



15. Technology Assessment, Refinement and Transfer

The Krishi Vigyan Kendras (KVKs) as a grass root institution have taken up a number of activities for assessment, refinement and demonstration of technologies/products under different agro-ecosystems to facilitate faster adoption of technologies developed by the National Agricultural Research System of the country. At present, 634 KVKs are operating across the country with different host organizations like State Agricultural Universities (431 KVKs), ICAR Institutes (51 KVKs), NGOs (99 KVKs), State Governments (35 KVKs), Public Sector Undertakings (3 KVKs) and Central Universities/Deemed Universities and other educational institutions (15 KVKs). The activities of the KVKs include on-farm trials (OFTs) to identify location specificity of technologies in various farming systems; frontline demonstrations (FLDs) to exhibit the production potential of the technologies and training of farmers, farm women, rural youth and extension personnel to enhance their capabilities to take up various farm related activities. In addition, the KVKs contributed as knowledge and resource centres, produced technological inputs and made climate resilient interventions for mitigating challenges posed by climate change.

Technology assessment and refinement

Assessment: During the year, 2,174 technological interventions were assessed across 4,159 locations by laying out 23,568 trials on the farmers' fields on various crops under different thematic areas, namely cropping systems, drudgery reduction, farm machineries, integrated crop management, integrated disease management, integrated farming systems, integrated nutrient management, integrated pest and disease management, organic farming technologies, processing and value addition, resource conservation technologies, seed/planting material production, storage techniques, varietal evaluation and weed management. The major crops covered were paddy, wheat, maize, blackgram, greengram, pigeon pea, chickpea, lentil, groundnut, mustard, sesame, soybean, sugarcane, cotton, onion, tomato, brinjal, okra, amaranths, chillies, cowpea, banana, mango, apple, turmeric, sweet potato and others.

In livestock, 452 technological interventions were assessed at 701 locations through 5,918 on-farm trials on animals under different thematic areas like disease management, evaluation of breed, feed and fodder management, fertility management, nutrition management, production and management practices, drudgery reduction, processing and value addition and

storage techniques. The major livestock species included dairy cattle, buffaloes, sheep, goat, poultry birds, quails, pigs and fisheries.

A total of 143 farm-women specific appropriate technological interventions were assessed at 225 locations through 1,848 trials under the thematic areas, namely drudgery reduction, family resource management, health and nutrition, child care, processing and value addition and production and management. The major enterprises related to farm women specific interventions included - Vermicompost production, sericulture, lac, mushroom, nutrition garden, nursery raising, poultry, dairy, seasonal vegetable production, soyabean based products, processing and value addition, entrepreneurship, management of waste, handicraft and tailoring etc

Refinement: A total of 1,897 trials were conducted at 309 locations to refine 253 technologies under different thematic areas like cropping systems, drudgery reduction, farm machineries, integrated crop management, integrated disease management, integrated farming system, integrated nutrient management, integrated pest management, processing and value addition, resource conservation, seed and planting material production, storage techniques, and weed management. Major crops included paddy, wheat, pearl millet, mustard, groundnut, pigeon pea, chickpea, sugarcane, cotton, tomato, onion, brinjal, okra, apple and chillies.

Further, 39 technological interventions on livestock, poultry and fisheries enterprises under the thematic areas, viz. disease management, feed and fodder management, nutrition management, processing and value addition and production and management were refined through 402 trials at 41 locations.

In addition, 17 women specific income generation technologies were also refined by conducting 158 trials in 20 locations. The major enterprises included value added dairy products, aonla, mushroom products, etc.

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. On-site training and field days for the benefit of farmers and extension workers were also organized at demonstrations. In all 1.71 lakh FLDs were organized by KVKs during the year, including 90,384 on crops (cereals, millets, oilseeds, pulses,



commercial crops, fibre, spices, medicinal, plantation, fodder, green-manure and horticultural crops) covering an area of 26,399 ha. For popularization of improved tools and farm implements, 5,388 demonstrations on 3,229 ha farm area; 11,180 demonstrations on livestock enterprises; and 4,113 demonstrations on other enterprises including gender-specific technologies for women empowerment were organized. Out of the total FLDs, as many as 51,956 demonstrations were conducted exclusively on climate-resilient technologies under NICRA project.

