SECOND SCHEDULE (See Rule 3(3))
DISTRIBUTION OF BUSINESS AMONG DEPARTMENTS
RULES OF BUSINESS FOR AGRICULTURE DEPARTMENT

AGRICULTURE DEPARTMENT	
1.	Legislation, policy formulation and sectoral planning regarding: a) Agricultural Education, Training and Research including Agriculture University, Faisalabad and Pir Mehar Ali Shah University of Arid Agriculture Rawalpindi and pre-service / in-service training at Agriculture Training Institutes. b) Adaptive Research and Research Farms c) Improvement of agricultural and water management methods. d) Protection against insects, pests, prevention of plants diseases and quality control of pesticides. e) Soil Fertility and Soil Conservation f) Mechanization, reclamation of land, use of agriculture machinery, ploughing, tube-wells and installation and research Agricultural Engineering (Agricultural Machinery and Implements), Water Management Training and Research Institute, Lahore. g) Agricultural Information and publications / training. h) Agricultural Statistics i) Preparation and review of agricultural production strategy in coordination with district agriculture extension.
2.	Arboricultural Operations.
3.	Monitoring of Agriculture inputs like fertilizer, pesticides, irrigation through field extension staff.
4.	Promotion of modern agriculture technologies and other extension activities through method / result demonstration, farmers gatherings, print and electronic media, etc.
5.	Training and Research on Floriculture Seed Farms / Green Belts.
6.	Market Information & Intelligence System and matters common to all Market Committees
7.	Agricultural Loans / subsidies
8.	Water Management Operations, Planning, Research and Coordination.
9.	Production, multiplication and marketing of certified seed through Punjab Seed Corporation
10	Coordination and Strengthening of Research activities in Agriculture, Livestock, Irrigation, Water Management, Forest and Fisheries Sector through Punjab Agricultural Research Board.
11.	Economic Planning and policy-making in respect of agriculture in the province.
12.	Plant Protection: a) Standardization of local and imported pesticides b) Plant quarantine
13.	Economic studies for framing agricultural policy 63 Inserted by No.SO (CAB-1) 2-12/2012, Dated 2nd April, 2012 64 Inserted by No.SO (CAB-1) 2-12/2012, Dated 2nd April, 2012 65 Inserted by No.SO (CAB-1) 2-9/2011, Dated 2nd April, 2012 66 Omitted by No.SO (CAB-1)2-11/2016 Dated February, 2016 67 Inserted by No.SO (CAB-I)2-12/2004 Dated 19.06.2014 68 Inserted by No.SO (CAB-1) 2-12/2012, Dated 12th July, 2012 34 Page 35 of 82
14.	Farm management research for planning project formulating and evaluation in the province.
15.	Seed testing and seed certification; crops forecast and estimation; crop insurance in the province.
16.	Grading of Agricultural commodities other than food grains, for exports.
17.	Agricultural commodity research (marketing research and laboratory research for lying down district, regional and provincial grades)
18.	Soil survey, comprehensive inventory of soil resources of province and their proper utilization.
19.	Standardization of fertilizers for meeting provincial requirements
20.	Introduction of special crops like jute, tea, olive etc.

