AIP NEWSLETTER

A Newsletter of the Agricultural Innovation Program (AIP) for Pakistan

Volume 2, Issue 1 | January-March 2015

Message from the Project Leader

Greetings from AIP!

I am pleased to present the updates of the Agricultural Innovation Program (AIP) for Pakistan for the January to March 2015 quarter.

In this quarter, all the science and activity windows of AIP showcased the latest advances in agricultural technology and provided a platform for local industry to explore innovative technologies, products and services at two national level expositions, the Pakistan Agricultural Conference and Expo 2015 held in Islamabad and the DAWN Sarsabz Pakistan Agri Expo-2015 held in Lahore.

Pakistan Agricultural Research Council (PARC) made significant progress in establishing the Provincial Agricultural Research for Development (AR4D) Boards. These Boards support the expansion of provincial linkages to national, regional and international communities through a mechanism of coordination. Competitive grants for research to enhance the agricultural growth of Pakistan were announced for identified priority areas. A total of 285 proposals were received from Punjab, Sindh, Balochistan and Khyber Pakhtunkhwa (KP).

The commissioned projects are progressing steadily towards achieving their goals. Through its training programs AIP prepared 21 women farmers from KP province in healthy vegetable seedling production. Immunization of 2,504 small ruminants – 1,081 sheep and 1,423 goats – for peste des petits ruminants (PPR) was carried out in Chakwal district of Punjab. For the first time in Pakistan, the Samsung tablet with open data kit (ODK) software was introduced to facilitate capture and monitoring of livestock survey data. Twenty two enumerators were trained to use it. AIP is also exploring traditionally non-maize areas in Sindh and Balochistan provinces for improved maize production. In collaboration with public and private partners in Sindh and KP provinces, AIP is improving the quality of wheat seed production by training 194 participants, including representatives of 12 seed companies and their contract growers. The three best high yielding bacterial leaf blight (BLB) resistant with good grain quality rice lines were introduced and selected by AIP's national partners for potential release as cultivars in the country. In this quarter, the skills of 161 mango, citrus and grape growers were enhanced through training. More than 100 smallholder farmers from Jafarabad district of Balochistan province were made aware of the direct seeding of wheat into residues of the preceding rice crop. AIP is bringing innovation to crop management by introducing and testing the GreenSeeker™ – a handheld crop sensor to make better on-farm nutrient management decisions. This device was provided to selected institutes and nine scientists received training on the use of GreenSeeker™ for a wheat crop.

Under the human resource development (HRD) component, 11 of 14 AIP Scholars have successfully started their MS and PhD studies in the land-grand universities in the U.S.

AIP is a collaborative effort of the PARC, the International Livestock Research Institute (ILRI), the International Rice Research Institute (IRRI), the World Vegetable Center (AVRDC), the University of California at Davis, and the International Maize and Wheat Improvement Center (CIMMYT). It is funded by the United States Agency for International Development (USAID). I take this opportunity to thank all the national partners involved in successfully carrying out AIP activities. Your comments and suggestions are welcomed.

Best regards and enjoy reading.

Md. Imtiaz
Project Leader

Inside This Issue:

Updates on AIP Activities

AIP Showcased the Latest Advances in Agricultural Technologies at Expositions in Islamabad and Lahore

In February and March 2015, AIP presented the latest advances in agricultural technology and provided a platform for local industry to explore innovative technologies, products and services at two national level expositions – the Pakistan Agricultural Conference and Expo 2015 held in Islamabad and the DAWN Sarsabz Pakistan Agri Expo-2015 held in Lahore.

Pakistan Agri Expo-2015

In February 2015, AIP showcased the latest advances in agricultural technology and provided a platform for local industry to explore innovative technologies, products and services at the Pakistan Agricultural Conference and Expo 2015 held in Islamabad. Mr. Gregory Gottlieb, USAID Pakistan Mission Director, Mr. Sikandar Hayat Khan Bosan, Federal Minister for National Food Security and Research and Dr. Iftikhar Ahmad, Chairman PARC, visited the AIP stall. The main attractions were the goats bred through artificial insemination, alternate wetting and drying in rice, zero tillage happy seeder, hermetic bags for rice storage, durum wheat, bio fortified maize and protected vegetable cultivation models. The AIP exhibit attracted many visitors, including farmers, policy makers, agriculture experts and scientists from both the public and private sectors. This has opened new avenues for AIP to connect with target groups and explore agricultural opportunities in Pakistan.

DAWN Sarsabz Pakistan Agri Expo-2015

On March 19-20, 2015, AIP exhibited its commissioned projects' interventions in Pakistan's largest agricultural exposition, the DAWN Sarsabz Pakistan Agri Expo-2015. This enabled the AIP's lead organization, CIMMYT, and its primary partners to develop partnerships with the key market players who can drive their relevant businesses forward. The Deputy Director of USAID Lahore, Ms. Maggie Schoch, visited the AIP display, which enabled the AIP team and the beneficiaries to describe the good work they are doing in agricultural development in Pakistan.

