk yield of milk animals in area. Besides, these DPCS faced problems of not having the provision of advance payment for milk to milk producers, which was sometime available with PDUs.
- Besides the milk producers, milk unions have also faced the constraints such as problem of labour as most of the persons do not want to work in interior areas of the tribal district. Besides, during lean season, this dairy faces the problems of working capital.

Policy Implications for development of dairy sector in Rajasthan

- The major constraint in milk marketing is the involvement of the unorganized sector. Changing the dairy-cooperative laws and regulations can reduce the unorganized sector's role in milk marketing. Strengthening the infrastructure for milk collection, transportation, processing, packaging, pricing,

and marketing through dairy co-operatives can also change the minds of the milk producers.

- The livestock services like artificial insemination/natural service, vaccination, de-worming, etc are time-sensitive and government institutions are not able to deliver in time due to financial as well as bureaucratic constraints. Therefore, there is a need to re-orient the government policy for delivery of livestock services and involve major stakeholder.
- The public provisioning of veterinary inputs delivery system should be strengthened by invigorating the extension machineries, so that the needy farmers could benefit from it. There is a need to make greater efforts to educate and assist the milk producers in respect to latest breeding, feeding and animal management technique.
- It was observed that the awareness about the dairy schemes among selected households was very poor. Therefore, there is a need to increase use advanced technology such as mobile phones in dairying for effective dissemination of livestock related information in general and dairying in particular.
- The selected households seldom aware about the livestock insurance. As insurance of livestock is the best safeguard for minimising the risk especially small holder producers, there is a need to increase the awareness and mandatory provision of the companies to undertaken livestock insurance of interested milk producers.
- The co-operative structure is very weak in Bharatpur regions of the state. Therefore, there is a need to support the MPCs as well as union in this areas for balanced development of dairy sector.
- The major constraints faced by the selected primary dairy cooperative societies and private dairy units were high numbers of small producers, irregular and inadequate supply of milk, unavailability of fodder throughout the years and low average milk yield of milk animals in area. Regarding infrastructure related constraints were unavailability of chilling facilities at village level for milk preservation and lack of training facilities. Few of them also faced Lack of necessary space required for dairy operation.
- The milk Unions are primarily engaged in manufacturing value added milk, butter, ice cream, peda, dehi, etc., in addition to milk sale. These milk produce are aimed at urban consumers whereas the attention of the dairy management should be focused to the welfare of the farmers' members. The union dairy should revised milk procurement price so as to factors like cost variation and seasonality in milk production could be taken into account.
- There are number of schemes that provide incentives to the milk producers, however most of the schemes were stand alone with meagre financial outlay. In fact it would be beneficial to harness the regional strengths using a regionally differentiated approach for exploiting the potential. On the line of suggestion made by the Working Group for 12th FYP, all the ongoing schemes should be converged and put under three mega schemes; a) Animal Production, b) Livestock Health and c) Dairy Development.

Field Survey Work of eNAM and GST Project

(vi)	**Title of The Project**	:	**Solarisation of Agricultural Water Pumps in Western India (Consolidated Report) Principal**
	Investigator/s	:	S. S. Kalamkar, Sonal Bhatt and H. Sharma
	Entrusted by	:	Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, GOI
	Coordinating Centre	:	AERU, SPU, VVN
	Date of Completion	:	February 2019
	Summary	:	

A complex set of factors including global warming, competitive land use and lack of basic infrastructure is creating new challenges for India's vast agrarian population. The ever increasing mismatch between the demand and supply of energy in general and electricity in particular, is posing challenges to farmers located in remote areas and makes them vulnerable to risks, especially the small and marginal farmers. Indian farmers and the national and sub-national governments both face several challenges with regard to irrigation. Electricity in India is provided at highly subsidized low tariffs, mostly at flat rates, and this has led to widespread adoption of inefficient pumps. Farmers have little incentive to save either the electricity, which is either free or highly subsidized, or the water being pumped, resulting in the wastage of both. Although the government heavily subsidizes agricultural grid connections, grid electricity in rural India is usually intermittent, fraught with voltage fluctuations, and the waiting time for an initial connection can be quite long. Besides, the power shortages, coal shortages and increasing trade deficit, put food security of nation at the risk. The generation of solar energy and irrigation for agriculture could be intricately related to each other. This is because India is a country that is fret with an irregular and ill-spread monsoon. Hence, irrigation is a pre-requisite for sustaining and increasing agricultural output. This is particularly true for the western states of India and especially Gujarat and Rajasthan, where rainfall is often scanty, uneven and irregular; whereas perennial rivers are few. The role of canal irrigation becomes very crucial in this scenario. However, in the absence of sufficient and reliable canal water supply, the only other option that remains with the farmers is that they irrigate their fields with the help of ground water withdrawn through either electricity or diesel-driven pumps. Provision of power for irrigation and other farm operations therefore, is a high priority area for the States. However, providing farmers reliable energy for pumping is as much of a challenge as is making the availability of water, sufficient. Currently, India uses 12 million grid-based (electric) and 9 million diesel irrigation pump sets. However, the high operational cost of diesel pump sets forces farmers to practice deficit irrigation of crops, considerably reducing their yield as well as income.

Currently, India has 26 million groundwater pump sets, which run mainly on electricity that is primarily generated in coal-fired power plants, or run by diesel generators. Irrigation pumps used in agriculture account for about 25 per cent of India's total electricity use, consuming 85 million tons of coal annually, and 12 per cent of India's total diesel consumption, more than 4 billion liters of diesel. Scarcity of electricity coupled with the increasing unreliability of monsoon forces the reliance on costly

diesel-based pumping systems for irrigation. Hence, the farmers look for alternative fuels such as diesel for running irrigation pump sets. However, the costs of using diesel for powering irrigation pump sets are often beyond the means of small and marginal farmers. Consequently, the lack of water often leads to damaging of the crop, thereby, reducing yields and income. In this scenario, environment-friendly, low-maintenance, solar photovoltaic (SPV) pumping systems provide new possibilities for pumping irrigation water. Solar powered pumps are emerging as an alternative solution to those powered by grid electricity and diesel. Diesel and electric pumps have low capital costs, but their operation depends on the availability of diesel fuel or a reliable supply of electricity. Saving of 9.4 billion liters of diesel over the life cycle of solar pumps is possible if 1 million diesel pumps are replaced with Solar Pumps. Using solar power for irrigation pumps can cut a carbon footprint of Indian agriculture and bolster the country's role in the war against climate change.

Solar power could be an answer to India's energy woes in irrigated agriculture. Solar power generation on the farm itself through installation of solar PV (photovoltaic) panels; and using it to extract groundwater could just be the solution for the above concerns. Solar pumps come with a user-friendly technology and are economically viable. They are easy to use, require little or no maintenance, and run on near-zero marginal cost. Solar power is more reliable, devoid of voltage fluctuations and available during the convenient day-time. India is blessed with more than 300 sunny days in the year, which is ideal for solar energy generation, aptly supported by promotional policies of the Government of India.

The Ministry of New & Renewable Energy (MNRE) has been promoting the Solar-Off Grid Programme since two decades. The programme size has increased many folds with the advent of Solar Mission, giving much impetus to various components of the programme in which solar pumping is one of the major component. Solar Pumping Programme was first started by MNRE in the year 1992. From 1992 to 2015, 34941 of solar pumps have been installed in the country. This number is minuscule, if we compare with the total number of pumps in agricultural sector. High costs of solar modules during these years resulted in low penetration of solar pumps. However, in recent times the module costs have started decreasing and are presently hovering around one fourth of the price in those days. As a result, the programme has become more viable and scalable. Therefore, present study was undertaken with aim to study the important issues concerning large scale adoption of solar irrigation pumps, its economics/feasibility and problems in adoption of same.

Literature suggests that application of solar energy in irrigation could have myriad benefits. The primary benefit is that it is 'free'. However, the generating apparatus comes with high initial fixed costs like that of capital equipment, costs of installation, depreciation, interest, protection from theft, vandalism etc. Nevertheless, the marginal costs are indeed 'near zero' (operation, maintenance, repairs). The costs of expansion in irrigated area like that of hose pipes for transporting water across fields is also much lesser compared to operating a diesel pump or getting another electricity connection. Hence, solar pumps could not only provide cheaper irrigation but also expand irrigated area and thus increase the returns on agriculture. It could also extend the farming beyond the kharif season (monsoon); by harnessing ground water and thus aid the diversification of crops. Solarization could also unshackle the farmers from the shortage of electricity supply and its inconvenient timings. They would be able to irrigate not only their own land, but also become irrigation service providers to

their neighbouring farmers and also supplement their own incomes in the process. Solarized pumps could promote conjunctive irrigation by promoting ground water extraction in flood-prone regions like north Bihar, coastal Orissa, north Bengal, Assam and eastern Uttar Pradesh. The government has acted positively in this matter and during the last five years, considerable progress ha s been made in installation of Solar Pumps.

In light of the above, this study attempts to study the status of solarisation of agricultural pumps in Western India covering the states of Gujarat and Rajasthan. The data were collected from three distinct groups of farmers, viz. farmers who had adopted SIPs with the help of subsidy by the government, farmers who had adopted SIPs without any support in the form of subsidy by the government, and the farmers who had not adopted SIPs. The first group was of 200 sample farmers who had installed Solar Irrigation Pumps (SIP) with the support of subsidy from the government (beneficiary farmer households). The second group consisted of 9 sample farmers who had installed SIPs on their own without any support in the form of subsidy (non-beneficiary farmers). The third group included 40 sample farmers who had not yet adopted solarized irrigation (non-adopters). They were still using other conventional fuels for powering their irrigation pumps when they were visited by the researchers. Thus, the total sample consisted of 249 selected farmers.

Case study on first ever cooperative formed by farmers for decentralized solar power generation and usage in irrigation i.e. Dhundi Saur Urja Utpadak Sahakari Mandali or DSUUSM registered in May 2016 by six farmers of Dhundi village of Kheda district of Gujarat State was studied and discussed in this report.

Policies Supporting Solar-Powered Irrigation in India

Among the various renewable energy resources, solar energy potential is the highest in the country. In most parts of India, clear sunny weather is experienced 250 to 300 days a year. The annual radiation varies from 1600 to 2200 kWh/m2, which is comparable with radiation received in the tropical and sub-tropical regions. The equivalent energy potential is about 6,000 million GWh of energy per year. The National Action Plan on Climate Change also points out: "India is a tropical country, where sunshine is available for longer hours per day and in great intensity. Solar energy, therefore, has great potential as future energy source. It also has the advantage of permitting the decentralized distribution of energy, thereby empowering people at the grassroots level". With the objective to establish India as a global leader in solar energy, by creating the policy conditions for its diffusion across the country as quickly as possible Government of India launched National Solar Mission. The National Tariff Policy was amended in January 2011 to prescribe solar-specific RPO be increased from a minimum of 0.25 per cent in 2012 to 3 per cent by 2022. CERC and SERCs have issued various regulations including solar RPOs, REC framework, tariff, grid connectivity, forecasting etc. for promoting solar energy. Many States have come up with up their own Solar Policy and among all the states, Rajasthan was at forefront to adopt the supportive policy for solar power adoption.

In view of the ongoing efforts of Central and State Governments and various agencies for promoting solar energy, Ministry of New and Renewable Energy has undertaken an exercise to track and analyze the issues in fulfillment of Solar Power Purchase Obligation and implementation of Solar REC framework in India. This would help various stakeholders to understand the challenges and

opportunities in the development of solar power. It would also include monitoring of Solar RPO compliance; analyzing key issues related to the regulatory framework for solar in various states of India.

The Government of India has set ambitious targets for expanding the country's renewable energy generating capacity, and in 2010 launched the Jawaharlal Nehru National (JNN) Solar Mission. In 2014, as part of this mission, the Ministry of New and Renewable Energy (MNRE) outlined the Solar Pumping Programme for Irrigation and Drinking Water, which sought to promote the adoption of solar pumps over five years. Implementation of the programme involved two financing schemes.

- First, farmers received a central financial assistance (CFA) of 30 per cent of the benchmark cost of the pump, and possible additional subsidies at the state level.
- The second, credit-linked scheme, involved 40 per cent capital subsidy from MNRE, 20 per cent beneficiary contribution, and the remaining amount extended as a loan implemented through the National Bank for Agriculture and Rural Development (NABARD) (MNRE, 2014a).

The initial capital subsidy scheme aimed at supporting 100,000 pumps in 2014, and one million by 2020, and the credit-linked scheme through NABARD targeted an additional 10,000 irrigation pumps by 2016. The number of solar pumps in India is increasing, with about 130,000 pumps installed since 2014 when the scheme started, though progress is well below the goals of the subsidy programme (MNRE, 2017a). In March 2017, MNRE closed the NABARD credit-linked subsidy scheme and set modified capital subsidy rates (MNRE, 2017b). It remains to be seen whether the capital subsidy programme will prove effective in encouraging farmers to buy and use solar pumps in the long run. Demand for sustainable irrigation far exceeds current available pumping capacity, and while the Indian government has announced various initiatives to boost deployment of solar irrigation pumps, uptake has been slow. The government, to its credit, is making efforts to encourage farmers to install stand-alone solar-powered off-grid pumps to not only meet their irrigation needs but also to provide an extra source of income from selling surplus power to distribution companies (DISCOMs).

Kisan Urja Suraksha Evam Utthaan Mahaabhiyan Scheme (KUSUM)

The start of year 2018 saw the announcement of the new solar water pump scheme Kisan Urja Suraksha Utthaan Mahaabhiyan (KUSUM) aimed at the betterment of farmers. Under this arrangement, the central government desires to assist as many farmers as possible to install new and improved solar pumps on their farms. The farmers need not pay a hefty fee for this benefit as it comes with government subsidy. The main aim of this scheme is to provide the farmers with advanced technology to generate power. The solar pumps will not only assist to irrigate the farmers, but will also allow each farmer to generate safe energy. Due to the presence of the energy power grid, the agricultural labors can sell the extra power directly to the government. It attempts to provide them with extra income as well. So, this scheme brings double benefits. The features of the scheme are as follows:

1. For the betterment of the farmers – The successful operation of this program will be able to help the farmers not only in meeting their power related requirements, but will also be able to earn some extra cash by selling excess energy.

2. Construction of plants on infertile lands only – The government has also announced that it will take initiative to construct plants, which will generate solar power. As per the draft, these plants will only be erected on infertile areas, capable of generating a total of 28, 250 MW power.
3. Distribution of solar powered pumps – One of the primary aims of this program is to provide interested farmers with solar pumps. The government states that 17.5 lakh solar powered pumps will be provided to agricultural labors.
4. Power production on small scale – Apart from the solar power plants, government will work towards the installation of new solar pumps in farms, which have diesel pumps. The capacity of these pumps will be 720 MW.
5. Power generation from tube-wells – The government will also work toward the installation of unique tube-wells. Each of these pumps will be able to generate power of 8250 MW
6. Sale of excess power – Apart from distribution, the scheme also provides all farmers with the chance to earn more money by installing the solar pumps. The excess amount of energy that the farmers generate can be sold to the grid.
7. Duration of the scheme – Current estimates state that for the successful completion of this elaborate scheme, the central government will have to work for at least 10 years.
8. Subsidy structure of the scheme – As per the draft, each farmer will get huge subsidy on new and improved solar powered pumps. The agricultural labors will have to tolerate only 10 per cent of the total expenditure to acquire an install a solar pump. The central government will provide 60 per cent cost while the remaining 30 per cent will be taken care of by bank as credit.
9. Good for the overall environment – The increased use of solar power and electricity generated from the solar plants, will lower the level of pupation in the area. Dependence on fossil fuel will go down considerably as well.

