



# AIP NEWSLETTER

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

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## Message from the Project Leader

### Greetings from AIP!

I am pleased to present you the Agricultural Innovation Program (AIP) for Pakistan updates for the October-December 2014 quarter.

All the AIP components have made steady progress towards achieving their goals. During this quarter, a group of 23 smallholder farmers from Khyber Pakhtunkhwa (KP) were empowered through an exposure visit to the International Livestock Research Institute (ILRI) and National Agricultural Research Center (NARC) in Islamabad, which provided them the opportunity to learn new techniques and innovative practices, such as feed silage making from maize, concentrated feed preparation, improved methods of calf rearing and animal housing with feed trough and watering points for improved livestock. Training and technical assistance was also provided to farmers from KP on artificial insemination in goats, which has yielded fruitful results. In the cropping season, wheat seeds were distributed to more than 9,300 families with the support of public and private partners in food insecure parts of 56 districts across Pakistan. AIP has reactivated maize research for development activities in the country by bringing together representatives of public and private institutions to evaluate the progress and challenges in the maize sector. In Punjab, AIP in collaboration with private sector partner Engro Eximp has trained 225 farmers in harvest and post-harvest rice/ paddy handling, which taught the farmers about the importance of quality paddy, time of harvesting, selection of good harvester, handling of paddy during transportation, farm level drying and storage, maintenance of combine/replacement of kit and machine operations, etc. A series of trainings was also organized on conservation agriculture in the Punjab and KP provinces through which



zero tillage happy seeder and multi crop bed planter were introduced to agricultural communities. AIP-socioeconomics updated the partners and stakeholders with the status of ongoing baseline surveys and shared results of completed surveys. AIP-Vegetables has installed five pilot drip irrigation systems at farmers' fields and research institutions to evaluate its usage and cost effectiveness. AIP under its perennial horticulture component is exploring growth opportunities in the pistachio industry in Balochistan province by holding discussions with farmers and stakeholders. A pre-orientation workshop was organized in Islamabad by the University of California, Davis (UC Davis) for AIP scholars who will be initiating their postgraduate and doctorate studies in the United States. The workshop enabled the scholars to understand the program and the cultural norms of the hosting country.

AIP is a collaborative effort of the Pakistan Agricultural Research Council (PARC), the International Livestock Research Institute (ILRI), the International Rice Research Institute (IRRI), the World Vegetable Center (AVRDC), UC Davis and the International Maize and Wheat Improvement Center (CIMMYT), and it is funded by the United States Agency for International Development (USAID). I take this opportunity to thank the whole AIP team for their hard work and continuous efforts in successfully carrying out the AIP activities. Please feel free to bring any comments and suggestions.

Best regards and enjoy reading,

**Md. Imtiaz**  
Project leader

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# Update on AIP Activities

## AIP-Livestock

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

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## Dairy Value Chain

### Strengthening Dairy Value Chain Through Capacity Building in Punjab and Balochistan Province

- On November 5, 2014, a one day training on the concepts and analyses of Dairy Value (DVC) was organized at the University of Agriculture Faisalabad (UAF), which attracted 103 animal husbandry students, including 83 men and 20 women, who were trained on the concepts and analyses of DVC.
- On November 17-18, 2014, a two day workshop on 'Livestock Dairy Value Chains: Concepts and Tools for Analyses and Rapid Assessment' was organized in at Balochistan University of Information Technology, Engineering and Management Sciences (BUIEMS), Quetta. The training attracted 29 participants, which included 20 men and nine women teaching staff and postgraduate (MSc and PhD) students from Balochistan.



- On November 19, 2014, a training on the concepts of DVC to enhance profitability of dairy sector was conducted at the Animal Science Training Institute (ASI), Quetta. The event was jointly organized by AIP-Livestock and the Livestock and Dairy Development Department of Balochistan (LDDDB). This training attracted 30 veterinary officers, management and staff of ASI and dairy farm managers.

## Empowering the Smallholder from KP Farmers to Adopt Innovative Practices

On October 23, 2014, an exposure visit was organized to familiarize the members of the dairy farmer associations of Khyber Pakhtunkhwa (KP) province to observe new livestock technologies and innovative practices. The group included 23 smallholder dairy farmers, five members of the dairy associations in Nowshera and Mardan, and four Livestock and Dairy Development Department (LDDD) officers from KP province. The group visited the international Livestock Research Institute (ILRI) and National Agricultural Research Center (NARC) in Islamabad.

The exposure visit enabled the participants to learn the new practices of feed silage making from maize also known as bale silage, concentrated feed preparation, improved methods of calf rearing and animal housing with feed trough and watering points.



Dairy farmers from KP visit ILRI office and NARC in Islamabad.





Demonstration on silage making.



Housing of adult animals and calf rearing.



### Constraints for Dairy Farming In Urban, Peri-Urban and Rural Areas in Lahore

In September, a reconnaissance survey was conducted in urban, peri-urban (Saggian Village) and in rural areas of Lahore. The AIP-Livestock team interviewed 31 farmers using a structure questionnaire that focused on feeding dairy cattle and buffaloes and production characteristics.

Category	# Of Interviews Conducted	Location	Date
Urban	10	Harbanspura	September 18-22, 2014
Peri-urban	5	Saggian Village	September 16, 2014
			September 29, 2014
Rural	16	Villages:	September 25, 2014
		Burj Kalan	

The findings of the survey revealed that:

- The urban dairy farmers are completely dependent on feed/ ration available in the market; whereas farmers from peri-urban and rural areas cultivate fodder in their own agricultural land.
- Dairying is part of the agricultural activity for urban dairy farmers, but for urban and peri-urban farmers it is solely a business enterprise.
- Cotton Seed Cake is the main concentrate feed used and is only fed to milking animals.
- Most farmers keep their animals tethered and the animal's water requirement is not fully met.