AIP-Competitive Grants System (CGS)

Competitive Grants System (CGS) is led by Pakistan Agricultural Research Council (PARC)

For feedback and queries contact Dr. Shahid Masood (PARC): shahid.masood617@gmail.com

Pakistan Agricultural Research Council (PARC) is playing a vital role in the establishment of Provincial Agricultural Research for Development (AR4D) Boards in Balochistan, KP and Sindh provinces. It is also strengthening the existing Punjab Agricultural Research Board (PARB) to support expansion of provincial linkages to national, regional and international communities through a mechanism of coordination. An Interim Provincial Competitive Grants System Management Committee, or research board, is set up to establish the boards and implement the approved projects. In addition to this, competitive grants, up to Rs.5.0 million for two or three years, for research to enhance the growth of agriculture in Pakistan were announced for identified priority areas. The overall response was tremendous. The scientists showed keen interest in writing and submitting proposals. PARB has received 157 preliminary proposals and PARC received 85 for KP province, 39 for Balochistan province and five for Sindh province.

AIP-Commissioned Projects

AIP-Vegetables

AIP-Vegetables is led by The World Vegetable Center (AVRDC)

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Empowering Farmers to Improve Practices Under Protected Cultivation of Vegetables

Hands-on experience was provided to 121 farmers. The training and practical demonstrations covered nursery bed preparation, tunnel construction, planting layout for different vegetables, identification of diseases, insects and integrated pest management techniques to avoid their spread, suitable fungicides and chemicals and the fertilizer requirement of vegetables at different stages. This training was made possible with the collaboration of the partner research institutes: Soon Valley Development Project (SVDP), Khushab; Vegetable Research Institute-AARI, Faisalabad; Vegetable Program, National Agricultural Research Center (NARC), Islamabad; and the Agricultural Research Institute, DI Khan.

Preparing Woman Farmers from KP Province for Healthy Vegetable Seedling Production

To meet the gender objectives of the project, AIP-Vegetables organized training on healthy vegetable seedling production exclusively for 21 women farmers at Kakot, Malam Jabba, KP province. In Mingora, Swat district, AIP-Vegetables, in collaboration with Agricultural Research Institute, trained two women farmers as master trainers. They will further disseminate their skills among the women farmers of their community. These women earn their livings mostly by growing French beans. AIP-Vegetables encouraged their activities by distributing seeds of French beans.

Strengthening Vegetable Seed Production Skills in Punjab and Khyber Pakhtunkhwa Provinces

AIP-Vegetables, with the collaboration of the Vegetable Program, NARC, Islamabad and Agricultural Research Institute, Mingora, Swat, attracted 45 farmers in two training sessions on onion seed production under vegetable value chains. This explicit training covered bulb selection, planting, production, threshing, drying, cleaning, marketing and storage. The training was followed up by the planting of onion bulbs for seed production on 1.5 acres in each region of KP and Punjab provinces.

Validation of Findings of Baseline Survey on Vegetable Value Chains

In March 2015, four stakeholders' validation workshops were organized. The objective was to validate the survey findings of a baseline survey on vegetable value chains. The workshops also identified major bottlenecks and set priorities for interventions, including suitable vegetables and locations for seed production. The workshops were held in Faisalabad district of Punjab province, Quetta district of Balochistan province, Kunri district of Sindh province and Swat district of KP province.

The major bottlenecks identified included the use of uncertified, mixed, poor quality and unhealthy seeds that results in the production of vegetables that are prone to diseases and unable to cope with environmental stresses. Other bottlenecks included poor management, which ultimately leads to low yield potential; traditional, but poor harvesting and produce handling methods, which result in a loss of produce; and poor quality bulk packaging.

The surveys revealed that farmers lack knowledge of value chain development, postharvest management and good agriculture practices. Farmers need to be aware of adulterated inputs, such as seeds, fertilizers, pesticides, the balanced use of fertilizers and the judicious use of insecticides/pesticides to avoid qualitative postharvest losses.

Minimizing Postharvest Losses in Mungbean by Improving Farmers' Knowledge and Skills

A postharvest training on improving mungbean production was arranged for 16 farmers in the Bhakkar district, Punjab province with the collaboration of Arid Zone Research Institute. The training has enabled the farmers to maintain good quality seed for their next crop and to market quality produce. These trained farmers will serve as trainers in their villages to reduce postharvest losses. The training focused on effective control of the pests of stored grains, particularly bruchids, in order to maintain high quality seed of approved varieties of mungbean to enhance regional productivity. The farmers were made aware of preventive and curative measures for the insect pests of stored mungbean seed (Khapra, Red flour beetle (Trogodermagranarium), Dhora beetle (Callosobruchusmaculatus)) as these cause 20 to 30 percent losses in storage. The advanced new methods and old practices of the farmers were compared to enhance their understanding of the control measures.