21.	Under-developed areas: a) Identification of under-development areas. b) Identification of the fields in which an area is under-developed. c) Measures necessary to remove the causes of under-development in different areas.
22.	Socio-economic studies for framing agricultural research policies.
23.	Research for the introduction of improved germs plasm, relating to agriculture
24.	Collection of statistics on agricultural research
25.	High level manpower training for agricultural research and on farm management.
26.	Pest Scouting, Pest Survey, Pest Warning, Quality Control of Pesticides, Research on Plant Protection, Training of Pesticide Dealers, Farmers & Extension Workers in Plant Protection.
27.	Budget, accounts and audit mattePKR
28.	Purchase of stores and capital goods for the department
29.	Service matters except those entrusted to Services & General Administration Department
30.	Administration of the following laws and the rules framed there-under: i. The Cotton Ginning and Pressing Factories Act, 1925 ii. The Cotton Industry (Statistics) Act, 1926 iii. The Punjab Soil Reclamation Act, 1952 iv. The Punjab Agricultural Development Finance Corporation(Recovery of Arrears) Act, 1958. v. The Punjab Tobacco Vend Act, 1958 vi. The West Pakistan Agricultural Bank (Recovery of Dues) Ordinance, 1959 vii. The Punjab Rice (Restrictions on cultivation) Ordinance, 1959. viii. The Punjab Institute of Textile Technology Cess Act, 1962 ix. The Punjab Vegetable Market (Lahore)Ordinance, 1963 x. Seed & Fruit Plant Ordinance, 1965 xi. The West Pakistan Seeds & Fruit Plants Ordinance, 1965 xii. The Punjab Cotton Control Ordinance, 1966 xiii. Agricultural Pesticides Ordinance, 1971 xiv. Agricultural Pesticides Ordinance, 1971 (II of 1971) xv. The Punjab Cotton Control (Validation of Levy of Fees) Ordinance, 1971 xvi. The Punjab Silkworms (Regulation & Control) Ordinance, 1972 xvii. The Punjab Essential Articles (Control) Act, 1973 xviii. The Punjab Fertilizers (Control) Order, 1973 xix. The University of Agriculture Faisalabad Act, 1973 xx. The Punjab Agricultural Development and Supplies Corporation Act, 1973 xxi. The Punjab Cotton Control (Validation of Transportation Fee) Act, 1974 xxii. The Punjab Seed Corporation Act, 1976 xxiii. Seed Act, 1976 xxiv. The Foodstuffs Fertilizers (Cancellation of Authorizations and Dealerships) Ordinance, 1978 xxv. The Punjab Agricultural produce markets Ordinance (XXIII of 1978) xxvi. Agricultural Pesticides (Amendment) Act, 1992 xxvii. The Pir Mehr Ali Shah Arid Agriculture University Rawalpindi Act, 1995. xxviii. Agricultural Pesticides (Amendment) Act, 1997 35 Page 36 of 82 xxix. The Punjab Agricultural Research Board Act, 1997 xxx. Patents Ordinance, 2000 xxxi. Water Users Association Ordinance Act, 1981.
31.	Matters incidental and ancillary to the above subjects.

	ANNEX II: Vision Statements of Agriculture Directorates
Extension & Adaptive Research	Transform Punjab's Agriculture by disseminating latest crop production technologies by growing / planting diversified, market driven, increasing per acre crop production inducting sustainable ICT based communication strategy through increasing per capita farmer income and extensive training of stakeholders for effective value for money
Water Management	Produce more crop per drop of water through technology driven, sustainable and climate smart agricultural water management, leveraging on private sector's capacities leading to crop diversification and higher farm incomes
Field	Increase profitability of farming sector through sustainable horizontal and vertical agricultural expansion and private sector led mechanization technology adaptation
Research	Ensure sustainability and self-sufficiency in food by developing high yielding varieties and hybrids, production technologies, conservation of agriculture through crop diversification and natural resource management
Pest Warning & Quality Control	Transform Punjab's agriculture into a profitable sector by technology driven crop pest forecasting system, integrated with sustainable pest management strategies and quality assurance of pesticides
Agriculture Marketing	Create opportunities for increase in net incomes of farmers through efficient/alternate marketing channels coupled with readily accessible information resulting in competitive and knowledge-based marketing system and services
Floriculture	Uplift economic status of farming community through training, introduction of high value floriculture crops, sustainable horizontal & vertical floriculture expansion and adaptation of effective technologies for value addition
Crop Reporting Services	Timely and accurate crop assessment by using state of the art technology for sustainable planning and policy decisions; and information dissemination to the stakeholders
Soil Survey	Transform Punjab's agriculture into sustainable sector through crop selection based on identified soil type, land capability classification and soil suitability, using state of the art technologies for soil surveys
Information	Disseminate market-driven and diversified information through print and electronic media for farmers / stakeholders
Punjab Agriculture Research Board (PARB)	Enhance sustainable productivity, reduce poverty, ensure food security and promote competitiveness in the agriculture sector through output oriented agricultural research development plans (as per Board approval)