Gathering information from farmer regarding daily feeding and milk production in Burj Kalan Village, Kasur district district of Punjab province.



Gathering information from farmer regarding daily feeding and milk production in Ratney Wala Village, Kasur district of Punjab province.



Information on dairy production was collected from a peri-urban farmer at Saggain Village within Lahore City limits in the Lahore district of Punjab province.



Information on dairy production was collected from the Cattle Colony located at Harbanspura, Lahore district of Punjab province.

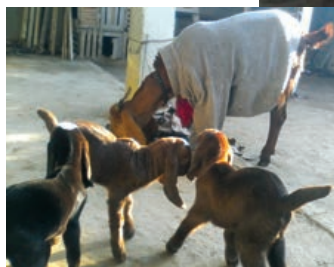
## Small Ruminant Value Chains

### Artificial Insemination in Goats Yields Fruitful Results

AIP-Livestock and LDDD KP has trained and provided technical assistance to semen processing units (SPU) in KP province. Smallholder dairy farmers have yielded overwhelming results in achieving acceptable conception rates averaging 65 percent and successful kidding using Beetal goat semen processed at the SPUs.

Malang is a dairy farmer from the Charsadda district of KP province. He received AI training through AIP. He is an enthusiastic AI propagator and has successfully inseminated more than 100 animals.

In the Malakand district of KP province a goat which was artificially inseminated by Dr. Burhan using semen processed locally has produced three kids.



## Knowledge and Skills Imparted for Improved Livestock Through Artificial Insemination Training in KP province

Collaborative efforts of AIP-Livestock and LDDD KP are improving the livestock in KP province. In December 2014, using the AI in goats training protocols developed by AIP, 85 veterinary officers and assistants were trained in three districts of KP, namely: Karak, Lakki Marwat, and DI Khan.

On December 4, 2014, a training session on AI in goats, which included lectures, discussions and demonstrations, was organized at Gomal College of Veterinary Science, Gomal University in DI Khan district of KP. The training attracted 25 women and 221 men who are students pursuing their veterinary degree at the university.



## AIP-Livestock Prepares Farmers for Healthy Livestock: Introducing Animal Health Seasonal Plan in Punjab

In December 2014 AIP-Livestock randomly selected six groups of sheep and goats, each of sample size of 50, with the objective of developing an animal health seasonal plan from Begal and Dhulli sites in the Chakwal district of Punjab province. Faecal samples of these groups were collected that revealed 80 percent of the animals were infected with multiple parasitic infections, including: Paramphistomum, Moniezia spp, Strongyloides, Ostertagia, Trichostrongylus, Chabertia ovina, Oesophagostomum, Haemonchus, and Trichuris ovis. The infected animals were given synthetic medicines – Nilzan plus and Ivermectin and herbal medicines – Deedani, Atreefal Deedani and Kirmar. The animals are being observed and the assessment will be done by the end of January 2015.

## Linking Farmers with Improved Livestock Rearing Practices in Punjab Province

In December 2014 flocks of ewes and does mostly pregnant from four farmers were randomly selected from two sites, Begal and Dhulli, in the Chakwal district of Punjab province. All the animals were ear tagged, vaccinated against enterotoxaemia diarrhea caused by bacteria, live-weight recorded and grouped. The animals were divided in four groups. Three groups were supplemented with 500 g/ head/ day of a concentrated ration varying in crude protein and energy, whereas the fourth group was kept on conventional farmer's practice. The animals are being observed in terms of their body weight, lamb/ kid birth ratio, survival/ mortality rate. Results will be compared and shared with the farmers for improved livestock rearing practices.



Farmer's sheep/goats flocks selected for supplemental feeding during gestation for improved productivity.



## Feed, Fodder and Rangeland

### Promoting Improved Rabi Season Fodder Crop Varieties in Punjab Province

In Begal and Dhulli villages in the Chakwal district of Punjab province, Rabi season fodder crop varieties were planted for improved livestock.

#### Oat

AIP-Livestock introduced the smallholder farmers to "NARC Oat" - a high yielding fodder variety developed by the National Agricultural Research Center (NARC) to plant in their field located at Begal and Dhulli villages.

#### Lucerne and Berseem

Lucerne and berseem are very nutritious legume fodder crops being planted under irrigated conditions. Small and large ruminants relish its fodder.

AIP- Livestock has familiarized 13 farmers from Begal and Dhulli villages in the Chakwal district of Punjab province with planting Lucerne variety – Sgd Lucerne and berseem variety – Superlat. These farmers are now growing perennial fodder multi-cut crop like berseem and lucerne of low yielding varieties.



Oats Seed Production Block at Dhulli.



Oats fodder variety planted at Begal.

### AIP- Livestock supported Lucerne and Berseem plantation.

Location	# of farmer fields
Begal	9
Dhulli	4

### Wheat and Barley

AIP-Livestock has supported smallholder farmers in Begal and Dhulli villages of the Chakwal district of Punjab province to plant wheat and barley. The planted wheat has better quality straw, which is most suitable for small ruminants; while the barley, which is high yielding, cold and drought tolerant, serves as grain for supplemental feeding during the winter season.

#### Wheat and barley variety planted with the support of AIP- Livestock.

Crop	Variety	Land in acres	
		Begal	Dhulli
Wheat	Chakwal-50	1	1
	Dharabi	1	1
	NARC 2009 and 2013	1	1
Barley	Sanober-96	2	-
	Rakhshan 2010	2	-

### Promotion of Canola Hybrid for Oil Extraction and the Residue as a Concentrate Feed



The meal from canola quality rapeseed is an excellent feed for small and large ruminants. NARC is a pioneer to introduce canola hybrid in the country, and AIP-Livestock has planted canola hybrid on 10 farmers' fields of Dhulli and Begal villages.