Early Cucumber Cultivation Brings Great Profits to Farmers

AIP-Vegetables developed an environment that made it feasible to grow cucumbers under cover during the winter season. For the first time in Swat district, first cucumber picking was completed by mid-March 2015. Previously the farmers sowed cucumber at the end of April and start of May. This innovation in early cultivation of cucumber has brought great profits to the farmers.

Gypsum Increased Tomato Yield in Noorpur Thal's Salty Soil

In Noorpur Thal, a tehsil in Khushab district of Punjab province, the soils are naturally sandy with a high concentration of total dissolved sodium (TDS). This resulting in enhanced electrical conductivity (EC) and the sodium adsorption ratio (SAR), which are extremely harmful to crop growth and development.

The tomato growers in the area commonly use fresh farm yard manures (FYM) to reclaim saline soils. This practice has proved to make the plants vulnerable to disease and insect attack at the very early stage of growth, leading to retarded growth and the eventual death of the plant.

AIP-Vegetables advised the tomato growers to apply gypsum to the affected fields of tomato. This has reclaimed the soil, the period of stunted growth ended, the vegetative and reproductive growth were at a peak and the plants were eventually 10 feet high and bore 7 to 10 clusters of fruits by the end of the season. Disease and insect attack was also reduced which is below the economic threshold level making plants more responsive to any chemicals applied. Thus, Gypsum application has enhanced the reclamation process by decreasing salinity in the soil and improved the tomato yield in Noorpur Thal.

AIP-Livestock

AIP-Livestock is led by the International Livestock Research Institute (ILRI)

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Awareness and Control of Peste des Petits Ruminants (PPR) in Sheep and Goats in the Chakwal District of Punjab

Peste des petits ruminants (PPR) is an acute, highly contagious viral disease of small ruminants characterized by fever, loss of appetite, stomatitis, gastroenteritis and pneumonia. The mortality rate for infected animals is high.

AIP-Livestock, in collaboration with the Food and Agriculture Organization (FAO), led a campaign to control PPR in Pakistan. It carried out a vaccination campaign February 25-27 at the Chakwal sites in Punjab province. In total 2,504 small ruminants, which included 1,081 sheep and 1,423 goats, were immunized. In addition, 39 farmers were trained in the control of PPR.

Foot and Mouth Disease – Awareness and Prevention Campaign

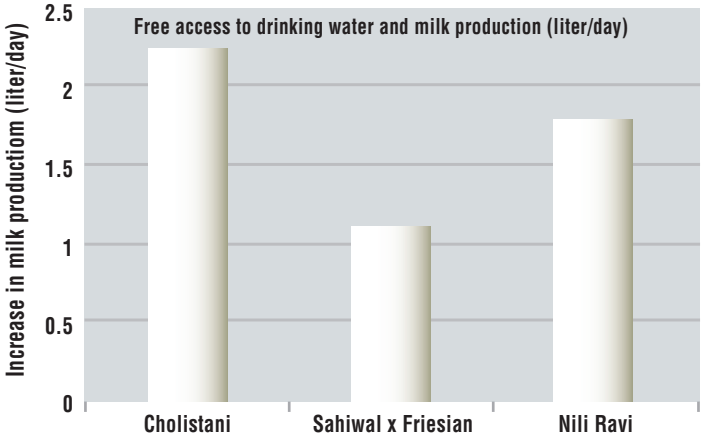
Foot and mouth disease (FMD) has had severe implications for dairy farming. In 2014, AIP-Livestock conducted survey interviews in six project villages in Jhang and Bahawalnagar districts, Punjab province. These revealed that FMD has affected 30 to 40 percent of the large ruminants, resulting in immense economic loss to the smallholder farmers. The mortality rate of FMD-affected calves below 5 months of age was more than 80 percent and in 5-12 month old calves, was 60 percent. The FMD pre-vaccination campaign with farmer groups revealed that last year milk production was reduced by 75 to 90 percent in disease-affected animals. The survey also showed that FMD resulted in financial losses of about Rs.100,000 (approximately US$1,000).

On March 11-14, AIP-Livestock raised FMD awareness with the assistance of the provincial livestock line departments in all six project villages and successfully vaccinated all large ruminants. The split dose vaccine was acquired from FAO on a cost sharing basis. A total of 7,594 animals, which included 4,071 cattle and 3,523 buffaloes belonging to 890 dairy farmers, were provided with the first dose of the vaccine. This will be followed up with a second booster dose in mid-April and a third in mid-June. This activity will result in increasing farmers' profitability from this livestock enterprise.

The AIP gained farmers' confidence and credibility by providing assistance when needed, and preventing economic losses from FMD outbreaks.

