Role of innovation platforms & participatory research in agricultural development in India

Dr Randhir Singh, ADG (Ag.Extension)
Indian Council of Agricultural Research

Agricultural Extension System

Four major components of the Indian Agricultural Extension System

1. **Agricultural extension service with the state governments**

   (Field Extension)

2. **Extension education system of ICAR and SAU system (Frontline Extension System)**

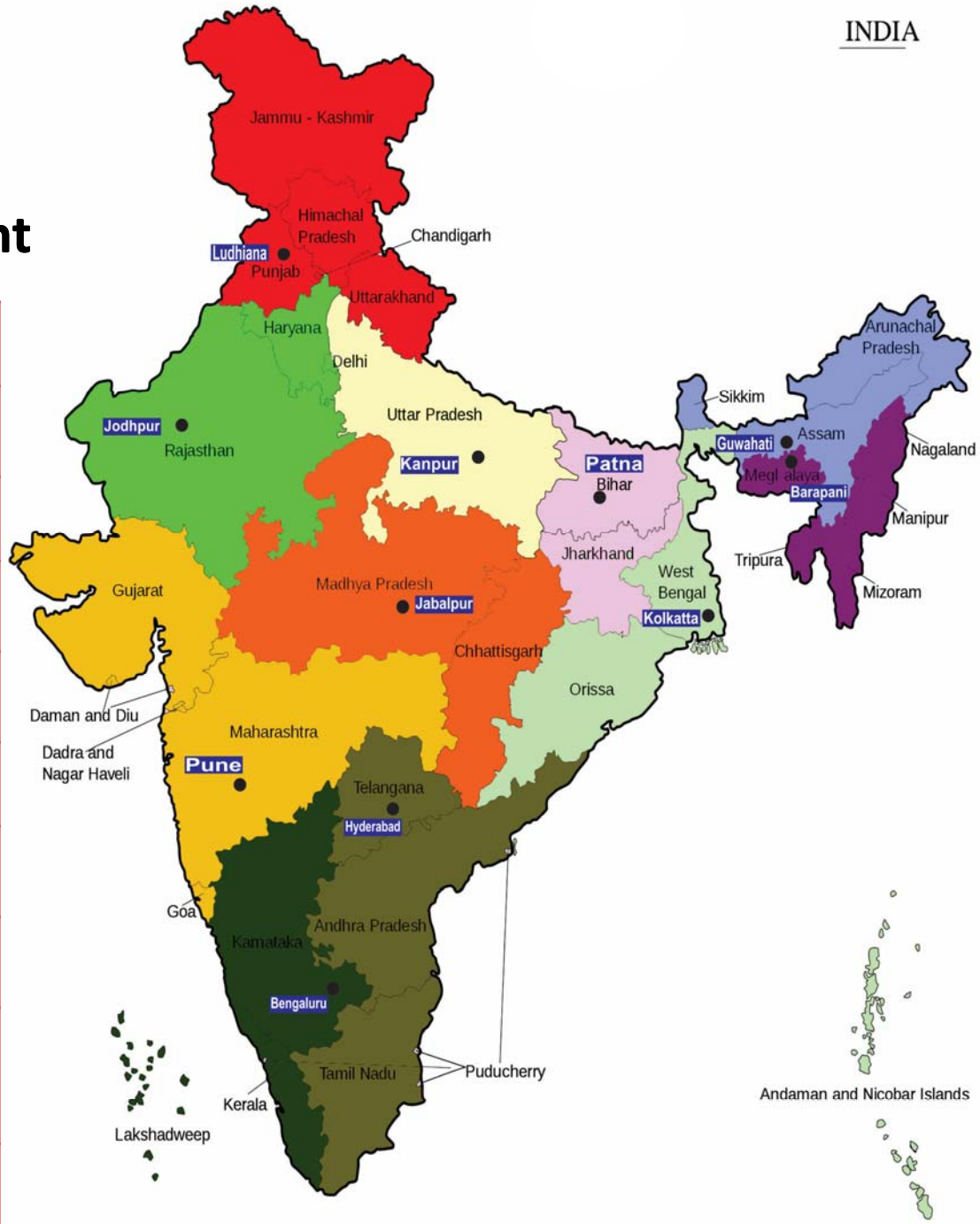
3. **Extension programme of input industries in public and private sectors and NGOs, and**