The components of the scheme are as follows:

1. Solar pump distribution – During the first phase of the program, the power department, in association with other wings of the government will work towards the successful distribution of solar powered pumps.
2. Construction of solar power factory – The next component will include the construction of solar power plants, which will have the capacity to produce a significant amount of power.
3. Setting up tube-wells – The third component of this scheme deals with the setting up of unique tube-wells, under the watchful eyes of the central government, which will also a certain amount of power.
4. Modernization of present pumps – Only production of powers is not the aim of the scheme. The final component of this program deals with the modernization of pumps, which are in use, as of now. Old pumps will be replaced by developed solar pumps.

The scheme was elaborated with additional funding for successful implementation. As per the announcement of this program, the Finance Minister and the Power department announced that it will require around Rs. 48, 000 crores. The allocation of funds will be done in four separate segments.

- During the initial stage that involves the solar pump distribution, the central government will dispatch an amount of Rs. 22,000 crores.
- During the second phase of this program, Rs. 4, 875 crores will be provided by the respective department.
- The third phase, wherein all ordinary pumps will be converted into solar powered pumps, the central government will have to tolerate an expense of Rs. 15, 750 crores.
- Lastly, for the successful completion of the fourth phase, the central government will have to spend Rs. 5000 crores.
- The scheme is not only aimed at providing better benefits and added income for the agricultural labors, but will also lower the level of pollution. As the solar pumps take over electricity driven or diesel pumps, it will provide better utilization of resources.

In summation, it could be said that solarisation of irrigation pumps has been a successful experiment in both Gujarat as well as Rajasthan. There is evidence to suggest that both the Gross Cropped Area and the Gross Irrigated Area have increased post solarization. The cropping pattern has also changed in favour of high value crops. The SIPs are found to be user-friendly, particularly for women. However, the cost of SIPs is still found to be high for individual farmers. Community-based SIPs on the lines of cooperative in Dhundi in Gujarat; could be helpful in making this technology accessible to marginal and low income farmers. Also, connecting the SIPs to the electricity grid; and equipping them with solar power storage cells; could enhance their utility as well as provide the farmers with a supplementary source of income through sale of solar power in much the same way as in the cooperative in Dhundi. For large-scale penetration of SIPs, there is a need for increasing awareness amongst farmers about the benefits of solarised irrigation. All in all, solarization of irrigation pumps in Gujarat and Rajasthan is 'a work in progress'; albeit with promising prospects.

vii)	**Title of The Project**	:	**Pilot Study for developing state level estimates of crop area and production on the basis of sample sizes recommended by Prof. Vaidyanathan Committee Report -Gujarat State**
	Principal Investigator/s	:	S.S. Kalamkar, S. R. Bhaiya, M. Swain & H. Sharma
	Entrusted/ Coordinating Centre by	:	ICAR-Indian Agricultural Statistics Research Institute (IASRI), Pusa, New Delhi (funded by Ministry of Agriculture & Farmers Welfare, Govt. of India, New Delhi)
	Date of Completion	:	April 23, 2018
	Observations	:	

- In some selected villages in Saurashtra region of Gujarat, Cotton is the only crop sown during kharif season by selected 100 survey numbers.
- In four selected villages in Kuchch region of Gujarat, no agriculture crop was sown during kharif 2016, thus may not get any crop in rabi season also.

- In some villages, only one food grain/oilseed crop was sown by selected 100 survey numbers.
- For about 35 villages, no land data was available on GOG website (https://anyror.gujarat.gov.in/). Thus, we have used land record available at selected villages, then we selected 100 survey numbers and then done census of same and subsequent crop and plot selection.
- Selected Village with Sole Crop, Fodder, no crop grown during crop season
- Few selected Survey villages were with less than 100 survey numbers: 26 Ahmedabad region- 04 villages; Vadodara region- 22 villages
- Total survey numbers 86700 (90000) as few villages with less than 100 survey numbers.
- Planning and execution of CCE required secondary data statistics from State Agriculture Department which is not available in time and the year which required for planning.
- Though Most of the farmers were cooperative, few farmers were not allowing our field staff to enter in to the field as they argue that crop gets disturbed/damaged. After continuous follow-up, somehow field staff managed to conduct the CCEs.
- In few cases, harvest of whole crop on selected plot was done by farmer/s, thus we recorded particular plot output and calculated yield for plot size under study.

Meeting with IASRI Research Staff at Centre on April 23, 2018

National Unity Day, OCTOBER 31, 2019

Shri Krishna Hospital Officers visit to Centre

PROJECTS IN PROGRESS

(i) Title of The Project (Special project) : Impact Assessment and Evaluation of Fodder Seed Production and Sale activities under National Dairy Plan I

Principal Investigator/s : S.S. Kalamkar, K. Ahir, S. R. Bhaiya, M. Swain & H. Sharma

Sponsored by : National Dairy Development Board, Anand

Date of Commencement : December 2017

Objective of the Study :

- To estimate the per cent increase in area under green fodder with certified/truthfully labeled seeds.
- To evaluate the increase in green fodder yield by using certified/truthfully labeled seeds of improved genetics in comparison to local /non descript varieties seed.-
- To estimate the reduction in cost of milk production as a results of higher green fodder yield obtained through fodder seed production and sale activities.
- To estimate the cost of fodder seed and green fodder production at seed growers and dairy farmers level and compare it with other competing crops.

(ii) Title of The Project (Special project) : Impact assessment of Goods and Service Tax (GST) on the use of selected inputs and adoption of Micro-Irrigation (MI) tools inselected districts of Gujarat

Principal Investigator/s : S.S. Kalamkar and Kinjal Ahir

Sponsored by : Gujarat Economic Association Silver Jubilee Trust, Vadodara

Coordinating Centre : AERU, SPU, VVN

Date of Commencement : February 2018

Objective of the Study :

- To inquire regarding the clarity of GST rates to be charged for the agricultural inputs and irrigation tools
- To observe the changes in the rates of agricultural inputs and irrigation tools in selected districts of Gujarat
- To analyze the impact on the use of agricultural inputs and adoption of irrigation tools before and after the implementation of GST.

(iii)	Title of the Project *(Special project)*	:	Post-Project Evaluation Study Of Sansad Adarsh Gram Yojana (Study Area: Zone Ii- Two States, Gujarat And Rajasthan)
	Project Team head	:	Prof. Shirish Kulkarni, Hon VC sir
	Project Team Members	:	Dr. Yogesh C. Joshi; Dr. S. S. Kalamkar; Dr. Darshana Dave; Dr. Kamini Shah; Dr. Sonal Bhatt; Dr. Shivani D. Mishra; Dr. D.O. Raykundaliy; Dr. Suresh P. Machhar; Dr. Arpit Patadia
	Sponsored By	:	Department of Rur al Development, Ministry of Rural Development (MORD), Government of India, Krishi Bhavan, New Delhi
	Date of Commencement	:	April 2018

Objective:

- Post-Project Evaluation Study Of Sansad Adarsh Gram Yojana (Study Area: Zone II- Two States, Gujarat And Rajasthan)

(iv)	*Title of the Project*	:	Electronic National Agricultural Markets (eNAM) in Gujarat: A Review of Performance and Prospects
	Principal Investigator/s	:	S.S. Kalamkar, Kinjal Ahir and S. R. Bhaiya
	Entrusted/assigned by	:	Directorate of Economics and Statistics, Ministry of Agriculture & Farmers Welfare, GOI
	Coordinating Centre	:	AERU, IEG, Delhi
	Date of Commencement	:	September 2017
	Objective of the Study	:	

- Study the extent of operation, adoption and functioning of e-NAM in some of the major markets
- Analyze the improvements due to e-NAMs in price discovery, quantity traded and marketing cost, among other things
- Assess the functioning of the assaying laboratories at the e-NAMs and acceptability of quality parameters to various stakeholders
- Analyze the infrastructure facilities at the e-NAMs for cleaning, sorting, grading and weighing of commodities
- Assess the overall impact on the ease of doing business

(V)	**Title of The Project (Special project)**	:	**Extent of Erosion Into Farm Profitability Due To Market Imperfections In Gujarat**
	Principal Investigator/s	:	S.S. Kalamkar and H. Sharma
	Sponsored by	:	Ministry of Agriculture and Farmers Welfare', GOI
	Coordinating Centre	:	AERU, IEG, Delhi
	Date of Commencement	:	March 2019

Objectives:

- To analyze the product markets (output) including price(s) received (market as well as MSP if any), marketing channels, market structure and bottlenecks
- To analyze the input markets including seeds, fertilizer, labouretc with particular attention to costs (of the inputs), market structure and problems in accessing the same
- To analyze e the government support structure including access to credit
- To analyze the coping strategies of farmers during economic hardships and their social networks

(Vi)	**Title of The Project (Special project)**	:	**Assessment of Feed and Fodder In Gujarat**
	Principal Investigator/s	:	S.S. Kalamkar and H. Sharma
	Sponsored by	:	Ministry of Agriculture and Farmers Welfare', GOI
	Coordinating Centre	:	ADRTC, ISEC Bangalore
	Date of Commencement	:	March 2019

Objectives:

- To analyze the growth trends of the area, production and productivity of green fodders, dry fodder crops and livestock.
- To assess feed and fodder availability, requirement, deficit/surplus across all states to improve livestock productivity.
- Estimating feed and fodder requirement for the future.

(Vii)	**Title of The Project (Special project)**	:	**Assessment of Feed And Fodder In Rajasthan**
	Principal Investigator/s	:	S.S. Kalamkar and H. Sharma
	Sponsored by	:	Ministry of Agriculture and Farmers Welfare', GOI
	Coordinating Centre	:	ADRTC, ISEC Bangalore
	Date of Commencement	:	March 2019

Objectives:

- To analyze the growth trends of the area, production and productivity of green fodders, dry fodder crops and livestock.
- To assess feed and fodder availability, requirement, deficit/surplus across all states to improve livestock productivity.
- Estimating feed and fodder requirement for the future.

(viii) Title of the Project : Seed Minikits of Pulses & Other Crops-Its relevance & Application/ Distribution Efficiency In Rajasthan

Principal Investigator/s : S.S. Kalamkar and H. Sharma

Entrusted/assigned by : Ministry of Agriculture and Farmers Welfare', GOI

Coordinating Centre : AERU, IEG, Delhi

Date of Commencement : March 2019

Objectives:

- To assess the relevance and the requirement of seed mini-kits among the farmers
- To compare the productivity of pulse crops using seed minikits with the control farmers/non users
- To suggest policy measures to address the efficiency issues in application/ distribution of seed mini-kits.

(ix) Title of the Project : Village Survey Study In Gujarat* (Jambua Village, Panchmahal District)

Principal Investigator/s : S.S. Kalamkar and H. Sharma

Entrusted/assigned by : Ministry of Agriculture and Farmers Welfare', GOI

Coordinating Centre : ISEC Bangalore

Date of Commencement : March 2019

Objectives:

- Continuous study to create a longitudinal panel dataset to capture the socioeconomic dynamics of the village

---

(x) Title of the Project : Village Survey Study In Rajasthan* (Naurangdeshar Village, Sriganganagar District)

Principal Investigator/s : S.S. Kalamkar and H. Sharma

Entrusted/assigned by : Ministry of Agriculture and Farmers Welfare', GOI

Coordinating Centre : ISEC Bangalore

Date of Commencement : March 2019

Objectives:

- Continuous study to create a longitudinal panel dataset to capture the socioeconomic dynamics of the village

(xi) Title of the Project : Assessment Of Skill Gap For Different Agro-Climatic Zones: Gujarat, Assam, Tamilnadu And Haryana

Principal Investigator/s : S.S. Kalamkar and H. Sharma

Entrusted/assigned by : Ministry of Agriculture and Farmers Welfare', GOI

Coordinating Centre : AERC, SPU, Vallabh Vidyanagar

Date of Commencement :

Objective:

- To review the status of farm mechanization in selected State of India
- To study the socio-economic condition of the selected farmers households and farm labourer and status of agricultural equipment/ machinery with them.
- To study the impact of farm mechanization on employment of labour.
- To study and assess the use of farm power per hectare, ultimate requirement, wage and means to fulfill the gaps for various farm operations in selected area
- To study the availability of skilled manpower for different job roles under farm machinery sector
- To estimate the requirements and gap of skilled man power for different job roles under farm machinery sector
- To formulate the strategy and programmes that may be required for filling up gap of skilled manpower in view of rapid mechanisation of agriculture in up coming periods

---

(xii) Title of the Project : Status Report on 15 Major Indicators of Agricultural Performance in Gujarat & Rajasthan

Principal Investigator/s : S.S. Kalamkar and H. Sharma

Entrusted/assigned by : Ministry of Agriculture and Farmers Welfare', GOI

Coordinating Centre : ISEC Bangalore

Date of Commencement : Quarterly on going

Objective:

- Preparation of database on 15 major indicators of agricultural performance in Gujarat and Rajasthan on quarterly basis.

