



Vision 2050



Zonal Project Directorate, Zone-VI
Indian Council of Agricultural Research





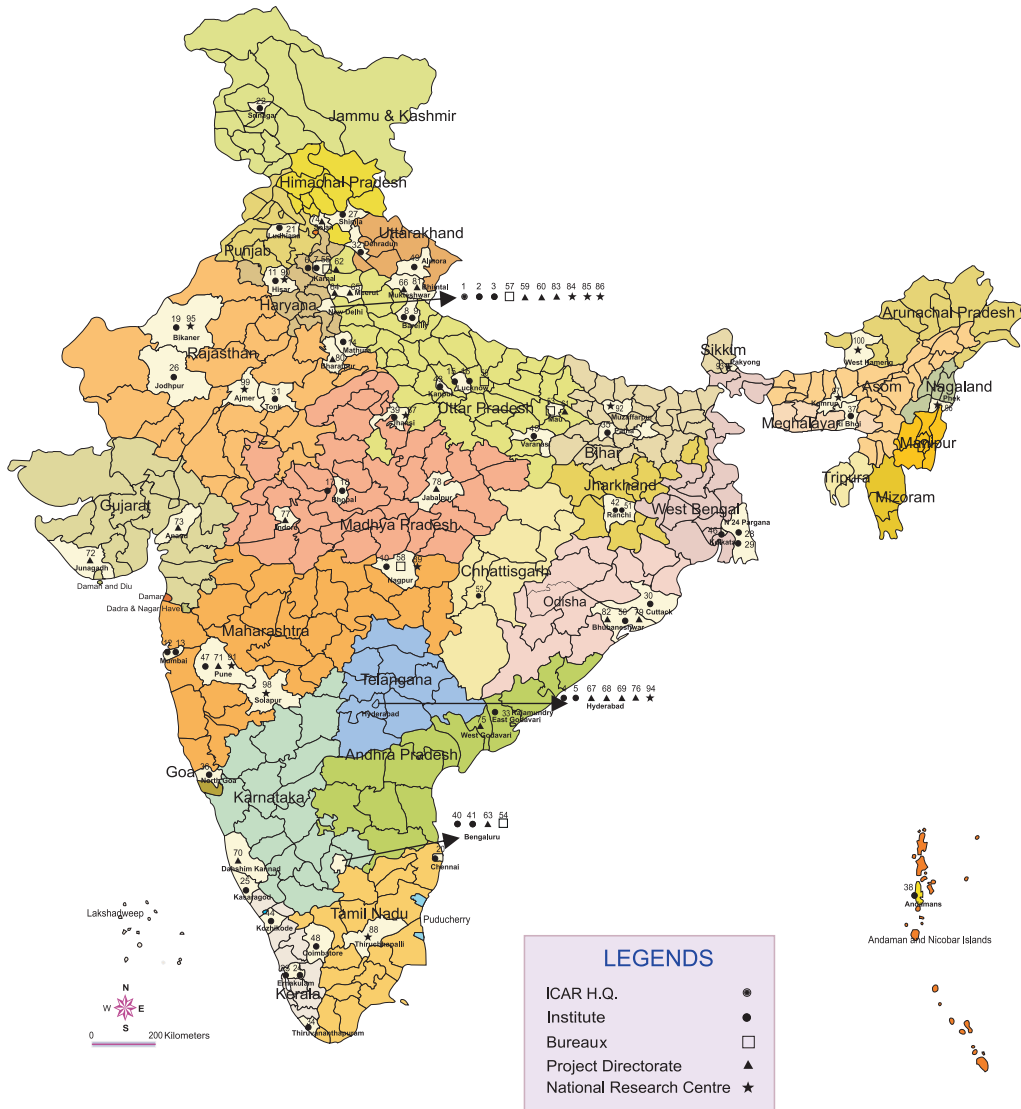
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Institutes, Bureaux, Directorates and National Research Centres



INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Agricultural Universities




● 64 Research Institutes ● 6 Bureaux ● 15 National Research Centres ● 15 Project Directorates

○ State Agricultural Universities
 ■ Central Universities with Agricultural faculties
 ☆ Central Agricultural Universities
 ● Deemed Universities



Vision
2050

ICAR-Zonal Project Directorate, Zone-VI
(Indian Council of Agricultural Research)
CAZRI Campus, Jodhpur 342 005

www.pdadmas.ernet.in 

Printed : July 2015

All Rights Reserved

© 2015, Indian Council of Agricultural Research, New Delhi



Laser typeset at M/s Print-O-World, 2568, Shadipur, New Delhi 110008 and printed at
M/s Royal Offset Printers, A-89/1, Naraina Industrial Area, Phase-I, New Delhi 110 028.