### Promotion of Village Base Seed Enterprises for Better Yields and Biomass Production

AIP-Livestock has introduced the concept of Village Base Seed Enterprise among the farmers in Begal and Dhulli villages. This will enable the farmers to locally produce good quality cereals and fodder seed and meet the needs of the community. The enterprise will result in better yield and biomass production. Two progressive farmers are engaged, who will plant oats in one hectare of land in the two villages.

### Forage and Biomass Production at Low and Medium Rainfall Areas:

Rangeland productivity is neither regularly monitored nor documented in the Punjab province; as a result data about forage production and its quality is very limited. According to literature, communal rangelands that are degraded can be rehabilitated either by grazing management or plantation of drought tolerant fodder shrubs at appropriate sites. The main objective of the proposed rangeland improvement is to increase the biomass production of the degraded rangelands to increase feed supply to small ruminants. Fresh and dry forage production was recorded at different topographical locations situated in Medium Rainfall Begal and Low rainfall area sites during August and November 2014. This was estimated by using randomly located one m<sup>2</sup> quadrats at 10 meter intervals along the transect lines of 100 meter length. All plant species used as forage for intake by livestock were clipped at the ground level. Harvested material of each quadrat was weighed and oven dried at temperature of 55°Celsius for a time period of 48 hours for dry matter yield determination. The production biomass yield during the month of November 2014 was comparatively higher than the yield in August 2014. The forage production in kg/ha was calculated on a dry matter basis to determine carrying capacity, which is estimated to be 0.6 AUM at Begal and 0.4 AUM at Dhulli.

Topographical Location	Forage Matter	Yield at Begal	Yield at Dhulli
Hill Top	Fresh	450 kg ha-1	250 kg ha-1
Hill Top	Dry	210 kg ha-1	160 kg ha-1
Southern Slope	Fresh	660 kg ha-1	345 kg ha-1
Southern Slope	Dry	480 kg ha-1	290 kg ha-1
Northern Slope	Fresh	660 kg ha-1	190 kg ha-1
Northern Slope	Dry	480 kg ha	105 kg ha
Flat Area	Fresh	880 kg ha-1	450 kg ha-1
Flat Area	Dry	530 kg ha-1	240 kg ha-1

### Atriplex Plantation

The first measurements taken in the rangeland areas by AIP-Livestock showed that biomass production at Dhulli village, Chakwal site was very low due to the properties of the rangeland species, climate and soil characteristics. Thus, as a first measure towards improving rangeland productivity, one block of *Atriplex* spp (*Atriplex canescens* and *A. lentiformis*) was established in a block with *Atriplex* spp (*Atriplex canescens* and *A. lentiformis*) sapling. Survival of *Atriplex* was almost 90 percent. *Atriplex* will serve as a useful fodder for small ruminants grazing in these rangelands.



Atriplex planted at Dhulli.



## Seeding of Rhodes Grass and Establishment of Grass Nursery:

During September/October 2014, an improved variety of Rhodes grass (*Chloris gayana*) also known as Katambora was sown on two hectares of a farmer's field at Dhulli for demonstration. The seeds were broadcast in a well-prepared seed bed at a seeding rate of 5 kg ha<sup>-1</sup>. Germination rate was 35 percent. Yield data will be available in May/June 2015.

A grass nursery comprising of *Panicum antidotale*, *Panicum maximum* and *Cenchrus ciliaris* was established at Dhulli. The nursery will be used as a source of root stock and tufts for further expansion of these grasses in the area.



Broadcasting of Rhodes grass and establishment of grass nursery in Dhulli.

# Cereal and Cereal Systems

## AIP-Wheat

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

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## Changes in Livelihood – Wheat Seed Distributed Among Farming Communities Across Pakistan

Under AIP-Wheat, CIMMYT deployed 16 new, high yielding & rust resistant wheat varieties to capitalize on the gaps identified in the three wheat seed value chain workshops. The wheat seed was distributed to more than 9,300 families, which included smallholder farmers, tenants and the landless farmers, especially women headed household and vulnerable groups, such as food insecure populations and flood victims in food insecure parts of 56 districts across Pakistan, including Balochistan, Punjab, KP and Sindh province and Gilgit Baltistan region. The distribution was made possible with the support of 15 public and 14 private partners through participatory varietal selection (PVS), variety popularization Informal Research and Development (IRD), agronomic trials and seed multiplication.

A summary of AIP wheat seed activities in Pakistan during 2014-15.

Province	Districts Covered	Number of New Wheat Varieties Deployed (released after 2010)		Quantity of Seed Used (ton)
		Farmers Reached		
Balochistan	13	7	165	5
Punjab	16	8	6566	190
KP	12	3	790	53
Sindh	10	7	1445	47
Gilgit Baltistan	5	6	350	2
Total	56	16	9316	297



A glimpse of wheat seed distribution.



## Getting Off on the Right Foot

On 10 November 2014, CIMMYT organized a partnership inception meeting jointly with National Rural Support Program (NRSP) followed by a staff orientation workshop, which was attended by 32 staff members from NRSP and 11 from CIMMYT. The purpose of this event was to share the objectives of developing new partnership with NRSP and orient their staff on the concepts and methodologies of conducting on-farm participatory varietal and agronomic research, demonstrations and village-based seed multiplication and marketing to improve wheat production and productivity in the project areas.

Dr. Imtiaz Muhammad, Country Representative CIMMYT Pakistan, spoke about AIP and its role in economic development. He said, "This partnership with NRSP under AIP will contribute directly to the CIMMYT's mission of improving food security and resilience of those most at risk. This will lead to new avenues for other AIP partners to join hands in testing and promoting appropriate agricultural innovations."