4. **Special rural development programmes of the central and state governments**

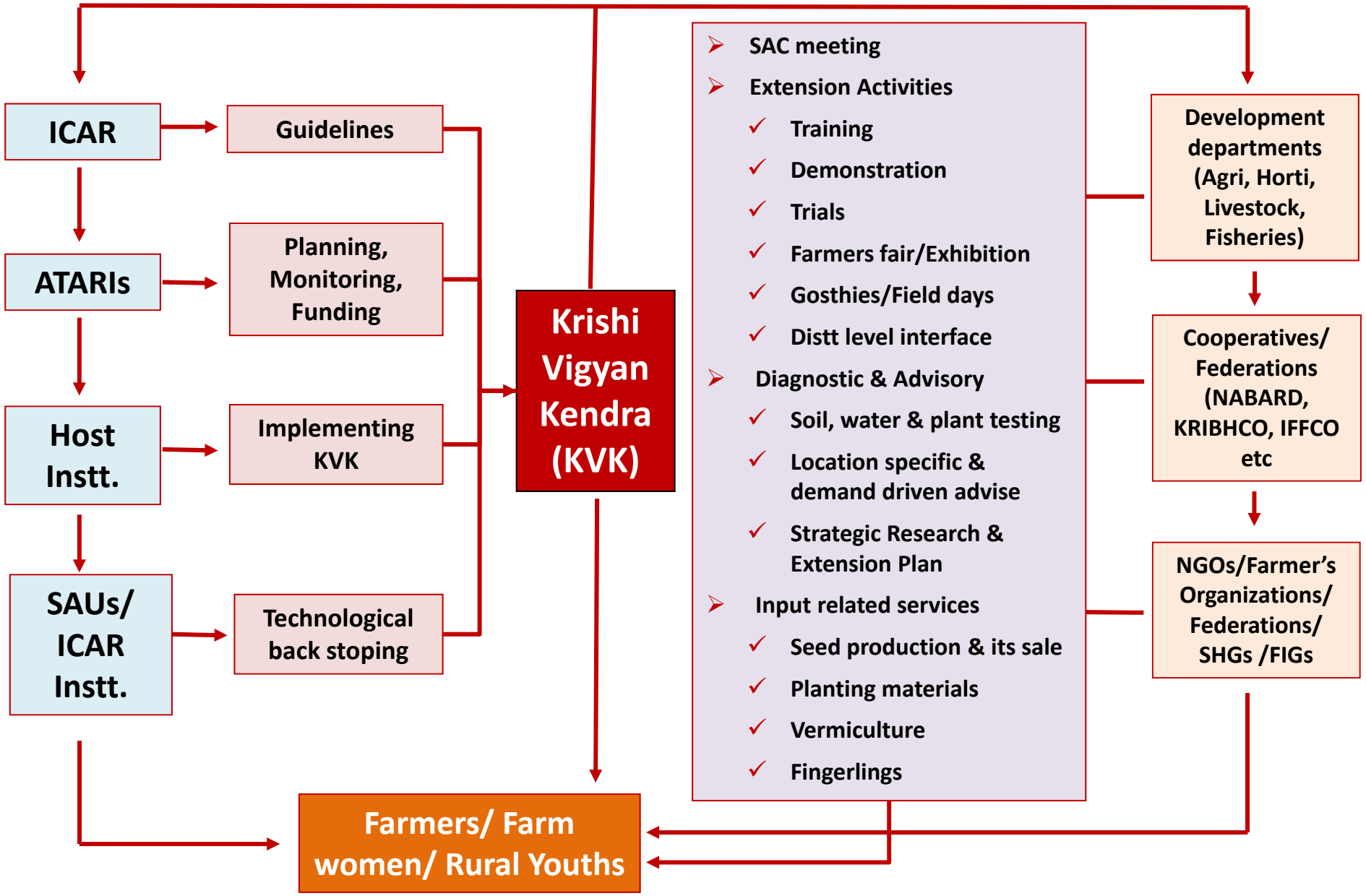
11 ATARIs- & 682 KVKs

- **TA&D for its Application and Capacity Development**

On Farm Trials	29805
Frontline Demonstrations	129678
Farmers Trained	1321000
Extension Personnel Trained	142000
Participants in extension activities	19868000
Production of Seed (t)	33900
Planting Material Produced	82031000
Livestock strains and fingerlings produced	65538000
Soil, water, plant, manures samples tested	637000
Mobile agro advisory	15522000

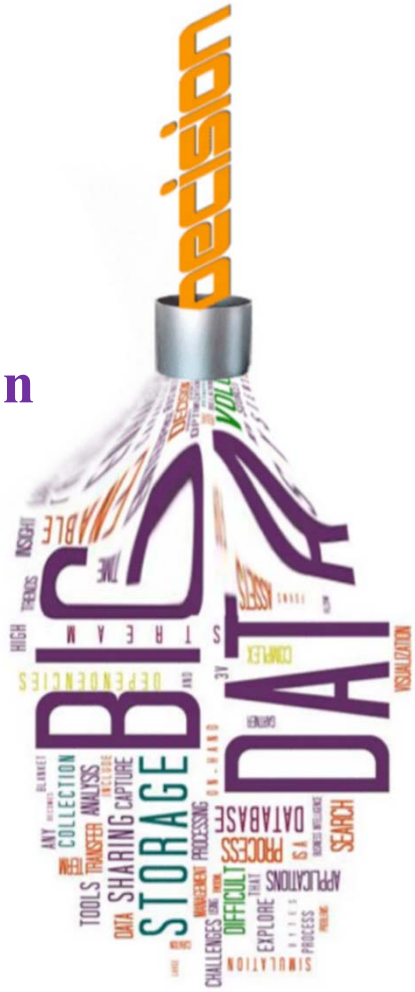


LINKAGES OF KVKs WITH OTHER ORGANIZATIONS



Key Programs

- **ARYA project in 25 KVKs of 25 states with additional 75 more KVKs**
- **Mera Gaon Mera Gaurav: Scientists of ICAR institutes/AUs have adopted 13500 villages**
- **Farmer FIRST: 52 projects by ICAR institutes/ SAUs covering 45,000 farm families**
- **National Initiative on Fodder Technology Demonstration (NIFTD)- 100 KVKs**
- **600 Skill training for 12000 rural youth by 250 KVKs**
- **Climate Resilient Initiatives at 121 KVKs**
- **Tribal area focus program at 125 KVKs**
- **Pulses seed hubs in 97 KVKs**