संदेश



भारतीय सभ्यता कृषि विकास की एक आधार रही है और आज भी हमारे देश में एक सुदृढ़ कृषि व्यवस्था मौजूद है जिसका राष्ट्रीय सकल घरेलू उत्पाद और रोजगार में प्रमुख योगदान है। ग्रामीण युवाओं का बड़े पैमाने पर, विशेष रूप से शहरी क्षेत्रों में प्रवास होने के बावजूद, देश की लगभग दो-तिहाई आबादी के लिए आजीविका के साधन के रूप में, प्रत्यक्ष या अप्रत्यक्ष, कृषि की भूमिका में कई बदलाव होने की उम्मीद नहीं की जाती है। अतः खाद्य, पोषण, पर्यावरण आजीविका सुरक्षा के लिए तथा समावेशी विकास हासिल करने के लिए कृषि क्षेत्र में स्थायी विकास बहुत जरूरी है।

पिछले 50 वर्षों के दौरान हमारे कृषि अनुसंधान द्वारा सृजित की गई प्रौद्योगिकियों से भारतीय कृषि में बदलाव आया है। तथापि, भौतिक रूप से (मृदा, जल, जलवायु), बायोलोजिकल रूप से (जैव विविधता, हॉस्ट-परजीवि संबंध), अनुसंधान एवं शिक्षा में बदलाव के चलते तथा सूचना, ज्ञान और नीति एवं निवेश (जो कृषि उत्पादन को प्रभावित करने वाले कारक हैं) आज भी एक चुनौती बने हुए हैं। उत्पादन के परिवेश में बदलाव हमेशा ही होते आए हैं, परन्तु जिस गति से यह हो रहे हैं, वह एक चिंता का विषय है जो उपयुक्त प्रौद्योगिकी विकल्पों के आधार पर कृषि प्रणाली को और अधिक मजबूत करने की मांग करते हैं।

पिछली प्रवृत्तियों से सबक लेते हुए हम निश्चित रूप से भावी बेहतर कृषि परिदृश्य की कल्पना कर सकते हैं, जिसके लिए हमें विभिन्न तकनीकों और आकलनों के मॉडलों का उपयोग करना होगा तथा भविष्य के लिए एक ब्लूप्रिंट तैयार करना होगा। इसमें कोई संदेह नहीं है कि विज्ञान, प्रौद्योगिकी, सूचना, ज्ञान-जानकारी, सक्षम मानव संसाधन और निवेशों का बढ़ता प्रयोग भावी वृद्धि और विकास के प्रमुख निर्धारक होंगे।

इस संदर्भ में, भारतीय कृषि अनुसंधान परिषद के संस्थानों के लिए विजन-2050 की रूपरेखा तैयार की गई है। यह आशा की जाती है कि वर्तमान और उभरते परिदृश्य का बेहतर रूप से क्रिया गया मूल्यांकन, मौजूदा नए अवसर और कृषि क्षेत्र की स्थायी वृद्धि और विकास के लिए आगामी दशकों हेतु प्रासंगिक अनुसंधान संबंधी मुद्दे तथा कार्यनीतिक फ्रेमवर्क काफी उपयोगी साबित होंगे।

राम मोहन सिंह

(राधा मोहन सिंह)

केन्द्रीय कृषि मंत्री, भारत सरकार

Foreword

Indian Council of Agricultural Research, since inception in the year 1929, is spearheading national programmes on agricultural research, higher education and frontline extension through a network of Research Institutes, Agricultural Universities, All India Coordinated Research Projects and Krishi Vigyan Kendras to develop and demonstrate new technologies, as also to develop competent human resource for strengthening agriculture in all its dimensions, in the country. The science and technology-led development in agriculture has resulted in manifold enhancement in productivity and production of different crops and commodities to match the pace of growth in food demand.

Agricultural production environment, being a dynamic entity, has kept evolving continuously. The present phase of changes being encountered by the agricultural sector, such as reducing availability of quality water, nutrient deficiency in soils, climate change, farm energy availability, loss of biodiversity, emergence of new pest and diseases, fragmentation of farms, rural-urban migration, coupled with new IPRs and trade regulations, are some of the new challenges.

These changes impacting agriculture call for a paradigm shift in our research approach. We have to harness the potential of modern science, encourage innovations in technology generation, and provide for an enabling policy and investment support. Some of the critical areas as genomics, molecular breeding, diagnostics and vaccines, nanotechnology, secondary agriculture, farm mechanization, energy, and technology dissemination need to be given priority. Multi-disciplinary and multi-institutional research will be of paramount importance, given the fact that technology generation is increasingly getting knowledge and capital intensive. Our institutions of agricultural research and education must attain highest levels of excellence in development of technologies and competent human resource to effectively deal with the changing scenario.

