

# 15. Technology Assessment, Refinement and Transfer

In order to facilitate adoption of technologies developed by the National Agricultural Research System of the country, Krishi Vigyan Kendras (KVKs) have taken up a number of activities for assessment, refinement and demonstration of technologies/products under different agro-ecosystems. At present, 631 KVKs are functioning across the country under different host organizations like State/Central Agricultural Universities (428 KVKs), ICAR Institutes (51 KVKs), NGOs (99 KVKs), State Governments (35 KVKs), Public Sector Undertakings (3 KVKs) and Central/Deemed Universities and other organizations (14 KVKs). The activities of the KVKs include on-farm trials (OFTs) to identify location specificity of technologies in various farming systems; frontline demonstrations (FLDs) and training of extension personnel. Besides, the KVKs also contributed for the development of contingent plans for drought and flood situations, and implementation through technical back-up to the extension system. In order to show potentiality of technologies in terms of technological inputs, information and knowledge, KVKs have organized Technology week across the country.

### Technology assessment and refinement

**Assessment:** KVKs laid out 20,015 trials to assess 2,323 technological interventions on the farmers' field at 3,625 locations in various crops under different thematic areas, namely cropping systems, capacity building, drought management, drudgery reduction, farm machineries, integrated crop management, integrated disease management, integrated farming systems, integrated nutrient, pest, and disease management, processing and value-addition, resource conservation, seed/planting material production, storage techniques, varietal evaluation, and weed management. Major crops include paddy, wheat, maize, bengal gram, blackgram, greengram, pigeonpea, pea, groundnut, mustard, sesame, soybean, sugarcane, cotton, tomato, brinjal, okra, chillies, banana, mango, turmeric and coconut.

In livestock, 443 assessment trials on technological interventions were carried out at 621 locations covering 5,218 trials on disease management, drudgery reduction, feed and fodder management, integrated farming systems, nutrition management, processing and value-addition, production and management, and storage techniques related to animal enterprises. The major livestock enterprises include dairy cows, buffaloes, sheep, goat, poultry birds, pigs and fisheries.

As many as 90 women-specific income-generation technologies related to technological empowerment of rural women were assessed at 163 locations, covering

1,428 trials. A total of 10 enterprises were considered for assessing the technologies and the major ones include apiculture, lac, mushroom, vermicompost production and nutritional gardens.

**Refinement:** Refinement of 285 technological interventions was carried out in 327 locations by laying out 2,244 trials in the farmers' field under various thematic areas of crop production and protection. A total of 63 crops were considered for refinement of technologies and the major crops include paddy, wheat, mustard, groundnut, sugarcane, cotton, tomato, chillies, okra and mango.

Besides, 43 technological interventions at 68 locations were also refined through 461 trials on livestock, poultry and fisheries enterprises under the thematic areas of livestock production and protection. In addition, 5 women-specific income-generation technologies were also refined by conducting 62 trials at 8 locations. The major enterprises were mushroom, apiculture and nutrition gardens.



OFT on cono-weeder at KVK, Kota

### Frontline demonstrations

Frontline demonstrations (FLDs) were conducted to demonstrate production potential of newly released crop varieties/production technologies in crops/ animal husbandry/ other agriculture-related enterprises on the farmers' fields. These demonstrations were also utilized for organizing training and field days for the benefit of extension workers and farmers. During the year, 1.31 lakh demonstrations were organized, out of which 73,175 were on crops including cereals, millets, oilseeds, pulses, commercial crops, fibre crops, spices, medicinal crops, plantation crops, fodder crops, green-manure crops and horticultural crops, covering an area of 23,246 ha. In order to promote the hybrids, 5,909 demonstrations were organized covering an area of 2,082 ha in cereals, millets, oilseeds, pulses, fodder

crops, cotton and horticultural crops. In improving tools and farm implements, 4,710 demonstrations covering an area of 3,419 ha; 14,390 demonstrations on livestock enterprises; and 5,991 demonstrations on other enterprises including gender-specific technologies for women empowerment were organized. Besides, 26,218 demonstrations on climate-resilient technologies were also conducted by KVKs under NICRA project.