Dr. Imtiaz Hussain, CIMMYT cropping systems agronomist, highlighted conservation agriculture technologies and their relevance for the partnership. Krishna Dev Joshi, CIMMYT wheat improvement specialist, discussed various types of varietal testing, including participatory varietal selection, mother-baby trials, village-based seed multiplication and on-farm demonstrations, to create awareness and demand for improved seed among farmers.



**Dr. Imtiaz Muhammad, Country Representative CIMMYT Pakistan, speaking to the audience about AIP's role in economic development.**



**Staff members from NRSP and CIMMYT at the meeting.**



**Inception meeting.**

## AIP-Maize

**AIP-Maize is led by the International Maize and Wheat Improvement Center (CIMMYT)**

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### Reactivating Maize Research and Development Activities in Pakistan

In November 2014, CIMMYT under AIP-Maize organized the first National Maize Workshop of Pakistan: Annual Progress Review in partnership with the Pakistan Agricultural Research Council (PARC). The two day workshop was targeted to evaluate the progress and challenges of the maize sector in Pakistan.

More than 50 participants representing public and private maize research and development institutions, local and multinational seed companies, higher learning institutions, departments of extension and food processors, among others, from all provinces of Pakistan attended the workshop.

Dr. Iftikhar Ahmad, chairman of PARC, in his inaugural speech emphasized the importance of accelerated deployment of white maize varieties. He also mentioned the importance of public-private partnership in reducing the cost of hybrid seed, which is the highest in South Asia.



**Drs. Shahid Masood (PARC), Md. Imtiaz (CIMMYT), Iftikhar Ahmad (PARC) and AbduRahman Beshir (CIMMYT).**



Dr. Imtiaz Muhammad, Country representative CIMMYT Pakistan and AIP Project leader, speaking to the participants, highlighted the role of CIMMYT in enhancing local capacities. He also talked about long-term impacts of AIP through creation of public and private linkages that are creating pathway that will benefit the smallholder farmers and improve their livelihoods.

During the concluding session, Dr. Shahid Masood, Member Plant Sciences and AIP focal person at PARC, said that deploying biofortified and specialty maize is of great importance. He talked about the importance of diversifying maize uses and of developing and deploying dual-purpose maize to meet the growing demand for food and feed.

Dr. AbduRahman Beshir, CIMMYT's Maize Improvement and Seed Systems Specialist, shared that the workshop has enabled the AIP-maize partners and CIMMYT to work on a common goal to reactivate maize research and development activities in Pakistan.

The workshop was followed by a field visit to AIP-Maize trials located at NARC Islamabad, where the participants observed the performance of maize germplasms introduced from CIMMYT Colombia, Mexico and Zimbabwe. The seed road maps by which partners outline their targets in varietal release and seed production during the life of the project were also discussed.



The first National Maize Workshop of Pakistan: Annual Progress Review.



Dr. Md. Imtiaz (Country representative CIMMYT INTL, Pakistan) with workshop participants at CIMMYT's Pakistan office located at NARC Islamabad.



Dr. AbduRahman Beshir explaining about Provita maize varieties at NARC Islamabad.

## AIP-Rice

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

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### AIP-RICE Evaluates Rice Combine Harvesters for Improved Rice Harvesting

In Pakistan substantial losses occur during harvesting and post-harvest handling. Particularly, in Punjab basmati rice is being harvested with wheat combines, and the quality of paddy is very poor and prone to severe contamination with aflatoxin. At present, nearly 9000 re-assembled conventional wheat combine harvesters are being used, which causes grain shattering, de-husking of grains and breaking rice grains, and it also harvests immature green grains resulting in low head rice recovery.

During November 2014, AIP-Rice evaluated the two harvesters, wheat combine "New Holland" and rice combine "Kubota" for various parameters, such as broken grain, skinned grain, green grain, trash/second cut, etc. in basmati growing areas of Sheikhupura district of the Punjab province.

A protocol was set to measure the performance of combine harvesters in the rice field. For grain loss flat pads (25cm x 20cm) were placed in line with the combine front to catch the spilt grain and counted the number of filled grains on each pad. On the center pads one grain is approximately grain loss equivalent to 2.5kg/ha. The drum of wheat combine harvester was also measured, which is 600 rpm with the reel speed 50 percent faster as compared to ground speed, which is higher than recommended. This results in a higher percentage of grain shattering, de-husking and breakage of grains using wheat combines.

#### Comparison of Combines on Paddy Quality.

Category	Kubota Rice Combine	New Holland (Wheat Combine)
Trash/ second cut	Clean (Nil)	High
Green grains per 100gms	75	400
De-husked grains per 100gms	None	50
Broken grains per 100gms	50	175
Grain shattering (kg/ha)	100	200
Monitory loss (Rs/ha)	3750	7500

Using the wheat combine harvester two feet above ground level, farmers do not get rice straw. The farmers tend to burn the loose straw, which causes environmental pollution; whereas the rice combine “Kubota” harvests from the ground level retaining the rice straw intact, which is used as feed and bedding for livestock or as packaging material. It is estimated that by adopting new improved harvesting machines an estimate of Rs.4-6 billion could be saved annually from losses in quality paddy.



Rice Combine Harvester Kubota.



Wheat Combine Harvester New Holland.



Counting grain loss after harvest with wheat combine.



Paddy with wheat combine.



Paddy with Kubota combine.

## Evaluation of Storage Bags

IRRI had developed hermetic bags for paddy storage and improved grain quality of rice. The experiments to evaluate physical and chemical grain quality and aflatoxin contamination are being conducted at three locations, namely Rice Research Institute (RRI) in district Kala Shah Kaku and Engro Eximp in district Sheikhupura of Punjab province and National Agricultural Research Center (NARC) Islamabad.