Vision-2050 document of ICAR-Zonal Project Directorate, Zone-VI (ZPD), Jodhpur has been prepared, based on a comprehensive assessment of past and present trends in factors that impact agriculture, to visualise scenario 35 years hence, towards science-led sustainable development of agriculture.

We are hopeful that in the years ahead, Vision-2050 would prove to be valuable in guiding our efforts in agricultural R&D and also for the young scientists who would shoulder the responsibility to generate farm technologies in future for food, nutrition, livelihood and environmental security of the billion plus population of the country, for all times to come.



(S. AYYAPPAN)

Secretary, Department of Agricultural Research & Education (DARE)
and Director-General, Indian Council of Agricultural Research (ICAR)
Krishi Bhavan, Dr Rajendra Prasad Road,
New Delhi 110 001

Preface

The Krishi Vigyan Kendra an innovative institution under the Indian Council of Agricultural Research engaged in the assessment, refinement and dissemination of technologies and products for enhancing the production, diversification of Indian agriculture and promoting the entrepreneurship in each district of the country. The comprehensive extension initiatives under the guidance of ICAR have led to notable accomplishment in the management of natural resources, input use efficiency, climate resilience, secondary agriculture and economic transformation of farmers through technological interventions. The market led and scientific technology driven agriculture is duly supported by appropriate institutional mechanism, enabling environment and developmental policies.

Chronologically the ICAR institutes have prepared first vision 2020 in the last year of 20th century to counter the challenges and provide solutions. Later “Perspective Plan 2025 was prepared by all the institutes to address the changes that had taken place. Zonal Coordinating Unit upgraded to Zonal Project Directorates in 2009 have their first vision 2030. The present document on Vision 2050 of Zone-VI articulates innovative extension strategies to overcome challenges and tap the opportunities by harnessing the potential of agricultural research and undertaking boundary less partnership with different stakeholders in food supply chain at national and international level with respect to Zone-VI comprising of Rajasthan and Gujarat states.

I would like to express my gratitude to Dr. S. Ayyappan, Secretary DARE & Director General, ICAR, New Delhi, for his motivation and invaluable guidance in preparing Vision 2050 document for ZPD, Zone-VI. I am grateful to Dr. A.K. Singh, DDG (Agril. Extn.) for his valuable suggestions in preparing this document. I am thankful to ADGs and all other Zonal Project Directorates for their moral support and valuable suggestions in finalizing this document.

Efforts put up by Mr. P. K. Satapathy, Ms Aruna Sharma, Sh N S Gehlot, and Sh, Permod Sharma in bringing out this document are worth appreciable.

I am quite sure that the Vision – 2050 of Zone-VI would provide a direction to planners, policy makers, executioners, development

departments and different stakeholders for achieving higher sustainable and inclusive agricultural growth in Zone-VI.

P.P. Rohilla
Zonal Project Director
ICAR-Zonal Project Directorate, Zone-VI
CAZRI Campus, Jodhpur

Contents

<i>Message</i>	<i>iii</i>
<i>Foreword</i>	<i>v</i>
<i>Preface</i>	<i>vii</i>
1. Introduction	1
2. Agricultural Scenario in Zone-VI	3
3. ZPD Zone-VI 2050	8
4. Harnessing NARS in Zone-VI	10
6. Strategy and FrameworkTargets	14
7. Epilogue	16
<i>Annexure</i>	17

Introduction

The frontline extension system of Indian Council of Agricultural Research presently includes a network of 642 Farm Science Centers, commonly known as Krishi Vigyan Kendras (KVK). Forty-four more KVKs are to be established during XII five Year Plan. KVKs stand as a bridge between the research laboratories and the application of modern agricultural sciences in rural India. They are striving for a holistic development of agriculture including horticulture, livestock, fisheries, processing product development and value addition and are giving appropriate advice to the farmers so that production becomes demand-driven, market led and ultimately results in the enhanced income and livelihood security of farmers. To meet the ever growing needs of knowledge intensive agriculture, appropriate means and mechanism have been developed so that there is a continuous flow of knowledge, techniques and technologies from the research institutes and universities to KVKs for minimizing the time lag between generations of technology and its awareness.

These KVKs are monitored by 8 Zonal Project Directors (ZPD) located at different parts of the country namely, Ludhiana (I), Kolkata (II), Barapani (III), Kanpur (IV), Hyderabad (V), Jodhpur (VI), Jabalpur (VII) and Bangalore (VIII).

Zonal Project Directorate, Zone-VI is located at Jodhpur, comprises of two states namely, Rajasthan and Gujarat. Presently, there are 71 KVKs in this zone and 7 more KVKs are to be established during this plan period. Out of 71 KVKs, 50 are being run by six state agricultural universities 5 by ICAR Institutes and 16 by leading Non-Government Organizations (NGOs) who provide strong technical backstopping.