Field Survey Work of eNAM and GST Project

PUBLICATIONS

A) Research Papers / Articles/Policy Brief/Policy Alerts Published:

- "Estimation of Changes in Income and Cost of Production owing to Changes in Inputs and Hybrid Seeds for Major Crops of Gujarat ", Artha Vikas - Journal of Economic Development (ISSN No. 0004-3567), Vol. LIV, No. 2, July December, 2018, pp. 1-11, by S. Kalamkar, M. Swain and S. R. Bhaiya .
- "Adoption of Recommended Doses of Fertilisers on Soil Test basis by Farmers in Gujarat" ", Artha Vikas - Journal of Economic Development (ISSN No. 0004-3567), Vol. LIV, No. 2, July December, 2018, pp. 12-28, by Mrutyunjay Swain, S.S. Kalamkar and Kalpana Kapadia .
- "Assessment of the Status of Dairying and Potential to Improve Socio-Economic status of the Milk Producers in Gujarat", Artha Vikas - Journal of Economic Development (ISSN No. 0004-3567), Vol. LIV, No. 2, July December, 2018, pp. 29-38, by S. S. Kalamkar, H. Sharma & M. Makwana.
- "Impact Assessment and Evaluation of Ration Balancing Program (NDP-I) in Gujarat" Artha Vikas - Journal of Economic Development (ISSN No. 0004-3567), Vol. LIV, No. 2, July December, 2018, pp. 29-38, by S. S. Kalamkar, H. Sharma and V. K. Boyal.
- "Status of Marine Fisheries Sector in Gujarat" *Agricultural Situation in India*, Vol. LXXV, No. 5, August 2018, pp. 25-35, by Hemant Sharma, M. Swain and S.S. Kalamkar (NAAS 2018- 3.15).
- "Supply Chain and Market Infrastructures for Marine Fisher in Gujarat" *International Journal of Fisheries and Aquatic Studies*" (ISSN 2394-0506), Vol. 6, No. 4, July August 2018, pp. 192-198, by H. Sharma, M. Swain and S. S. Kalamkar (NAAS 2018- 3.99).
- "Constraints facing Livestock Feed and Fodder Traders: Evidence from Gujarat in India", *International Journal of Pure and Applied Bioscience*, Vol. 6, No. 3, May June 2018, pp. 208-213 by S. Kumar; S. S. Kalamkar and T.B. Parihar (NAAS 2018- 4.71).
- "Review of Contract Farming Regulations with Special Reference to State of Maharashtra and Gujarat" *Indian Journal of Economics and Development*, (ISSN 2277-5412), Vol. 14, No. 1a, April 2018, pp. 413-423, by Varun Miglani and S. S. Kalamkar (NAAS 2018- 4.82).a
- "Management of Market Risk through Market Integration: Study of Price Volatility in Domestic Market of Onion in Gujarat", *Indian Journal of Agricultural Marketing*, Vol. 32, No. 3, September December 2018, pp. 40-48, by Hemant Sharma, S.S. Kalamkar and M.C. Makwana.
- "Agro Climatic Zone, Season and Crop wise changes in Cultivated area during a decade in Gujarat – Economic Analysis" *Arthvikas (*ISBN 0004-3567), 2017, Vol. LIII, No. 1, by S. R. Bhaiya.
- "An Economic Analysis of Clusterbean in Bikaner District of Rajasthan. *International Journal of Agricultural Science,* Vol. 10, No. 7, 2018, pp. 5672-5675, by Jyani, Mukesh, Sharma Hemant and Meera.

- Working of Pressurized Irrigation Network Systems (PINS) in India *Agricultural Situation in India* LXXV (6):31-41, 2018, by Mrutyunjay Swain, S. S. Kalamkar and Hemant Sharma.
- "Marketing of milk and milk products at GANGMUL dairy plant in Rajasthan", *Journal of Pharmacognosy and* Phytochemistry Vol. 7, No. 5, 2018, pp. 1963-1966, by Navjot Kour, Hemant Sharma and Meera.
- "Agricultural Extension Services by Agri-Clinic and Agri-Business Centres (ACABCs) Scheme in Rajasthan", *International Journal of Advanced Scientific Research and Management,* Special Issue I, 188-193, by Hemant Sharma.
- "Constraints facing Livestock Feed and Fodder Traders: Evidence from Gujarat in India", *International Journal of Pure and Applied Bioscience, Vol.* 6, No. 3, pp. 208-213, by Hemant Sharma..
- "Dynamic Growth and Decomposition Analysis Major Pulses in Rajasthan" Bioved, Vol. 29, No. 1, by Hemant Sharma.

A) Publication released by the Centre

- "Water Governance in India: issues and Concerns", by Mrutyunjay Swain and S.S. Kalamkar (Eds) Allied Publishers Private Limited, New Delhi, 2018 (ISBN: 978-93-87997-31-8).
- "Pressurized Irrigation Network Systems in India: Adoption, Efficiency and Institutional Dynamics", by Mrutyunjay Swain, S.S. Kalamkar and Hemant Sharma (Eds) Allied Publishers Private Limited, New Delhi, 2018 (ISBN: 978-93-87997-32-5).

C) Policy Briefs and Policy Alerts

Submitted to Hon'ble Prime Minister's Office, the Ministry of Agriculture and Farmers Welfare, GOI & others [Compiled and Edited by Center for Management in Agriculture (CMA), Indian Institute of Management Ahmedabad (based on Research & Contributions of: 15 Agro-Economic Research Centers and Units, supported by Ministry of Agriculture & Farmers Welfare)

Agro-Economic Policy Briefs

1. "Economic Losses in the Fisheries Sector in Gujarat due to Inadequate Post-harvest Infrastructure Activities", *Agro-Economic Policy Briefs,* Issue 6, August 2018, pp. 4-6, by H. Sharma, M. Swain and S.S. Kalamkar.
2. "Harnessing Solar Energy: A Novel Solar Cooperative Initiative in India", *Agro-Economic Policy Briefs,* Issue 8, December 2018, pp. 2-4, by Sonal Bhatt and S.S. Kalamkar.
3. "Impact of Check Dams in Gujarat: Case of Tarakpur Check Dam", *Agro-Economic Policy Briefs,* Issue 9, February 2019, pp. 7-9, by S. S. Kalamkar, H. P. Trivedi, S. R. Bhaiya, D. J. Chauhan.

Agro-Economic Policy Briefs

1. "Problems in the Implementation of GST on Selected Agricultural Inputs in Gujarat", *Agro-Economic Alerts,* Issue 5, May 2018, pp. 5-7, by Kinjal Ahir and S.S. Kalamkar.
2. "Onion Price Increase and Volatility Likely Due to Shortage", *Agro-Economic Alerts,* Issue 9, January 2019, pp. 2-4, by Hemant Sharma and S.S. Kalamkar.

D) Abstract in proceeding of National Conference on Agro-Economic Policy and Research 2019, at Centre for Management in Agriculture, Indian Institute of Management, Ahmedabad (January 10-11, 2019):

- Adoption of Recommended Doses of Fertilisers on Soil Test basis by Farmers in Gujarat
- Evaluation and Assessment of Economic Losses on Account of Inadequate Post-Harvest Infrastructure Facilities for Fisheries Sector in Gujarat State
- Evaluation Of Price Support And Market Intervention Scheme In Rajasthan
- Farmers Suicides in Gujarat
- Impact Assessment And Evaluation Of Ration Balancing Program In Gujarat State
- Impact of National Food Security Mission on Input use, Production, Productivity and Income in Gujarat (India)
- Marketed and Marketable Surplus of Major Foodgrains in Rajasthan
- Problems and Prospects of Oilseeds Production in Gujarat
- Socio-Economic Impact Analysis of Introduction of Renewable Energy Technologies in Five Tribal Villages of Gujarat (India)
- Socio-Economic Impact of Tarakpur Check Dam in Khambhat Area of Gujarat
- Working of Pressurized Irrigation Network Systems (PINS) in Gujarat
- Working of Pressurized Irrigation Network Systems (PINS) in Rajasthan
- Working of Pressurized Irrigation Network Systems (PINS) in India
- Relationship between wholesale prices, retail prices, and details of contributing factors for the price difference of Onion in Gujarat
- Estimation of Changes in Income and Cost of Production owing to Changes in Inputs and Hybrid Seeds for Major Crops of Gujarat
- Solar Power Generation and Usage in Irrigation: Lessons from a novel cooperative initiative in India
- Assessment of the Status of Dairying and Potential to Improve Socio-Economic Status of the Milk Producers and Convergence of all Central & State Schemes at District level in Gujarat
- Assessment Of The Status Of Dairying And Potential To Improve Socio-Economic Status Of The Milk Producers And Convergence Of All Central & State Schemes At District Level in Rajasthan.

E) Rapporteurs Report/Book Reviews/Articles/Abstracts in Magazines

Shri T. B. Parihar

- Submitted the Rapporteur Report of technical session in International Conference on "Emerging Global Economic Situation: Impact on Trade and Agribusiness in India" at Bjvm During September 28-29, 2018.
- Book Chapter On "*agro-tourism In India Is A Challenging Mood: A Swot Analysis*", In The Book Application Of Ict In Development Of Sustainable Tourism: An Initiative Under Digital India (ict-dst: 2019).

Advisor (CS Division) visit to Field with CCS Staff

Prof. Talule, Prof G. Lalitha and Shri Parihar at session of International Conference

PARTICIPATION IN CONFERENCES, SEMINARS, WORKSHOPS, TEACHING, WORK ON COMMITTEES, EXPERTS, OTHER ACADEMIC ACTIVITIES, ETC

Dr. S.S. Kalamkar

- Participated at in two days International Conference on 'Emerging Global Economic Situation: Impact on Trade and Agribusiness in India', jointly organized by AERC & BJVM at BJVM campus during September 28-29, 2018 at presented collectively/jointly the following research papers on
    - Fodder Production and Marketing Practices In Gujarat,
    - Organic Agribusiness in Gujarat: Status, Potential & Constraints,
    - Status and Potential of Agribusiness In Gujarat and
    - Status And Potential Of Export Of Organic Agricultural Produce From India.
- Participated and presented our research studies in National Conference on Agro-Economic Policy and Research 2019, at Centre for Management in Agriculture, Indian Institute of Management, Ahmedabad (January 10-11, 2019).
- Participated in two days brainstorming workshop on 'Dimensions of Agrarian Distress' organized jointly by National Institute of Agricultural Extension Management (MANAGE), Hyderabad; Centre for Economic and Social Studies, Hyderabad; International Crops Research Institute for the Semi-Arid Tropics, Hyderabad and Telangana Economic Associations at MANAGE, Hyderabad, during April 20-21, 2018 and presented paper on "Farmers Suicides in Gujarat". Also acted as a Co-Chair for Theme I 'Current Status of Agrarian Crisis in India.
- Participated in 5th National Seminar of the Society of Economic and Development, held at Punjab Agricultural University, Ludhiana on April 5, 2018 and presented paper on "Review of Contract Framing Regulations with special reference to State of Maharashtra and Gujarat".
- Participated in consultation workshop on 'Doubling farmers Income by 2022- a strategic initiative, organized by the Anand Agricultural University, Anand on June 1-2, 2018.
- Reviewed the article to be considered for the publication in the Journal 'Agricultural Research'
- Acted as a External Examiner for the M Sc thesis Viva Voce of International Institute of Agribusiness Management of Anand Agricultural University, Anand on June 15, 2018.
- Delivered special lecture/keynote address on "Doubling of Farmers' Income: Status, Possibilities and Constraints" at 19th Annual Conference of Economic Association of Bihar organized at Magadh University, Bodh Gaya, Bihar on June 22, 2018.
- Participated in Ministry's organized second "India Agricultural Outlook Form, 2018" at NASC, Pusa New Delhi during September 10-11, 2018 & acted as a Panelist in one of the sessions on the subject 'Water Management'.

- As guide of the Ph.D. student, attended final Ph.D. Viva Voce examination of - Mukti Patel and Sanjiv Kumar (14.09.2018 and 26.09.2018) at MBA Department of our University..

- Acted as External Expert for the Ph.D. Viva Voce examination of student registered at Gujarat University, Ahmedabad on October 8, 2018

- Delivered lectures at HRDC, SP University, Vallabh Vidyanagar on November 19, 2018 (Solarisation of Agricultural Pumps: A Study of Dhundi Cooperative).

- Participated in discussion at sessions of IWMI Tata Partner's Meet 2018 on 'Building Climate Resilience for Doubling Farmers' Income, at NDDB Campus, Anand during December 4-6, 2018.

- Reviewed the article to be considered for the publication in the Journal Indian Journal of Agricultural Marketing, Hyderabad paper Jan 22, 2019

- Delivered expert lecture on 'Energy Conservation Economics In Agriculture: A Case Study of Dhundi Cooperative' at One week Short term Training Programme (STTP) on 'Energy Conservation and Management' at Mechanical Engineering Department of B & B Institute of Technology, Vallabh Vidyangar

- Acted as a External referee for the Ph.D. Viva Voce examination of candidate for Ph.D. (Economics) degree of Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon, Maharashtra, on February 1, 2019.

- Acted as a resource person to deliver lecture on "Self Employment in Agriculture through AC & ABC Scheme: Status and Challenges" at National Conference at Department of Economics, Arts, Science and Commerce College, Indapur, Dist Pune on February 2, 2019.

- Participated in two days cooperative conclave on "Enhancing Competitive Advantages of Cooperatives as Business Enterprises" at Institute of Rural Management (IRMA), Anand on March 12-13, 2019.

- Ph.D. Thesis Viva Voce Examination on March 16, 2019 - Ph.D. thesis entitled "Measurement of Gap in Service Quality of Hotel Industry in Sindhudurg District" for the Ph.D. (Commerce) degree in Business Economics of University of Mumbai.

- Acted as External Expert for the Ph.D. Viva Voce examination of a Ph.D. Thesis Viva Voce Examination of Ph. D. Degree in Economics under the faculty of under the Faculty of Mental, Moral and Social Sciences (Ph.D. degree of Savitribai Phule Pune University, Pune) on sMarch 16, 2019.

- Acted as a Co-Chair for Theme I 'Current Status of Agrarian Crisis in India' of two days brainstorming workshop on 'Dimensions of Agrarian Distress' organized jointly by National Institute of Agricultural Extension Management (MANAGE), Hyderabad; Centre for Economic and Social Studies (CESS), Hyderabad; International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad and Telangana Economic Associations (TEA) at MANAGE, Hyderabad, during April 20-21, 2018.

- Acted as a Chairman of technical session of 5th National Seminar of the Society of Economic and Development (SOED), held at Punjab Agricultural University, Ludhiana on April 5, 2018.
- Participated at national seminar on 'Recent developments in Economics of Education: Policy approaches, Issues and Innovations' organized by PG Department of Economics of our University on January 25, 2019 and presented paper on "Economics of Agricultural Education in India: Status & Challenges".
- Participated in National Seminar on 'Transformation in Indian Rural economy' organized by GH Patel Postgraduate Institute of Business Management of our University on February 9, 2019 at chaired the technical session.

Dr. S. R. Bhaiya

- Participated in "One day Workshop" on How to write a research paper? Organized by Gujarat Economic Association and N. S. Patel Art College, Anand, Sardar Patel University, Vallabh Vidaynagar, dated August 04, 2018.
- Participated in "Three Days National Workshop" (Sponsored by Ministry of Agri. Govt. of India, New Delhi) at Department of Economics, University of Kerala, Kariavottam, Thiruvananthapuram – 695581, Kerala, dated Sep 13-15, 2018.
- Participated in Two days International Conference organized by BJVM Commerce College and Agro Economic Research Centre, SPU, dated Sep 28-29, 2018 and presented a paper on 'Status of Farmers Income in Gujarat: An Empirical Analysis'.
- Completed the UGC Sponsored Refresher Course in 'Development Economics' from the UGC-HRDC, Sardar Patel University, Vallabh Vidyanagar during November 12, 2018 to December 02, 2018 and obtained Grade A (No. UGC-HRDC/RC–196/2018-19/7).
- Participated in National Conference organized by 15 AERC & Units hosted by Centre for Management in Agriculture, Indian Institute of Management Ahmedabad (IIMA) during January 10-11, 2019, Presented the studies as 'Socio-Economic Impact of Check Dam in Khambhat Area of Anand district' and Estimation of Changes in Income and Cost of Production owing to Changes in Inputs and Hybrid Seeds for Major Crops of Gujarat'.