**Cereals:** A total of 24,238 demonstrations were conducted, covering an area of 8,492 ha in various cereals such as paddy, wheat, maize, sorghum, barley and oats. The highest increase in yield was recorded in sorghum (39.7% increase over farmers' practices), followed by 35.8% in maize and 29.5% in barley. Paddy and wheat demonstrations recorded an increased yield of 19.8 and 19%, respectively.

**Millets:** Demonstrations were also conducted on barnyard millet, finger millet, pearl millet and proso millet in 2,040 farmers' fields covering an area of 688 ha during the year, achieving an average increase of 29.40% yield over their local checks/farmers' practices.

**Oilseeds:** During the year, 11,644 demonstrations in 3,998 ha area were conducted on groundnut, sesame, soybean, sunflower, *toria*, linseed, mustard, castor, brown sarson, niger, rapeseed, safflower and *raya*. The increase in yield varied from 15.1% in brown sarson to 89.8% in linseed under improved technology demonstration compared to farmers' practices.

**Pulses:** Frontier technologies on pulse crops such as blackgram, chickpea or gram, cowpea, field pea, greengram, horse gram, lentil, pea, pigeonpea, rice bean and rajmash were demonstrated in 17,145 farmers' fields covering an area of 5,930 ha. The increase in yield was 39.3% in blackgram, 31.8% in chickpea, 23.4% in cowpea, 38.9% in field pea, 31.8% in greengram, 33% in horse gram, 34.7% in lentil, 48.6% in pea, 32.8% in pigeonpea, 28.3% in rajmash and 38.1% in rice bean demonstration plots compared to farmers' practices. These FLDs also included 5,372 demonstrations conducted to harness the pulse productivity in 137 districts.

**Commercial crops:** A total of 1,714 demonstrations were conducted in commercial crops like sugarcane (283), cotton (1,379), tobacco (29), betel leaf (10) and mulberry (13) in an area of 790.3 ha through KVKs in the country. The yield increase in FLDs was 12.7% in cotton, 15.3% in sugarcane, 20.6% in mulberry, and 27.5% in betel leaf as compared to local checks in respective crops.

**Fibre crops:** Frontline technology demonstrations were also conducted in jute and sunnhemp in 140 farmers' fields covering an area of 40.6 ha and achieved an average yield increase of 21.5% under demonstrations compared to farmers' practices.

**Fodder crops:** Demonstrations on fodder crops such as barseem, cowpea, lucerne, maize, napier, oat, pearl millet, sorghum and sudan grass were conducted in 2,241 farmers' fields covering an area of 402 ha. The fodder yield increase achieved under demonstrations

#### Low-cost, labour-efficient and eco-friendly option for managing foot rot in black pepper

Foot rot disease causes severe economic loss in black pepper. KVK, Kannur (Kerala) attempted technology assessment and refinement by involving black pepper growers. The technological intervention trial conducted with the treatment option phyto-sanitation + application of *Trichoderma viride* enriched manure @ 5 kg/vine was found to be low-cost, labour efficient and eco-friendly. As the results were disseminated to the farmers through various extension agencies, the demand for *Trichoderma* increased. In order to meet the demand, KVK started producing and supplying *T. viride*.

During the period 2006-07 to 2011-12, 27.98 tonnes of *Trichoderma* worth ₹19.59 lakh was supplied to 3,544 farmers for its use in about 1,418 ha.



Low-cost, labour-efficient and eco-friendly option for managing foot rot in black pepper

ranged from 10.3% in *dhaincha* to 82.8% in Napier grass compared to their local checks.

**Green-manure crops:** In view of depleting soil fertility, frontline demonstrations were conducted on green-manure crops in 49 farmers' fields covering an area of 10.5 ha achieving an increase of 19.4% in yield of green-manure to improve the soil-fertility status.

**Horticultural crops:** Altogether, 13,988 demonstrations on horticultural crops comprising vegetables (9,637), fruits (1,635), flowers (380), spices and condiments (1,569), plantation crops (660) and medicinal crops (107) were conducted in 2,900 ha area in the country. The yield increase recorded under FLDs as compared to farmers' practice was in the order of 15.6% in medicinal crops, 27.4% in fruits, 32.7% in flowers, 35.1% in spices and condiments and 37.4% in vegetables over the farmers' practices.