Mandate of the Directorate

- Formulation and implementation of plans of KVKs
- Monitoring and evaluation
- Infrastructure development and financial management
- Coordination

Mandate of KVK

Technology assessment, refinement and demonstration of technologies/products.

Activities of KVK

- On-farm testing to identify the location specificity of agricultural technologies under various farming systems.
- Frontline demonstrations to establish production potentials of technologies on the farmers' fields.
- Training of farmers to update their knowledge and skills in modern agricultural technologies.
- Training of extension personnel to orient them in the frontier areas of technology development.
- Work as resource and knowledge centre of agricultural technology for supporting initiatives of public and voluntary sector for improving the agricultural economy of the district.



Agricultural Scenario in Zone-VI

Zonal Project Directorate, Zone-VI covers Rajasthan, Gujarat, Daman, Diu, Dadra & Nagar Haveli (561947 sq. km.). But union territories have not established KVKs as priorities are focused on tourism and industries.

Rajasthan is the largest state of Indian union covering 342,239 sq. km. area (10% of India) which support 6.8 billion human and 4.91 billion livestock. Gujarat has a total of 196024 sq. km. area which support 6 billion human 2.2 billion livestock. Rajasthan is predominantly agricultural and pastoral land. The climate of Rajasthan varies from semi-arid to arid on the west of Aravali and semi-arid to sub-humid on the east of Aravali. The climate of Gujarat ranges from arid in Kutch to sub-humid humid in Dangs and Valsad. The mean annual rainfall (low & erratic) in the west ranges from 100-400 mm, while it ranges from 250 mm in Kutch to 2000 mm in Dangs. These two states together represent 80 percent of total Indian arid region which spread over 0.32 million sq. km. Undulating sand dunes, low and erratic rainfall, limited water and extreme temperature are some of the main characteristic of harsh climate in this region. From ancient times, animal rearing has been the main occupation of the people but arable farming has been in vogue for fulfillment of ever increasing food requirement. The major soils are entisols, inceptisols, arid-soils and vertisol in Rajasthan while in Gujarat it is black coastal, alluvial, alluvium, entisol, brown alluvium. These two states have 7.3 lakh hectare in Rajasthan and 16.9 lakh hectare in Gujarat as saline sodic soils. Out of 33 districts, 31 districts have acute shortage of groundwater due to over exploitation in Rajasthan. In Gujarat northern districts have acute shortage of water. Plain areas have canal network and ground water potential while hilly tract denuded have shortage of water due to runoff. Pearl millet, sorghum, maize, moongbean, urd, sesame, soybean, cotton, groundnut, wheat, clusterbean, barley, wheat, gram, pigeon-pea, mustard, spices are major crops of these states. Among fruit crop mango, sapota, banana, pomegranate, bael, guava in Gujarat and ber, pomegranate, mango, citrus, kinnow are main crop in Rajasthan. Rajasthan has a share of 35% in mustard in the country while groundnut has good share in India. Spices namely cumin, coriander and funnel not only meet domestic requirement but also earn considerable foreign exchange. But productivity is low which has to be increased through dissemination of improved technologies. Average land holding ranges from

1.5 to 3.5 ha in Rajasthan and 0.8 to 2.2 ha in Gujarat which drastically declined during last 3 decades due to population explosion. Production system deteriorated due to frequent drought and declining of ground water. Canal command area are facing the problem of water logging and secondary salinization in both the states. Under such situation efficient management of limited water need more attention. Decline in land holding need attention of technologies suitable to small land holding. Burgeoning population @ 2 to 2.4 percent per annum is major threat on food supply in these states. Thus necessitate efficient management farming to augment production and enhance use of meat, fish fruits and vegetables in the region in addition to entrepreneurship development and export enhancement to provide income earning to rural youths of both the states. Both the states are facing climate change like early temperature rise at reproduction stage during rabi and frost in Rajasthan in peak winter. These situations are detrimental to crop production. More emphasis is needed to climate resilient technologies in these states. Both the states are quite rich in livestock wealth as Gir, Sahiwal, Tharparkar, Rathi, Kankej (cattle), Murah, Surti, Jafrabadi (buffalo), Sirohi and Marvari (goat), Chokla and Marwari (sheep) are prominent breed in these states. Conservation and improvement of these breeds is more important as cross breeding resulted mixed type of animals producing low yield. Grass land like bani in Gujarat and sewan pasture in Rajasthan deteriorated due to biotic pressure and these need more attention to meet the fodder requirement. To enhance the production and productivity of livestock products is the key issue. The agricultural growth rate of Gujarat is 8-10% in last one decade while it was in between 2 to 4% in Rajasthan. More attention is needed on watershed management and dryland farming as 78% in Rajasthan and 65% in Gujarat of total cultivated area is rainfed. Gujarat has good marketing network but it needed more attention in Rajasthan. Processing of fruits, vegetables are needed as these states have tremendous scope in horticultural crops. In all following problems and challenges are to dealt efficiently by extension system which is very weak particularly in Rajasthan through KVKs.