Cereals: For different cereal crops like rice, wheat, maize, and barley, as many as 30,505 demonstrations were conducted covering 9,865 ha area. The highest yield advantage was recorded in the case of wheat (43.4% over farmers' practice), followed by 26% in maize, 24.9% in barley and 22.3% in rice.

Millets: Demonstrations on important millet crops like barnyard millet, finger millet, pearl millet and proso millet were conducted on the field of 2,313 farmers with area coverage of 826.9 ha. The average increase in yield of different millets was 30.7% over local checks.

Oilseeds: During the year, 15,677 FLDs were conducted on oilseed crops like groundnut, sesame, soybean, sunflower, *toria*, linseed, mustard, castor, niger, rapeseed, and safflower with area coverage of 4,664 ha. The yield increase ranged from 21.7% in soybean to 49.3% in rapeseed over farmers' practices.

Pulses: As many as 20,956 FLDs on pulse crops like blackgram, cowpea, field pea, greengram, horse gram, lentil, pea, pigeonpea, and *rajmash* were conducted on farmers' fields in an area of 6,380 ha. The average increase in yield was recorded as 33.4% in blackgram, 26.8% in chickpea, 25.4% in cowpea, 47.1% in field pea, 34.9% in greengram, 63.5% in horse gram, 38.1% in lentil, 45.8% in pea, 34.2% in pigeonpea, 50.4% in *rajmash* and 29.2% in rice bean as compared to farmers' practices.

Commercial crops: Under commercial crops, 1,719 FLDs were laid out. These included sugarcane (335), cotton (1,217), betel leaf (32), coffee (20), tea (9) and cluster bean (106) in an area of 708.6 ha. The yield advantage in demonstration plots was 20.6% in cotton, 17.6% in sugarcane, 15.6% in coffee, 39.5% in betel leaf, 14.4% in tea, and 9.14% in cluster bean as compared to local checks.

Fibre crops: The demonstrations on fibre crops like jute and sunhemp involved 228 farmers covering an area of 50.6 ha. The average yield increase of 27.5% in demonstrations was recorded as compared to farmers' practices.

Fodder crops: FLDs on fodder crops like berseem, cowpea, maize, lucerne, napier, oat, pearl millet, sorghum and Sudan grass were conducted in 2,044 farmers' fields covering an area of 319.5 ha. The increase in fodder yield reported under these demonstrations varied from 23% for oat to 60% in napier grass as compared to the local checks.

Horticultural crops: Over 16,900 demonstrations

were conducted on horticultural crops including vegetables (9,409), fruits (1,468), flowers (383), spices and condiments (4,646), tuber crops (492), plantation crops (318) and medicinal crops (216) covering total area of 3,581.7 ha. The yield advantages recorded was 28.3% in medicinal crops, 28.2% in fruits, 29.4% in flowers, 25.4% in spices and condiments and 26% in vegetables over the farmers' practices.

Hybrids: For exploiting the potential of hybrids at farmers' fields, total of 8,857 demonstrations over 3,093 ha were conducted for cereals, millets, oilseeds, pulses, fodder crops, cotton and horticultural crops. In cereals like rice, wheat, sorghum, pearl millet and maize, 3,470 FLDs were conducted by 272 KVKs covering 1,472 ha area achieving a yield increase up to 135% in the case of rice hybrids. A total of 548 demonstrations on hybrid cotton were conducted by 33 KVKs on 222 ha wherein the yield increase was found to the extent of 79% as compared to local checks. Similarly, 1205 FLDs on hybrids of castor, mustard and sunflower were conducted by 94 KVKs across the country covering an area of 426 ha and achieving yield increase as high as 136% in hybrid sunflower compared to local checks. Demonstrations (147) were conducted on napier hybrids achieving enhanced yield up to 150% as compared to local checks. Similarly, 1426 demonstrations were conducted on vegetable and fruit crop hybrids covering an area of 264.8 ha through 153 KVKs achieving yield increase as high as 85.7% in tomato hybrid as compared to local checks. The remaining 2061 demonstrations on hybrids were conducted on crops like soybean, *toria*, etc.