NEW INITIATIVES

Value Addition and Technology Incubation Centers in Agriculture (VATICA)

3 Models

- ✓ Establishing in KVK Premises and operated for incubation and skill development.
- ✓ Establishing in KVK Campus and outsourcing to group of Entrepreneurs to operate for incubation, skill development and partial commercial terms to operate the unit sustainably.
- ✓ The unit is to be given to FPO or any private entity with one time grant of RKVY to operate on commercial lines

- ➢ 100 VATICA centers
- ➢ Funding
- ➢ Revolving Fund and one time grant of RKVY
- ➢ Estimated budget: About 2 Crores

Nutri-sensitive Agricultural Resources and Innovations (NARI)

- Food Security must lead to Nutritional Security
- Focus on gender empowerment & nutrition
- Demonstrations and capacity development to promote nutrition -sensitive agriculture and gender mainstreaming
- Interventions on family farming, linking agriculture to nutrition, skill development among women and youth, bio-fortification of locally available food, round-the-year dietary pattern, nutri-thali, Nutrition Smart villages, etc.
- 100 KVKs @ 2.0 lakh/KVK under Revenue for 2 years

Interventions in Tribal Areas

125 KVKs: TSP Districts

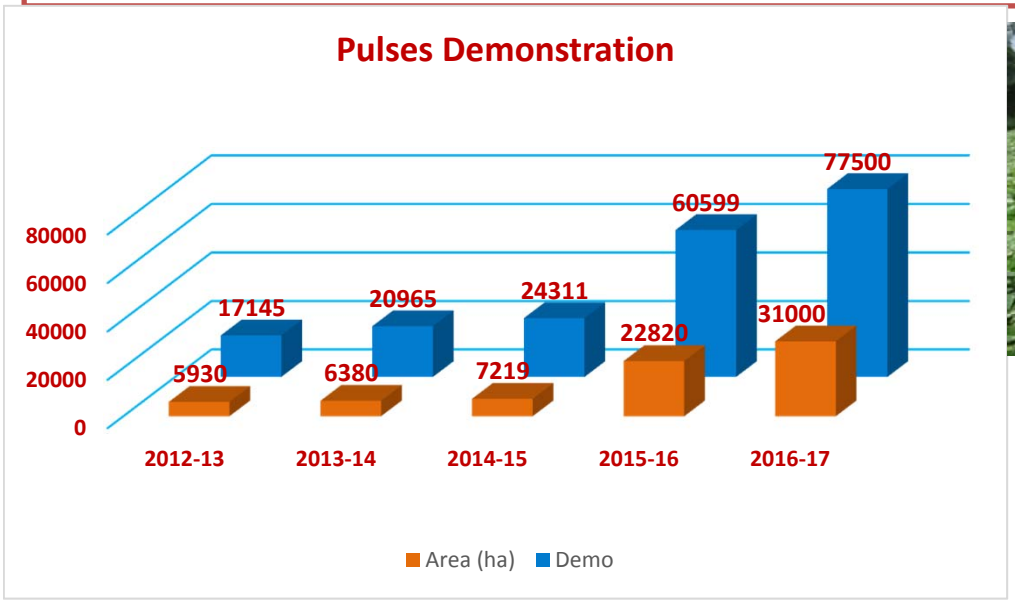
- ***Seeds of Cereals, Oilseeds, Pulses and Horticultural and fruit crops etc.***
- ***Storage bins, Spray machine& small tools & Poultry, fish production***
- ***Goatry , buck***
- ***5500 genetic resources identified***

Knowledge Systems and Homestead Agriculture Management in Tribal Areas (KSHAMTA)