Farmer Participation Trial on the Importance of Water for Milk Production

In February 2015, a preliminary farmer participatory demonstration study was conducted by AIP-Livestock to make dairy farmers aware of the importance of water intake for milking animals. The study was carried out with six farmers, using six animals each of Cholistani, Sahiwal x Friesian crossbreds and Nili-Ravi buffaloes in Noor Sar village, Bahawalnagar district, Punjab province. Over a period of one week, the response to free access to water was highest with the Cholistani breed which produced 2.2 liter/day. This was followed by the buffaloes at 1.75 liter/day. The smallest improvement was with the Sahiwal × Friesian crossbred cattle at 1 liter/day. The response of the farmers was very positive. These farmers were also helpful in further disseminating the message in their neighboring farming community.



The effect of free access to water on milk production in cattle and buffaloes.

Snap-Shot Survey Makes Dairy Farmers Aware of the Importance of Watering, Feeding and Housing Facilities for Animals for Improved Milk Production

In March 2015, a snap-shot study was conducted to capture current dairy farming practices, such as animal housing, feeds and feeding, animal management and health facilities affecting the production and quality of milk. In all, 697 dairy farmers were interviewed. These included 247 farmers from KP province and 450 from Punjab province. The study revealed that less than five percent of the farmers have proper housing facilities for their animals. Approximately 95 percent of the farmers practice an intensive system of management where animals are kept tethered by the neck or legs. All the dairy farmers interviewed were unaware of the importance of water and feeding the animals a balanced ration for better quality milk production. Calf mortalities were high, which was attributed to the farmers not practicing routine deworming.

Training for Enumerators to Capture and Monitor Interventions Using Open Data Kit (ODK)

On March 15-20, AIP-Livestock organized a five day training course on capturing and monitoring data using open data kit (ODK) software. The course in Islamabad was attended by 22 enumerators. Ms. Jane Poole and Mr. Harrison from Research Methodology Unit, ILRI, Nairobi, conducted the training. For the first time in Pakistan the Samsung tablet with ODK software, with its 34 page questionnaire, was successfully introduced. The training included the use of both printed questionnaires and the software one using the tablets. The training was followed up by a field visit to a project village in Chakwal district, Punjab province. The survey was begun on March 24 and will be completed by April 15. Data from 350 households from all 10 project villages in Chakwal, Jhang, Bahawalpur and Bahawalnagar districts, Punjab province will be collected and stored on the ILRI server for analysis and reporting.

AIP-Cereal and Cereal Systems

AIP-Wheat

AIP-Wheat is led by the International Maize and Wheat Improvement Center

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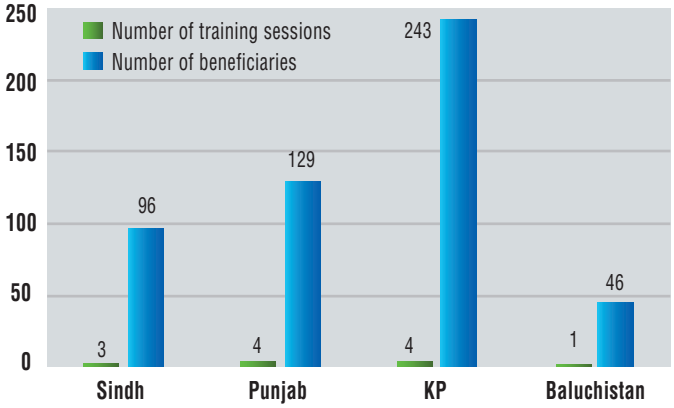
Training Growers on Wheat Seed Quality Management

AIP-Wheat has started production of the basic and certified wheat seed of newly released, high yielding, rust resistant wheat varieties in several districts of Pakistan. To make these efforts sustainable, a one day training program on wheat seed quality management was organized by CIMMYT in collaboration with PARC and national partners. The training provided both conceptual and practical hands-on experience to 320 wheat seed growers using an innovative and cross-cutting curriculum on wheat seed quality management. Nine training sessions were conducted across four provinces in Pakistan – one in Baluchistan, two in KP, four in Punjab and two in Sindh. The resource persons for the training were drawn from CIMMYT, the federal and provincial wheat breeding institutes, and the Federal Seed Certification and Registration Department (FSC&RD).



Details of the training sessions on wheat seed quality management in Pakistan under AIP-Wheat.

Training Private Sector Companies on Producing High Quality Wheat Seed Through Public-Private Partnerships

Participants at a seed quality management training organized by CIMMYT, in collaboration with Agricultural Research Institute, Tandojam, for seed companies under public-private partnerships on March 10, 2015.

Access to the basic seeds of new wheat varieties has been identified as one of the major bottlenecks in fast tracking newly released wheat varieties. The first amendment bill to the Seed Act of 1976 allows private seed companies to produce and market basic seeds of all the recommended varieties. However, it is yet to be institutionalized. Currently, a very limited private seed companies have been getting pre-basic or basic seeds from wheat research institutes on the basis of personal relationships.