Farm mechanization: To showcase effective and efficient use of improved tools and implements, the demonstrations (5,388) were conducted on different farm operations like planting/sowing (1437), post-harvest and processing (1351), tillage (948), weeding (792), plant protection (411), harvesting (374) and threshing (75).

Livestock, fisheries and other enterprises: Demonstrations conducted were in total 15,293 covering 8,118 dairy animals, 3,866 sheep and goat, 30,570 poultry birds, 869 ducks, 537 pigs, 30 units of rabbits, 195 units of fisheries and 9 units of prawn cultivation. Besides, FLDs were also conducted on bee keeping (128 units), lac cultivation (56 units), mushroom production (2,495 units), vermicompost production (213 units), household food security (32 units), nutrition gardens (844 units), sericulture rearing (9 units), value-addition (242 units) and women empowerment (93 units) through economic activities which involved 4,113 farmers and farm women.

Capacity development

As many as 61,495 training programmes were organized wherein 16.06 lakh farmers/farm women, rural youths and extension personnel participated.

Farmers and farm women: For the benefit of 13.11 lakh farmers and farm women, total of 48,576 training courses were organized on various technologies to



update their knowledge and skills. Most of these courses were on productivity enhancement of field crops (21%), horticultural crops (14%), empowerment of rural women (12%), plant protection (13%), livestock production and management (17%), soil health and fertility management (8%), farm machinery tools and implements (4%), and capacity building and group dynamics (5%), production of input at site (3%), fisheries (3%) and agro-forestry (2%). Out of these courses (48,576), 44% were conducted on campus and 56% were organized off-campus. The participants included 3.69 lakh farm-women. Among the crop production technologies, about 29% of the training courses were on integrated crop production technologies, followed by resource-conservation technologies (6.6%) and weed management technologies (9.12%). Out of 6,977 training courses on horticulture, 3,380 were on vegetable crops, 2,146 on fruit crops, 402 on spice, 317 on ornamental and 172 courses on medicinal and aromatic crops.

Rural youth: Skill-oriented training courses (7,489) were organized for 1.77 lakh rural youth, including 63,517 young women (36%) during the year. These courses were on integrated farming, mushroom production, value-addition, dairy farming, seed production, vermin-culture, nursery management of horticulture crops, bee-keeping, protected cultivation of vegetables, repair and maintenance of farm machinery implements, sheep and goat rearing, poultry production, production of organic inputs and small-scale processing.

Extension personnel: Capacity development programmes (5430 courses) were also conducted for 1.18 lakh extension personnel, out of which 28,289 were women extension personnel. These courses were organized for extension functionaries working in government and non-government organizations who were directly or indirectly related 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 of farm animals, rejuvenation of old orchards, women and child care, livestock feed and fodder production, protected cultivation technology and ICT applications.

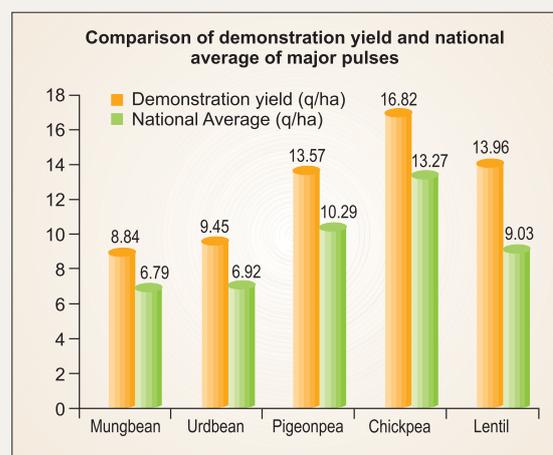
Sponsored training: Out of the total 61,495 training courses, 10,535 were sponsored programmes which benefitted 3.87 lakh farmers and farmwomen, rural youth and in-service extension personnel. Most of these courses were related to on-site input production, economic empowerment of women, processing and value-addition, methods of protective cultivation, farm machinery tools and implements, fisheries management, household nutritional security, animal nutrition management, animal disease management, fisheries and drudgery reduction technologies for farm women.