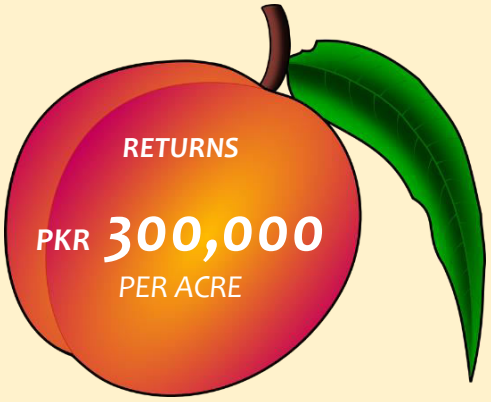
DRIP IRRIGATION MAKING IT HAPPEN: STORY OF PEACH CULTIVATION

IMPACT STORY

Few years back, fruit cultivation was not so popular amongst the farmers in the Punjab due to issues like higher water requirement, shortage of irrigation water and lack of production technology particularly efficient irrigation system capable of water application to fruit plants only. Wheat-rice is the dominant cropping pattern with sown area of over 21 million acres (8.7 million ha) whereas the area under fruits is less than one (1) million acres in the Punjab. During recent years, introduction of Drip Irrigation technology by the On Farm Water Management (OFWM) wing of Agriculture Department with the World Bank assistance has made it possible to grow variety of fruits in the entire province. Peach is one of those fruits, which was not considered Punjab's product as it is mostly grown in Baluchistan (Quetta, Kalat) and KPK (Peshawar, Swat valley) provinces. Pothohar area of the Punjab has, however, huge potential for producing fruits like peach due to conducive environment.



Mr. Sarwar Khan, a progressive grower, resident of village Noshehri Khan, tehsil Taxila, district Rawalpindi is one of those pioneers who installed Drip Irrigation system under the "*Punjab Irrigated Agriculture Productivity Improvement Project*" to grow peach. Mr. Hassan Ali, Farm Manager, shared the story of peach cultivation with drip irrigation as "***before Drip Irrigation**, we used to cultivate **wheat and maize** crops which require **more water, intensive labor work** for flood irrigation, **extra time to irrigate** and most importantly have **less market value of the produce**. We were looking for such a technology which enable us to grow high value crops with lesser inputs. **OFWM staff had introduced the Drip Irrigation technology** and we decided to grow peach with drip irrigation. Now, **only one person (Farm Manager) is enough to irrigate 12 acres** of peach orchard*".



Mr. Hassan is very much convinced about revolution with the Drip Irrigation in the Pothohar region. He explained that "***Drip irrigation** enabled us to cultivate **more land with less available water** and other inputs like fertilizer because water and fertilizer are applied directly to the plant root zone according plants requirement and there is **no chances of wastage of costly inputs** during application at any stage of plant growth".*

While sharing the economic returns, he told that "*the size and growth of peach plants is uniform due to equal application of requisite amounts of essential inputs through **Drip Irrigation**. The peach orchard started fruit bearing within three years, earlier than the flood irrigated orchard. We **earned about PKR 150,000, PKR 250,000 and PKR 300,000 per acre** during 3rd, 4th and 5th year, respectively. On the other hand, the profit from Wheat and Maize crops were not more than PKR 20,000 per acre".*

Mr. Hassan further explained that Drip Irrigation system is easy to operate and the best production crop management tool which provides more returns per acre as compared to traditional farming. Due to impressive growth of my peach orchard, my neighbor farmers have also planned to shift from traditional to high value agriculture by adapting Drip Irrigation technology for growing orchards and vegetables. The dawn of innovative farming has begun in Pakistan and **Drip Irrigation is playing a pivotal role in modernizing the Punjab's agriculture**".