AIP-Agronomy, in collaboration with its public and private partners in Sindh and KP provinces, is improving the quality of wheat seed production through training. Three training sessions, one in Sindh and two in KP province, focused on producing quality basic wheat seed by engaging concerned wheat breeders, personnel from the FSC&RD and CIMMYT scientists. Altogether 194 participants, who included representatives of 12 seed companies and their contract growers, received the training. These events were instrumental in developing a closer relationship between wheat breeding institutes, private seed companies and FSC&RD.

AIP-Maize

AIP-Maize is led by the International Maize and Wheat Improvement Center

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Unlocking the Untapped Potential of Maize in Sindh and Balochistan Provinces

Maize trials planting at Sariab Quetta-Balochistan province

Maize in Pakistan is predominantly cultivated in Punjab and KP provinces. AIP-Maize is exploring traditionally non-maize areas. In this spring season (February-July, 2015), various maize varieties are being tested in Sindh and Balochistan provinces.

In Sindh province, three white maize trials, consisting of about 150 varieties, are being evaluated in Tando Jam and Tando Alla Yar districts. Some of the entries from previous trials in 2014, showed a record high yield of more than 10 t ha^{-1} from these sites. This encouraging result shows the potential for the future large scale production of maize in the province.

Similarly, Balochistan province is being explored for its potential for improved maize production. Under AIP-Maize, two white maize trials are being conducted at Qila Saifulla and Quetta. These trials consist of 30 open pollinated white maize varieties that will help to identify the best performing entries for the large scale production of maize in Balochistan, where farmers so far have no access to improved maize varieties.

In general, the diverse ecological conditions of these provinces and the encouraging trial results recorded will make the provinces a new frontier at which to scale up maize production and productivity in Pakistan. Once potential varieties have been identified in these provinces, CIMMYT will allocate and provide initial seed to initiate local seed production in the provinces. AIP-Maize will enhance efforts to further harness the potential through various public and private partnerships for improving access to and the availability of improved maize varieties in Sindh and Balochistan provinces.

AIP-Rice

AIP-Rice is led by the International Rice Research Institute (IRRI)

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PARC Variety Evaluation Committee Recommends IRRI-developed BLB-resistant Variety BR1 (Super Basmati 101)

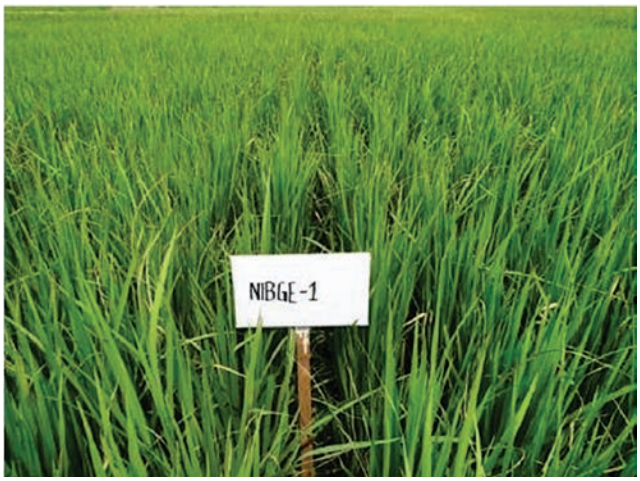
Despite various advancements in rice production systems, the yield of rice, particularly basmati varieties, is very low. The main yield limiting factors include a narrow basmati gene pool and its susceptibility to bacterial leaf blight (BLB). The disease incidence in different rice growing areas of Punjab is from 30 to 40 percent and sometimes as high as 90 percent – significant quantitative and qualitative losses every year.

IRRI developed 25 BLB-resistant advanced lines using Super Basmati x IRBB57 parents and by introgression BLB resistant genes through marker assisted backcross breeding (MABB). Of these 25, the three best lines – BR1(*Xa4, Xa21*), BR18 (*Xa4, Xa21*), and BR23 (*Xa5*) – were tested and selected by a national partner (National Institute of Biotechnology and Genetic Engineering (NIBGE), Faisalabad) for their higher yield, resistance to 90 percent of the local BLB viruses and grain quality as compared with the parent (Super Basmati). The same material was also tested at IRRI against different races of BLB pathogens, *Xanthomonos oryzae* pv. oryzae (Xoo). A set of field trials of the three lines together with Super Basmati was conducted at Muridke Sheikhupura by Engro Eximp for field evaluation against BLB. The results revealed that the BLB-resistant line BR1 performed well in the field and produced a 29.5 percent higher yield than the parent variety (Super Basmati). The yield gain is attributed to the higher number of filled grains and the lower proportion of sterile grains as a result of the higher resistance to BLB.