Problems

- Diverse harsh climate condition
- Declining ground water and poor quality
- Low fertility of soils
- Resource poor farming community
- High temperature, wind velocity and high evapo-transpiration affect crop production
- Water logging and salinization in canal command area

- Runoff losses in southern Rajasthan and hilly district of Gujarat due to deforestation
- Sea water ingress in coastal area of Gujarat
- Soil degradation in the form of salinity and sodicity and declined fertility
- Weak extension network owing to engaged in other activities

Challenges

- Dissemination of crop resilient technologies
- Food, livelihood and income security
- Sustainable production and maintenance of environment pollution
- Conservation and improvement of soil health
- Production enhancement of livestock
- Opportunities for improved production system
- Exploring opportunities for commercial and green agriculture
- Production, processing of horticultural crops
- Agri-business intensification using ICT for promoting export in these states.

KVKs, have to intensify its activities as knowledge resource centre in the district to overcome these problems and challenges for overall development of farming community in these states.

Agro-climatic Zones: Thrust Areas and Constraints

Rajasthan is divided into 10 agro-climatic zones, while Gujarat has 8 agro-climatic zones. The details of KVKs falling in different agro-climatic zones is given in the table below:-

Agro-climatic zone	Annual rainfall (mm)	Name of KVK
1a Arid western Plains	150-350	Jodhpur & Barmer
1b Irrigated North western Plain	300-350	Hanumangarh & Sriganganagar
1c Hyper Arid and partially irrigated Western Plain	100-300	Bikaner, Jaisalmer & Churu
IIa Transitional Plain of Inland drainage	300-450	Sikar, Nagaur & Jhunjhnu
IIb Transitional Plain of Luni Basin	300-500	Jalore, Sirohi and Pali
IIIa Semi Arid Eastern Plain	450-650	Jaipur, Ajmer, Tonk & Dausa
IIIb Flood Prone Eastern Plain	500-700	Alwar, Bhartpur and Dholpur
IVa Sub-Humid Southern Plain and Aravali Hills	500-900	Bhilwara, Chittoregarh, Rajsamand & Udaipur
IVb Humid Southern Plain	525-1000	Banswara & Dungepur
V Humid South Eastern Plain	650-1150	Kota, Bundi, Jhalawar, Baran & Swai Madhopur

South Gujarat Heavy Rainfall	1500-2100	Dang & Valsad
South Gujarat Medium Rainfall	1000-1500	Surat & Bharuch
Middle Gujarat	800-1100	Anand, Panchmahal, Dahod & Baroda
North Gujarat	500-1000	Banskantha, Gandhinagar, Ahmedabad, Sabakantha, Mehsana, Patan
North-West Arid	250-400	Kutch
North Saurashtra	400-700	Amreli, Jamnagar, Rajkot & Surenderanagar
South Saurashtra	750-1000	Junagadh & Porbandar
Bhal & Coastal	650-750	Bhavnagar & Kheda

Thrust Areas

The Thrust areas of Zone-VI are given below:-

- Popularization of improved production technology for field crops, vegetables and fruit crops.
- Dissemination of dry land/rainfed farming technology.
- Conservation of soil, water and natural resources.
- Moisture conservation and low cost water harvesting technology.
- Promotion of alternate land use system through perennial cropping, including silvi-pastoral and agro-horticulture.
- Reclamation of problematic soils and efficient use of poor quality water.
- Popularization of water saving devices such as under ground cement/PVC pipe specially drip irrigation system.
- Integrated watershed management programmes.
- Pasture development.
- Non-chemical farming/organic farming.
- Vermi-culture and vermi-compost.
- Popularization of IPM, INM, IWM programmes.
- Promotion of eco-friendly bio-pesticides and bio-fertilizers.
- Diversification of farming and income supplementary programmes.
- Livestock improvement through breeding, feeding and management.
- Empowerment of farmwomen.
- Popularization of Institutional Development
- Popularization of Agro-Forestry
- Popularization of Post Harvest Technology and Value Addition
- Upliftment in socio-economic status of women through income generating programmes.
- Popularization of improved farm tools and implements.