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Village Noshehri Khan,
Taxila, Rawalpindi District

IMPACT STORY

SOLAR COUPLED DRIP IRRIGATION
IDEAL COMBINATION OF TWO CLIMATE SMART TECHNOLOGIES

It was 2011 when Mr. Mustafa Yousaf, a young man, working with a Dutch Bank in the UAE decided to quit his job and inspired himself of adopting agriculture as a business. On his return, he started exploring different feasible farming options at his agriculture land located at Saikhum, a village about an hour-and-a-half's drive from provincial headquarters Lahore. His first year of farming experience was not so encouraging because he had spent more money on growing spices and vegetables on flood irrigation than he had earned from their sale. This was the turning point when he stopped using conventional flood irrigation and switched to drip irrigation technology. He got installed drip irrigation system on six (6) acres for growing vegetables and spices under the World Bank funded PIPIP program during 2013-14 from On Farm Water Management (OFWM).

"Since we have shifted to precision irrigation, our input and labour costs have decreased dramatically by almost 50 percent and yield has increased upto 40 percent," Mustafa Yousaf says proudly. Currently, about 60 percent less water is required through drip irrigation as compared to flood irrigation. The water saved by drip irrigated vegetables has been used to irrigate additional area.

60% *Less Water*
50% *Less Fertilizers*
40% *More Yield*

He further explained that the vegetables grown with drip irrigation are less prone to fungal diseases and resultantly less use of pesticides. Another benefit is 35% less sprouting of weeds because required amount of water is applied directly to the crops roots with this pressurized irrigation system while most of the land remains un-irrigated leading to very less weeds infestation. Mr. Mustafa shared that drip irrigation technology enabled them to compete in the international market due to better quality produce of uniform size due to spoon-feed application of water and fertilizer to the plants as per their requirement.

Mr. Mustafa hasn't limited himself to drip irrigation technology, he has taken a step further by installing solar system, funded by the Punjab Government, for operating drip irrigation system to reduce the operational and labor costs Mr. Mustafa says that ***"solar power for operating drip irrigation system allows us to automate the entire system and further cut down labour cost"*** as they are no longer dependent on the unreliable and insufficient power supply from the grid in the area.

He acknowledged that recent increasing trend in adoption of drip irrigation by the famers, especially in canal irrigated areas of the Punjab is due to the strenuous efforts by the OFWM staff. Mr. Mustafa has also signed an agreement with international food firm to grow Chilies, Fenugreek (*Kasuri Methi*) and Coriander according to GAP (Good Agriculture Practices) standards. He has also grown gladiolus successfully on drip irrigation. ***Growing these crops according to international standards is only possible with drip irrigation technology***, he said.

While sharing his experience of adopting solar operated drip irrigation system, Mr. Mustafa told that this is an ideal combination of two climate smart technologies enabling the farmers to drastically cut down their input costs and at the same time enhance productivity. I am very happy the way I am doing innovative farming using these modern technologies, which is the future of Pakistan's agriculture.

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CHANGING CROPPING LANDSCAPE OF THE PUNJAB
STORY OF GRAPES CULTIVATION

In Pakistan, grapes are mostly grown in mountainous and sub-mountainous areas of the Balochistan and Khyber Pakhtunkhwa provinces. Grapes are cultivated on an area of nearly 39,000 acres (15,300 hectares) with annual productivity of about 64,320 tonnes. Punjab province, with a plain topography, not known for fruit cultivation such as Grapes but there is huge demand for eating this delicious fruit by the Punjabi people.

During last few years, innovative farming methods like high efficiency irrigation systems has made it possible to grow different types of fruits like Grapes, Olive, Papaya etc. in plain areas of the Punjab like Toba Tek Singh, Nankana Sahib, Mandi Bahauddin, Layyah and Bhakkar districts. Under the World Bank funded Punjab Irrigated-Agriculture Productivity Improvement Project (PIPIP), installation of drip irrigation systems have been started by the On Farm Water Management (OFWM) wing of Punjab Agriculture Department in 2012.

Mr. Aslam, a progressive farmer of district Toba Tek Singh, is one of those pioneering farmers who said goodbye to the traditional farming due to shortage of canal water, highly brackish groundwater & less profit on traditional crops and opted drip irrigation to grow high value crops. He got installed drip irrigation system on five (5) acres for cultivation of citrus in 2014 and after getting tangible results extended it on another five (5) acres for growing Grapes.