Comparison of BLB-resistant line (BR-1) with Super Basmati *

Variety/line	Plant height (cm)	Tillers/plant	Panicle length (cm)	Filled grains /panicle	Sterility (%)	1000 grain weight (gm)	Yield kg (ha)
BR 1 (NIBGE-1)	120.3	23.8	28.4	115.5	5.79	23.6	4514
BR 18	133.4	23.4	28.2	111.1	7.25	23.5	3960
BR 23	121.4	22.7	27.2	92.5	14.23	23.0	3762
Super Basmati (check)	124.3	21.7	26.8	96.5	15.98	22.8	3485

*Average of 10 observations



Crop stand of BR1 and Super Basmati under farmer's field condition at Muridke, Sheikhupura district, Punjab province.

The development of BR-1 (Super Basmati 101) is the first example in Pakistan where PCR-based markers have been used to identify two BLB-resistant genes along with various quality characteristics. The recovery of the recurrent parent genome was also monitored using molecular markers in all backcross generations. The newly developed Super Basmati 101 possesses the following characteristics as compared with its parent variety Super Basmati.

- BLB resistant.
- Matures one week earlier.
- Short statured (5 to 8 cm shorter).
- Higher yield potential (29%).
- Lodging resistant because of stiff stem and short stature.
- Cooking and eating quality at par.

AIP-Agronomy

AIP-Agronomy is led by the International Maize and Wheat Improvement Center

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Small Farmers Experience Zero Tillage Wheat Planting in Balochistan Province

AIP-Agronomy, in collaboration with Agriculture Research Balochistan, initiated zero tillage wheat after rice in Jafarabad district, Balochistan province. On January 10, more than 100 participants gathered for a field day on the direct seeding of wheat into residues from a preceding rice crop. This was organized by CIMMYT in collaboration with the Directorate of Agricultural Research's Usta Muhammad Farm, Jaffarabad district. While the event was intended for smallholder farmers, it drew progressive farmers, agricultural extension specialists and researchers. Renowned parliamentarians, Mr. Khan Muhammad Khan Jamali, Mr. Changaiz Khan Jamali and Mr. Mir Jan Muhammad Jamali, Speaker, Balochistan Provincial Assembly, also attended the field day.

Dr. Muhammad Javaid Tareen, Director General of Balochistan Agricultural Research, praised AIP and its partners' efforts to promote conservation agriculture practices, such as zero tillage.

Mr. Jamali, Speaker, Balochistan Provincial Assembly, was grateful for the efforts of USAID and CIMMYT to improve smallholder famers' incomes and assured the farmers and agricultural professionals that efforts would be made to improve research facilities and access to new technologies in Balochistan.

Zero Tillage Happy Seeder Planted Wheat in Rice-Wheat Area of Punjab

CIMMYT, in collaboration with its national partners, Adaptive Research Punjab, Engro Eximp, Rice Research Institute Kala Shah Kaku and Wheat Research Institute Faisalabad, has initiated wheat planting using the zero tillage (ZT) Happy Seeder in Punjab. Demonstrations of wheat planting using the ZT Happy Seeder at 33 sites (including 28 farmer and five national partners' farms) was carried out in four districts – Gujranwala, Sheikhupura, Sialkot, and Faisalabad districts, Punjab province. This technology enabled the farmers to plant wheat without burning the rice residue and reduced the number of tillage operations from six to one. This will reduce the cost of cultivation by about Rs.6,000 per acre.

Farmers' field days were organized to create awareness regarding the benefits of the ZT Happy Seeder, at four locations on ZT planted wheat.

Place, venue	Date	No. of participants
Dahr Farm, Mureedkai, Sheikhupura	January 07, 2015	114
Adaptive Research Farm, Sheikhupura	March 12, 2015	104
Adaptive Research Farm, Gujranwala	March 26, 2015	95
Syed Mubarik Ali Farm, Farooqabad	March 28, 2015	85

Multi-crop Bed Planter Was Used for Planting Wheat

National partners of AIP-Agronomy in three provinces, Punjab, KP, and Sindh, were instrumental in testing and demonstrating a multi-crop bed planter for wheat planting at 25 sites, including two districts, Shaheed Benazir Abad and Hyderabad, in Sindh province, Nowshera district in KP province, and Vehari, Sahiwal, Faisalabad and Chakwal districts in Punjab province.

During the wheat season, the bed planting of wheat under ZT conditions after maize was also demonstrated in Nowshera district at five sites. Exposure visits for farmers were arranged to observe bed and ridge planted wheat fields at the following sites.

Place, venue	Date	No. of participants
CCRI, Pirsabak, Nowshera, KP province	March 11, 15	130
Haji Naseem Farm, Bahawalpur, Punjab province	March 19,15	60
Agronomy Research Station, Bahawalpur, Punjab province	March 27,15	100
Khan Muhammad Jalalani, Sakrand, Shaheed Benazir Abad, Sindh province	March 29,15	74

Innovation in Crop Management by Introducing and Testing the GreenSeeker™ for Nutrient Management in Wheat

GreenSeeker™ is a handheld crop sensor which helps make better on-farm nutrient management decisions. Use of GreenSeeker™ helps the farmers and extension agents to apply nitrogen fertilizer to wheat according to the crop requirement, which will save the cost of unwanted nitrogen fertilizer.