**Hybrids:** In order to achieve higher harvest index in crops, KVKs conducted 5,909 demonstrations on hybrids covering an area of 2,082 ha in cereals, millets, oilseeds, pulses, fodder crops, cotton and horticultural crops. In maize, millets and paddy, 3,864 demonstrations were conducted by 160 KVKs to demonstrate the potential of various hybrids in 1,367 ha area achieving up to 167% increased yield in rice hybrid KRH 2 under SRI technology. A total of 588 demonstrations on hybrid cotton were conducted by 35 KVKs in 296 ha wherein the yield increase was highest in RCH 625 (35.9%) compared to local checks. Demonstrations

(405) on hybrids of castor, mustard and sunflower were conducted by 31 KVKs across the country covering an area of 154 ha and achieving yield increase as high as 82.8% in KBSH 1 sunflower compared to local checks. Demonstrations (156) were conducted on napier hybrids achieving enhanced yield up to 31.9% in napier Co 4 as compared to local checks. Similarly, 876 demonstrations were conducted on vegetable and fruit crops hybrids covering an area of 204.3 ha through 93 KVKs achieving yield increase as high as 114.3% in tomato hybrid Red Coral compared to local checks.

**Farm mechanization:** Demonstrations (4,710) were conducted on improved tools and farm implements including drudgery reduction technologies covering an area of 3,419 ha. Maximum (1,144) demonstrations were conducted on harvesting equipment and tools, followed by 988 on planting/sowing equipment, 762 on inter-tillage equipment, 556 on plant-protection equipment, 373 on weeders, 297 on post-harvesting and processing equipment and the rest on chaffers, threshers, vegetable preservers, coconut climbers, etc.



Demonstration of sugarcane bud chipper

**Livestock, fisheries and other enterprises:** As many as 14,390 demonstrations were conducted covering 7,091 dairy animals, 1,856 sheep and goat, 145,973 poultry birds, 418 ducks, 818 pigs, 27 units of rabbits, 186 units of fisheries and 2 units of prawn cultivation. Besides, 5,991 demonstrations were also carried out on bee keeping (150 units), food processing (198 units), mushroom production (2,033 units), vermicompost production (423 units), household food security (100 units), nutrition gardens (279 units), sericulture rearing (12 units), value-addition (124 units) and women empowerment (74 units) through economic activities covering a total of 5,991 farmers in the country during the year.

### Capacity building

During the year, 65,314 training programmes were organized under capacity building with the participation of 18.8 lakh farmers/farm-women, rural youth and extension personnel.

### Role of KVKs in Disaster Management

A severe cyclonic storm *Thane* affected the coastal districts of Tamil Nadu especially Cuddalore, Villupuram and Union Territory of Puducherry on 30 December, 2011. Agricultural scenario in all these districts was severely affected with damage to crops, livestock, fisheries and infrastructure.

Quick revival processes were initiated by KVKs of these three districts to stabilize. The cyclonic storm had affected the coastal districts of Tamil Nadu and Puducherry especially Cuddalore, Villupuram and Puducherry. The damage caused to the KVKs and to the farming community was assessed. Accordingly, ICAR had sanctioned an amount of ₹ 65 lakh to KVK Puducherry, ₹ 11 lakh to KVK Cuddalore and ₹ 6 lakh to KVK Villupuram for carrying out relief measures.

Following steps were suggested:

1. Contingent plan for cultivation of short-duration paddy varieties and cultivation of pulses/vegetables in paddy fallows.
2. Integrated farming system promoted as part of the contingency plan.
3. Production and supply of cashew grafts for replanting in cyclone affected areas and
4. Farmers advised about alternative crops like bamboo and alternate enterprises like poultry.

**Farmers and farmwomen training:** A total of 51,098 training courses were organized for the benefit of 15.47 lakh farmers and farm-women on various technologies to update their knowledge and skills. Most of these courses were on productivity enhancement of field crops (22%), horticulture crops (16%), empowerment of rural women and plant protection (13% each), livestock production and management (12%), soil health and fertility management (9%) farm machinery tools and implements and capacity building and group dynamics (5% each), production of input at site (4%), fisheries and agro-forestry (3% each). Of these 51,098 courses, 36% were conducted on-campus and 64% were off-campus courses. The participants included 4.03 lakh farm-women. Among the crop production technologies, about 26% of the training courses were on integrated crop production technologies, followed by resource-conservation technologies (8.8%) and weed management technologies (6.5%). Out of 8,092 training courses on horticulture, 3,762 were on vegetable crops, 2,473 on fruit crops, 511 on spice crops, 409 on ornamental crops, and 408 courses on medicinal and aromatic crops.