While sharing his experience he shared that *"I used to grow Wheat, Cotton and Maize before installation of drip irrigation. It took three hours to irrigate one acre of land. Now, I irrigate five (5) acres Grapes just in one hour time. First harvest of Grapes earned me PKR 400,000 per acre. It was impossible to get such huge profit with ordinary crops grown with flood irrigation".*

INCOME

PKR 400,000 per ace

Regarding fertilizer application, Mr. Aslam indicated that *"one of the biggest advantage of drip irrigation is application of soluble fertilizers to plants through fertigation tanks & venturi results in higher yields, better quality produce, reduced leaching & runoff, less volatility and better return on fertilizer investment".*

"I grow all popular Grapes varieties including NARC Black, Sultania-C, Kings Rubi, Flame Seedless, Vetro Black, Cardinal, Sugra-1 and Early White. Among all these varieties, Sultania-C is fetching better prices in the local market due to its unique taste and color. Grapes cultivated with drip irrigation gave healthy and vigorous crop stand, more fruit on strong & resilient branches leading to higher yield per plant".

Mr. Ghulam Shabir, Deputy Director Agriculture (OFWM), T.T. Singh while giving his views indicated that drip irrigation technology is getting more popular day by day amongst the farming community of Toba Tek Singh because it is enabling farmers to shift from traditional to high value agriculture and they can grow crops with less inputs vis high returns under the water shortage and climate change scenario.

Mr. Aslam recommending his fellow farmers to adopt drip irrigation technology for growing high value crops (grapes, citrus and vegetables) to improve their socio-economic conditions.



Mr. Muhammad Aslam
Ph #: +92 333 8887361
Chak No. 351 Nagra
Tehsil & District: Toba-Tek-Singh, Punjab
Pakistan

Government of the Punjab
Agriculture Department

More Crop per Drop
Punjab Irrigated-Agriculture Productivity Improvement Project
PIPIP

Olive Cultivation with Drip Irrigation: A Miracle in Potohar Region

Olive can be grown successfully in marginal and waste lands where the soil is not suitable for other crops. It can, therefore, be very helpful in improving livelihood of the farmers of Potohar region and play a pivotal role in the economy of Pakistan. Actually, drip irrigation is the major contributor in making the olive cultivation possible in the Potohar region under undulated land conditions. The progressive growers of the region are very satisfied because they are converting their waste lands into productive by growing olive orchards with drip irrigation and getting good economic returns.

Mr. Yaqoob Tahir Izhar, a progressive olive grower of the Potohar region has installed drip irrigation system and established an olive model farm. The Farm Manager, Mr. Sabtain Abbas (Agronomist) shared his experiences about olive cultivation with drip irrigation. He told "the climatic conditions of the Potohar region are very conducive for olive cultivation but the limiting factor was shortage of water. This problem was resolved by the Punjab government with introduction of drip irrigation. In other words, it was not possible for the Potohar growers to cultivate any crop without drip irrigation because of undulated/ mountainous lands and water scarcity". He proudly apprised that "the olive plants of our orchard are very healthy and now we earn about Rs. 125,000 per acre annually".

While responding to a question about economic importance of olive cultivation, Dr. Azhar Iqbal, Olive Expert explained as "Ripened olive fruits are rich in oil which is the best oil available in the world for edible purpose. Olive products especially olive honey, olive pickle, olive kehwa etc. are helping to fulfil the nutritional needs of the people. It also contributes to establish agro-industries for manufacturing olive filter discs, olive crushers, packaging materials, etc.". He added that "Punjab government has also installed an olive oil extraction unit at Barani Agricultural Research Institute, Chakwal to provide facility to the olive growers for free oil extraction".

Mr. Sabtain highlighted an important benefit of the drip irrigation technology that "the Potohar barren lands are converting into cultivable lands with drip irrigation which provides employment opportunities to the rural population and thus helps in poverty alleviation in the area".