Dr. Hemant Sharma

- Participated in AFITA/WCCA2018 conference on *Research Frontier in Precision Agriculture* held at IIT Bombay, India during *24-26 Oct , 2018* and presented paper on "Gram Price Forecast and Market Intelligence: A case study of Bikaner market of Rajasthan".
- Participated in international Conference on Emerging Global Economic Situation: Impact on Trade and Agribusiness in India held at BJVM, Vallabh Vidhyanagar, Anand (Gujarat) during September 28-29,2018 and presented paper on "Agricultural Marketing In Rajasthan: Status, Problems and Remedies".
- Participated in 21st Indian Agricultural scientist and farmers' Congress on Prospects of Rural prosperity and Income Security of Farmers on the occasion of Maha Kumbh Mela- An important step towards Making New India during 16-17 Feb., 2019 and presented paper on "Agriculture Market Intelligence: The Way of Doubling Farmers Income".

Shri Deep Patel

- Participated at Seminar on 'Future Librarianship', held at Central Library, Parul University, Vadodara & CIVOM, Indore, Vadodara, on August 10, 2017.
- Participated at National Conference on 'Advancements and Challenges in Health Science Librarianship: Need of Transformation of medical & Allied Sciences Librarianship in Digital Era', held at Health Science Library Association & Central Library Pandit Dindayal Upadhyay Medical College, Rajkot on November 18, 2017.
- Participated at Conference on 'Technical Conference on Open', held at H. M. Patel English Medium School & Council of Library and Information Science, Gandhinagar, Dharmah during March 17, 2018 and presentation of Resource Sharing in L.

Shri V. D. Parmar

- Attended three days training programme from October 02 to 04, 2018 at Sardar Patel Institute of Public Administration (SPIPA), Ahmedabad on Skill Development.

Shri Brijesh Pandya

- Participated in "Three Days National Workshop" (Sponsored by Ministry of Agri. Govt. of India, New Delhi) at Department of Economics, University of Kerala, Kariavottam, Thiruvananthapuram – 695581, Kerala, dated Sep 13-15, 2018.

Shri Hemal Padhiyar

- Participated in "Three Days National Workshop" (Sponsored by Ministry of Agri. Govt. of India, New Delhi) at Department of Economics, University of Kerala, Kariavottam, Thiruvananthapuram – 695581, Kerala, dated Sep 13-15, 2018.

Shri Hitesh Makwana

- Participated in "Three Days National Workshop" (Sponsored by Ministry of Agri. Govt. of India, New Delhi) at Department of Economics, University of Kerala, Kariavottam, Thiruvananthapuram – 695581, Kerala, dated Sep 13-15, 2018.

Shri Vishal Chudasama

- Participated in "Three Days National Workshop" (Sponsored by Ministry of Agri. Govt. of India, New Delhi) at Department of Economics, University of Kerala, Kariavottam, Thiruvananthapuram – 695581, Kerala, dated Sep 13-15, 2018.

ACADEMIC EVENTS AND VISITORS AT THE CENTRE

(A) AERC Foundation Day Lecture 2018

AERC celebrated its 57th Foundation Day on September 26, 2018. AERC Foundation Lecture 2018 was delivered by Prof. Vijay Paul Sharma, Chairman, Commission for Agricultural Costs and Prices, Ministry of Agriculture and Farmers Welfare, New Delhi delivered AERC Foundation Day Lecture 2018 on "Transforming Indian Agriculture: Key Challenges and Policy Choices" on September 26, 2018.

Dignitaries of the Foundation Day Lecture on September 26, 2018

Distinguished Audience at AERC Foundation Day Lecture on September 26, 2018

Prof. Vijay Paul Sharma delivering AERC Foundation Day Lecture

(B) International Conference on Emerging Global Economic Situation: Impact on Trade and Agribusiness in India", September 28-29, 2018.

Centre had organized 'International Conference on Emerging Global Economic Situation: Impact on Trade and Agribusiness in India" jointly with BJVM, Vallabh Vidyanagar on September 28-29, 2018. More than 400 teachers/ researchers/ students had participated in conference and conference was grant success.

Shri Sanjay Ajmeri; Dr. Ketaki Seth; Dr. Bhavesh Patel (VC, CVM); Er. Bhikubhai Patel (Chairman, CVM); Shri Anup Singh (Director General, Nirma, University, Ahmadabad & Chief Guest Of Function); Dr Vinod Vidhyarthi, (DGM, NABARD, Mumbai); Dr. S. S. Kalamkar and Dr. S.R. Bhaiya In Inaugural Session On September 28, 2018.

Dr. S. S. Kalamkar, Director & Professor, AERC, SPU, VVN welcoming Dr. Vinod Vidyarthi, DGM, NABARD, Mumbai on September 28, 2018.

Releasing AERC book on 'Water Governance' at International Conference on September 28, 2018

Distinguished Audience at International Conference during September 28-29, 2018

Dr. S.R. Bhaiya; Dr. S. S. Kalamkar; Dr. Mahesh Pathak; Dr. Talati, Dr. Nikhil Zaveri; Dr. Ketaki Seth and Dr. Sanjay Ajmeri in Valedictory session of the Conference on September 29, 2018.

During the two days conference, nine technical sessions were organized under four broad themes in which more than 350 research papers (contributed by 558 authors) were presented and discussed. The conference was supported by the National Bank for Agriculture and Rural Development (NABARD), Ahmedabad and Ministry of Agriculture and Farmers Welfare, Govt. of India. Conference was inaugurated by the Chief Guest Shri Anup Singh Director General, NIRMA, University, Ahmadabad in the gracious presence of Dr. Bhavesh Patel, Chairman, CVM; Dr Vinod Vidhyarthi, DGM, NABARD, Mumbai.

(C) State Level Stakeholders Meet and Workshop on Cost of Cultivation Scheme for Gujarat, September 24-27, 2018

CCS for Gujarat had organized three days State Level Stakeholders Meet and Workshop on Cost of Cultivation Scheme during September 24-27, 2018 for the technical/field staff of CCS at the Centre from September 24-26, 2018.

Dr. Mahesh Pathak, Adviser AERC and Ministry of Agriculture, New Delhi CS Division officers inaugurated the workshop on September 24, 2018

Dr. S.S. Kalamkar welcoming the officers of CS division of MOA&FW, GOI (Shri Joginder, Assistant Director; Shri M. P Kahandelwal; Shri Vijaykumar and Shri D. C. Joshi)

CCS staff at Workshop

(D) The 6th H. M. Patel Memorial Lecture

Dr. Sudarshan Iyengar, (Former Vice Chancellor, Gujarat Vidyapith, Ahmedabad) delivered the 6th H.M. Patel Memorial Lecture on "Valued Cherished and Pursued by Mohan, The Gandhi" on February 06, 2019. The Post Graduate Department of Economics and Agro-Economic Research Centre, H. M. Patel Institute of Rural Development, Sardar Patel University, Vallabh Vidyanagar jointly organized this lecture.

Dr. Sudarshan Iyengar delivering the H. M. Patel Memorial Lecture

Distinguished audience at the Memorial Lecture

Prof. H.P Trivedi and Dr. S.S. Kalamkar presenting books to Dr. Sudarshan Iyengar

(E) Professor Vasant P. Gandhi, Chairperson, Centre for Management in Agriculture, Indian Institute of Management, Vastrapur, Ahmedabad visit to AERC on April 30, 2018

(F) Blood Donation Programme:

On the occasion of celebration of 57th foundation day, Agro-Economic Research Centre, S. P. University, Vallabh Vidyanagar had organized a blood Donation Camp on September 26, 2018. In the morning session, blood donation camp organized at the M. P. Patel Auditorium Hall, B/h Physics Department of our University. All together, 21 people had donated the blood.

(G) Faculty Seminar:

- Faculty Seminar on 'NCDFI – emarket – A Ray of hope' held was delivered by by Shri K. C. Superkar, Managing Director, NCDFI, Anand on May 18, 2018 at Agro-Economic Research Centre, Sardar Patel University, Vallabh Vidyanagar, Anand, Gujarat.
- Faculty Seminar on "Case Study Method of Teaching and Writing in Management' held on December 19, 2018 at Agro-Economic Research Centre, Sardar Patel University, Vallabh Vidyanagar, Anand, Gujarat by Dr. Shakti Ranjan Panigrahy, Assistant Professor, International Agri-Business Management, Anand Agriculture University, Anand, Gujarat.

(G) Yoga Session:

(H) OTHER VISITORS:

- Shri Nand Lal, Adviser (CS Division), Directorate of Economics and Statistics, Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Government of India, New Delhi visited during April 22-23, 2018
- Dr. L. M. Bhar, Director, Dr. Tauqeer Ahmad, Dr. Hukum Chandra, Dr. Kautsav Aditya, Mr. Arvind, Indian Agricultural Statistical Research Institute, New Delhi and Dr. T. K. Dutta, Consultant, ISRI, New Delhi visited during April 22-23, 2018.
- CA Ashok Shah, Chartered Accountant, Vadodara visited on May 01, 2018.
- Shri P. S. Patel, Deputy Director, Department of Agriculture, Government of Gujarat visited on September 24, 2018.
- Shri Gurpreet Singh, Doctoral Fellow, CMA, Indian Institute of Management, Vastrapur, Ahmedabad visited on December 11, 2018.
- Dr. Vinod Vidyarthi, DGM, DEAR, NABARD, Mumbai visited during September 28-29, 2018.
- Dr. Dnyadeo Talule, Professor, Department of Economics, Shivaji University, Kolhapur (Maharashtra) visited during September 27-29, 2018.
- Dr. Amrita Patel, Former Chairman, NDDB, Anand visited on February 06, 2019.
- Dr. Bhavesh Patel, Vice Chancellor, Charutar Vidya Mandal, Vallabh Vidyanagar visited on February 06, 2019.
- Prof. S. S. Patel, Hon. Secretary, Charutar Vidya Mandal, Vallabh Vidyanagar visited on February 06, 2019.
- Prof. Peter Mollinga, Director, Centre for Water and Development, School of Oriental and African Studies (SOAS) University of London, UK visited on March 27, .2019

DETAILS OF FIELD VISITS FOR PROJECT WORK/CCS

(A) Cost of Cultivation in Gujarat Selected CCS Village Cluster (block 2017-2020) as on March 31, 2019

ZONE	CL. NO.	FIELDSMAN	VILLAGE NAME	TALUKA	DISTRICT	AS/FS
SG (HR)	1	Parmar S B	Kikakui	Songadh	Tapi	R I Patel
SG (HR)	2	Machhi R S	Nagdhara	Navsari	Navsari	R I Patel
SG (HR)	3	Mistry A K	Vad	Khergam	Navsari	R I Patel
SG	4	Vidja L S	Kumbhari	Olpad	Surat	R I Patel
SG	5	Mistry A K I/c	Karcheliya	Mahuva	Surat	R I Patel
SG	6	Patel P C	Kahanva	Jambusar	Bharuch	H U Padhiyar
SG	7	Vohra A I	Umalla	Jhagadia	Bharuch	R I Patel
CG	8	Patel J J	Kundela	Dabhoi	Vadodara	H U Padhiyar
CG	9	Machhi S C	Sadhli	Sinor	Vadodara	H U Padhiyar
CG	10	Parekh T P	Janod	Balasinor	Mahisagar	H P Makwana
CG	11	Vaghela A D	Limadiya	Khanpur	Mahisagar	V C Chudasama
CG	12	Parmar K G	Alhadpura	Bodeli	Chhotaudepur	H P Makwana
CG	13	Bariya C G	Pingadi	Kalol	Panchmahal	H P Makwana
CG	14	Sharma S J	Bajarvada	Jhalod	Dahod	H P Makwana
NG	15	Parmar M S	Vatadra	Khambhat	Anand	A B Chaudhari
NG	16	Patel Bhaskar K	Heranj	Mahudha	Kheda	R I Patel
NG	17	Patel H B	Savali	Kapadvanj	Kheda	R I Patel
NG	18	Chauhan J D	Vanch	Daskroi	Ahmedabad	R I Patel
NG	19	Patel P S	Harsholi	Dehgam	Gandhinagar	B P Pandya
NG	20	Patel Bharat K	Thol	Kadi	Mahesana	B P Pandya
NG	21	Patel G A	Gambhu	Becharaji	Mahesana	B P Pandya
NG	22	Pandya H M	Dugharvada	Modasa	Arvalli	V C Chudasama
NG	23	Patel B M	Tenpur	Bayad	Arvalli	V C Chudasama
NG	24	Prajapati A B	Vankaner	Bhiloda	Arvalli	V C Chudasama
NG	25	Nai U B	Kanadara	Vijaynagar	Sabarkantha	V C Chudasama
BCA	26	Bhoi S C	Sahij	Dholka	Ahmedabad	R I Patel
SS	27	Bhoi H D	Sirvaniya	Botad	Botad	A B Chaudhari
SS	28	Panchal S A	Kundheli	Talaja	Bhavnagar	A B Chaudhari
SS	29	Mobha B B	Aohtha	Mahuva	Bhavnagar	A B Chaudhari

SS	30	Rathava Vijay C	Lunki	Babra	Amreli	A B Chaudhari
SS	31	Karmata Sanjay H	Dhareswar	Rajula	Amreli	A B Chaudhari
SS	32	Velari P D	Putaliya	Liliya	Amreli	A B Chaudhari
SS	33	Singhada M N	Darshali	Mangrol	Junagadh	H P Makwana
SS	34	Singhada M N I/c	Moti Ghansari	Keshod	Junagadh	H P Makwana
SS	35	Chaudhariy V H	Bardiya	Visavadar	Junagadh	H P Makwana
SS	36	Sherathiya A J	Choki (Sorath)	Junagadh	Junagadh	H P Makwana
SS	37	Baldha K M	Borvav	Talala	Gir Somnath	H P Makwana
SS	38	Patel N P	Vadviyla	Girgadhada	Gir Somnath	H P Makwana
NS	39	Patel J V	Bodiya	Limbdi	Surendranagar	A B Chaudhari
NS	40	Tadvi Kamlesh	Vijaliya	Thangadh	Surendranagar	A B Chaudhari
NS	41	Patel J N	Jadiya	Rajkot	Rajkot	V C Chudasama
NS	42	Vanvi D D	Sanganva	Lodhika	Rajkot	V C Chudasama
NS	43	Patel Bhadres R	Anida (Bhasedi)	Gondal	Rajkot	V C Chudasama
NS	44	Vanvi D D I/c	Ardoi	Kotda angani	Rajkot	V C Chudasama
NS	45	Patel D G	Kolki	Upleta	Rajkot	V C Chudasama
NS	46	Bhoraniya K J	Theba	Jamnagar	Jamnagar	H U Padhiyar
NS	47	Vaghela D S	Vodisang (Devpur)	Kalawad	Jamnagar	H U Padhiyar
NS	48	Rabadiya A P	Haripar	Dhrol	Jamnagar	H U Padhiyar
NS	49	Makwana P M	Satapar	Jamjodhpur	Jamnagar	H U Padhiyar
NS	50	Makwana P M I/c	Bhinda	Khambhalia	Dev. Dwarka	H U Padhiyar
NS	51	Dabhi L C	Suryovadar	Kalyanpur	Dev. Dwarka	H U Padhiyar
NWA	52	Chauhan Jasmat D	Ghansyampur	Halvad	Morbi	A B Chaudhari
NWA	53	Patel J K	Chandravati	Siddhpur	Patan	B P Pandya
NWA	54	Chaudhari S R	Nava	Deesa	Banaskantha	B P Pandya
NWA	55	Chaudhari S R I/c	Lundra	Deodar	Banaskantha	B P Pandya
NWA	56	Padhiyar S C	Voda	Dhanera	Banaskantha	B P Pandya
NWA	57	Patel G B	Moti Pavad	Tharad	Banaskantha	B P Pandya
NWA	58	Bhoi Sanjay V	Vasana (vatam)	Lakhani	Banaskantha	B P Pandya
NWA	59	Bhoi Vishnu B	Vaghrol	Dantiwada	Banaskantha	B P Pandya
NWA	60	Patel R B	Mota Ansaliya	Mandvi	Kachchh	H U Padhiyar