Extension programmes

For creating awareness among farmers about improved technologies and to provide timely advisory

Technology demonstration for harnessing pulses productivity

A National level programme on 'Technology Demonstration for Harnessing Pulses Productivity' was operated through 137 KVKs in 11 states in partnership with and technological backstopping by IIPR, Kanpur and six Zonal Project Directorates. The programme focused on demonstration of district specific technology modules of five pulse crops and capacity building of KVK functionaries, representatives of line departments and participating farmers. A total of 5124 demonstrations on an area of 2049 ha were laid out on mungbean (388 ha), urdbean (241 ha), pigeonpea (445 ha), chickpea (768 ha) and lentil (207 ha) showing productivity gains of 30%, 37%, 32%, 27% and 55% respectively over national average yield.



to farmers, KVKs organized different extension programmes. A total of 4.24 lakh extension programmes/activities in the form of advisory services, diagnostic and clinic services, celebration of important days, exhibitions, exposure visits, ex-trainees *sammelan*, farm science club conveners meet, farmers' seminar, farmers' visits to KVK, field days, film shows, group meetings, *kisan ghosthi*, *kisan melas*, technology weeks, lectures delivered as resource persons, *mahila mandals* conveners meetings, method demonstrations, plant/animal health camps, scientists' visit to farmer's field, self help group meetings, soil health camps, soil test campaigns, workshops and others were organized which attracted the participation of 102.41 lakh participants including farmers and extension personnel. The KVKs also organized 1.43 lakh extension programmes through electronic and print media to have wider coverage. These included electronic media in the form of TV programmes, radio talks, CDs/DVDs, extension literature, newspaper coverage, popular articles, leaflets, folders and books/booklets.

Production of technological inputs and products

KVKs produced large quantity of technological products like seeds and planting materials of improved varieties and hybrids, bio-products and elite species of livestock, poultry and fish which benefitted 23.68 lakh farmers in the country.



Seeds: During the year, 1.57 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 2.61 lakh farmers.

Planting materials: In all, 167.19 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 2.35 lakh farmers.

Bio-products: Bio-products, namely, bio-agents, bio-pesticides, bio-fertilizers, vermi-compost, mineral mixture etc. were produced and supplied to the extent of 1.79 lakh q and 6.87 lakh numbers benefitting 13.74 lakh farmers.

Livestock, poultry and fish fingerlings: Animals of improved breeds of cattle, sheep, goat and buffalo including breeding bulls were produced and supplied to 800 farmers. Different strains of poultry birds (chickens, quails, ducks and turkey) were provided to 25,208 farmers. Improved breeds of pigs were provided to 455 farmers. KVKs also enabled 77 farmers to establish rabbit rearing units by providing 170 rabbits. A total of 102.53 lakh fish fingerlings of different types of fishes were produced and supplied to 23,887 farmers.

Soil, water and plant analysis

A total of 2.91 lakh samples (comprising 2.36 lakh samples of soil, 0.48 lakh of water, 0.04 lakh of plant, and 0.03 lakh of manure) were analyzed related to 2.29 lakh farmers of 0.37 lakh villages, with a revenue generation of ₹ 144 lakh.

Rainwater harvesting

A total of 347 training courses and 211 demonstrations were conducted utilizing this facility and produced 7.05 lakh planting materials. Further, 33,155 farmers and 1,662 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 KVKs benefitting 7.62 lakh farmers, farm-women, extension personnel, rural youth and members of self-help groups. The events included 4,916 extension activities such as seminars, skill demonstrations, film shows, field visits, demonstrations, exhibitions and scientist-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

***In-situ* moisture conservation helping *rabi* Jowar cultivation**

The efforts of KVK Baramati, Pune through village wise farmers' campaign for popularizing *in-situ* moisture conservation technology is showing the results. Total of 42 rainfed villages were selected for this activity and demonstrations were conducted for farmers by involving farmers' clubs and State Department of Agriculture. As a result, about 256 ha was brought under this technique. With just 60 to 70 mm rainfall before sowing of *rabi* Jowar, farmers could harvest good yields in Baramati, Purandhar and Indapur tehsils of the district. The technique has resulted in 60 to 70 % yield increase. Where this technology was not adopted, farmers could not harvest even dry fodder (*Kadbi*). As a result of excellent success of this practice, more farmers are coming forward to adopt *in-situ* water conservation in forthcoming *rabi* seasons.