Mr. Abdul Sattar, Deputy Director Agriculture (OFWM), Chakwal indicated that "drip irrigation technology is getting more popular day by day amongst the progressive growers of Potohar region because of its huge benefits. In fact, it is the best advanced and suitable technology especially for orchard cultivation under water shortage and climate change scenario.

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Government of the Punjab
Agriculture Department

More Crop per Drop
Punjab Irrigated-Agriculture Productivity Improvement Project
PIPIP

Transforming Traditional to Innovative Farming

Story of Sugarcane and Maize Cultivation with Drip Irrigation

PIPIP Feature Story

Excitement was everywhere when Mr. Atiq-ul-Rehman shared with the neighbouring farmers about his bumper yield of sugarcane and maize crops grown with drip irrigation. He got 60,000 kg & 3,840 kg yields of sugarcane & maize, respectively. It was really amazing for those farmers who were not able to get such higher yields with traditional flood irrigation method. Mr. Atiq is a graduate and well-known progressive grower of the area. He has successfully grown sugarcane and maize crops with drip irrigation and has practical information about comparative difference in growing crops with flood irrigation vs drip irrigation in terms of crop yields.

Water Saving 60 %
Fertilizer Saving 50 %

Crops	Yield (Kg/Acre)	
	Flood Irrigation	Drip Irrigation
Sugarcane	40,000	60,000 (50%) ↑
Maize	3,200	3,840 (20%) ↑

Mr. Atiq-ul-Rehman
Ph #: +92-333-6711036
Moza Bhawana,
District Chiniot,
Punjab Pakistan

Mr. Atiq very excitedly indicated that "I have experience to grow sugarcane and maize crops with flood irrigation as well as drip irrigation. As far as I know, there is significant difference in crop yields while reduction of almost 60% & 50% in water and nutrients application, respectively. Actually, drip irrigation precisely applies agricultural inputs in proximity to plant roots as per their requirements besides there is negligible wastage of inputs".

While explaining his story about innovations, he told that "Initially, it seemed difficult to shift from traditional farming to a new farming method. Actually, there was a complete shift in all agricultural operations for drip irrigation method. However, with the technical assistance of Water Management staff, I manageged to tackle any issue during the entire crop season thereby attaining bumper crop". He added that "although sugarcane is high delta crop but we can save precious water by applying required quantity for irrigation. On the other hand, maize crop is sensitive to both moisture stress & over irrigation and requires regular but light irrigation. It is essential to ensure optimum moisture availability during the most critical phase (45 to 65 days after sowing). Drip irrigation is more suitable for maize crop in dry lands. In order to get desired yield, it is imperative to select site specific variety, quality seed, correct planting season, timely cultural operations and other associated management practices".

Mr. M. Mansha, Director Agriculture (OFWM), Faisalabad opined that "maize crop responds intensely to nutrients, water and radiation. Radiation is uncontrollable, but we can control water and nutrients to enhance photosynthetic efficiency of plants. Traditional flood irrigation method provides little control as it is inefficient and has less uniformity of inputs application. As such, the best solution to overcome inefficiency issue is growing the crops with drip irrigation".

While commenting about high efficiency irrigation system, Malik Muhammad Akram, Director General Agriculture (Water Management), Punjab shared that "drip irrigation encompasses bright future as we cannot afford current luxury of flood irrigation in the years to come. Knowing the fact, progressive farmers/ innovators have started growing major crops like sugarcane and maize with this latest irrigation method. This is among the very few technologies that can cater water shortage under climate change scenario and exponentially growing population of the country".

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Government of the Punjab
Agriculture Department

More Crop per Drop
Punjab Irrigated-Agriculture Productivity Improvement Project
PIPIP

Drip Technology Changing Fortune of Punjab's Farmers

PIPIP IMPACT STORY

Guava, also called 'the apple of tropics' is one of the most common fruits in Pakistan. It is extensively grown in Sindh and Punjab. It adapts to most of the soil and climatic conditions in the country. This fruit occupies third position after citrus and mango in terms of area and production.

The guava plants grow healthy, vigorous and productive, if the nutritional and water needs of the plant are fulfilled timely and according to plant requirements. The **drip irrigation is the best system** to provide necessary nutrients according to requirement of the plants through fertigation.