Constraints

Rajasthan

- Declining water resources
- Low grain filling in rabi crops due to rising temperature followed by hot winds and cold waves during peak winter
- Frequent droughts and climate change affect crop production
- Water logging and secondary Salinization in canal command areas
- Saline-sodic soils and water
- Feed and fodder quantity and quality
- Availability of quality seed and agriculture inputs
- Livestock productivity
- Abiotic stress intensification
- Cropping pattern varietal preference
- Unorganized market
- Energy crisis
- Wind and water erosion

Gujarat

- Acute water shortage in arid and semi-arid regions.
- Cutting of trees and cultivation on sloppy land in hilly areas resulted soil erosion due to run off.
- Salinity, sodicity and sea water ingress in coastal areas
- 30% villages are facing fluoride and nitrate problem in ground water supply.
- Lowering ground water table in arid and semi-arid districts.
- Excessive growth and no flowering in pulses and sucking pest in cotton.
- Canal siltation, water logging and secondary salinization in canal command area.
- High climatic variability in Saurashtra, Kutch, North and Central Gujarat.
- Shift in biotic stress
- Cropping pattern and crop diversification in view of climatic change
- Farm mechanization on fragmented land holdings
- Entrepreneurship development on processing of horticultural crops



ZPD Zone-VI 2050

Zonal Project Directorate, Zone-VI functioning in Rajasthan and Gujarat is marching ahead with the vigorous support of its 71 KVKs to face complex challenges and to harness the various opportunities for the welfare of the farmers, consumers and other stakeholders in food supply chain. The efforts would be to become more responsive and vibrant leading Directorate in Rajasthan and Gujarat for fulfilling the needs of different stakeholders.

Vision

Ensure food and income security for burgeoning population under challenging climatic and economic scenario.

Mission

Human touched transformation of farming community through assessment, refinement, coordination, implementation and evaluation of ICAR's frontline extension programmes to make agriculture sustainable and an economic viable profession/enterprise.

To accomplish the vision and mission of ZPD, Zone-VI – it gives highest priority to farmers and entire strategy is based on “Farmer First” and “ARYA”. It is determined to continuously strive hard to transform KVKs into a vibrant knowledge resource centre to cater the needs of different stakeholders in each district for sustainable production and economy of India globally It would concentrate on following key areas :

Focus

- Rapid spread of location specific technology/process/products through assessment, refinement and demonstration.
- Client specific leadership in each district.
- Food and income security and maintenance of agro-eco environment and mitigating climatic change.
- Promoting entrepreneurship in various component of farming systems.
- Holistic knowledge empowerment for transfer of technology through system specific interventions like – risk prone farming, green agriculture and commercial farming.

-
- Alternate source of income for drought proofing by empowering rural youth and women through vocational training.
 - Farm-produce compatible at international marketing/trade to promote export and make sound national economy.
 - Providing fast services to benefit stakeholders through web enable systems, mobile agro advisory, kisan call centers, e-farm club and ICT, etc.
 - Establish Farmers – research – business – public administration – private – open/global market linkages in participatory mode.
 - Food back and feed forward researchers/ATMA/ and development agency.

Road Map

- Mandated activities of KVK to continue.
- Documentation of accomplishments.
- KVK intervention led entrepreneurship development.
- Innovation in resource conservation technologies refined/adopted by farming community.
- Participatory seed production.
- Maintenance of agro-eco-environment adopting integrated farming systems in farming participatory mode.
- Forward and backward linkages with line department/stakeholders.

Expected Outcome

- Technology/process.
- Knowledge resource centre in each district.
- Client specific leadership.
- Food security and maintenance of agro-eco environment.
- Employment generation.
- Enhanced export of quality product.
- Social recognition of KVK.
- Mitigating climate change through climate resilient technology.
- Strong national income at global perspective.



Harnessing NARS in Zone-VI

Krishi Vigyan Kendras under Indian Council of Agricultural Research, New Delhi would strive to harness the benefit of available technologies developed by ICAR and SAUs in increasing production, productivity, input use efficiency, reducing cost and post harvest losses, minimizing risk, and improving quality of food commodities through assessment, refinement, dissemination and vocational training of extension personnel, rural youth, farm women and farmers in Zone-VI under the guidance of Division of Agriculture Economics, ICAR, Zonal Project Directorate would evolve mechanisms for accelerating innovations through institutional and policy support in Zone-VI.

In view of dwindling resources and increasing demand for food technological challenges are becoming more complex than before these days. Radical changes in agriculture globally with the emergence of new tools, methods, techniques and extension approaches which promise technological break thorough to accomplish the mission.

Approaches

- Assessment and refinement of location specific technologies.
- Livelihood security through alternative agriculture and employment generation.
- Capacity enhancement.
- Visibility, vibrancy and accessibility of KVKs. Efforts will be concentrated on following aspects.
- Need to enhance production and productivity to feed growing population to make agriculture an economic viable profession.
- Advance the farming community in learning by engaging in participatory technology assessment and refinement.
- Prepare the young farmers by providing excellent professional training to compete in competitive world market
- Mainstreaming of gender issues and empowerment of women farmers.
- Value addition for entrepreneurship.
- Effective linkages between scientists, farmers and private for technology information exchange to counter the challenges.