To evaluate the use of GreenSeeker™, the nitrogen management of wheat has been started in collaboration with five institutes from two provinces, Punjab and KP, and Islamabad. The collaborating institutions are the Agronomic Research Station, Bahawalpur, the Rice Research Institute, Kala Shah Kaku, and the Wheat Research Institute Faisalabad, in Punjab province, the Cereal Crops Research Institute, Nowshera, KP province, and the National Agricultural Research Center (NARC), Islamabad. The device was provided to these institutes. Training of nine scientists in the use of GreenSeeker™ for a wheat crop was held at the NARC, Islamabad. Field trials are in progress in various parts of the country.

AIP-Socioeconomics

AIP-Socioeconomics is led by the International Maize and Wheat Improvement Center

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Exploring Maize Street Vendors' Livelihoods in Big Cities of Pakistan

Street vending in Pakistan is quite common and one can find street vendors selling vegetables, fruits, clothes, blankets, ice cream, cooked/roasted/boiled maize grains cobs, etc. in urban, peri-urban and rural areas.

AIP-Socioeconomics conducted a study to assess the livelihoods and influence of potential customers (with respect to age, gender, seasonal and/or special events) on sales volumes, vendors' dependence on street vending, etc. Altogether 204 maize vendors from Rawalpindi, Faisalabad and Lahore, Punjab province and Islamabad were interviewed by trained enumerators.

The survey revealed that the majority of the street vendors were found to be completely dependent on street vending. They were less well educated, Pashto speaking and used mobile carts. They switched their business seasonally. Maize is being sold as boiled or roasted cobs, as roasted grains and as popcorn. The vendors generally earn more profit on roasted grains than on roasted and boiled cobs. Being a daily cash flow business, on average, the street vendors earn Rs.624 per day by investing approximately Rs.1,200. Vendors switch to other daily cash flow businesses, such as ice cream, drinks and fruit or vegetable vending during the off season and in the holy month of Ramadan, the fasting month. The survey also showed that the street vendors lack the skill to produce and present hygienic products to the consumers.

Gauging Consumers' Perceptions Regarding Street-Sold Boiled/Roasted Maize in Selected Cities in Pakistan

A parallel study was conducted in the same cities – Islamabad, Rawalpindi, Faisalabad and Lahore – to gauge consumers' preferences and the consumption trend over time of boiled and roasted cobs and grains. Analysis of the interviews with 213 maize consumers revealed that the majority of them were satisfied with the taste and quality of the maize being sold. The consumption of maize in the form of boiled or sand-cooked cobs was preferred by 47 percent of consumers. This was followed by roasted grains at 21 percent and roasted cobs at 10 percent. Reportedly, maize is popular among youth, especially females. A significant proportion (35 percent) consume maize at least once in a week. Further, more than half of the consumers were of the view that the number of maize street vendors was increasing over time. Since maize is popular among the youth, there is need to introduce maize varieties enriched with vitamin A to provide a balanced diet to this growing generation.

Exploring the Adoption and Adoptability of Two-wheeled Tractors in Northern Hilly Areas of Pakistan

Given their small fragmented land holdings, smaller field size and the difficulty of operating with four-wheeled tractors, farmers from Azad Jammu and Kashmir and Gilgit Baltistan regions have eagerly adopted the smaller two-wheeled walking tractors for their farm operations and transportation. More farmers can now benefit as the machinery can be rented either from public research and extension departments or local progressive landlords. To popularize such innovative machinery, tax exemptions for local importers and manufacturers in the initial few years would help make it more affordable for farmers and, ultimately, result in improved crop productivity and livelihoods for small farmers in hilly areas of the country.

Preparing Local Seed Companies and Wheat Growers to Develop Sustainable Seed Enterprises through Training

AIP-Socioeconomics actively participated in building the capacity of local seed companies, wheat growers and community-based organizations and established sustainable rural seed enterprises across four provinces. With the collaboration of national partners, including local seed companies, not for profit organizations, public agricultural extension departments and agricultural research institutes, 13 training sessions were offered across Pakistan attracting 518 farmers. Three training sessions were conducted in Sindh for 89 participants, five in KP for 254 participants, four in Punjab for 129 participants and one in Balochistan for 46 participants. A total of seven women farmers from Mirpukhas district, Sindh province also participated in the training.

The training enabled the farming community to learn about the projected wheat demand in relation to the country's population. They learned also about the existing private wheat seed sector, the concept of community-based seed enterprise models,

formulating business plans and conducting financial analyses for seed enterprise development, the possibility of registering community-based organizations as registered seed growing entities, linking community-based farmers' organizations with seed companies as registered growers, and the branding and marketing of community-based quality seed.