(A) Research Team Visits to field - Ministry's entrusted projects

Sr. No.	*Project title*	*Field Team*	*Duration of Visit*	*Name of Villages/ Places of Visit*
1	Electronic National Agricultural Markets (eNAM) in Gujarat: A Review of Performance and Prospects & GST (Agriculture in Gujarat)	Shri Manish Makwana	July,17-27 2018	To collect data at APMC, Navsari (Bilimora), Surat (Mahuva), Tapi (Nizar), Valsad (Valsad), Bharuch, Narmada and Dand
		Ms. Kalpana Kapadia & Ms. Prachi Patel	July,17-27 2018	To collect data at APMC, Botad, Gir Somnath (Kodinar), Junagadh, Porbandar, Morbi (Halvad), Jamnagar, Rajkot, Amreli (Bhiloda), Dwarka, Bhavnagar
		Shri Thansingh Parihar	July,17-27 2018	To collect data at APMC, Arvali (Bhiloda), Banaskatha (Deesa), Mehsana(Vijapur), Patan, Sabarkantha (Himmatnagar), Surendranagar (Wadhwan), Gandhinagar & Kutch
2	Study of the Implementation and Enabling Conditions for the Central Crop Insurance Scheme – Pradhan Mantri Fasal Bima Yojana (PMFBY) in Gujarat	Ms. Kalpana Kapadia & Ms. Prachi Patel	June 14-16, 2018	Field visits to Sabakantha district for primary data collection on PMFBY (Rabi Season) Phase I and II study To submit field observ ations from the district.
			June 21-23, 2018	Field visits to Sabakantha district for primary data collection on PMFBY (Rabi Season) Phase I and II study To submit field observations from the district.

(C) Research Team Visits to field - NDDB Fodder Project

Sl	States	Officers	Date of Visit	EIAS
1	Punjab,	Dr. S.S. Kalamkar	04.4.2018 to 07.4.2018	Ludhiana
2	Karnataka	Dr. S.S. Kalamkar	06.6.2018 to 08.6.2018	Bengaluru
3	Bihar	Dr. S.S. Kalamkar	21.6.2018 to 24.6.2018	Bodh Gaya
4	Rajasthan	Dr.Hemant Sharma	12.10.2018 to 18.10.2018	Chittorgarh & Kota
5	Punjab	Dr.Hemant Sharma	12.10.2018 to 18.10.2018	Ropar, Ludhiana & Jalandhar
6	Uttar Pradesh	Dr.Hemant Sharma	14.11.2018 to 17.6.2018	Lucknow & Ambedkarnagar
7	Uttar Pradesh	Dr.Hemant Sharma & Dr. S. R. Bhaiya	11.1.2018 to 23.1.2018	Lucknow & Ambedkarnagar & AERC Allahabad

(D) DETAILS OF FIELD VISITS FOR CCS

Dr. S. R. Bhaiya

Zone	Cl. No.	Village	TALUKA	FO visit	Team
SS	36	Junagadh	Choki (Sorath)	16/8/2017	FO, Adviser, IASRI team, FS
SS	38	Girgadhada	Vadviyla	16/8/2017	FO, Adviser, IASRI team, FS
CG	8	Dabhoi	Kundela	31/8/2017	FO, Adviser, IASRI team, FS
CG	9	Sinor	Sadhli	31/8/2017	FO, Adviser, IASRI team, FS
NG	18	Daskroi	Vanch	02/9/2017	FO, Adviser, IASRI team, FS
CG	11	Khanpur	Janod	18/1/2018	FO, Adviser, IASRI team, FS
NS	41	Rajkot	Jadiya	18/1/2018	FO, Adviser, IASRI team, FS
NS	50	Khambhalia	Bhinda	25/1/2018	FO, One Supervisor

Shri R. I. Patel

Zone	Cl. No.	Cluster	Visit I	Visit II	Visit III
SG(HR)	01	Songadh	21,22/1/19	16,17/03/19	-
	02	Navsari	19,20/1/19	15/03/19	-
	03	Khergam	16,17/1/19	13/03/19	-
SG	04	Olpad	23,24/1/19	18/03/19	-
	05	Mahuva	18/1/19	14/03/19	-
	06	Jagadiya	25,26/1/19	19,20/03/19	-
NG	16	Mahudha	16,17/4/18	18,19/02/19	-
	17	Kapadvanj	14,15/4/18	15,16,17/02/19	-
	18	Daskroi	12,13/4/18	20,21/2/19	-
BCA	26	Dhodka	10,11/4/18	22,23/2/19	-

Shri Brijesh Pandya

Zone	Cl. No.	Cluster	Visit I	Visit II	Visit III	Visit IV
NG	19	Dehgam	18/4/18	7,8/2/19	30/3/19	-
	20	Kadi	17/4/18	5,6/2/19	29/3/19	-
	21	Bechraji	16/4/18	3,4/2/19	28/3/19	-
NWA	53	Siddhpur	1,2/2/19	27/3/19	-	-
	54	Deesa	19/6/18	18,19/1/19	-	-
	55	Deodar	20/6/18	20/1/19	-	-
	56	Dhanera	23/6/18	25/1/19	-	-
	57	Tharad	22/6/18	23,24/1/19	-	-
	58	Lakhani	21/6/18	21,22/1/19	-	-
	59	Dantiwada	24/6/18	16,17/1/19	-	-

Shri Hemal Padhiyar

Zone	Cl. No.	Cluster	Visit I	Visit II	Visit III	Visit IV
SG	06	Jambusar	21/4/18	16/6/19	17,18,19/1/19	28/3/19
CG	08	Dabhoi	19/4/18	15/6/19	20,21/1/19	27/3/19
CG	09	Sinor	20/4/18	14/6/19	22,23/1/19	26/3/19
NS	46	Jamnagar	23/4/18	21,22/2/19	-	-
	47	Kalavad	23,24/2/19	-	-	-
	48	Dhrol	23/4/18	25,26/2/19	-	-
	49	Jam-Jodhpur	16,17/2/19	-	-	-
	50	Khambhaliya	18/2/19	-	-	-
	51	Kalyanpur	19,20/2/19	-	-	-
NWA	60	Mandavi	27,28/2/19	-	-	-
NS	39	Bodiya	23/4/18	-	-	-

Shri Hitesh Makwana

Zone	Cl. No.	Cluster	Visit I	Visit II	Visit III	Visit IV
CG	10	Balasinor	13/6/18	14,15/2/19	28/3/19	-
	12	Bodeli	11/6/18	16,17/2/19	-	-
	13	Kalol	12/6/18	29,30,31/3/19	-	-
	14	Zalod	14/6/18	18,19/2/19	-	-
SS	33	Mangrol	24/4/18	21,22/1/19	-	-
	34	Keshod	23/4/18	23/1/19	-	-
	35	Visavadar	19,20,21/4/18	19,20/1/19	-	-
	36	Junagadh	22/4/18	16,17,18/1/19	-	-
	37	Talala	25/4/18	24,25/1/19	-	-
	38	Gir- Gadhada	26/4/18	26,27/1/19	-	-

Shri Vishal Chudasama

Zone	Cl. No.	Cluster	Visit I	Visit II	Visit III	Visit IV
CG	11	Khapur	16/6/18	24,25/1/19	16/3/19	_
NG	22	Modasa	14/6/18	18,19/1/19	14/3/19	_
	23	Bayad	15/6/18	26/9/18 #	16,17/1/19	15/3/19
	24	Bhiloda	12/6/18	26/9/18 #	20,21/1/19	12/3/19
	25	Vijaynagar	13/6/18	24,25/1/19	13/3/19	_
NS	41	Rajkot	18/4/18	2,3/2/19	_	_
	42	Lodhika	16/4/18	4,5/2/19	_	_
	43	Gondal	19/4/18	31/1/19 01/2/19	_	_
	44	Kotada Shanghani (I/c)	17/4/18	_	_	_
	45	Upleta	20/4/18	29,30/1/19	_	_
CG	15	Khambhat	25/09/18 #	_	_	_

Notes: # With Cs Division Team - Mr. Joginder, Mr. D C Joshi Mr. Vijaykumar

Shri Atishesh Chaudhary

Zone	Cl.No.	Cluster	Visit I	Visit II	Visit III	Visit IV
CG	08	Khanmbhat	14/6/18	10,11/1/19	09/2/19	_
CG	09	Botad	28,29/1/19	_	_	_
CG	12	Talaja	07,08/2/19	_	_	_
NG	15	Mahuva	05,06/2/19	_	_	_
SS	27	Babra	30,31/1/19	_	_	_
NS	28	Rajula	03,04/2/19	_	_	_
NS	29	Lilya	01,02/2/19	_	_	_
NS	30	Limbdi	13/6/18	08,09/1/19	15/3/19	_
NS	31	Thangad	12/6/18	06,07/1/19	14/3/19	_
NS	32	Halvad	11/6/18	04,05/1/19	13/3/19	_
SS	39	Khanmbhat	14/6/18	10,11/1/19	09/2/19	_
SS	40	Thangadh	28,29/1/19	_	_	_
NWA	52	Halvad	07,08/2/19	_	_	_

CCS Cluster Village of Motipavad, Taluka of Tharad, District Banaskanta on 23/1/2019

CCS Cluster Village of Voda,, Taluka of Dhanera, District Banaskanta on 25/1/2019

CCS Cluster Village of Voda,, Taluka of Dhanera, District Banaskanta on 25/1/2019

CCS Cluster Village of Chandravati,, Taluka of Siddhpur, District Patan on 02/02/2019

CCS Cluster Village of Kundhela,, Taluka of Dabhoi, District Vadodara on 20/01/2019

CCS Cluster Village of Suryavadar, Taluka of Kalyanpur, District Devbhumi Dwarka on 19/02/2019

Administrative Assignment/s Handled (Name of the Post held; Duration, nature of duties, etc.)

Dr. S. S. Kalamkar

- Honorary Director, Cost of Cultivation Scheme- w.e.f. July 5, 2012- Administrative work.
- Public Information Officer, AERC, S.P. University, Vallabh Vidyanagar since July 19, 2012.
- Public Information Officer, CCS, S.P. University, Vallabh Vidyanagar since July 19, 2012.
- Member, Advisory Committee, H.M. Patel Memorial Lecture, Sardar Patel University, Vallabh Vidyanagar since November 12, 2013.

Dr. M. Swain

- Worked as Officer In-Charge, AERC and CCS, as and when required, during the absence of Director, AERC during April & May, 2018 .
- Coordinator of the 'Internal Quality Assurance Cell (IQAC)' of our Centre up to June 08, 2018.

Dr. S. R. Bhaiya

- *Assistant Public Information Officer* in *Cost of Cultivation Scheme*, AERC, SPU, Vallabh Vidyanagar since July 2012.
- *Secretary* of *'Standing Administrative Affairs Committee of CCS*, AERC, SPU, VVN since March 2013.
- *Secretary for* the *'Committee for Selection of Best Field man in Cost of Cultivation Scheme (CSBF)'*, CCS, AERC, SPU, VVN since March 2013.
- Acted as a *'Secretary Member'* for the AERC 7th Pay Fixation Committee for the fixation of pay of AERC and CCS non-teaching staff.
- *Member of Library Committee'* for the Library of the Centre since Feb 04, 2014.
- Worked as a *Officer In-charge of Director* in the Centre, S P University, Vallabh Vidyangar when out of station and on leave/s the Director/Hon. Director.
- Ex-Officio member of Internal Quality Assurance Cell (IQAC) from September 08, 2017 *(Ref. AERC/1.3/367/2017 dated September 12,2017)*

Shri D N Thakkar

- Asst. Public Information Officer, AERC, S.P. University, Vallabh Vidyanagar since July 19, 2012.
- Accounts and Administration work of Cost of Cultivation Scheme since 16.04.2010

Shri Vinod D Parmar

- Assisted Hon. Director of CCS for day to day office work since April 01, 2010.
- Annual Maintenance Contract of Hydraulic Lift and Solar Power System.

Skill Development training at SPIPA, Ahmedabad during 04-06/10/2018

SAGY team visit to village Hamidpura, Ta Umreth, Anand

GUIDANCE TO THE PH.D / M.PHIL STUDENTS

Dr. S. S. Kalamkar

- Ph.D. Thesis –**Ph.D. Degree Awarded: 02**

Sr. No.	Name Of The Candidate	Topic	Date of Registration & Receipt No.	Full / Part Time
1	Ms. Mukti Patel	Understanding Attrition of Teachers in Private Schools of Anand District of Gujarat: Problems, Causes and Remedies	Sept 2014	Part Time
2	Sanjiv Kumar	Livestock Feed Value Chain Analysis in Gujarat	Sept 2014	Part Time

- **Ph.D. -Work in Progress- 06**

Sr. No	Name Of The Candidate	Topic	Date of Registration	Full / Part Time
a	*Subject: Economics -03*			
1	Pawar Vandana K.	Agricultural Growth and Crop Diversification In Gujarat	Sept 2014	Part Time
2	Yamuna Panicker	Challenges and Opportunities In Production and Marketing Of Organic Agricultural Produce In India With Special Focus on Gujarat	Dec. 24, 2014 No. 957	Part Time
3	Shri Thansingh B. Parihar	Study Of Agricultural Extension Services by Agri-Clinic and Agri Business Centres (Acabcs) Scheme in Maharashtra and Gujarat	March 2016	Part Time
b	*Subject: Management (MBA) -03*			
1	Shakti Ranjan Panigrahy	Production And Marketing Of Potato In Gujarat	No. 1690 March 23, 2018	Part Time
2	Ms. S.S. Moghe	yet to be finalised	181134 Oct.01 2018	Part Time
3	Mr. Sonawane Vijaykumar V	Farmers Producer Organizations	181135 Oct.01 2018	Part Time

Dr. M. Swain

Sr. No.	Name of the Candidate	Topic	Date of Registration	Full / Part Time
1	Anjali Sureshbhai Trivedi	Financial Inclusion of Urban Women: A Study of Ahmedabad district in Gujarat	Dec, 2014	Part Time
2	Subrat Sahoo	Assessment of Vulnerability to Drought and Water Scarcity in Agriculture: Case of Drought Prone Areas in Gujarat	Jan - 2015	Part Time
3	Vaishaliben K. Makwana	Pattern and Determinants of Horticultural Development in Gujarat	Dec - 2014	Part Time
4	Kalpana Kapadia	Role of Crop Insurance in Agricultural Risk Management: Special Reference to NAIS in Gujarat	Nov - 2015	Part Time
5	Anushka Mahto	Impact of Salinity Ingress on Cropping Pattern and Agricultural Production: A Micro-level Evidence from Gujarat	2015	Full Time

Dr. S. R. Bhaiya

Sr. No.	Name Of The Candidate	Topic	Date of Registration	Full / Part Time
1	Shri Hiteshkumar P. Makwana	A Study of National Food Security Mission in Gujarat	Dec, 2014	Part Time
2	Shri Hemal U. Padhiyar	The Trends in Cost of Cultivation of Principal Crops in Gujarat	Aug - 2015	Part Time
3	Shri. Sunil D. Rajput*	An economic evaluation of MGNREGA in Gujarat State (A case study of Anand District)	Aug- 2016	Part Time
4	Shri. Rajesh J. Parmar*	The problems of workers in AGATE Industry in Khemby in Gujarat	Aug - 2016	Part Time

AWARDS WON, ELECTION/ NOMINATION TO PROFESSIONAL, EDUCATIONAL, NON-ACADEMIC BODIES, ETC.