Encashing Genetic Resources

NARS has done tremendous efforts in evolving varieties, breeds and technologies in the past. Conservation of genetic resources through farmers with the help of KVKs is the prime objective to provide strong feedback to NARS for further improvement. Inventory of genetic resources and technological options are to be prepared for further assessment, refinement and dissemination among farming community. KVK scientists will be made familiar to biotechnological advancement by NARS, so as these technologies may be disseminated with full swing to change the agricultural scenario in agricultural sector of Zone-VI.

Harnessing Natural Resources

Low and erratic rainfall, depletion of groundwater, deteriorations of production environment and climate change are the major issues in Rajasthan and Gujarat state. Therefore, emphasis is to be given on conservation of rainfall, soil and genetic resources through water harvesting, management of limited water and better feed management for livestock in both the states. KVKs have demonstration units on rainwater harvesting, pressurized irrigation, organic farming, precision and protected farming which will be disseminated through state development agencies through demonstration and training in Zone-VI. In place of crop/commodity based extension-integrated farming system based models are to be developed in each KVK for the holistic development of farming. Technology developed on IWM, INP, IPM would be accelerated through KVK with the help of private sector in participatory mode.

Promotion of Diversified Farming

In view of low and erratic rainfall and limited availability of water crops and technologies developed by NARS with regard to diversified agriculture will be promoted in these states. More emphasis will be given on popularizing short duration and low input requiring crops to enhance the income of farmers to counter the negative effect (like low income) of conventional practices. Extension approaches like demand driven extension, market led extension, export oriented-extension have to be promoted to harness the advantages of agricultural diversification. Post-harvest value addition, processing and dissemination have to be strengthened in respect of horticultural crops, meat and fish production, as these have vast potential in two states. ICT will be used to educate farmers on marketing aspect including processing and value addition of

different products so as the farmers may get better price of their raw produces and processed products.

Management of Energy

These two states of Zone-VI are facing the problem of energy crisis, hence the emphasis will be given on use of non-conventional energy resources and popularization of cost effective farm machinery to reduce drudgery and enhance the income of the farmers.

Holistic Dissemination of Technologies

Currently it is unidirectional single technology package approach so integrated farming system combining water harvesting and pressurized irrigation are to be promoted in arid areas (150-500 mm rainfall). In semi-arid (500-700 mm) integrated watershed management, pressurized irrigation, diversified-green agriculture, livestock and fisheries have to be promoted. In sub-humid/humid areas (800-2000mm) integrated diversified-green agriculture, watershed management, fisheries, terrace farming and management of water logged and saline soils have to be promoted.

Holistic Knowledge Empowerment in View of Climate Change

Till date routine training to different stakeholders is practiced. Now emphasis has to be given on problem-solving and decision-making training by integrating technology-generation-refinement and dissemination with efficient extension methodologies.

Human Resource Development

Capacity building to promote public-private partnership, capacity building on information technology for faster dissemination by KVKs. Training to Programme Coordinators on management from MANAGE and NAARM.

Improving Income of Trainees

Empowerment of rural youth and women through trainings to provide them alternate source of income for drought proofing.

Employment Generation

More emphasis is to be given in all KVKs for entrepreneurship development through value addition and processing of products.

Linkages

So far linkages are incomprehensive and farmer-extension only. Efforts are being made to strengthen research-extension linkages and prioritizing planning and implementation of programmes. Also, importance has to be given to farmer-research business, public administration-stakeholders-open market.

Enhancing Revenue Generation

KVKs have limited financial resources, therefore, efforts are to be made to generate revenue through taking externally funded projects, consultancy and income generation under revolving fund to demonstrate demonstration unit to benefit different stakeholders in the district.

In all, effective delivery mechanism would greatly help in bridging gap between potential and realized productivity. More far reaching, participatory information and communication technology would be involved by optimizing print and electronic delivery systems by showcasing research products for effective linking accomplishments with the stakeholders.



Strategy and Framework

The following six point strategy would be adopted to accomplish the vision and goals of Zonal Project Directorate, Zone-VI under the guidance of Indian Council of Agricultural Research, New Delhi and to enhance the efficiency and effectiveness of the KVKs (see annexure-I).

Facilitate acceleration of system specific technologies, knowledge and information

- Dissemination of system specific technologies like risk prone production, green agriculture production and commercial production through assessment and refinement and evolving different stakeholder using ICT and e-extension.
- Provide state of art on demonstration units and technology parks to educate different stakeholders.
- Establish linkages with back end service providers to disseminate NARS technology effectively.
- Awareness and sensitization on conservation of natural resources, safety concern and better marketing etc.
- Effective utilization of human and finance resources
- Formulate target oriented eco-region wise extension programmes cutting across disciplines within and outside the NARS.
- Prioritize demand driven and resource based extension programmes focusing on small and marginal farmers in relation to emerging market opportunities.
- Harness synergies of different stakeholders in dissemination of technology and information.
- Updating knowledge of extension functionaries, rural youth, farm women and different stakeholders.
- Problem-solving and decision-making training by integrating technology generation departments – refinement and dissemination with efficient extension mechanism.
- Emphasis on entrepreneurship development.
- Human Resource Development – Knowledge strengthening of KVK staff through capacity building to promote public-private farmer partnership.
- Capacity building on ICT for faster dissemination of technologies.
- Capacity building climate resilient technologies and extension management of KVKs Scientists.