This training helped the farmers understand the road map from the commodity – grain – to the product – seed – and conduct agricultural activities from entrepreneurial perspectives.

Participants in the quality seed management training organized by CIMMYT, in collaboration with the National Rural Support Programme, in Mirpurkhas district, Sindh province March 11, 2015.

AIP-Perennial Horticulture

AIP-Perennial Horticulture is led by UC Davis

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Grapes in Stages

A grape model demonstration block has been established on the Koont farm in Chakwal district, Punjab by AIP-Perennial Horticulture in collaboration with PMAS-Arid Agriculture University, Rawalpindi. Three training sessions with farmers, students and field staff were conducted during the different growth stages of the orchard. On Feb. 12, 2015, 12 participants attended a session on the training of grapevines to I-shaped trellises. On Feb. 13-14, 2015, 14 participants learned about grape propagation through stem cutting and 39 participants – 20 men and 19 women – participated in the layout and installation of a trellising system on March 25, 2015.

More Mangoes

A mango growers' meeting on Feb. 21, 2015 addressed the commercialization and introduction of new mango accessions in the Multan region. The meeting was attended by 55 mango growers, who actively participated and showed interest in adopting the new varieties. A follow-up survey will be conducted after the mango sowing season to assess how many growers planted the new varieties.

Better Citrus Practices

On Feb. 24, 2015, a hands-on training on Citrus: Better Management Practices attracted 49 citrus growers from the Sargodha district, Punjab province. The training consisted of a presentation followed by a field visit to observe practical demonstrations of the management practices.

A Taste Test Survey of the Mango Leather Product

A taste test survey of mango leather, to assess the acceptance of the product, was conducted by AIP-Perennial Horticulture in collaboration with University of Faisalabad (UAF). The responses of the testers were very positive and encouraging. The average rating for taste was 7.6 on a 9 point scale, while color, texture and overall acceptability received an average rating of 7.36 on a 9 point scale. The mango leather project will further explore commercialization and branding of the product.

Nurturing the Nascent Pistachio Industry in Balochistan Province

On Feb. 15 -16, 2015 the University of California at Davis (UC Davis) team hosted a strategy meeting in Balochistan province that included a tour of two pistachio research station orchards in Quetta and Mastung and a local grower's orchards in Mastung.

In order to further bolster the nascent pistachio industry in Balochistan province, UC Davis has supplied 600 seeds of three pistachio rootstock varieties to PARC and the Agriculture Research Institute, Quetta. The rootstock will be tested for their adaptability to Pakistan's climate and the results will determine the next steps.

Postharvest Laboratory Tools Delivered

AIP-Perennial Horticulture delivered two sets of postharvest tool kits to the Agriculture Training Institute, Sakrand, Sindh province. This laboratory will contribute to better quality guavas and mangoes. Another postharvest laboratory will be established at the Citrus Research Institute Sargodha, Punjab.

AIP-Human Resource Development (HRD)

AIP-Human Resource Development (HRD) is led by UC Davis

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They Have Only Just Begun

Of 14 AIP Scholars seeking doctorate and postgraduate scholarships, 11 have successfully commenced their studies in the U.S. These scholars have been placed in various land-grant universities in the United States.

University	AIP doctorate scholars	AIP postgraduate scholars
University of California, Davis	2	1
Texas A&M University	-	3
University of Missouri	-	1
University of Minnesota	1	-
Mississippi State University	1	-
University of Massachusetts	-	1
Washington State University	1	-
Purdue University	-	1
Mississippi State University	-	1
University of Minnesota	-	1

Vocational Workshops Meet the Needs of AIP Partners

A two day action planning workshop was held Feb. 18-19, 2015 in Islamabad, by Dr. Mark Bell from UC Davis, to develop implementation plans for newly started projects. The meeting was attended by 20 representatives (17 men and three women) of AIP collaborators.

Likewise, a one day participatory workshop on effective meetings was held for the higher management of UAF on Feb. 23, 2015. The workshop welcomed 30 participants (27 men and three women).

AIP-ePakAG

AIP-ePakAG is led by UC Davis

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Stakeholders in Information and Communication Technology (ICT) and Agriculture Gather to Discuss Integration of Technology with Traditional Practices and Deliver Information

UC Davis, in collaboration with Dr. Babar Shahbaz (UAF), organized two consultative workshops on information and communication technology (ICT) and Agriculture. One was held at NARC, Islamabad on Jan. 8, 2015, which attracted 43 participants (38 men and five women). The second was held in Lahore on Feb. 25, 2015, attracting 45 participants (42 men and three women). Discussions covered a range of topics, including ICT to integrate with traditional practices and deliver information to the farmers as well as validation, development, and packaging and delivery of needed information.

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