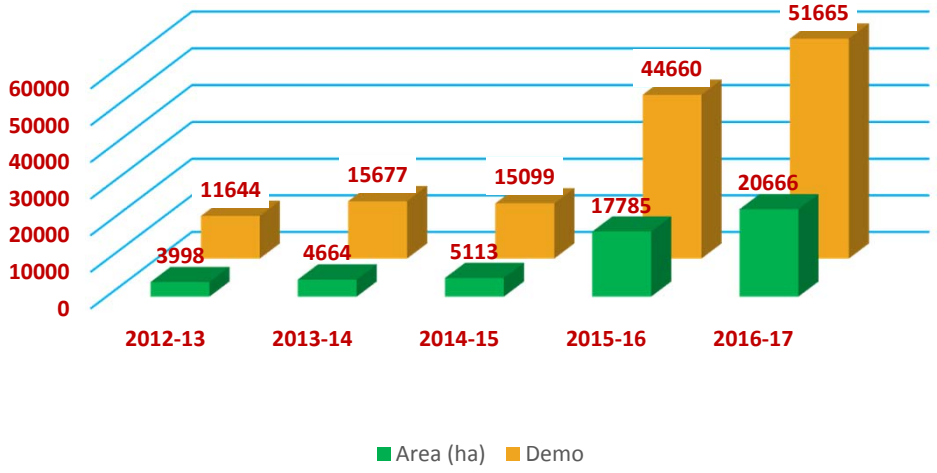
- **Documentation and Validation of the traditional agriculture knowledge systems existing in the 125 Tribal dominated districts of the country.**
- **Appropriate technological interventions and improvements in existing cropping systems so as to ensure livelihood and nutritional security.**
- **Provide modules for enterprise based technological interventions for economic development of niches areas.**
- **Undertake appropriate capacity building of the men and women folk to achieve the objectives.**
- **KVKs as the nodal point at the district level and It will be operationalised by pooling the funds available under the TSP in all ICAR Institutes.**
- **The programme will be implemented in convergence with the programmes of line departments.**

FARM LEVEL IMPACT

Pulses and Oilseeds Demonstrations



Contributing to record pulse production of 22.14 million tons in 2016-17



Wheat Technology Interventions (2009-10 to 2013-14)

- 12 States
- 67 KVKs and Indian Institute of Wheat and Barley Research, Karnal
- Yield gains (6 to 46%)

Happy Seeder

Wheat germination

Zero tillage grown wheat

State	KVKs	Varieties	No. /Area(ha)	Demo at Farmer field Yield (q/ha)	Farmer field Yield (q/ha)
Uttar Pradesh	13	DBW-17, CBW-38, K-307, HD-2932, HD-2967, DBW-39, PBW-550	795 (445.50)	46.27	41.00
Haryana	12	DBW-17, PBW-550, HD-2967, DPW-621-50	500 (309.40)	49.18	45.38
Bihar	10	CBW-38, K-307, DBW-39, HD-2985	540 (296.05)	40.39	35.77
Punjab	6	HD-2967, DPW-621-50, DBW-17	230 (189.2)	52.09	48.84
Jharkhand	5	CBW-38, K-307, DBW-39	1046 (175.54)	31.95	24.44
Maharashtra	5	AKAW-4627, MACS-6222, HI-8663	297 (206.15)	33.60	29.07
Rajasthan	4	HD-2967, PBW-550, Raj-4037	388 (226.57)	45.51	38.98
Gujarat	3	GW-11, GW-366, MPO-1215, HD-2932	273 (180.0)	40.20	36.39

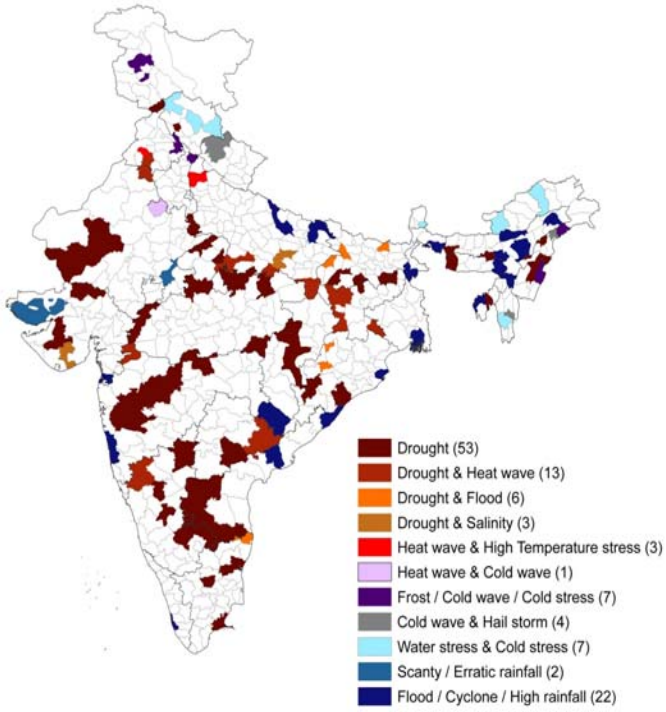
Maize Revolution

- Single cross hybrids
- Production 20.23 mt
- 150 KVKs are working

Increase in yield-Farmer's field			
State	Area (ha)	Mean Yield (kg/ha)	% increase over state productivity
A. P.	135.2	6,598	95.9
Assam	3.6	5,419	NA
Bihar	5.1	6,075	132.2
Chhattisgarh	18.4	4,106	128.9
Gujarat	3.2	8,325	246.5
Jharkhand	4.5	4,005	158.6
M. P.	119.0	5,123	193.7
Maharashtra	28.0	6,819	173.8
Rajasthan	137.1	4,815	185.4
Karnataka	17.6	3,858	50.5
H. P.	1.6	3,227	38.4
J.& K.	162.1	3,374	107.3
Odisha	26.0	6,135	176.1
Uttar Pradesh	40.5	5,307	136.7
Total	713.9	5,012	98.7