At each station, three types of bag material, namely Jute, *Polypropylene* (PP) and hermetic, is used for bags to store rice/ paddy for a period of six months. The grain moisture will be maintained at 13.2 to 14.1 percent. During this period, the grain quality will be assessed for its aroma, aflatoxin contamination, pests and physical and chemical grain quality.

Storage Regimes	Jute bag	PP bags	Hermetic bags
Brown rice stored for 6 months	5 bags @ 60 kg	5 bags @50kg	5 bags @60 kg
Paddy stored for 2 months, dehusked stored 4 months	6 bags @ 60 kg	6 bags @ 60 kg	6 bags @ 60 kg
Paddy stored for 4 months, dehusked stored 2 months	6 bags @ 60 kg	6 bags @ 60 kg	6 bags @ 60 kg
Paddy stored for 6 months, dehusked stored 4 months	6 bags @ 60 kg	6 bags @ 60 kg	6 bags @ 60 kg



Filling of rice paddy in hermetic bags.





## Determination of Source of Aflatoxin Contamination

A system for determining aflatoxin contamination initiated in November 2014 by AIP-Rice at two locations in Punjab province Rice Research Institute (RRI), Kaka Shah Kaku and Engro Eximp, Sheikhupura. A total of 29 paddy samples were collected for analysis from various sources, such as crop prior to harvest – standing and lodged crop, the combine harvester during wheat and rice harvest, the transport trucks, middle man market, ground and machine drying facilities and the lack of facilities to determine the source of contamination. The evaluation is underway; the results will be available by March 2015.

## Farmers from Punjab Province Trained in Harvest and Post-Harvest Paddy Handling

During November 2014, AIP- Rice in collaboration with Engro Eximp organized trainings on harvest and post-harvest paddy handling at four locations in rice growing districts of Punjab province namely Gujranwala, Sheikhupura, Hafizabad and Sialkot. The trainings attracted 255 farmers and machine operators. The training was imparted on the following topics:

- Importance of quality paddy
- Time of harvesting
- Selection of good harvester
- Handling of paddy during transportation
- Farm level drying and storage
- Maintenance of combine/Replacement of kit
- Machine operation

At the end of the training the participants were aware of the importance of quality paddy, time of harvesting, selection of good harvester, handling of paddy during transportation, farm level drying and storage, maintenance of combine/replacement of kit and machine operations, etc.

Village	District	No. of Farmers/ Service Providers
Noiekey	Gujranwala and Sialkot	62
Saranwala	Sheikhupura	80
Botala Jandh Singh	Gujranwala	81
Dhirankey Lalkey	Hafizabad	32
<b>Total</b>		<b>255</b>



## AIP-Agronomy

**AIP-Agronomy is led by the International Maize and Wheat Improvement Center (CIMMYT)**

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### Building the Capacity of National Partners on the Use of Conservation Agriculture Technologies

CIMMYT, in collaboration with the Pakistan Agricultural Research Council (PARC), organized a series of trainings on conservation agriculture, which focused on creating a better understanding of conservation agriculture-based crop production practices, the operation and calibration of conservation agriculture seeders and the pathways for up scaling these technologies. These trainings were attended by agronomists and operators from the agricultural research and agricultural extension departments and private sectors from Pakistan. Ken Sayre, consultant with CIMMYT conservation agriculture, shared experiences of farmers from different regions of the world with the participants.



Training on zero tillage (ZT) happy seeder in Kala Shah Kaku, Punjab province.



On October 25, 2014 a training on zero tillage (ZT) happy seeder was organized at the Rice Research Institute (RRI) in Kala Shah Kaku, Punjab province, which attracted 15 agriculturalists.

On October 28, 2014 a two-day training on conservation agriculture was held at National Agriculture Research Center (NARC) in Islamabad, which attracted 18 agronomists.

On October 30, 2014 a hands-on training on plot planter was held at NARC in Islamabad, which was attended by 18 participants.



**Hands-on training on plot planter in Islamabad.**



**Training on conservation agriculture in Islamabad.**

### **Farmers Observed Bed Planted Maize in Khyber Pakhtunkhwa (KP) and Punjab.**



**Field day at village Pirsabak Nowshera.**

On October 2, 2014 a field day was organized at Village Pirsabak in district Nowshera of KP province by CIMMYT in collaboration with Cereal Crops Research Institute (CCRI). The event attracted more than 90 participants, including farmers and agriculture professionals. The participants visited the farmer maize plots on which the planting was done using multi-crop bed planters and zero tillage planters.

On November 6, 2014 Adaptive Research and Agriculture Extension in Punjab province were instrumental in organizing a field day at Adaptive Research Farm Vehari, Punjab province. It attracted more than 200 participants associated with the farming community, agriculture extension, agriculture research and also private seed companies. The participants observed maize plots planted using multi-crop bed planter.



**Wheat on beds in ZT condition.**



**Zero till wheat planted on beds in Nowshera.**



## Pilot testing and demonstration of Zero Tillage Happy Seeder in Rice – Wheat Area of the Punjab Province

In rice- wheat area of the Punjab province, rice residue burning is common practice on 70-90 percent area in Sheikhupura, Gujranwala, Sialkot and Hafiz Abad districts. This practice of residue burning is causing environmental pollution and also resulting in the loss of nutrients.

Zero tillage (ZT) happy seeder is a planter that can be used for direct drilling in the fields with surface retention of residues and without any soil disturbance. Use of ZT happy seeder can help farmers to avoid burning of crop residues for sowing of the next crop under heavy residue loads in high combine harvested fields.

In Punjab province pilot testing of ZT happy seeder to plant wheat under heavy rice residue was done at farmer's field, institute's trial plots and farms by CIMMYT in collaboration with its national partners Adaptive Research, Engro Eximp Agriproducts Private Limited, Rice Research Institute (RRI) Kala Shah Kaku and Wheat Research Institute (WRI) Faisalabad.