Award

- Shri Dadabhai Navroji Prize received for a paper on 'Solar power Generation and usage in Irrigation: lessons from a Novel Cooperative Initiative in India" (as a Best paper published in the calendar for the year 2017-18 from Sardar Patel University, Vallabh Vidyanagar (SPU Notification No. G/25-G/2591, dated 30.07.2018) by Sonal Bhatta and S. S. Kalamkar.
- SOED Best Paper Award' received for a paper on 'Impact of Tarakpur Check Dam in Khambhat Area of Gujarat' published in Indian Journal of Economics and Development (Volume 13, No 2, 2017 pp. 229-242) at 5th National Seminar of the Society of Economic and Development, held at Punjab Agricultural University, Ludhiana on April 5, 2018, by S. S. Kalamkar, H.P. Trivedi, D.J. Chauhan and S.R. Bhaiya.
- Prof. V. S. Vyas Felicitation Award/Prize (2016-18) received for the best research report conducted at the Centre (during 2016-18) on "Working of Pressurized Irrigation Network Systems (PINS) in India (Consolidated Report)", prepared by Mrutyunjay Swain, S. S. Kalamkar and Hemant Sharma (SPU Notification No. G/22-G/3054, dated 16.08.2018).
- Sardar Patel Research Award 2018 (First Prize) for Best Research paper in the group of Agricultural Sciences and Economics by Sardar Patel University, Vallabh Vidyanagar was received by the research paper titled, 'Adoption of Recommended Doses of Fertilizer on Soil Test Basis by Farmers in Gujarat' (Authors: M. Swain S.S.Kalamkar and Kalpana Kapadia).
- Best Fieldman award for the year 2017-18 was awarded to Shri A. P. Rabadia, Fieldman, CCS working at Siyawada village of Dholka Taluka of Ahmedabad district

Dr. S. S. Kalamkar

- Worked as a Member of Executive Council of Gujarat Economic Association (GEA), Anand.
- Worked as a Member, Board of Governors, India Natural Resource Economics and Management (INREM) Foundation, Anand 388001, Gujarat (since August 2014).
- Worked as a **Member**, Expert Committee on Minimum Support Prices, **Directorate of Agriculture, Government of Gujarat** (Ex-Officio Member) (since July 5, 2012).

- Member, Advisory Board, Artha Vikas (ISSN: 0004-3567) (Biannual Journal of Economics, Department of Economics, S P University, Vallabh Vidyanagar) (since 2014).
- Worked as member of Editorial Board of "*International Journal of Social Science*", (ISSN 2249-6637), Visva-Bharati Shantiniketan, published from New Delhi Publishers, New Delhi.

AERC Staff Celebration Of Tree Plantation (Environment Day) On June 05, 2018

PROFESIONAL AFFILIATION

Dr. S. S. Kalamkar

- Indian Society of Agricultural Economics (ISAE), Mumbai (Life Member)
- Indian Society of Agricultural Marketing (ISAM), Nagpur (Life Member)
- The Indian Economic Association (IEA), New Delhi (Life Member)
- Agricultural Economic Research Association (AERA), New Delhi (Life Member)
- Maharashtra Society of Agricultural Economics (MSAE), Pune (Life Member)
- Indian Society of Agricultural Development And Policy, Ludhiana (Life Member)
- Indian Society for Studies in Cooperation- Life Member
- Gujarat Economic Association (Life Member)
- India Natural Resource Economics and Management Foundation (INREM), Anand (Life Member).
- Society of Economics and Development, Ludhiana, Punjab (Life member)

Dr. M. Swain

- Life Member, Indian Society of Agricultural Economics
- Life Member, Indian Economic Association
- Member, South Asian Network for Development and Environment Economics
- Member, Society of Economics and Development.

Dr. S. R. Bhaiya

- Life Member, *Gujarat Economic Association*

Dr. Hemant Sharma

- Life time member of Journal of Agricultural Development and Policy
- Life time member of Indian Society of Agricultural Economics
- Life time member of Agricultural Economics Research Association (AERA)
- Life time member of Society of Economics and Development
- Life member of Indian Society of Agricultural Development & Policy
- Life member of Indian Society of Agricultural Development & Policy
- Life time member of Rajasthan Society of Extension Education Udaipur.
- Member of Bioved Research Society.
- Member of Journal of Progressive Agriculture
- Member of Indian Journal of Dairy Science
- Member of Journal of Research, PAU
- Member of International Journal of Agricultural Economics & Statistics
- Member of Indian Journal of Agricultural Research
- Indian Journal of Agricultural Economics and Development

Shri Manish Kant Ojha

- Life Member, Indian Society of Agricultural Economics, Mumbai.
- Life Member, Rajasthan Economic Association, Jaipur.

Shri Manish Makwana

- Life Member, Indian Society of Agricultural Economics, Mumbai.
- Life Member, Indian Economic Association.
- Life Member, Agricultural Economics Research Association, New Delhi.
- Life Member, Gujarat Economic Association.

Shri T. B. Parihar

- Life Member, Indian Society of Agricultural Economics, Mumbai.
- Life Member, Indian Society of Agricultural Marketing.

Shri Deep Patel

- Gujarat Granthalaya Seva Sangh, Ahmadabad (Life Member).
- Alumni Assiciation, Department of Library and Information Science, Sardar Patel University, Vallabh Vidyanagar. (Patron Member).
- Ahmadabad Library Network (ADINET), Ahmadabad (Life Member).
- Indian Library Association (ILA), Delhi (Life Member).
- Public Library, Anand, Gujarat (Life Member).

Audience at AERC Foundation day September 26, 2018

MEETING OF GOVERNING BODY

- No meeting of Governing Body was held in the calendar year 2018 in view of formation of AERC Advisory Committee / Governing Body as per the Ministry, composition.

Group photo during celebration of Kite Flying Day on the terrace of H. M. Patel Institute of Rural Development, SPU, VVN on January 8, 2019.

SAGY Project Field Visit, Village Bechari, August 30, 2018

RESEARCH SUPPORT SERVICES

A) Library:

- Agricultural Economics Research Review
- Agriculture Today
- Artha Vikas
- Bhumi Putra
- Cyber Safar (Gujarati)
- Down to Earth
- Economic & Political Weekly
- Indian Farming (English)
- Indian Horticulture (English)
- Indian Journal of Agricultural Economics
- Indian Journal of Agricultural Marketing
- Indian Journal of Economics and Development
- Indian Journal of Fertiliser
- India Today
- Journal of Rural Development
- Kurukshetra (English)
- Latest Facts in General Knowledge (Gujarati)
- Millennial Asia
- PC Quest
- The Economist
- The Indian Journal of Agricultural Sciences (English)
- The Indian Journal of Animal Sciences (English)
- University News
- Yojana (Gujarati)
- Yojana (English)

Gift:

- Agricultural Situation in India
- Krushi Govidya

Online dataset subscribed:

- **www.indiastat.com** (belongs to Datanet India Pvt. Ltd.)
- http://www.epwrf.res.in/- Economic and Political Weekly Research Foundation (EPWRF) Data Series on Agricultural Statistics, Price Indices and Domestic Product of States of India.

Books Purchased: 2018-19:

AERC	**: 08**
CCS	**: 06**
Total	**: 14**

AERC Library Orientation Programme on August 13, 2018 in the Seminar Hall of our Centre

Exhibition of AERC publications in International Conference during 28-29 September, 2018

B) Seminar Hall:-

The Seminar hall housed in the Centre is well-equipped with all facilities created with the financial support of Ministry of Agriculture, Govt. of India.

C) Computer Centre:

The Computer Centre housed in the Cost of Cultivation Scheme, AERC is well-equipped with hardware and software to support the research and training programmes of the Centre. In the computer laboratory, staff have access to the internet both for reference work and communication.

COMMITTEES

Public Information Officers –

Agro-Economic Research Centre	
Appellate Public Information Officer (APIO)	Hon. Vice Chancellor and Chairman, Governing Body, AERC Sardar Patel University, Vallabh Vidyanagar 388120, Anand, Gujarat Ph. No. 02692-230009 (Telefax)/ 226800 Email-vc_spu@spuvvn.edu, vcspu@yahoo.co.in
Public Information Officer (PIO)	Director Agro-Economic Research Centre, Sardar Patel University, Vallabh Vidyanagar 388120, Anand, Gujarat Ph. No. 02692-230106 (Telefax)/230799 Email-director.aerc@gmail.com
Assistant Public Information Officer (Assit. PIO)	Office Superintendent Agro-Economic Research Centre, Sardar Patel University, Vallabh Vidyanagar 388120, Anand, Gujarat Ph. No. 02692-230106 (Telefax)/230799

Cost of Cultivation Scheme	
Appellate Public Information Officer (APIO)	Hon. Vice Chancellor and Chairman, Governing Body, AERC Sardar Patel University, Vallabh Vidyanagar 388120, Anand, Gujarat Ph. No. 02692-230009 (Telefax)/ 226800 Email-vc_spu@spuvvn.edu, vcspu@yahoo.co.in
Public Information Officer (PIO)	Honorary Director Cost of Cultivation Scheme, Agro-Economic Research Centre, Sardar Patel University, Vallabh Vidyanagar 388120, Anand, Gujarat Ph. No. 02692-230106 (Telefax)/230799 Email-director.aerc@gmail.com
Assistant Public Information Officer (Assit. PIO)	Field Officer Cost of Cultivation Scheme, Agro-Economic Research Centre, Sardar Patel University, Vallabh Vidyanagar 388120, Anand, Gujarat Ph. No. 02692-230106 (Telefax)/230799 Email- srbbhaiya@yahoo.com

Technical Advisory Committee- Research (TAC-R)

Objective: To receive useful feedback on research work completed and to be undertaken at the Centre

No. of Meetings: Committee shall meet at least once in a year.

Composition	Nature of Membership	Name of the Member
1) Hon. Adviser, AERC	Ex-Officio	Dr. Mahesh Pathak
2) One Subject Expert	Ex-Officio	Dr. Tushaar Shah, IWMI
3) The Director of Agriculture, Gujarat State, Krishi Bhavan Sector 10/A, Gandhinagar 382010 or his/her nominee	Ex-Officio	Dr. S. R. Chaudharay
4) The Commissionerate of Agriculture, Rajasthan State, Department of Agriculture, Pant Krishi Bhawan, Jaipur or his/her nominee	Ex-Officio	Shri Sudhansh Pant
5) The Director, Directorate of Economics and Statistics, Government of Gujarat, Gandhinagar, Gujarat or his /her nominee	Ex-Officio	-
6) Head, De partment of Agricultural Economics, BA College of Agriculture, AAU	Ex-Officio	Dr. Y. C. Zala
7) Representative of National Dairy Development Board (NDDB), Anand	Ex-Officio	Would be deputed by the NDDB
8) Representative of National Bank for Agriculture and Ru ral Development (NABARD), Ahmedabad	Ex-Officio	Would be deputed by the NABARD
9) Head, PG Department of Economics, SPU	Ex-Officio	Dr. H. P. Trivedi
10) Director, AERC	Ex-Officio	Dr. S. S. Kalamkar

"STANDING ADMINISTRATIVE AFFAIRS COMMITTEE (SAAC)"

Objective: To create a healthy environment and work culture in Centre by addressing the various administrative issues. The Committee will also recommend the actions to address the issues such as unhealthy practice of data collection/reporting, imperfection in data collection, non compliance of office orders interfering others' work, and other related issues.

Composition	*Nature of Membership*	*Term of Membership*	*Nominating /appointing authority*	*Name of the Member*	*Period of Membership*
1) Director/Hon. Director	Ex-Officio	--	--	Dr. S. S. Kalamkar	--
2) Dy. Director/Hon. Dy. Director	Ex-Officio			Dr. Kinjal Ahir	
3) Field Officer	Ex-Officio	--	--	Dr. S. R. Bhaiya	--
4) Office Superintendent	Ex-Officio			Shri D. N. Thakkar	
5) Assistant Statistician	Ex-Officio	--	--	Shri Gopal Machhi	--
6) One member nominated by Hon. Vice Chancellor, SPU	Member	Two Years	Vice-Chancellor	Dr. H. P. Trivedi Dept. of Economics, SPU,VVN	21.06.2017 to 20.06.2019
7) One member from Agril. Supervisor/Field Supervisor (rotation according to seniority)	Member	Two Years	Director/ Hon. Director	Shri Hemal Padhiyar	21.06.2017 to 20.06.2019
8) Two members from Field men, on the basis of their better work performance, in consultation with Field Supervisor and Field Officer, CCS.	Member	Two Years	Director/ Hon. Director	Shri C. G. Bariya Shri B. B.Mobha	21.06.2017 to 20.06.2019

Note: The Director/Hon. Director shall be the Chairman and the Field Officer shall be the Secretary of the Standing Administrative Affairs Committee of the Centre; As per the case/matter/subject, Director/Hon. Director may invitee any other staff member of the Centre/University as a Special Invitee

"COMPOSITION OF 'INTERNAL QUALITY ASSURANCE CELL (IQAC)

Objective: The Prime task of the IQAC is to develop a system for conscious, consistent and catalytic improvement in the overall performance of our Centre. It would also aim to promote measures for institutional functioning towards quality enhancement through internalization of quality culture and institutionalization of best practices. Besides, IQAC would certify the Academic Performance Indicators (API) required for the faculty while submitting the application in other Institutions (as per respective Institute/University adopted API format).