151 Climate Resilient Villages Established

Modules: NRM, Crops, Livestock, Fisheries, Institutional



- Resilient Interventions
- Adaption towards weather aberrations
- *In-situ* moisture conservation practices.
- Soil health cards-SSNM
- Tolerant crops.-varieties, breeds, fodder
- Water saving paddy systems
- Crop residue recycling
- Community nursery and planting dates
- Farm machinery with CHC

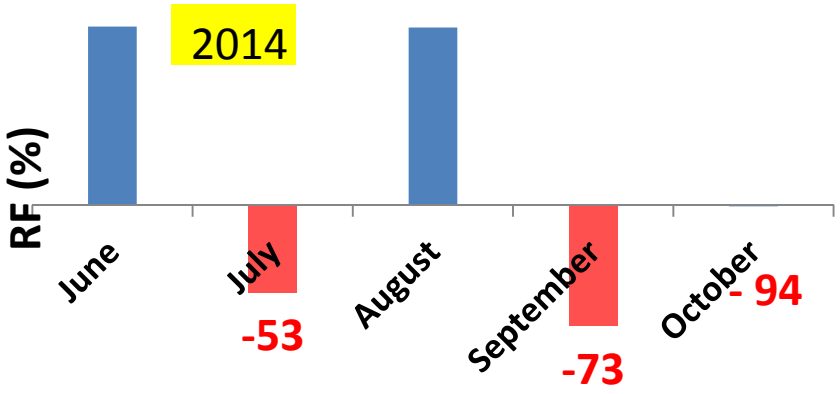
NICRA-NMSA Interface Workshop

Climate Vulnerabilities addressed

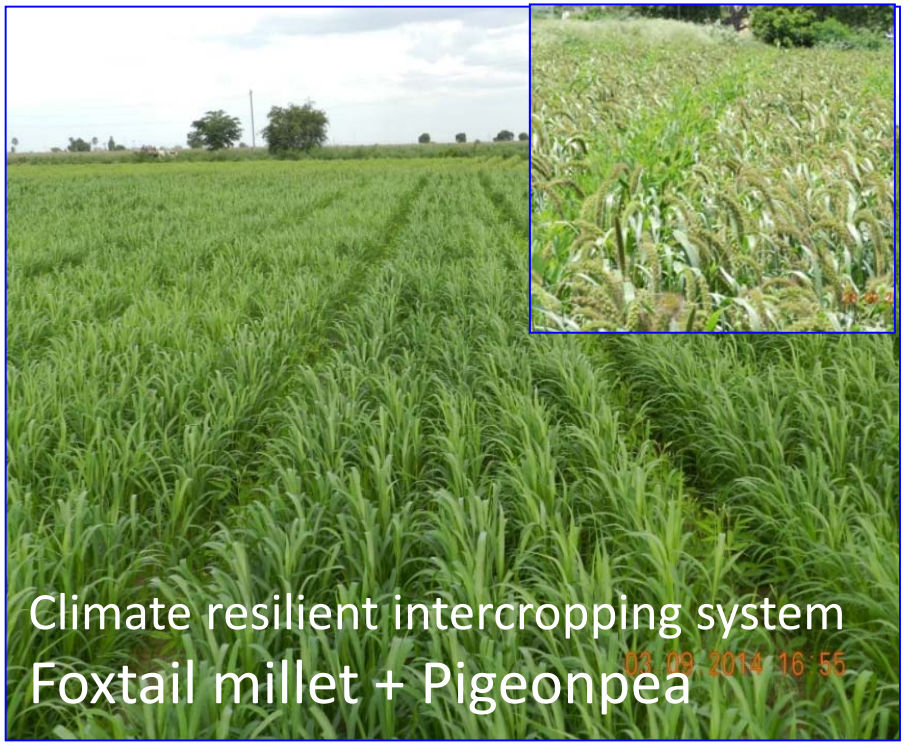
- Custom hiring of farm machinery (revenue Rs 8 lakhs)
- Demonstrations in 6803 farmers fields covering 3431 ha
- 722 training programs organized covering 27887
- Smart farmer certificates awarded to 4605 NICRA farmers
- Identified 27 climate resilient practices for up-scaling under NMSA

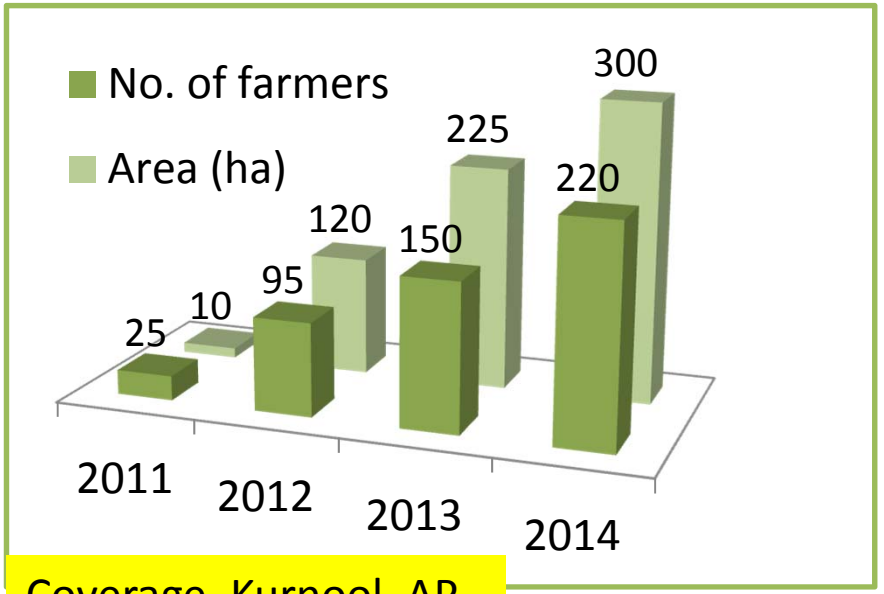
Scaling up in 5000 villages in Maharashtra due to success of NICRA Model