**Rural youth training:** During the year, 8,486 skill-oriented training courses were organized for 1.91 lakh rural youth, including 69,163 young women (36.17%). Majority of the courses were on integrated farming, mushroom production (7% each), value-addition, dairy farming (6% each), seed production (5%), vermi-culture, nursery management of horticulture crops, bee-keeping, protected cultivation of vegetables (4% each), repair and maintenance of farm machinery implements, sheep and goat rearing, poultry production, production of organic inputs and small-scale processing (3% each).

**Extension personnel training:** A total of 5,730 capacity building programmes were conducted for 1.42 lakh extension personnel, which included 34,563 (24.35%) women extension personnel. These courses were organized for extension functionaries working in government and non-governmental organizations related directly or indirectly with the development of agriculture sector. Training was imparted in frontier areas of agricultural technologies related to productivity enhancement in field crops, integrated pest management, integrated nutrient management, group dynamics and farmers' organization, management in farm animals, rejuvenation of old orchards, women and child care, livestock feed and fodder production, protected cultivation technology and capacity building for ICT applications.

**Sponsored training:** As many as 6,685 training courses were sponsored by different organizations, which were conducted for 2.83 lakh farmers and farmwomen, rural youth and in-services extension personnel. Most of the sponsored courses were on production of inputs at site, economic empowerment of women, processing and value-addition, methods of protective cultivation, farm machinery tools and implements, fisheries management, household nutritional security, animal nutrition management, animal disease management, drudgery reduction of women and fisheries nutrition.

**Lac becomes lucky for tribals in Jharkhand**

KVK, Ranchi demonstrated and promoted scientific lac cultivation among 500 farmers belonging to 22 tribal villages of Khunti district and Kuchru of Ranchi district. With the help of the Indian Institute of Natural Resin and Gum (IINRG), the KVK introduced cultivation of *kushmi lac* in *ber* plant which is first of its kind for the farmers of this locality. This enabled the tribal people of these villages to successfully produce lac and also able to find market for broodlac from their *palas* and *ber* tree. Each lac cultivator of Putadag village in Angara Block of Ranchi district earns ₹ 20,000–25,000/year. Shri Baleshwar Bedia, a lac cultivator of Putadag village earned up to ₹1 lakh/year. Lac cultivators are now able to produce their own brood lac by utilizing their own trees and have become model for other lac cultivators.

The KVK has formed a brood lac (lac seed) bank with farmers as members. This bank ensures timely supply of quality brood lac to the lac cultivators.



Lac cultivation in Ranchi district of Jharkhand

**Extension programmes**

Extension programmes are organized by KVKs to create awareness among farmers about improved technologies and to provide timely advisory to farmers. A total of 4.86 lakh extension programmes/activities were organized which attracted the participation of 170.16 lakh farmers and 2.61 lakh extension personnel. The KVKs also organized 1.30 lakh extension programmes through electronic and print media to have wider coverage in the districts. These included electronic media in the form of TV programmes, radio talks, CDs/DVDs, extension literature, newsletters, newspaper coverage, technical bulletins/reports/books, popular articles, leaflets, folders and books/booklets.



Method demonstration on CMS technology in black pepper at KVK, Uttara Kannada

**Production of technological products**

The technological products like seed and planting material of improved varieties and hybrids, bio-products and elite species of livestock, poultry and fish were produced at KVKs, which benefited 23.68 lakh farmers in the country.

**Seeds:** During the year, 1.74 lakh quintal seeds of improved varieties and hybrids of cereals, oilseeds, pulses, commercial crops, vegetables, flowers, fruits, spices, fodder, forest species, medicinal plants and fibre crops, were produced and provided to 2.54 lakh farmers.

**Planting materials:** In all, 206.59 lakh quality planting materials of elite species of commercial crops, vegetables, fruits, ornamental, medicinal and aromatic crops, plantation crops, spices, tuber crops, fodder and forest species were produced and provided to 1.60 lakh farmers.

**Bio-products:** Bio-products, namely, bio-agents, bio-pesticides, bio-fertilizers, vermicompost, mineral mixture etc., were produced and supplied to the extent of 2.41 lakh q and 6.18 lakh numbers benefiting 15.27 lakh farmers.