Composition	Nature of Membership	Term of Membership	Nominating /appointing authority	Name of the Member	Period of Membership
1) Chairperson Head of the Institution / Centre • Director / Hon. Director	Ex-Officio	--	--	Dr. S. S. Kalamkar	--
2) A few senior administrative officers • FO, CCS • OS, AERC	Ex-Officio	--	--	Dr. S. S. Kalamkar Dr. S. R. Bhaiya Shri D. N. Thakkar, OS	--
3) Three to eight teachers (all faculty members of AERC CCS) • Deputy Director • Research Officer • Field Officer, CCS	Ex-Officio	--	--	Dr. S. S. Kalamkar Dr. Kinjal Ahir Dr. M. N. Swain Dr. S. R. Bhaiya Dr. Hemant Sharma	--
4) One member from the Management • Head, PG Dept. of Econ, SPU	Member	Two Years	Vice-Chancellor	Dr. H. P. Trivedi	Sept. 9, 2017 to Sept 8, 2019
5) One/two nominees from local society , Students and Alumni (PhD Student)	Member	Two Years	Director/Hon. Director	Ms. V. K. Makwana Ms. Pawar Vandana K.	Sept. 9, 2017 to Sept 8, 2019
6) One/two nominees from Employers/ Industrialists stakeholders	Member	Two Years	Vice-Chancellor	Prof. Yogesh Joshi	Sept. 9, 2017 to Sept 8, 2019
7) One of the senior teachers as the coordinator /Director of IQAC	Member	Two Years	Director/ Hon. Director	Dr. Mrutyunjay Swain Research Officer (SS), AERC	Sept. 9, 2017 to Sept 8, 2019
The membership of nominated members shall be for a period of two years. The IQAC should meet at least once in every quarter. The quorum for the meeting shall be two -third of the total number of members.					

AERC LIBRARY COMMITEE

Objectives: Centre has its own small library which is being used by the insider as well as outside researchers. In order to address the various issues related to Library, AERC Library Committee was constituted in 2013.

Sr. No.	Composition	Nature of Membership	Name of the Member
1)	Hon. Adviser, AERC	Ex-Officio Chairman	Dr. Mahesh Pathak
2)	Director/Hon. Director (AERC/CCS)	Ex-Officio	Dr. S. S. Kalamkar
3)	Hon. Dy. Director, AERC	Ex-Officio	Dr. Kinjal Ahir (w.e.f 01.09.2017)
4)	Field Officer, CCS	Ex-Officio	Dr. S. R. Bhaiya
5)	Research & Ref. Asstt. – Library, AERC	Ex-Officio	Shri Deep K. Patel

WOMEN CELL

Objective: With an aim of creating awareness of women's right and duties as well as to take up women's issues and problems. It also provides a platform for women to share their experiences and views regarding their status in the society and to suggest ways to improve and empower themselves. Aiming at intellectual and social upliftment of the female students, the cell stands for facilitating women's empowerment through guest lectures, seminars, awar eness programmes life skill training programmes, entrepreneur training and other welfare activities.

Composition	Nature of Membership	Nominating /appointing authority	Name of the Member
1) Director/Hon. Director	Ex-Officio	--	Dr. S. S. Kalamkar
2) One Female Lady Faculty	Member	Director/ Hon. Director	Dr. Kinjal Ahir
3) One female non-teaching staff representative from AERC	Member	Director/ Hon. Director	Ms. Kalpana Kapadia
4) One female non-teaching staff representative from CCS	Member	Director/ Hon. Director	Ms. Kena H. Patel

'AERC CCS RECREATIONAL CLUB'

The major aim of club is to arrange/organise cultural/sport/social activity in a group manner for and by the staff of the Centre. The following staff members are unanimously nominated on the organising body of this club by the staff.

Sr. No	Composition
1	Shri Deep K Patel
2	Shri D. N. Thakkar
3	Ms. Kalpana Kapadia
4	Shri Mihir R Rana
5	Shri Thansigh Parihar
6	Shri Bhavesh M. Solanki
7	Shri Bhoomika S. Padhiyar
8	Shri Faruq G. Vahora
9	Shri Selvin Macwan

Inter Dept. Sports Comp. for Teaching & Non Teaching Staff on December 19, 2018 (Volley ball Run-up)

APPOINTMENTS, RETIREMENT, RESIGNATION, EXPIRED & CONTRACT COMPLETION ETC.

AERC Staff	Post	Date
Joined		
Ms. Prachi S Patel	Research Fellow*	11.06.2018
Mr. Subrat Kumar Nishanka	Research Fellow*	20.07.2018
Resigned		
Dr. Mrutyunjay Swain	Research Officer(SS)/ Assistant Professor	08.06.2018
Retired		
-	-	-
Contract Completion		
Mr. Sagar Sharma	Research Assistant*	18.12.2018

CCS Staff	Post	Date
Joined		
Ms. Renuka J Machhi	Jr clerk/Typist*	13.04.2018
Shri Bhavesh M Solanki	Jr clerk/Typist*	16.04.2018
Ms. Kena Patel	Jr clerk/Typist*	23.04.2018
Shri Mihir R Rana	Computer*	14.06.2018
Mrs. Bhoomika N Patel	Computer*	14.06.2018
Shri Rupesh C Mistry	Computer*	22.06.2018
Shri Jaswant N Singh	Computer*	03.07.2018
Shri Faruk G Vohra	Computer*	13.08.2018
Shri V C Harijan	Peon*	24.07.2018
Shri A C Pandya	Research Assistant*	14.06.2018
Shri D M Pandya	Consultant Accounts	16.02.2019
Resigned		
Retired		
Contract Completion		
Ms. Renuka J Machhi	Jr clerk/Typist*	12.03.2019
Shri Bhavesh M Solanki	Jr clerk/Typist*	15.03.2019
Ms. Kena Patel	Jr clerk/Typist*	22.03.2019

* Indicate temporary/ad-hoc post.

INFRASTRUCTURE

The Centre is located at the H.M. Patel Institute of Rural Development, Opp. Nandalaya Temple, Sardar Patel University, Vallabh Vidyanagar 388120. In the same building, Department of Economics is housed on ground an d first floor while AERC and CCS are working from second floor of the same building. (Purchase of items in Financial Year i.e. April 2018 to March 2019)

AERC:

During the year 2018 -19, the following equipments/hardware/software/office materials were purchased from the grant-in-aid received: (1) Partition Gate- 02 (Room No. 1 & 2) (2) Mirror Wooden Work -01 (3) Curtains-02 (4) Computer Table -02 (5) Shree Lipi Software-01 (6) hp inkjet printer cartridge -01.

CCS:

During the year 2018 -19, the following equip ments/hardware/software/office materials were purchased from the grant -in-aid received: (1) Beetel Phone -1 (2) Shree Lipi Software-01 (3) Lenovo Original Adapter -02.

Staff of the Centre at Registration Counter of the Conference

STAFF MEMBERS AS ON MARCH 31, 2019

AERC STAFF:

Sr. No.	Name	Designation
1	Dr. Mahesh Pathak	Hon. Adviser
2	Dr. S. S. Kalamkar	Director
3	Dr. Kinjal V. Ahir	Hon. Deputy Director
4	Dr. Hemant Sharma	Research Officer
5	Shri M. R. Ojha	Research Associate
6	Shri M C Makwana	Research Associate
7	Shri Kalpana Kapadia	Research Associate
8	Shri Thansingh Parihar	Research Associate
9	Shri Deep K Patel	Res. & Ref. Asstt. Lib.
10	Shri D.N. Thakkar	Office Superintendent
11	Shri Vinod D Parmar	P.A. to Director
12	Shri P. J. Pat el	Account Assistant
13	Shri N. J. Amin	Jr. Clerk/Typist
14	Shri Subrat Kumar Nishanka	Research Fellow
15	Ms. Prachi S. Patel	Research Fellow

COST OF CULTIVATION SCHEME

Staffing Pattern as on March 31, 2019

OFFICE STAFF

Sr. No.	Name	Designation
1	Dr. S. S. Kalamkar	Hon. Director
2	Dr S R Bhaiya	Field Officer
3	Shri G S Machhi	Assistant Statistician
4	Shri R I Patel	Agri. Supervisor
5	Shri B P Pandya	Field Supervisor
6	Shri H P Makwana	Field Supervisor
7	Shri H U Padhiyar	Field Supervisor
8	Shri V C Chudasama	Field Supervisor
9	Shri A B Chaudhary	Field Supervisor
10	Shri B M Solanki	Jr.Clerk/Typ.
11	Ms. R J Machhi	Jr.Clerk/Typ.
12	Ms. K H Patel	Jr.Clerk/Typ.
13	Shri J N Singh	Computer
14	Shri F G Vohra	Computer
15	Shri R C Mistry	Computer
16	Shri Ms. B N Patel	Computer
17	Shri M R Rana	Computer
18	Shri V C Harijan	Peon
FIELD STAFF		
19	Shri P.C.Patel	Agri. Asst.
20	Shri C.G.Baria	Agri. Asst.
21	Shri A.J.Sherathiya	Agri. Asst.
22	Shri Jashmat.D.Chauhan	Agri. Asst.
23	Shri L.S.Vidja	Agri. Asst.
24	Shri A.I.Vora	Agri. Asst.
25	Shri A.D.vaghela	Agri. Asst.
26	Shri J.V.patel	Agri. Asst.
27	Shri B.K.Patel	Agri. Asst.
28	Shri G.B.patel	Agri. Asst.
29	Shri Bharat.K.patel	Agri. Asst.
30	Shri H.M.Pandya	Agri. Asst.
31	Shri D.G.Patel	Agri. Asst.
32	Shri M.N.Singala	Agri. Asst.
33	Shri S.R.Chaudhary	Agri. Asst.
34	Shri J.K.Patel	Agri. Asst.
35	Shri S.B.Parmar	Agri. Asst.
36	Shri J.N.patel	Agri. Asst.

37	Shri S.C.padhiyar	Agri. Asst.
38	Shri A.K.Mistry	Agri. Asst.
39	Shri S.A.Panchal	Agri. Asst.
40	Shri K.J.Bhoraniya	Agri. Asst.
41	Shri J.D.Chauhan	Agri. Asst.
42	Shri K.M.Baldha	Field Man
43	Shri H.B.Patel	Field Man
44	Shri P.M.Makwana	Field Man
45	Shri S.C.Bhoi	Field Man
46	Shri P.S.Patel	Field Man
47	Shri M.S.Parmar	Field Man
48	Shri D.D.Vanvi	Field Man
49	Shri A.P.Rabadia	Field Man
50	Shri D.S.Vaghela	Field Man
51	Shri H.D.Bhoi	Field Man
52	Shri S.C.Machhi	Field Man
53	Shri R.B.Patel	Field Man
54	Shri V.H.Chaudhary	Field Man
55	Shri A.B.Prajapaati	Field Man
56	Shri B.M.patel	Field Man
57	Shri B.B.Mobh	Field Man
58	Shri T.P.Parekh	Field Man
59	Shri B R Patel	Field Man
60	Shri Nirav P Patel	Field Man
61	Shri J J Patel	Field Man
62	Shri Machhi R S	Field Man
63	Shri Dabhi L C	Field Man
64	Shri Sharma S J	Field Man
65	Shri Velari P Di	Field Man
66	Shri Parmar K G	Field Man
67	Shri V B Bhoi	Field Man
68	Shri V C Rathava	Field Man
69	Shri S H Karamata	Field Man
70	Shri S V Bhoi	Field Man
71	Shri Shri K P Tadvi	Field Man
72	Shri U M Nai	Field Man

AUDITED STATEMENT OF ACCOUNTS

The grant-in-aid received from the Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India and other agencies and Expenditure incurred during 2018-19 is presented below. The audited utilization certificate is submitted to the Ministry in the first week of April, 2019.

AERC		Amount in Rs.
i)	Unspent Balance as on April 1, 2018	15,95,910.98
ii)	Grant-in-aid received during 2018-19	1,40,00,000.00
iii)	Other Income 1. Income from Bank Interest Rs. 1,11,989/- 2. Notice Pay RS. 83,250/-	1,95,239.00
	Total	**1,57,91,149.98**
	Total Expenditure during 2018-19	1,38,87,851.85
	Unspent Balance as on March 31, 2019	19,03,298.13

CCS		Amount in Rs.
i)	Unspent Balance as on April 1, 2019	70,50,288.22
ii)	Grant-in-aid received during 2018-19	3,50,00,000.00
iii)	Other Income 1. Income from Bank Interest Rs. 1,11,989/-	4,781.00
	Total	**4,20,55,069.22**
	Total Expenditure during 2018-19	4,20,42,084.45
	Unspent Balance as on March 31, 2019	12,984.77

Rashmita Ganatra & Associates

Chartered Accountants

AUDITORS REPORT

For Rashmita Ganatra & Associates
Chartered Accountants

Place : Anand

Agro-Economic Research Centre
Sardar Patel University, Vallabh Vidyanagar – 388 120 (Gujarat)
GFR 12 – A
FORM OF UTILIZATION CERTIFICATE
FOR AUTONOMOUS BODIES OF THE GRANTEE ORGANIZATION

1. Name of the Scheme: Agro-Economic Research Centre, Sardar Patel University, Vallabh Vidyanagar, Anand, Gujarat.

Component wise utilization of grants:

Details of grants position at the end of the year 2018-19

Agro-Economic Research Centre
Sardar Patel University, Vallabh Vidyanagar – 388 120 (Gujarat)

Place : Vallabh Vidyanagar

Place : Anand

AGRO-ECONOMIC RESEARCH CENTRE
SARDAR PATEL UNIVERSITY
VALLABH VIDYANAGAR – 388 120, GUJARAT
FORMS
FORM GFR 19-A
(See Government of India's Decision (1) below Rule 150)

Audited Utilization Certificate for the Period from 01-04-2018 to 31-03-2019

Sr. No.	Letter No. & Date	Amount (Rs.)	
1	G.20017/1/2018-EA Dt. 03-07-2018 Plan	27,05,000/-	Certified that Rs. 1,40,00,000/- of grant-in-aid was released during 2018-19 in favour of Registrar, Sardar Patel University, Vallabh Vidyanagar for Agro-Economic Research Centre, Vallabh Vidyanagar – 388120, Gujarat vide Ministry/Department letter nos. shown in the margin and Rs. 15,95,910.98 was on account of unspent balance of previous year. During the year, the interest income is Rs. 1,11,989.00. Thus, aggregates fund of Rs. 1,57,73,899.98 was available with the Centre for the financial year 2018-19 ending on 31st March 2019. A sum of Rs. 1,38,54,601.85 has been utilized for the purpose of expenditures on Agro-Economic Research Centre, Vallabh Vidyanagar, Gujarat for which it was sanctioned. The balance amount is **Rs. 19,03,298.13** as on 31-3-2019.
2	G.20017/1/2018-EA Dt. 18-09-2018 Plan	34,10,000/-	
3	G.20017/1/2018-EA Dt. 19-12-2018 Plan	64,85,000/-	
4	G.20017/1/2018-EA Dt. 27-03-2019 Plan	14,02,000/-	
		1,40,00,000/-	