Crop diversification to cope with variable rainfall in scarce rainfall zone of Andhra Pradesh



- Frequent crop failures/ low productivity experienced by farmers in **Maize** and **Cotton**
- Short duration cultivar of **Foxtail millet** (cv Suryanandi) intercropped with Pigeonpea performed demonstrated as an effective & resilient alternative
- Seed multiplication at farmer level ensured sustainability of the practice





Coverage, Kurnool, AP
60 % farmers
47% area

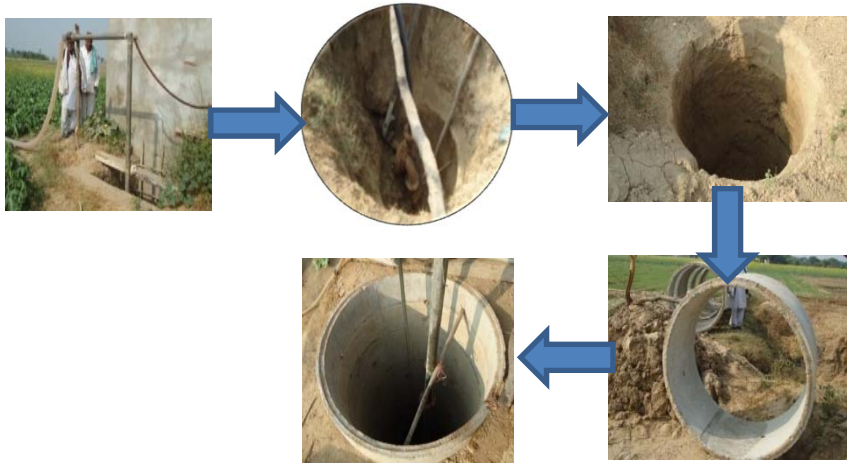
Ground Water Recharging

Technical support- KVK Bharatpur, Rajasthan

Institutional linkage: KVK - CRIDA, Hyderabad - state line Dept

Economic impact and Adoption:

- ***95 tube well recharged (95% were successfully recharged) at a cost of Rs.10,000 to 12000 per tube well.***
- ***Water made available to irrigate 272 ha land.***
- ***Major crops in the rabi season viz. wheat, mustard, barley etc. minimized 90% of the yield losses due to availability of recharged ground water (8-10ft).***
- ***KVK-Line Departments interface held for up-scaling the technology.***
- ***Thus, nearby villages are also adopting the technology (Sitara, Sahenti, Mukundpura).***



Bamboo Drip Irrigation an Innovative technique to save water

KVK Ri Bhoi, Meghalaya (Innovative Farmer- Shembhalang Khongjoh

- The water is being refilled 2 to 3 times in a week.
- This irrigation method had covered 2500 Khasi mandarin plants that are 10 to 12 years old.
- New plantation was also done
- Jalkund was made at hill top to store water

Refilling of water in Bamboo Based Drip Irrigation

Jalkund at Hill top

Bamboo filled with water

New plantation

JSS Agri Clinic –

A Pilot Demand Driven Extension System-KVK Mysuru

- Institution: KVK, a link institution between research & extension
- Model: Social Enterprise
- Services offered: Agri Doctor & Agri Pharmacy
- Goal: To meet
  - the farmers' information and input demands,
  - on time, at competitive price, and
  - at one easily accessible place
- Strategy: Technology as well as input delivery

Entrepreneurship Development- ICAR-KVK, KANNUR

Fish Bite Product

Sultan Fish Farm Karnal- Farm to Plate

Indoor Climatic Controlled Fish Farming System " RAS" Recirculatory Aquaculture System Technology installed at Sultan Fish farm,Karnal

Fish & Vegetables Growing Together

Value Added Fish Processing Unit

PROSPERITY THROUGH KADAKNATH REARING

- KVK Jhabua, MP, introduced Kadaknath poultry breed for tribals.
- Established hatchery at KVK under NAIP to meet demand.
- A unit of 100 birds is providing 95 man days of employment per year and income up to rupees one lakh per year.
- Number of tribal poultry entrepreneurs in the district has increased 5 to 493 in 2017.
- Migration of tribal youth reduced.