Mr. Ayub, a progressive grower of Chak 26 (Begum da dera), tehsil Muridke, district Sheikhupura decided to get rid of **traditional farming and grow high density guava orchard** with drip irrigation. Actually, water shortage for irrigation, less economic returns from traditional crops and precious canal water compelled him to shift from traditional crops to high value agriculture with drip irrigation.

The Farm Manager of Ayub Zarai Model Farm hared that "We used to grow **rice and wheat crops before installation of drip irrigation**. As water was not enough to irrigate even half of the cultivated land, we decided to grow guava orchard with drip irrigation. Drip irrigation enabled us to cultivate the entire land with same quantity of the available irrigation water". He added that "Guava orchard requires less irrigation water and labor than rice and wheat crops. It provided more income (@ **Rs. 175,000 to 250,000 per acre** from a single fruit harvesting) than rice and wheat.

While responding to a question about effect of drip irrigation on guava orchard, he told that "guava cultivated with **drip irrigation provides healthy and vigorous plants, brings more fruit and matures one year earlier than the traditionally grown orchard leading to higher yield**. Moreover, it provides more economic returns in the local markets due to uniform size, shape and good color". Infact, drip technology is changing the fortune of farmers in the Punjab.

Director General Agriculture (Water Management) Punjab, Malik Muhammad Akram opined that Water Management wing of Agriculture Department is **promoting high efficiency (Drip & Sprinkler) irrigation systems to change the landscape of irrigated agriculture** in the Punjab. He advised the farmers to benefit from government facilities and shift towards high value agriculture as Punjab government is providing a comprehensive subsidy package for adoption of drip irrigation, solar system for operating high efficiency irrigation systems and tunnel technology to promote climate smart technologies in the province.

ON FARM WATER MANAGEMENT
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SUCCESS STORIES OF UNIVERSITIES: MNSUA MULTAN AND UAF

VEGETABLE NURSERY PRODUCTION AND SUPPLY SYSTEM FOR KITCHEN GARDENING

The project, in collaboration with private nursery farms, was started in November 2017 by MNS University of Agriculture Multan to promote kitchen gardening by establishing a system for provision of healthy nursery for economical and clean (pesticide free) vegetable production by overcoming germination and season-related problems. A walk-in tunnel (130x15 $ft.^2$) was constructed for raising nursery of Tomato, Chili, Pepper, Brinjal and Cucurbits (gourds and cucumber etc.). Different potting media (Peat moss, Perlite, Silt and compost) are being evaluated for nursery raising. Both male and female students are involved in various activities of the project to promote their capacity building in nursery media preparation, multipot tray filling, sowing and further nursery management. A portal for online sale of vegetable nurseries has been launched on the website: mnsuam.edu.pk/nursery. Programs for awareness of healthy foods and promotion of kitchen gardening for self-sufficiency in vegetables were conducted at 3 schools / colleges. The awareness campaigns were also launched on electronic media and print media including FM-101, Rohi TV and Radio Pakistan linking this project to community service. Market linkages have been developed with different Departmental Stores, Food Festival, CSD shops, etc. to provide space for display of nurseries for sale at their stores. up till now, 2,097 plants of Chillies, 2,131 of tomato, 1,774 of sweet pepper, 630 of brinjal, 692 plants of pumpkin, 1127 plants of cucumber 629 plants of vegetable marrow 105 plants of luffa and 150 plants of melon ahave been sold and gifted to dignitaries and hospitals.

ARSENIC FILTERING USING XANTHATED WATERMELON RIND

Groundwater in Pakistan is often prone to poisonous arsenic, which is found in the soil and it can contaminate drinking water. Arsenic contaminated water kills 43,000 people annually across the world. Wells in Punjab and Sindh are exposed to high concentrations of arsenic – higher than the World Health Organization (WHO) standards of 10 parts per billion (ppb) – leading to several diseases like skin cancer; blood vomiting; diarrhea; and severe damage to liver, kidney and lungs. While current methods of arsenic removal from water are expensive, this latest discovery is the easiest and cheapest developed so far.