Linkages

- Strengthening research – extension linkages for implementation of programme on prioritized issues.
- Farmers – research business – public administration – stake holders – open/global market linkages to benefit farmers and improve national economy.

Initiative at KVK Level

- Technological modules for climate change
- Export and market led extension approaches
- Agri-alert and agro-advisory through kisan mobile
- Technology parks for faster dissemination of innovative technologies
- Participatory seed production and plant material in model villages
- Backstopping to Gram Panchayat, NGOs and farmers group on latest technologies.

In the implementation of vision and mission of ZPD, Zone-VI, our KVKs will develop into knowledge resource centre to provide client specific leadership, food and income security, improve agri-eco-environment, enhance export of quality product, mitigate climatic change and guide development departments in Rajasthan and Gujarat.



Epilogue

Zonal Project Directorate, Zone-VI under the guidance of ICAR is committed to bring demand driven and technology led revolution to meet challenges of rising demand of food, livelihood security, sustainable farming and agricultural growth in Zone-VI. Implementation of vision and mission would help in transforming slowing down agriculture into a vibrant and competitive sector by harnessing various opportunities at zonal and national level. The programme would augment farmers' income, generate employment, conserve natural resources, promote export by restricting import, and increase value addition for inclusive agricultural growth in Zone-VI. The KVKs of Zone-VI would further sensitize different stakeholders on problems, challenges and solution in the region. Concerted efforts would help in transforming ZPD-VI to be more sensitive to the needs of the farming community, specially the small land holders, below poverty line group living in fragile ecosystems of arid and semi-arid environment in Rajasthan and Gujarat. Focus will be concentrated on monitoring of changes occurring at zonal, national and international level and will develop strategy to provide solutions to problem and challenges in participatory mode. Definitely the KVKs would become more responsible, accountable and faithful to society at zonal and national level.



ANNEXURE-I

Strategic framework

Goal	Approach	Performance measure
Improve food and income security	<ul style="list-style-type: none"> Dissemination of system specific technologies for higher productivity and quality from shrinking land and water resources without impairing agro-eco environment. 	<ul style="list-style-type: none"> Alleviate poverty and reduce hunger in Zone-VI
Update knowledge of different stake holders	<ul style="list-style-type: none"> Problem solving and decision making training to change agricultural scenario in Zone-VI Employment generation of rural youth and farmer Empowerment of farm women for entrepreneurship development and alternate source of income for drought proofing. 	<ul style="list-style-type: none"> Improved livelihood opportunities through higher income and better quality of life.
Enhance competitiveness	<ul style="list-style-type: none"> Develop demand driven high value products Improve market intelligence for prices to raise the income of farmers. Effective policies for enhancing trade 	<ul style="list-style-type: none"> To promote trade and benefit different stakeholders. To promote export and reduce import.
Improve status of natural resources	<ul style="list-style-type: none"> Conserve and access to genetic diversity for better use. To improve soils and water bodies. Increase water use efficiency with limited water. Production maximization on waste and marginal lands. 	<ul style="list-style-type: none"> Enhance production of crops and livestock. Improve water and input use efficiency. Reclaim problematic saline sodic and nutritional poor soils.
Value addition for employment generation	<ul style="list-style-type: none"> Promote demand driven value addition production. Linking with marketing. Ensure preservation and storage of products. 	<ul style="list-style-type: none"> Employment generation evolving public-private – farmer partnership. Promote quality product for better health of several clients.
Linkages	<ul style="list-style-type: none"> Research – extension – farmers – business – public civil society linkages. Strengthening research extension linkages and implementation 	<ul style="list-style-type: none"> To achieve inclusive agricultural growth in Zone-VI in participatory mode.
Access to genetic resources, information knowledge and other resources	<ul style="list-style-type: none"> Access to genetic resources. Conservation of genetic resources for further improvement by NARS. Improve access to technology and dissemination. Use of ICT in dissemination of technology 	<ul style="list-style-type: none"> Sharing knowledge through website. Faster dissemination of technology for large adoption.
HRD	<ul style="list-style-type: none"> Capacity building to promote public-private partnership. Advance training on technology advancement and management. 	<ul style="list-style-type: none"> To enrich different stakeholders. Efficient management of resources and human resources.