**Livestock, poultry and fish fingerlings:** Improved breeds of cow, sheep, goat, buffalo and breeding bull were produced and supplied to 2,706 farmers. Different strains/breeds/eggs of poultry birds (chickens, quails, ducks and turkey) were provided to 6,972 farmers.

### Participatory seed production

KVK, Saharanpur (Uttar Pradesh) has been engaged in participatory seed-production programme of wheat and paddy since 2008. These farmers were trained on different aspects of seed production. A total of 531 q seed of wheat varieties HD 2851, DBW 17, HD 2894, PBW 590 and PBW 550 and 770 q seed of paddy varieties—Pusa Basmati 1401, Pusa Basmati 1460 and Pusa Basmati 1121 were produced and supplied to 457 and 525 farmers, respectively. The concept of supplying quality seed from farmer-to-farmer in the villages enhanced seed replacement rate, i.e. 52 % in wheat and 44.5% in paddy. Better quality seeds enabled the farmers to harvest up to 50.5 q/ha yield in wheat and 58 q/ha yield in paddy. Owing to availability of seed, the area coverage under high-yielding varieties of paddy and wheat was expanded. The paddy variety Pusa 1401 was grown in 7,278 ha followed by Pusa 1460 in 5,500 ha and Pusa 2511 in 4,550 ha. Similarly, wheat variety HD 2851 was grown in 15,550 ha followed by PBW 590 in 14,500 ha, PBW 550 in 12,800 ha, DBW 17 in 10,850 ha and HD 2894 in 4,800 ha.

Improved breeds of pigs were provided to 195 farmers. KVKs also enabled 201 farmers to establish rabbit-rearing units by providing 425 rabbits. A total of 117.46 lakh fish fingerlings were produced and supplied to 5,098 farmers.

**Soil, water and plant analysis:** A total of 3.78 lakh samples (comprising 3.16 lakh samples of soil, 0.56 lakh of water, 0.03 lakh of plant, 0.002 lakh of leaf/petiole and 0.03 lakh of manure) were analyzed covering 3.33 lakh farmers belonging to 0.40 lakh villages and the revenue generated was ₹ 29.22 million.

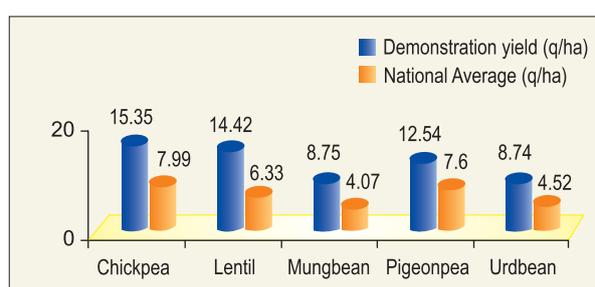
**Rainwater harvesting:** Rainwater harvesting unit with micro-irrigation system was established in 118 KVKs. A total of 590 training courses and 424 demonstrations were conducted utilizing this facility and produced 7.63 lakh planting materials. Further, 53,900 farmers and 1,518 officials visited these units and got acquainted with the system.

**Technology week:** Technology week, under public-public and public-private partnership mode, was organized by 213 KVKs benefiting 8 lakh farmers, farm-women, extension personnel, rural youth and members of self-help group by organizing 5,553 extension activities such as seminars, skill demonstrations, film shows, field visits on results demonstrations, exhibitions and scientists-extension personnel-farmer interactive sessions.

**Kisan Mobile Advisory:** As a part of application of Information and Communication Technology in KVK system, Kisan Mobile Advisory (KMA) was initiated by the ICAR during 2010-11 to provide timely and need-based information to farming community. At present 310 KVKs are providing this service through various service providers. Information on weather, market, various farm operations, outbreak of pests and disease incidence and their control measures are given to the farmers through Short Message Service (SMS). During the year, about 1.47 lakh short text

messages were sent to 11.14 lakh farmers on various aspects of agriculture, horticulture and animal husbandry, weather forecast, and pest and disease control. Some KVKs are also attempting Voice Mail Services to farmers.