Moisture conservation in flat beds after first rain

providers. Information on weather, market, various farm operations, outbreak of pests and disease incidence and their control measures are being given to the farmers through Short Message Service (SMS). During the year, about 3.89 lakh short text messages were sent to 16.28 lakh farmers on various aspects of agriculture, horticulture and animal husbandry, weather forecast and pest and disease control. In addition, 148 KVKs also sent 1,749 voice messages on different aspects of agriculture and allied enterprises to 30,752 registered farmers, which cumulatively benefitted as many as 10.04 lakh farmers.

Demonstrations on climate resilient technologies

As part of NICRA project, 100 KVKs partnered in Technology Demonstrations and Dissemination for Climate Resilient Agriculture. More than one lakh farmers from 132 villages across the country were covered. Integrated packages of available and proven technologies were demonstrated in one village in each district for adaptation and mitigation under climate variability. During the year, 12,308 demonstrations on natural resource management in an area of 5,599 ha; 21,222 demonstrations on crop production technologies in an area of 6,380 ha and 18,426 demonstrations on livestock production including fodder cultivation and fisheries in an area of 14,505.08 ha



were carried out. About 57,423 animals/ birds belonging to 24,211 farmers were attended through demonstrations related to livestock and fisheries. Capacity-building interventions and the extension activities like exposure visits benefitted 83,774 farmers.

Technological backstopping

For updating the technical knowhow of the KVK staff, the Directorates of Extension Education (DEEs) of SAUs/CAU organized 193 training programmes which helped 2791 staff of KVKs. These training programmes covered the important areas like identification of thrust areas, contingency planning, administrative and financial matters, extension methodology, OFT modulation, market intelligence, entrepreneurship development, participatory extension approaches, information and communication technology, natural resource management, impact assessment of extension programmes, integrated farming systems, high value horticultural crops, post harvest management of horticultural crops, pesticide residues and food safety, technologies for yield maximization in rainfed areas, protected cultivation, participatory seed production, livestock production management, scientific fish hatchery management, commercial poultry production, animal genetic resource conservation, clean milk production, etc.

Further, the DEEs also organized 196 workshops and meetings for effective implementation of programmes of KVKs. The officials of these directorates made 2,136 visits to the KVKs and also made 1,859 field visits to review and monitor activities at farmers' fields like on-farm trials, frontline demonstrations, etc. These directorates provided technological products like seeds to 413 KVKs, planting materials to 188 KVKs, bio-products to 137 KVKs, livestock breeds to 41 KVKs, livestock products to 26 KVKs, poultry breeds to 75 KVKs, poultry products to 32 KVKs, mineral mixture and urea molasses mineral blocks to 8 KVKs, fish seed to 18 KVKs, polyhouses to 8 KVKs and low cost vermin-compost technologies to 6 KVKs.

The Zonal Project Directorates through their HRD programmes upgraded the knowledge and skills of 3,988 staff of KVKs by arranging 93 training programmes at various SAUs and ICAR Institutes in the areas like Application of ICT in Modified Agricultural Extension Reforms, Participatory Impact Monitoring and Assessment, Administrative and Accounting Procedures for KVKs, Institutional Innovations in Agricultural Extension for Inclusive Growth, Knowledge Management in Agriculture, Different Communication Skills, Supply Chain Management in Agriculture, Soil Fertility Management, Orientation Programmes for Newly Recruited Staff, KVK Knowledge Exchange Meet, Micro-Irrigation System to Mitigate Climate Change, Soil Test based Nutrient Management, Mushroom Production, Sub-tropical Horticulture, Vegetable Production under Changing Climate Scenario, Sugarcane Production

Success story

Vanaraja poultry strain ruling backyards in Kashmir Valley

Backyard poultry farming plays vital role in augmenting the rural family income and food security especially for marginalized families. Farmers of district Pulwama in Kashmir valley have also come forward to adopt this practice. However, the existing backyard poultry farming system is mostly intensive or semi-intensive with use of local, less yielding poultry strain.