For Rashmita Ganatra & Associates
Chartered Accountants

Dr. S. S. Kalamkar
Director,
Agro-Economic Research Centre
Vallabh Vidyanagar- 388 120 (Gujarat)

Place : Vallabh Vidyanagar

Place : Anand

Agro Economic Research Centre
Sardar Patel University, Vallabh Vidyanagar

Memo of Receipts & Payments of the Grant of Agro Economic Research Centre for the states of Gujarat and Rajsthan Sardar Patel University, Vallabh Vidyanagar, Dist Anand, Gujarat for the year 2018-2019 (Period from 1.04.2018 to 31.03.2019)

RECEIPTS	Amount(Rs.)	Amount(Rs.)	PAYMENTS	Amount(Rs.)	Amount(Rs.)
(A) Balance on hand as on 01.04.2018			**A) ESTABLISHMENT**		
Cash on hand	148.63		Salary to staff	176980.00	
Telephone Deposit	2000.00	2148.63	Pay band	8188861.00	
			Grade Pay	244067.00	
(B) Bank balance as on 01.04.2018			Dearness Allowance	2073096.00	
Corporation Bank SB A/c 1017		8636702.72	Arrears of D.A	217962.00	
			H.R.A	301440.00	
			Medial Allowance	36580.00	
			Conveyance Allowance	11413.00	
(C) Other Fund as on 01.04.2018		422.43	Group Accident Insurance Premium	3304.00	
S.P. University Adv A/c			Centre contribution to PF	852231.00	
			P L Encashment	134527.00	
			Gratuity	1200000.00	
			Honorarium	16000.00	
			Travelling and Halting	100325.00	
			Temporary Staff Salary	84000.00	
(D) Grant in aid :			Arrears of 7th Pay Scales to NonTeaching Staff	1687482.00	
1st Installment 2018-2019	2709000.00			13274675.00	
2nd Installment "	3410000.00		Less : Notice Pay Recovery	83255.00	13191420.00
3rd Installment "	6480000.00				
4th Installment "	1402000.00	14000000.00			
			B) NON ESTABLISHMENT		
(E) Other Income :			Computers & Accessories, Software purchases	5100.00	
Income From Bank Interest (SB A/c)		111989.00	Furniture & Equipments	96381.00	91481.00
			Maintenance & Repairs		
			Computer Maintenance and Repairs	14060.00	
			Other Repairs and maintenance Expenses	23136.00	37196.00
			Postage & Telephone		
			Postage & Telegraph and Cash Postage	39287.00	
			Telephone Exp	15190.00	54477.00
Total C/F		**22751263.78**			**13344574.00**

RECEIPTS	Amount(Rs.)	Amount(Rs.)	PAYMENTS	Amount(Rs.)	Amount(Rs.)
Total B/F		**22751263.78**			**13344574.00**
			Stationery & Printing		
			Printing & Binding charge	103564.00	
			Stationery Exp	3940.00	
			Duplicating(Zerox) Exp	5278.00	111882.00
			Books & Periodicals		
			Library Books	6281.00	
			Periodicals & Subscription	45167.00	51429.00
			Other Expenses		
			Legal and Professional Fees Expenses	29967.00	
			Registration Fees,Work Shop participation exp	103600.00	
			Advertisement Expenses	1911.00	
(F) Project Funds					
CC Scheme with AERC on 31.03.2019		2711.37	Elctricity Expenses	3000.00	
			Recreational Expense	4710.00	
			Misc & Contingency Expenses	84759.85	
			Foundation Day Expenses	69670.00	296717.85
			C) Balance of CCS with AERC as on 31.3.18		7042941.37
			D) Fund with SPU A/c as on 31.03.19		422.43
			E) Balance in Bank A/c as on 31.3.19		
			Corporation Bank SB a/c 1017		1896230.87
			F) Telephone Deposit		2000.00
			G) Cash on hand 31.03.2019		7778.63
Grand Total		**22753975.15**			**22753975.15**

As per our reports of even date attached

Notes : 1. Accounts are maintained on Cash Basis.
2. Depreciation not charge on fixed assets.
3. The Accounts are subject to the balance confirmation of Sardar Patel University, Vallabh Vidyanagar.

Dr. S. S. Katarmkar
Director
Agro-Economic Research Centre
Sardar Patel University
Vallabh Vidyanagar - 388 120
Dt- Anand, Gujarat

Place : Vallabh Vidyanagar
Date : 23-05-2019

For Rashmita Ganatra & Associates
Chartered Accountants
(ICAI Reg No. 131441W)

Rashmita Ganatra
Proprietor
(M. No. 047248)

Place : Anand
Date : 23-05-2019

Rashmita Ganatra & Associates

Chartered Accountants

[illegible]

AUDITORS' REPORT

[illegible]

Place : Anand

Cost of Cultivation Scheme for Gujarat,
Agro-Economic Research Centre
Sardar Patel University, Vallabh Vidyanagar – 388 120 (Gujarat)

GFR 12 – A

FORM OF UTILIZATION CERTIFICATE
FOR AUTONOMOUS BODIES OF THE GRANTEE ORGANIZATION

1. Name of the Scheme: Cost of Cultivation for Gujarat, Agro-Economic Research Centre, Sardar Patel University, Vallabh Vidyanagar, Anand, Gujarat.

2. [illegible]

3. [illegible]

4. [illegible]

[illegible]

Cost of Cultivation Scheme for Gujarat,
Agro-Economic Research Centre
Sardar Patel University, Vallabh Vidyanagar – 388 120 (Gujarat)

[illegible]

For Rashmita Ganatra & Associates
Chartered Accountants

Place : Vallabh Vidyanagar

Place : Anand

COMPREHENSIVE SCHEME TO STUDY THE COST OF CULTIVATION OF PRINCIPAL CROPS IN GUJARAT
AGRO-ECONOMIC RESEARCH CENTRE
SARDAR PATEL UNIVERSITY
VALLABH VIDYANAGAR – 388 120,
GUJARAT

FORMS
FORM GFR 19-A
(See Government of India's Decision (1) below Rule 150)

Audited Utilization Certificate

Sr. No.	Letter Nos. & Dates	Amount (Rs.)	
1	[illegible] Dt. 18.06.2018 PLAN	47,00,000/-	Certified that Rs. 3,50,00,000/- of grant-in-aid was released during 2018-19 in favour of Registrar, Sardar Patel University, Vallabh Vidyanagar for Cost of Cultivation Scheme, Agro-Economic Research Centre, Vallabh Vidyanagar – 388120, Gujarat vide Ministry/Department letter Nos. shown in the margin, and Rs. 70,82,288.22 was on account of unspent balance of previous year. [illegible] has been utilized for the purpose of expenditure on Cost of Cultivation Scheme, Agro Economic Research Centre, Vallabh Vidyanagar, Gujarat for which it was sanctioned. The balance amount is **Rs. 12,984.77** as on 31st March, 2019
2	[illegible] Dt. 28.09.2018 PLAN	1,00,00,000/-	
3	[illegible] Dt. 04.12.2018 PLAN	1,18,50,000/-	
4	[illegible] Dt. 25.03.2019 PLAN	[illegible]	
		3,50,00,000/-	

Honorary Director
Cost of Cultivation Scheme, Agro-Economic Research Centre
Sardar Patel University, Vallabh Vidyanagar 388 120 (Guj.)

For Rashmita Ganatra & Associates
Chartered Accountants

Place : Vallabh Vidyanagar

Place : Anand

COST OF CULTIVATION SCHEME
AGRO ECONOMIC RESEARCH CENTRE
Memo of Receipts & payments of the Comprehensive Scheme to study the Cost of Cultivation of Principal Crops in Gujarat.
for the year 2018-2019 (from Period 1.04.2018 to 31.03.2019)

RECEIPTS	Amount(Rs.)	Amount(Rs.)	PAYMENTS	Amount(Rs.)	Amount(Rs.)
(A) Opening Balance with AERC as on 01.04.2018		7042541.37	(A) ESTABLISHMENT		
			Salary to staff	95269.00	
			Pay Band	31041949.00	
			Grade Pay	274700.00	
			Clearness Allowance	3632311.00	
(B) Balance in Bank as on 01.04.2018 Corporation Bank SB A/c 7754		747.85	House Rent Allowance	1173888.00	
			Medical Allowance	219000.00	
			Conveyance Allowance	9600.00	
(C) Cash on Hand		6586.00	Temporart staff salary	114000.00	
			Group Insurance Premium A/c	17228.00	
			Scheme contribution to PF	3308725.00	
			Salary Difference to Adhoc Staff	9645.00	
			Honorarium Expenses	119136.00	
			Travelling and Halting	289112.00	
			L.T.C Expenses	115424.00	
			Arrears of D.A	786583.00	
(D) Grant in aid :					
1st Installment 2018-2019	4768000.00		Reimbursement of Medical Expenses	65329.00	41273696.00
2nd Installment "	10000000.00				
3rd Installment "	11853000.00				
4th Installment "	8382000.00	35000000.00	(B) NON ESTABLISHMENT		
			Computers & Accessories, Software Purchases	7650.00	
			Furniture & Equipments	675.00	8325.00
(E) Other Income :					
Income From Bank Interest (SB A/c)		4781.00	Maintenance & Repairs		
			Computer Maintenance and Repairs	3600.00	
			Other Repairs and Maintenance Expenses	43130.00	46730.00
			Postage & Telephone		
			Postage & Telegraph and Cash Postage	30821.50	
			Telephone Exp	8140.00	38961.50
			Stationery & Printing		
			Printing & Binding charge	199270.00	
			Stationery Exp	2079.00	
			Duplicating(Zerox) Exp	15338.00	216687.00
Total C/F		42055069.22			41583406.50

RECEIPTS	Amount(Rs.)	Amount(Rs.)	PAYMENTS	Amount(Rs.)	Amount(Rs.)
Total B/F		42055069.22			41583406.50
			Books & Periodicals		
			Library Books	27779.00	
			Periodicals & Subscription	18361.00	46140.00
			Other Expenses		
			Legal and Professional Fees	93475.00	
			Registration Fees, Workshop/Training expense	251971.00	
			Misc & Contt Exp	63476.95	
			Recreational Expense	2115.00	
			Electricity Expenses	1500.00	412537.95
			(C) Balance in Bank as on 31/03/19 Corporation Bank SB A/c 7754		5888.00
			(D) Closing Balance transfer to AERC 31/3/19		2711.37
			(E) Cash on Hand		4384.50
Grand Total		42055069.22			42055069.22

As per our report of even date attached
Notes : 1. Accounts are maintained on cash basis.
2. Depreciation not charge on fixed assets.
3. The Accounts are subject to the balance confirmation of Sardar Patel University, Vallabh Vidyanagar.

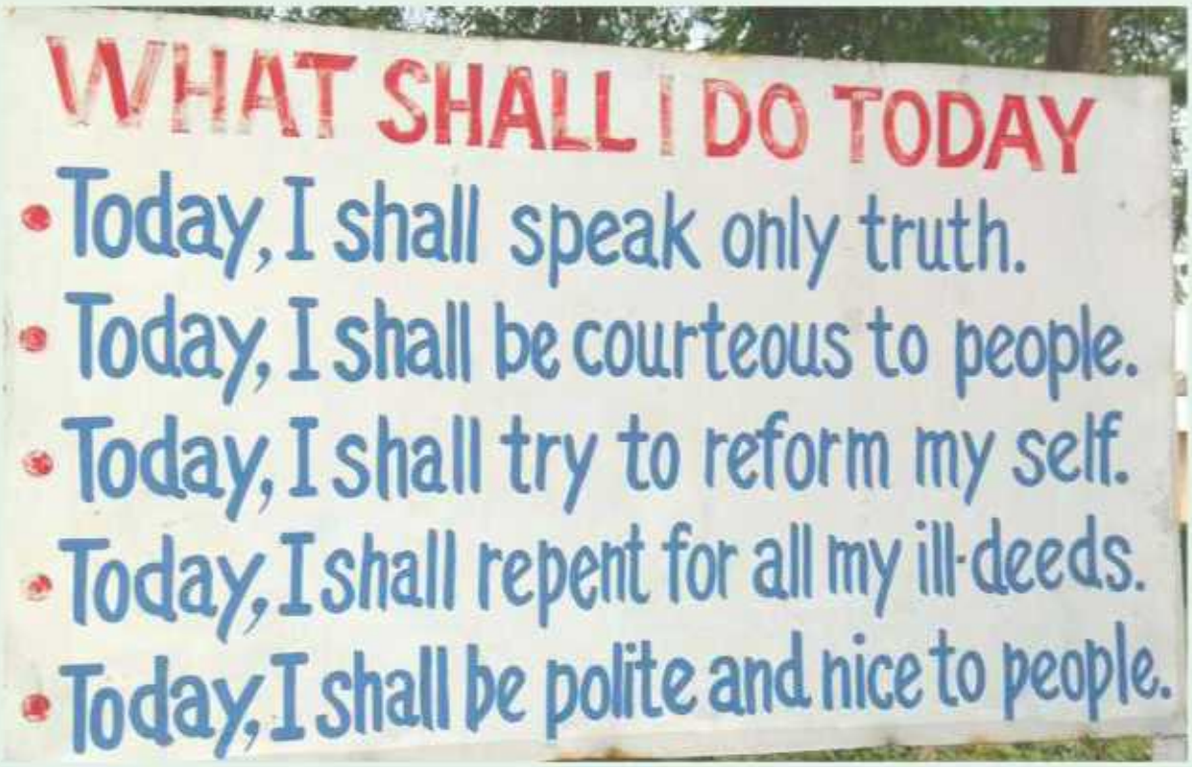
Dr. S. S. Kalamkar
Honorary Director
Cost of Cultivation Scheme
Agro Economic Research Centre
Sardar Patel University
Vallabh Vidyanagar - 388 120
Dt. Anand, Gujarat

Place : Vallabh Vidyanagar
Date : 23-05-2019

For Rashmita Ganatra & Associates
Chartered Accountants
(ICAI Reg. No. 131441W)

Rashmita Ganatra
Proprietor
(M. No. 047248)

Place : Anand
Date : 23-05-2019



VERKA Milk Federation, Punjab, Ludhiana, April 6, 2018

Staff with MoA&FW, GoI, New Delhi and IASRI, New Delhi officers on April 23, 2018

Staff with MoA & FW officers, GOI, on September 24, 2018

Sardar Patel University

Agro-Economic Research Centre

For the states of Gujarat and Rajasthan

(Ministry of Agriculture & Farmers Welfare, GOI)

H.M. Patel Institute of Rural Development
Opp. Nandalaya Temple, Post Box No. 24

Sardar Patel University

Vallabh Vidyanagar 388120, Anand, Gujarat (India)

Ph. No. +91-2692-230106, 230799, 292865; Fax +91-2692-233106
Email: director.aerc@gmail.com; directoraercgujarat@gmail.com
Websites: www.aercspu.ac.in, *www.spuvvn.edu*