Participants of field day in Vehri.



Zero Tillage Happy Seeder Training in Shiekhupura.



Wheat planting with Happy seeder in Satyana, Faisalabad.

## AIP-Socio Economics

**AIP-Socioeconomics is led by the International Maize and Wheat Improvement Center (CIMMYT)**

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### Maize Baseline Surveys Designed and Conducted in Gilgit-Baltistan (GB), Azad Jammu & Kashmir (AJ&K) and Sindh Province



Maize Baseline Survey in Gilgit-Baltistan.

During the last quarter of 2014, AIP-Socioeconomics designed and conducted maize baseline surveys in Gilgit-Baltistan (GB), Azad Jammu & Kashmir (AJ&K) and Sindh province. The main objectives of the surveys were to get a clearer picture of agricultural farming in the target areas, primarily focusing on prevailing cropping patterns and adopted production practices for maize – awareness, access and extent of Hybrid and open pollinated variety (OPV) maize production; comparative productivity, cost and revenue analysis of Hybrid and OPV maize; existing constraints in adoption of Hybrid maize and possible pathways for enhanced maize productivity in target areas.

The survey revealed that maize is an emerging crop in the Sindh province. For the past four years, the hybrid maize cultivation is a rising trend with progressive involvement of both multinational seed companies and processing industry. Currently, the farmers prefer OPV maize cultivation for fodder purposes, hybrid varieties for grains and green cobs for processing industry and wholesalers. In lower Sindh, the OPV maize growers earn more from selling maize as fodder compared to the hybrid maize growers; while in upper Sindh, the situation is quite different, with hybrid maize growers earning significantly more than OPV maize growers. The predominant reason for the differential amongst net earnings of lower and upper Sindh farmers is the low productivity of hybrid maize in

former than latter region, as 6300 kg/ha and 10700 kg/ ha, respectively. Soaring demand for milk and meat necessitates more production of fodder-maize on one hand and compulsory selling of grains back to relevant seed company or processing industry on the other hand projects a flourishing future demand of maize in the province. But at the same time, high hybrid-seed prices increase production-cost; the limited number of market players on the demand side puts a serious question on market price, marketability and likelihood of buyers' exploitation.

In the existing cropping pattern in the regions Azad Jammu and Kashmir (AJK) and Gilgit-Baltistan (GB), maize is the prime crop. Agricultural farming in AJK completely depends on rainwater; whereas natural water courses, originating from glaciers and streaming down mountains, are the only source of drinking and irrigation water for the inhabitants of GB valleys. Small fragmented landholdings with less cultivable land and very restricted alternate earning opportunities limit households to merely subsistence living in GB. Not having surplus money to invest, the agricultural farming in GB looks traditional in that the use of farm machinery, fertilizers and certified seed is far below required and recommended threshold. On the other hand, the situation in AJK is relatively much better. There are diverse livelihood opportunities available which are less dependent on agriculture that results from the use of traditional practices. Active participation of the public and private sectors will improve the agricultural development in the both of the regions.

Appended with baseline surveys, a study titled “Current state and future prospects of two-wheel tractor adoption in northern hilly areas of Pakistan” is also carried out in AJK and GB. The purpose of the study was to explore the opportunities and challenges for the adoption of the two-wheel tractor amongst the farming communities.

The study revealed minimal use of farm machinery with the non-existence of the two-wheel tractor. Further, a majority of the farmers were not aware of the two-wheel tractor. Due to inaccessible plots, the farmers have to use bullock or hand operated tools. Farming communities in both of the regions showed strong willingness to adopt the two-wheel tractor, despite its affordability.



Maize Baseline Survey in Sindh province.

#### Summary of surveys conducted during Oct-Dec, 2104.

Regions/ Provinces	Activities				Status
	Maize Baseline Surveys		Current state and future prospects of Two-wheel tractor		
	Sample (No.)	Districts (No.)	Sample (No.)	Districts (No.)	
Azad Jammu and Kashmir (AJ&K)	53	7	53	7	Report furnished
Gilgit-Baltistan (GB)	45	3	42	3	Report furnished
Sindh	51	7			Report in progress

#### Identifying the Possible Pathways for Enhanced Maize Productivity In Punjab, Balochistan and Khyber Pakhtunkhwa (KP) Provinces



Maize Baseline Survey in Balochistan province.

The maize baseline survey also initiated in three provinces in Pakistan, namely Punjab, Balochistan and KP. The purpose of this survey was to assess the possible pathways for enhanced maize productivity in these provinces.

A sub-grant agreement was signed with the Comsats Institute of Information Technology (CIIT), Lahore to conduct the baseline survey, which was expected to be completed during January 2015.



## AIP- Socioeconomics Assessing the Prospects of Wheat and Conservation Agriculture in Balochistan, Punjab, Sindh and Khyber Pakhtunkhwa (KP) Provinces

The wheat and conservation agriculture baseline survey was conducted across different cropping zones in four provinces in Pakistan, namely Balochistan, Punjab, Sindh and KP. The specific objective of the study was to assess existing conservation practices being adopted by the farming community and to gauge any yield and net benefit advantage to the farmers adopting those practices.

In KP province, the results revealed that the farmers have limited access to existing technologies, where the modern conservation technologies, such as zero tillage (ZT) drill, laser land leveler, happy seeder, bed planter, residue management and reduce tillage, are either unavailable or very costly making it unaffordable. Some of the farmers were not even aware of such technologies.

The responses from Balochistan, Punjab and Sindh province are similar to the response of agricultural community in the KP province.