After identifying this problem, KVK Pulwama took the lead by demonstrating production potential of Vanaraja birds to the farmers. Initially, 900 Vanaraja birds were provided in the year 2011-12 to the farmers for encouraging rearing of ideal poultry strain by following good production practices in their backyard units. These backyard units acted as demonstration sites for other farmers of the district which helped in popularizing the Vanaraja as backyard poultry. The farmers who raised Vanaraja in their backyard, got the average weight of 2 kg/bird within six months as against 1 kg body weight of local bird. Thus, there was 100 % productivity enhancement. The initiative has succeeded in wide scale adoption of Vanaraja strain of poultry for backyard rearing in the district.



Vanaraja birds for backyard poultry

Technologies, Orchid Conservation and Sustainable Development for Community Livelihood, Piggery Production and Management, Goat Farming, Fish Production, etc.

Agricultural Technology Information Centres (ATICs)

For single window delivery of technology information, farm advisory and diagnostic services and technology products to the farmers, 44 ATICs proved instrumental in attracting 6.12 lakh farmers who visited these centres for technological solutions to their problems. Technological information was provided to 1.63 lakh farmers both through print and electronic media. Similarly, 2.82 lakh farmers got quality technological products including 0.742 lakh q seed, 6.23 lakh seedlings/saplings, 5.55 lakh livestock species and fingerlings, 26,476 poultry birds and 0.14 lakh q bio-products. In addition, 4.25 lakh farmers were benefitted by farm advisory and diagnostic services like soil and water testing, plant/animal diagnostics, seed testing and different types of farm machinery and equipment etc.



Success story

Egg vendor to broiler farm owner

KVK, Bankura, West Bengal facilitated Shri Samir Chel with skill development training on 'Poultry farm management' using repetitive reinforcing approach. Initially, he started his first broiler farm with capacity of 500 birds. Gradually, over the period of two decades, Shri Chel up-scaled broiler production and now he has become the proud owner of six broiler farms in the district. The total capacity of his farm is more than 62,000 broilers. In order to increase his income he has also opened a professional shop of poultry meat and egg at Sonamukhi, West Bengal. Started with the initial annual income of ₹ 36,000. Shri Chel now earns more than ₹ 3.0 lakh per annum as the net profit. He has good knowledge of poultry market network within and beyond his district and his business has scaled up even to neighbouring state of Jharkhand. Broiler farming has elevated his livelihood status as he now owns two storied *pucca* house, two two-wheelers, one four-wheeler and other household amenities. Witnessing his success, more than 100 unemployed youths of the area have ventured into small scale poultry farming. These youths are now maintaining more than 50,000 broilers. The adoption of poultry farming as a livelihood option has now enabled these youths to earn a secured income every month.



8th National Conference on KVK

The 8th National Conference on KVK was organized at UAS, Bengaluru during 23-25 October, 2013 with focus on "Sustainable Intensification of Smallholder Farms". About 1,300 delegates took part in the deliberations including Programme Coordinators of 634 KVKs. There were eight technical sessions dealing with various sub-themes including i) Technological intensification for higher yields and improved nutrition; ii) Resilience to pests, diseases and climate for sustainable productivity of small farms; iii) Ecological intensification for sustainable cropping/farming systems, conservation agriculture; iv) Farmers rights and bio diversification of small farms; Farmer centric approaches, small agri-business models and development of social and human capital; vi) Innovative experiences of KVKs and farmers in sustainable intensification of small farms; vii) Integration of



Dignitaries releasing publications during 8th National Conference on KVK

livestock and fisheries for sustainability of small farms ;and viii) Experiences of KVKs under NICRA Project in sustainable intensification of small farms. In addition, a special session was also held on Facilitating KVKs on administrative, financial and management issues. Technology Exhibition and Innovation Market Place showcasing technologies of ICAR Institutes, Agricultural Universities, farm innovators and farm entrepreneurs were also organised. One National and eight Zonal Best KVK Awards for the year 2012 were conferred on the occasion. KVK Neempeeth bagged the National Best KVK award.

The action points agreed during deliberations in the Conference included working of KVKs as agri-intelligence centres; improving science communication to KVKs; organizing quarterly meeting/ interface with district administration; increasing scientific technical and administrative staff and adequate funds for contingency and infrastructure; development of training plan for all the SMSs; arranging visits of Directors of Research of AUs, ICAR Institutes, Heads of Divisions and Subject Experts to KVKs ; and regular feedback by KVKs to the Universities and ICAR Institutes on performance of various technologies; problems diagnosed and identified researchable issues. A number of recommendations also emerged in the eight technical sessions. For the first time, the proceedings of the KVK Conference were webcasted and accessed on websites of ICAR and KVK Hub by more than 51,000 people across the world.