**Technology demonstration for harnessing pulses productivity:** A national level programme on ‘Technology Demonstration for Harnessing Pulses Productivity’ was co-ordinated with participation of IIPR, Kanpur, Zonal Project Directorates namely, Zone II, IV, V, VI, VII and VIII and 137 KVKs in 11 States. The programme focused on development of district specific technology modules and capacity building of KVK functionaries, representatives of line departments and participating farmers. A total of 5,372 demonstrations in an area of 5307.69 ha were laid out on pigeonpea (1,358), chickpea (1,620), urdbean (768), mungbean (1,166) and lentil (460).



Comparison of demonstration yield and national average of major pulses



Transplanting technology revolutionized pigeonpea cultivation

### Demonstrations on climate resilient technologies

National Initiative on Climate Resilient Agriculture (NICRA), a network project was launched in February 2011. Under the sub theme-Technology Demonstrations and Dissemination for Climate Resilient Agriculture, about one lakh farmers are being covered in 132 villages. In this component, an integrated package of proven technologies was demonstrated in one village in each district for adaptation and mitigation of the crop and livestock production system to climate variability based on the available technologies.

During the year, 100 KVKs carried out 9,478 demonstrations on natural resource management in an area of 6,675 ha, 12,741 demonstrations on crop production technologies in an area of 4,301 ha and 1,222 demonstrations on fodder and feed production in an area of 197 ha. About 48,413 animals/birds belonging to 7,893 farmers got benefited from the demonstrations related to livestock and fisheries. Capacity-building interventions benefited 37,435 farmers and the extension activities like exposure visits,

### 7<sup>th</sup> National Conference on KVK-2012 Organized

The 7<sup>th</sup> National Conference on KVK-2012 was organized with focus on “Integrating Technologies and Best Practices” at Punjab Agricultural University, Ludhiana from 20 to 22 November, 2012. About 1,300 delegates from across the country participated in the Conference. The deliberations were held during eight technical sessions, viz. (i) convergence and linkages between KVK-ATMA programmes - best successful cases of field extension; (ii) KVK’s best practices and innovative approaches for out-scaling technologies; (iii) best practices and technologies for higher production, value-addition and improved livelihood; (iv) facilitating KVKs in management, administrative and financial matters; (v) Farm innovations and best practices developed by farmers; (vi) ICT mediated best practices in knowledge empowerment of farmers; (vii) integration of best practices and technologies under NICRA-project; and (viii) technological backstopping and harnessing synergy of working in partnership mode. A technology exhibition and innovative market place was also organized. Shri Sharad Pawar, Hon’ble Union Minister of Agriculture and Food Processing Industries, inaugurated the Conference as well as the exhibition. Two farm women were honoured as “Champion Female Farmers” for their excellence in agriculture. He also conferred KVKs with National and Zonal Best KVK awards for the year 2011.

The recommendations include development of technology delivery models for resource poor farmers based on principles of group dynamics; adoption of demand driven approach; functional convergence with programmes of National Mission on Agricultural Extension and Technology; harnessing the potential of ICTs; launching of farmers first programme through research-extension convergence; prioritizing and integrating technologies and best practices; and development of soft skills and competency of KVK staff.



field days, *krishimela* and method demonstrations benefited 2,944 farmers.

Demonstrations on cold-tolerant varieties showed 72% enhancement in yield, whereas demonstrations on crop diversification indicated 69.3% increase in yield over farmers’ practice. Advancement of planting dates of *rabi* crops in areas with terminal heat stress resulted in 38% increase in yield over farmers’ practice. Under the initiative, 14,703.50 quintals of fodder and feed was produced and emphasis was given on better utilization of the same through 160 demonstrations on improved fodder/feed storage methods. Under Institutional Interventions, 2,617 demonstrations were

### ASEAN-INDIA Farmers’ Exchange Programme

As part of a number of activities under ASEAN – India Commemorative Summit, the first leg of ASEAN-India Farmers’ Exchange Programme was conducted in India during 19-30, December 2012. The farmers’ delegation from nine ASEAN member states, namely Cambodia, Brunei Darussalam, Indonesia, Myanmar, Malaysia, Vietnam, Philippines, Lao PDR and Thailand, participated.