Kadaknath hatchery established

Chicks Produced and Distributed Across States by KVK Jhabua

Production Year	No. of chicks	States-wise spread of Kadaknath
2014-15	32665	Madhya Pradesh-Jhabua, Alirajpur, Dhar, Indore, Ujjain, Badwani, Gwalior, Shivpuri, Sivani, Sagar, Sehore, Chhindwara, Devash, Jabalpur, Khargone, Betul, Balaghat
2015-16	29582	Chhattisgarh- Raipur, Kanker Rajasthan-Udaipur, Jaipur, Banswara, Churu, Sikar, Sri Ganganagar Maharastra- Pune, Nagpur, Dhule, Osmanabad, Wardha, Sangli Uttar Pradesh- Gorakhpur, Jhansi, Merath, Barely
2016-2017	23657	Gujarat- Dahod, Anand Haryana, Kerala

Kadaknath Spread in Chhattisgarh

No. of districts covered	No. of villages covered	No. of chicks supplied by KVK	No. of farmers benefited
19	256	50463	493

Innovation Platform partners

Sardar Harbir Singh (farmer), KVK Kurukshetra and CCS HAU, Hisar

Address: **Village Dadlu, District Kurukshetra, Haryana**

Description:

Exemplary agricultural innovation Platform
Diversified agri-enterprises to raise farm income
Facilitated overall agricultural development of others
Recipient of several national and international awards

Economic analysis of agri-enterprises undertaken by Sardar Harbir Singh

Agri-enterprise	Seedlings (No. Lakh)@	Cost (₹ Lakh)#	G. returns (₹ Lakh)#	Net profit (₹ Lakh)#	B:C Ratio
Paddy-Wheat rotation (2011-12 to 2015-16)	n/a	0.43 to 0.48	1.49 to 2.28	1.01 to 1.70	3.13 to 4.63
Paddy nursery (2015-16)	324	1.45	4.36	2.91	3.00
Tomato nursery (2011-12 to 2015-16)	27 to 57	8.10 to 19.38	13.50 to 31.35	5.40 to 12	1.62 to 1.72
Capsicum nursery (2011-12 to 2015-16)	24 to 36	9.60 to 18.00	22.50 to 36.00	10.50 to 18.00	1.75 to 2.50
Chilies nursery (2011-12 to 2015-16)	40 to 52	8.90 to 15.60	17.80 to 28.60	8.90 to13.00	1.83 to 2.10
Cauliflower nursery (2011-12 to 2015-16)	16 to 35	3.20 to 7.50	5.20 to 15.75	2.00 to 8.25	1.71 to 2.10
Onion nursery (2011-12 to 2015-16)	420 to 910	5.80 to 8.25	9.80 to 14.75	4.00 to 8.75	1.69 to 2.46
Tomato crop (2011-12 to 2015-16)	n/a	0.67 to 1.05	1.80 to 2.90	1.12 to 1.85	2.67 to 2.93
Chili crop (2011-12 to 2015-16)	n/a	0.67 to 0.88	3.00 to 10.50	2.32 to 9.63	4.17 to 12.00
Poultry	125-250	0.50 to 1.00	0.95 to 1.80	0.45 to 0.80	1.80 to 2.00

#: Per ha in case of paddy-wheat rotation, tomato crop, chili crop
@: No. of words (not in Lakh) in case of poultry

Innovation Platform partners-

Sardar Harbir Singh (farmer)- **Village Dadlu, District Kurukshetra, Haryana**

with KVK Kurukshetra and CCS HAU, Hisar

Pictorial depiction of different agri-enterprises undertaken under this AIP






Paramparagat Krishi Vikas Yojna

- The Network Project on Organic Farming (NPOF) (2012-2017)
- In 2015, the GOI launched a flagship project Paramparagat Krishi Vikas Yojna (PKVY) or Traditional Farming Improvement Programme with a budget of 47.07 million US Dollars.
- The PKVY envisages supporting and promoting organic farming and improving soil health.
- To encourage farmers to adopt eco-friendly methods of cultivation and reduce their dependence on fertilizers and agricultural chemicals and improve yields.
- Most of the interventions in the area of organic farming are developmental in nature with little investment in organic agriculture research.

Participatory Research and Development : CAZRI, Jodhpur

Crop Productivity under organic farming (Jodhpur) (@4.5t/ha manure, 493 mm rainfall)

937 kg/ha

1532 kg/ha

1873 kg/ha

Package of practices of organic mung bean and sesame production, developed at CAZRI - included in the state govt. POP

For popularization of organic farming –

- demonstrations of organic system management in rainfed village.
- Training programs and group discussions.

154 farmers and farm women participated and got first hand experience of organic farming technologies.