### Baseline Progress and Results Sharing Meeting

On December 17, 2014 a baseline progress and results sharing meeting was organized by AIP- Socioeconomics in Islamabad. The purpose of the meeting was to update the status of ongoing baseline surveys and share results of already completed surveys with all AIP partners and stakeholders. The meeting resulted in getting the feedback and expert opinions of the participants. AIP primary partners, national partners, representatives of USAID and colleagues from CIMMYT attended the meeting.



## AIP-Vegetables

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

For feedback and queries contact Mansab Ali (AVRDC): [mansab.ali@worldveg.org](mailto:mansab.ali@worldveg.org)

### Promoting Tomato Hybrids with Improved Technology in Punjab province

Bhikhi is located in the Sheikhpura district in the Punjab province where 1,200 acres of land is devoted to agriculture. Vegetables are grown on more than 400 acres of land, and tomato, cucumber and green chili are popular crops. Vegetables are mostly grown under protected cover as an off-season crop in order to fetch a good price in the nearby markets of Sheikhpura and Lahore.

In the last season, AIP-Vegetable in collaboration with the Vegetable Research Institute, Ayub Agriculture Research Institute, Faisalabad, selected the location Bhikhi to promote new innovations and to educate farmers on new research and technologies.



Quality and pricing of tomato hybrids is a major concern of farmers. In response to this AIP- Vegetables is comparing two public sector tomato hybrids 'Salar' and 'Sandal' with commercial hybrid 'Sahel' at farmer's field in Bhikhi. The performance of the hybrids will be assessed with respect to plant growth and yield. Currently, the crop is in the flowering stage and staking has been completed.

The smallholder farmers in this area are very progressive in cultivating vegetables. They are now switching from furrow irrigation to drip irrigation systems, which is enabling them to better conserve and protect their water supply and helps them to save in fertilizer and pesticide costs. AVRDC's Agricultural Engineer is also backstopping them to water discharge and fertigation.



**Comparison of public hybrids with commercially available tomato hybrid under plasticulture.**



**Tomato nursery sowing on raised beds.**



**Farmer is observing staking in tomato under protected cultivation.**

### **AIP is Promoting Sustainable Agriculture Practices in DI Khan, Khyber Pakhtunkhwa (KP) Province: Farmers Fetching Higher Returns on Cucurbits Using Vertical Gardening Techniques**



**Bottle gourd hybrid cultivated using vertical structures.**

AIP-Vegetables in collaboration with the Agriculture Research Institute (S) DI Khan is working with smallholder farmers in KP province to improve their livelihoods by promoting advanced vegetable production techniques.

Bottle gourd, also known as lauki in the local language, is one of the popular crops in D.I. Khan, KP province, but local varieties are low yielding due to being raised on flat land, coupled with low quality fruit and has also affected the cucurbit culture.

AIP-Vegetables has introduced vertical gardening technology for sustainable agriculture and livelihood of farmers.

Field demonstrations were carried out during the October- December quarter for the farmers. Two bottle gourd hybrid seed varieties long and super hybrid F1 and nets were given to the 15 farmers, along with technical assistance on improving planting geometry. After successful germination of the bottle gourd hybrids, vertical nets were installed using bamboo shoots.



The new practice has helped farmers to achieve considerable increase in yield and has improved the fruit quality. The farmers conveyed their acknowledgements for AIP that with the continuous support will enable the farming community to improve their socioeconomic status.

Malik Ramzan is a smallholder farmer from Hissam village in district Dera Ismail Khan of KP province. He has cultivated bottle gourd, hybrid (long and super Star F1) using vertical structures. The quality of fruit has improved using nets and amending planting geometry. The vegetable produce from his field has attracted a higher price than usual.



Bottle gourd hybrid (long & super star).

### Technology Transfer a Lucrative Experience for Farmers: Drip Irrigation Systems installed at Farmer's Field in KP and Punjab

A total of five cost-effective and user-friendly drip irrigation systems worth US\$660 were installed for demonstrations at three farmers' fields: one in KP province and two in Punjab province of Pakistan and at two partner institutes: the National Agricultural Research Center, Islamabad and the Vegetable Research Institute, Ayub Agriculture Research Institute, Faisalabad. Three farmers, Suleman from Mang village Haripur district KP province, Munawar Hussain from Chevanda-Gojra and Chaudhary Hakim Ali from Bhikki-Sheikhupura of Punjab province, experienced the extended benefits from the drip irrigation systems and found this technology very useful as it saves water for cultivation and the costs of fertilizer application. Earlier they practiced furrow irrigation for cultivating tomato, sweet pepper, cucumber and bitter gourd. This new innovative system saves their time and resources spent on weeding/hoeing, and disease/insect management.

#### AIP- Vegetables Installed Drip Irrigation System for Demonstrations.

S #	Location	Location	Category	Date
1	Vegetable Program, National Agricultural Research Institute	Islamabad	Research Institute	September 4, 2014
3	Vegetable Research Institute, Ayub Agricultural Research Institute	Faisalabad, Punjab province	Research Institute	December 12, 2014
2	Mr. Suleman	Haripur district, KP province	Farmer's field	October 31, 2014
4	Mr. Munawar Hussain	Chavenda-Gojra, Punjab province	Farmer's field	December 14, 2014
5	Ch. Hakim Ali	Bhikki, Sheikhupura district, Punjab province	Farmer's field	December 16, 2014



Agricultural Engineer explaining functions of drip irrigation system to the visiting farmers from Balochistan at Vegetable Research Institute, Faisalabad.



Agricultural Engineer demonstrating drip irrigation system to Research Associate and farmer at Chevanda-Gojra.



Tomato hybrid Sahel raised through drip irrigation system under plasticulture at Vegetable Program, NARC, Islamabad.