Farmers' visit to Malaysia

As part of ASEAN-India Farmers Exchange Programme, an Indian farmers' delegation visited Malaysia during 14-23 April 2013. The visit was organized in cooperation with the Department of Agriculture, Ministry of Agriculture and Agro-based Industry, Malaysia, and the ASEAN Secretariat. The delegation comprising of 18 farmers from 17 states was accompanied by two ICAR officials. The purpose of the visit was to build capacity and confidence among Indian farmers while sharing experiences and technology among farmers of Malaysia and India.

Visit of Nigerian delegation

A study visit of a 17 member Nigerian delegation



of senior Agriculture Officers from Agricultural Research Council of Nigeria (ARCN), Federal Ministry of Agriculture and Rural Development, NGOs and Farmers Organizations was conducted from 25 September 25 to 3 October 2013 to familiarize them with the KVKs and Indian Agricultural Research and Extension Systems. The visit was sponsored by Nigerian Government under West African Agricultural Productivity Program (WAAPP). The delegation visited KVKs at Gurgaon, Karnal and Ludhiana; two premier ICAR institutes, the i.e Indian Agricultural Research Institute, New Delhi and National Dairy Research Institute, Karnal; besides Punjab Agricultural University and Guru Angad Dev Veterinary and Animal Sciences University at Ludhiana. In addition visit to three progressive and innovative farmers in Haryana and Punjab was also arranged. As part of above program,



Nigerian delegates visiting cattle farm at GADVASU, Ludhiana

the delegation members also interacted with senior officials of ICAR on 27 September 2013 wherein the delegation was briefed about activities of all Subject Matter Divisions. The delegation was led by Dr. Usman Ahmed, Deputy Director (Linkages and Partnerships), ARCN, who appreciated the ICAR for setting up KVKs in the country and desired to seek help in Nigeria for opening KVK like institutions to speed up agricultural technology transfer for the benefit of Nigerian farmers.

Pomegranate orchard management under deficit water condition

KVK Ahmednagar facilitated formation of pomegranate growers' group and addressed the problems related to water management, nutrient management, and pest and diseases management on community basis. Demonstrations on use of water absorbent polymer in pomegranate orchard showed the net saving of 14 lakh liters of water per hectare because of reduced water demand to an extent of 35 per cent over untreated control. Similarly, the fruit size and fruit retention was higher in absorbent polymer applied trees as compared to untreated trees. The fruit yield in treatment plots was observed to be about 20 kg as compared to 16 kg per tree in control plots. The yield in demonstration plots was 157q/ha as compared to 135.6



q/ha in control plots. There was an average increase of 13.7 per cent in marketable yield under demonstration.

Due to efficient nutrient utilization the plants in treated plots showed no symptoms of leaf yellowing or other nutrient deficiency symptoms. In these villages the area under pomegranate has increased from 225 ha to over 630 ha (64%) and number of farmers has also increased six-fold, i.e. from 200 to 1200. Also, during last two years 150 farm ponds have been excavated to ensure timely availability of water for pomegranate production.

Hot arid region turns hot spot for medicinal plants

Arid regions of Barmer are known for wild growth of wide range of medicinal plants. KVK, Barmer had earlier conducted a survey on this issue and found 120 different kind of species, which mostly grow as wild herbs. People at times take out these plants and sell to local middlemen in low price. KVK identified wildly grown useful herbs in this desert tract and formed a group of farmers and linked it with a private company to get good rates for the product of these medicinal plants.

A private company initially gave a purchase order of 70 q dried leaves of Sankhpushpi (*Convolvulus pluricaulis*). After checking the produce they got satisfied and gave another order of 300 q. The offered rate of Sankhpushpi was ` 19 per kg of leaves, and ` 1,600 per kg of seed as against ` 9 per kg given by local middlemen. These two successful supply of consignments made KVK trustworthy to farmers of



Shankhpushpi plants in field



the district. The KVK invited Senior Management of the company to Barmer and asked to help farmers in producing two other medicinal plants, i.e. Mulethi (*Glycyrrhiza grabra*) and Arnie (*Clerodendrum phlomidis*) along with Shankpushpi on contract basis. Formal MoU of farmers with the company was signed in January 2012 for 3 years at a rate contract of ` 16 per kg for Shankpushpi leaves and ` 55 / kg for Mulethi.