Under PKVY scheme(state govt.) about 900 farmers of Luni tahseel visited and get training at Model organic farm, CAZRI, During- Jan.-March.2017

Organic Farming-Rajesh Farm Kaithal

•During 2007 started growing organic vegetables in 3.0 acre, now 16 acres (13 acres on lease @ 50,000/year)
•Grows vegetables as well as cereals
•Developed a total of 7 liquid products as growth promoter, insecticide, mosquito control, etc.
•Developed Bio-Pesticides : Kisan Sathi: Developed to control stem borer and larvae in rice and vegetables; and Kisan Biswas: Developed to control Bhura Tela, Kala Tela and Chepa
•Knowledge leader for 125 farmers across states
•Employment generation for 45 local youth
•Direct marketing of produce to consumers at higher price
• Farm developed for knowledge Exchange & Eco-tourism
•Haldhar Organic Award ICAR; Haryana Jawik Krishi Ratan Puruskar and many other awards

Organic farming practices – assessment in farmers fields (Medak, Telangana)

Crop	Practice	Remarks
Banana	Bunch feeding of Panchgavya	Improvement in bunch size
Sugarcane	White grub management with soil application of *Metarhizium anisopliae* (bio-fungus)	Effective and long lasting control
Greengram	Foliar spray of liquid biofertilizers (Vermiwash 20% , Panchagavya 3%) at 15 days interval	Yield enhancement
Pigeonpea	Disease management with seed treatment with *T. viride* 10 g.+ FYM powder 30 g. per Kg seed as paste followed by soil application of 5 kg of *T. viride* +225 kg FYM + 25 kg neem cake per ha.	Decrease in wilt disease incidence
Pigeonpea	Spray of neem oil @2% and erection of 50 bird perches per ha followed by shaking the plants after flowering period	Yield increase due to pod borer management

Issue in Organic Farming

- Interactions between researchers and stakeholders (farmers, extension workers, consumers)
- Setting up research agenda, priorities and establish a program to address priorities
- Funding for research proposals
- Participatory technology development
- Client oriented production
- Dissemination and local adaptation of existing research results
- Access to information on organic farming and food systems
- Validated pest and disease control
- Capacity building of stakeholders
- Market and certification procedures

REACHING TO FARMERS

Successful Farmer Producer Organizations (FPOs)

590 FPOs linked to KVKs, 258653 farmers registered

Perundurai Groundnut Farmers Producers Company, Erode, TN

- Mentored by KVK, Erode, Registered in 2015 under Company Act, Membership – 540 (420 men and 120 women)
- Current share capital mobilized from Members – Rs.34.20 lakh
- Capital received from NABARD – Rs.4.20 lakh
- Major functions- Value addition of Groundnut and its bye products

Nachalur Farmers Producers Company,Karur, TN

- Paddy , Bengal Gram & Soybean in 40 villages & 800 members
- Bulk input supply to member farmers under direct dealership from IFFCO, and other major agro-chemical dealers
- Seed processing unit established with Rs.20.0 lakh support from NABARD
- Custom Hiring Centre with assistance from NABARD including power tillers, paddy transplants and weeders

WOMEN GROUP – 'KRISHI SAHAYI'

- A work force for farm mechanization in paddy through custom hiring

By ICAR-KVK, MALAPURAM

Background: Drastic decline in paddy area

Reasons

- Labour scarcity
- High wages
- Low price for paddy

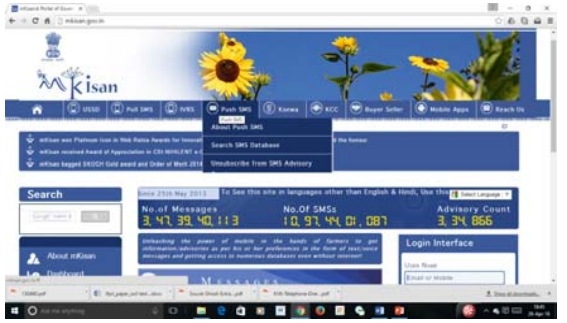
KVK Intervention

Formation of trained activity group to take up all mechanized operations in paddy on custom hiring through registered society **'KRISHI SAHAYI' benefiting 170 farmers every year**

- The success of KVK model made the district panchayat to launch the fallow free Malappuram project for activity group formation in 35 panchayaths
- At farmer level, the cost of transplantation was reduced by 40%, harvesting by 80% and net income increased by Rs.8000/ha.

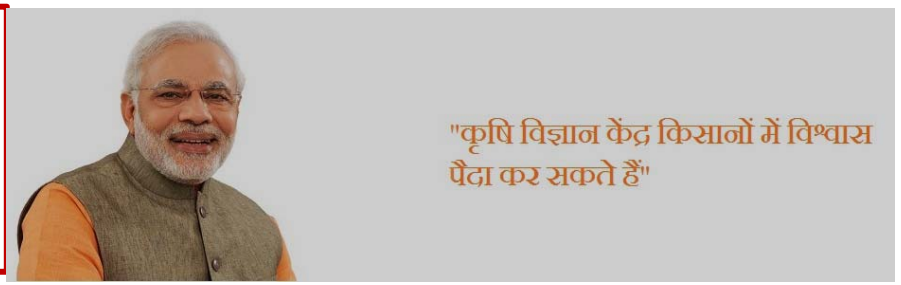
ICTs a medium to reach last mile

- Web-based mobile advisory to farmers
- Research Institutes and AUs support
- 130 lakhs farmers



Krishi Vigyan Kendra (KVK) Portal

http://kvk.icar.gov.in



Websites	: 366
Video clips developed	: 30,777
E-publications	: 666
CDs distributed	: 3520
No of farmers linked through mobile with KVKS	:1387827
Kisan Call Centre (1800-180-1551)	
Community Radio Station	

Mobile Apps in local languages in KVKs

Thanks