## AIP-Perennial Horticulture

AIP-Perennial Horticulture is led by UC Davis

For feedback and queries contact Louise Ferguson (UC Davis): [lferguson@ucdavis.edu](mailto:lferguson@ucdavis.edu)

### Focus on Citrus

On December 5, 2014, under AIP-Perennial Horticulture, UC Davis collaborated with Citrus Research Institute Sargodha to conduct a citrus training for 25 local growers at Chak SB 6 in Bhalwal of district Sargodha in the Punjab province. The training utilized both lecture sessions and field visits to maximize learning. Field visits included processing and packinghouse tour at National Kinnow and manual citrus harvesting at a farmer's field in Bhalwal.



Dr. Louise Ferguson of UC Davis explains disease identification in a farmer's field in Bhalwal, Punjab Province.



Farm model presented by a woman growing pistachio from Balochistan province.

## Exploring the Potential in the Growing Pistachio Industry in Balochistan province

On December 10, 2014, to explore the potential in the pistachio industry in Balochistan province, a group of 28 pistachio growers convened in Quetta. Dr. Louise Ferguson of UC Davis introduced the participants and discussed the opportunities and challenges faced by them. Three pistachio growers, which included two men and one woman, prepared and presented the pistachio farm model. The main purpose of this meeting was the participants' discussion about establishing a pistachio growers' organization for developing their 200 hectare industry.

Visiting a 40 year- old orchard on the field station where AIP will initiate a pruning project provided further insights into the exciting opportunities of developing the pistachio industry.



## AIP-Human Resource Development (HRD)

For feedback and queries contact Mark Bell (UC Davis): [mark.andrew.bell@gmail.com](mailto:mark.andrew.bell@gmail.com)

### Preparing AIP Scholars for Life in the US



Dr. Imtiaz Muhammad, Country Representative CIMMYT talking to the AIP scholars.

On December 9, 2014 a day-long pre-departure orientation workshop for the AIP scholars who will initiate their postgraduate and doctorate studies in the United States was conducted by Dr. Tom Rost of UC Davis. The workshop, held at NARC in Islamabad, provided the 13 scholars with an opportunity to learn about what to expect from student life in the USA, cultural norms and expectations as well as to learn from each other. Dr. Imtiaz Muhammad, Country Representative CIMMYT Pakistan and Project Leader AIP, briefed the scholars about the program and the expectations from the scholars when they return to Pakistan after completion of their degree. Representatives of PARC, CIMMYT and Higher Education Commission (HEC) further enriched the workshop. Students gained a greater appreciation of what awaits them as they make their final preparations for the US.



Famous five AIP Ph.D. AIP- Scholars.



Participants of pre-departure orientation workshop.

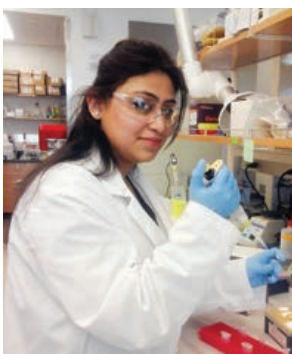


Postgraduate AIP- Scholars.



AIP- Scholar presenting at the workshop.

### AIP Provided Me Direction to the Highway of My Dreams: Maria Amir Solangi



Maria is a bright and progressive graduate of Sindh Agriculture University Tandojam, Pakistan. Despite low prospects of progressing, Maria's commitment to help the destitute communities though her dream of contributing to the society as a veterinary scientist, remained high.

UC Davis, in collaboration with CIMMYT, is leading the AIP human resource development component of AIP. This component aims to

enhance the national capacity of agriculture scientists and researchers through postgraduate and doctorate degrees at the land grant universities in the US.

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*"One day I shall live my father's dream".  
I am thankful to USAID for giving me the  
direction to the highway of my dreams. I  
dreamt to become a veterinary scientist since  
I was a little girl. I grew up accompanying  
my father, who is a veterinary doctor, to his  
visits to the rural areas of Sindh province in  
Pakistan for treating animals, guiding the  
villagers for better animal husbandry and  
serving the deprived.*

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From time to time, Maria consulted her professors at the University for their expert opinion on issues and her findings. Looking at the zealous attitude, her professor at the university informed her about the opportunity for young agricultural researchers and scientists, which will strengthen their capacities by the Agricultural Innovation Program for Pakistan (AIP).

Maria applied for the MS scholarship program, which received 300 applications. Fortunately, she is amongst the nine MS scholarship finalists through an extensive selection process.

Today, Maria is a fully registered Masters student at the Veterinary & Animal Sciences department, University of Massachusetts, Amherst in the United States.

“Studying in the United States has submerged me into a new culture, absorb alternative views, and has led to an array of new challenges and opportunities.”

Maria has continued success in her sights: after completing her degree she looks forward to providing outstanding veterinary care to the underprivileged communities in Pakistan and also intends to share her learning and experience with young researchers and scientists.

She is thankful to the people of the United States, USAID, AIP, CIMMYT and University of California Davis for their ongoing assistance in strengthening her capacity.



## AIP-E-Pak Ag

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As an experiment, 24 AIP collaborators enrolled in an online statistics course run by the American Society of Agronomy. After the course, participants were surveyed and the findings will soon be made available to better understand its effectiveness.

### Statistics - Who's the audience?

Knowing who the audience is is critical to delivering good training. We know AIP collaborators have a lot of interest in statistics training. During his December 2014 visit to Islamabad, Dr. Tom Rost met with AIP partners (AVRDC, IRRI, ILRI, PARC, and CIMMYT) to discuss each partner's vision for a series of statistical training workshops. The discussion revealed a diverse set of interests, ranging from reviewing fundamental concepts to introducing new high-powered modeling techniques. Partners agreed that workshops should be tailored to both breeders and agronomists and looked forward to the introduction of new software tools that can complement statistical software already in use. In relation to this, UC Davis is developing resource materials and investigating the development of an App that could greatly facilitate the use of the software package “R”.

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