As part of technological interventions, the KVK organized meeting of 200 farmers from excluded communities and selected 50 for trials in first year. Each farmer cultivated 0.20 ha to 0.40 ha of land, making it a total of 20 ha. Since, Mulethi is susceptible to 'termite', therefore, fields were finally selected after initial soil and water testing. Farmers were given on an average 6 q of Mulethi tuber per acre of land for using as seed. The KVK gave detailed training for scientific cultivation of Mulethi. Tubers were given free of cost, with a condition that the same quantity of Mulethi will be taken out of their produces during harvest. Each farmer obtained 22 q/ha of Mulethi which earned an income of ` 1.21 lakh/ha with ` 25,875/ha as cost of cultivation. The KVK is regularly monitoring for appropriate treatment to the soil and herbs. For next crop season, 100 farmers have come forward for Mulethi and Shankpushpi cultivation under this approach and hopefully better marketing avenues will be created in future.

Rice bowl in Kerala developing as a mushroom belt

The upper Kuttanad of Pathanamthitta district is known as rice bowl. In recent years, usage of combined harvester has increased due to which farmers are leaving paddy straw in the field itself. Except feed for cattle the paddy straw goes waste or remains unutilized. The other best alternative to make use of unutilized paddy straw is in cultivation of *Calocybe indica* (milky) and *Pleurotus* (oyster) species of mushroom. The KVK, Pathanamthitta has trained 3471 farmers through 161 training courses on mushroom cultivation, spawn production and value addition. KVK has also produced a total of 6010 Kg of spawn in its mushroom unit and provided to 250 mushroom farmers in the district.

The spawn production and supply has created an opportunity of extra income for the women folk involved. Under the aegis of KVK, the Confederation of mushroom growers in Pathanamthitta was formed under the name Edanadu Mushroom Growers Association, Pathanamthitta. The association includes five societies registered under the project, and individual or any farmers' club members who are willing to work for the objectives of the Confederation. Twenty-one members have signed the memorandum of association. As a result, mushroom production has enhanced in the district by 2,000 kg/month, spawn production in the district by 750 packets/month and employment man days by 750/month.

Sericulture productivity enhancement through cluster approach

Chickballapura and Kolar are the major silk producing districts of Karnataka. Kathariguppe a village in Chintamani taluk of the district with more than 60 sericulturists promoted community cluster approach for enhancing production, productivity and quality cocoon production and their conversion into quality silk fabric. Under RKVY, a *sangha* was formed and registered as *Kathariguppe Bivoltine Reshme Belegarara Sangha* in December 2011. The members of the *Sangha* were given technical and financial support required for Bivoltine silk production. An amount of ` 10 lakh was spent from the project to modify the mulberry gardens, silkworm rearing houses and equipment for scientific rearing. All the members of the *Sangha* started rearing Bivoltine hybrids after affecting modifications to the mulberry gardens and silkworm rearing houses. Appropriate production, grading, packing and marketing technologies were adopted and 34 crops were harvested in the cluster villages by 22 farmers (12 farmers completed two crops) with an average cocoon yield of 64.4 kg/100 Disease Free Laying (DFL) and the total cocoon production in 10 months time is about 25,000 kg. With an average price of ` 230/kg, an approximate return was ` 57.50 lakh. The Bivoltine cocoon productivity was 20 per cent more than the productivity of the taluk for the corresponding period.



A view of sericulture unit through a cluster approach

In addition, a second cluster village Lakshmidivakote was identified in which 15 farmers with 16.25 acres of mulberry plantation were provided technical support. The identified farmers have been trained on quality aspects of different activities such as, mulberry production, rearing house management, *chawki* handling, silkworm rearing, compost production, harvesting and grading of cocoons. This has created a big impact as evident by the fact that a total of 6,175 DFLs were brushed yielding 4,893.86 kg of cocoon with average yield of 79.25 kg per 100 DFLs.

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