The delegation comprising 18 farmers and 9 officials from the ASEAN countries visited Indian Agricultural Research Institute, New Delhi; National Dairy Research Institute, Karnal; Central Soil and Water Conservation and Training Institute, Dehra Dun and Central Institute for Research on Goats, Makhdoom, Mathura. The delegation also visited the Punjab Agricultural University, Guru Angad Dev University of Veterinary and Animal Sciences, Ludhiana, KVKs, farmers’ fields and agri-enterprises. Besides, the delegation also interacted with scientists, farmers, officers of different departments and ICAR.



organized on mechanization through custom-hiring and ensured timely planting in an area of 2,567 ha. In all 26,218 demonstrations were conducted by KVKs under NICRA project.

### Technological backstopping

The Directorates of Extension (DEs) of SAUs/CAU updated the technical knowhow of 6,136 staff members of KVKs by organizing 263 training programmes. The DEs also organized 210 workshops and meetings for effective implementation of KVK programmes. The officials of Directorates of Extension made 1,526 visits to the KVKs to review and monitor the activities of KVKs. These visits included participation in Scientific Advisory Committee meetings and Technology Weeks.

Besides, the Zonal Project Directorates arranged 85 training programmes for 2,609 KVK staff members on fodder production and grassland management, content designing and delivery for mainstream media, information and communication technologies for agricultural information management and networking, off-season vegetable production technologies etc.

### Agricultural Technology Information Centre

Forty-four Agricultural Technology Information Centres (ATICs) in the country serve as single-window delivery system by providing technology solutions (information, services and products). As many as 7.2

### Tomato cultivation becomes a farm-business in Himachal Pradesh

In the mountainous terrain of district Shimla of Himachal Pradesh, the farmers of Sub-Tehsil Nerwa, Tehsil Chopal were growing paddy, wheat and maize. The earnings were meagre and hence the standard of living was very poor. The KVK, Shimla attempted to mitigate the situation through crop diversification with tomato cultivation in Nerwa area of the district. The KVK trained farmers of the area in nursery production of tomato and tomato-cultivation technologies. Tomato varieties, namely Naveen 200 Plus, Himsona and Minakshi, were demonstrated for adoption in farmers' field conditions. From about 30 acres in the year 2000, tomato area spread to 200 acres in 2002 covering 600 farmers. During 2011–12, around 3,000 families were involved in tomato cultivation with a turnover of ₹ 200 million. With an expenditure of ₹ 1 lakh/acre, farmers are earning a gross income of ₹ 2.6 lakh/acre/crop.

In order to facilitate better price for their produce, KVK formed a group of 30 farmers of the locality, which has been registered in the name of *Shalu Valley Kisan Sangh*. The produce is sold by this group in local market of Nerwa and different markets of Dehra Dun (Uttarakhand), Saharanpur (Uttar Pradesh) and Delhi. At present, tomato cultivation has become an integral part of farmers of Nerwa area.

lakh farmers visited the ATICs during the year. Technological information was provided to 3.13 lakh farmers through print and electronic media, whereas technological products like seeds (88,076.74 q),

### Area covered through seeds and planting material supplied by KVKs

Seeds and planting material of high-yielding varieties/hybrids produced and supplied by the KVKs in the country have spread to large area as detailed below:

- **Cereals:** The estimated spread was maximum in paddy (212,302 ha) followed by wheat (24,909 ha), sorghum (8,624 ha), *ragi* (5,230 ha), barley (2,090 ha), maize (2,085 ha), *bajra* (1,973 ha) and barnyard millet (1,173 ha).
- **Oilseeds:** The area spread was maximum in rapeseed and mustard (49,082 ha) followed by soybean (9,630 ha), sesame (8,154 ha) and groundnut (2,884 ha).
- **Pulses:** The estimated spread was highest in greengram (10,655 ha) followed by pigeonpea (7,297), blackgram (4,898 ha) and chickpea (3,520 ha)
- **Vegetables:** The area spread was maximum in cabbage (10,680 ha) followed by brinjal (10,240 ha).
- **Planting materials:** The area spread was highest in mango (3,041 ha) followed by cashew (483 ha) and guava (477 ha).

seedlings/saplings (13.30 lakh), livestock (3.41 lakh), poultry birds (3.79 lakh) and bio-products (1,172.42 q) were provided to 2.60 lakh farmers. Technological services like soil and water testing, plant diagnostics, seed testing, animal health camp, different farm machinery equipments, etc. were provided to 4.08 lakh farmers.

□