A team of researchers headed and supervised by senior faculty of University of Agriculture, Faisalabad has developed an arsenic filter using 'xanthated watermelon rind', which is an extremely cost-effective solution to fight water polluted by arsenic. The research – funded by Grand Challenges Canada, Stars in Global Health – has been published in 'Science of the Total Environment'. It reveals that the method is 95 percent effective. The method is capable of filtering 20 litres of water daily for 6-8 months for just PKR 5,000-6,000 whereas the other filters cost around PKR 20,000-25,000. To filter the water, watermelon rind is dried in sunlight and ovens after washing it to remove any dirt, and then grounded to powder form. Finally, it is treated with sulphuric acid and then carbon disulphide. The tests conducted on water samples from different parts of the country have shown very positive results. The material can also be used as a sensor to determine the presence of arsenic in water as well. There is another important potential use of this xanthated material since it can easily be turned into a cheap sensor to spot arsenic poisoning in water reservoirs. A patent has already been filed for the technology by UAF to provide support to underprivileged people across the country through it as the filter works without any power supply.

MANGO PROMOTION AT TASHKENT, UZBEKISTAN

MNSUA Multan organized various mango promotion activities at Tashkent Uzbekistan from July-August 2017 in collaboration with the Mango Industry Stakeholders, Govt. of Punjab, Embassy of Pakistan Tashkent, Centre for Global & Strategic Studies Islamabad and Uzbek Embassy Islamabad. This event was organized following the visit of delegation organized by Agriculture Department, Government of the Punjab who visited agro-industry and agricultural institutions in Uzbekistan to expand cooperation and bilateral trade between the 2 countries. Apart from mango related products, guava pulp, citrus juice, pomegranate juice etc were also introduced. Mango and guava pulps were given to Marvin Brands, Uzbekistan and other potential importers along with product specifications for evaluation in order to support further business development. Besides the above promotional activities, visits to various areas and markets of Tashkent, Samarkand and Bukhara were also planned to have an overall orientation of different parts of the country, particularly marketing related issues, and market analysis (consumer response

regarding quality, taste, shelf life, price etc). This campaign acts as a baseline source for promotion of bilateral trade among the two countries.

MANGO FESTIVAL, MULTAN 2017

MNSUA Multan organized the 2nd Annual Mango Festival from 8th-10th July, 2017 in collaboration with the District Administration, Mango Research Institute, Multan and Mango Industry. The theme of the festival was "Showcasing Diversity, Potential and Value in Mango Sector" and branding Multan as the 'Mango Capital'. Stakeholders including political leadership, academia, researchers, Government officials, Ambassadors and Commercial Attaché's of various countries together with mango growers, traders, exporters, input suppliers and service providers participated in this event. Mango festivity activities including games for children, and performances (dramas/skits, songs, etc) by the University students. A competition titled 'food challenge' was also organized, where students from various educational institutes, housewives and restaurants participated and prepared different mango dishes with unique recipes.

The general public attending the exhibition were exposed to different mango; more than 100 indigenous and exotic mango cultivars being grown in Southern Punjab region were displayed. The stakeholders of mango industry were brought together from across the country and discussions were held to overcome the prevailing challenges, to identify key gaps and explore options for improved value and net income of supply chain partners. Approximately, more than 25,000 people visited and participated in the Festival. Overall, this event provided a valuable opportunity for creating awareness, branding and networking in mango production and developing supply and value chains.

MANAGING DOMESTIC WASTE TO REDUCE TRASH IN MULTAN

Ever increasing domestic waste production due to population growth is creating serious consequences to environmental quality and public health. In developing countries like Pakistan, increasing domestic waste is a major issue. This domestic waste is mostly dumped around living areas creating serious risks for community health. Multan being the 7th most populous city of the Pakistan with 1.87 million people is expected to produce around 650 tons/day of waste. Multan Waste Management Company (MWMC), established by the Government of Punjab is working to collect and dispose household waste. Nevertheless, awareness among community about proper sorting of recyclable non-recyclable waste, indiscriminate collection of household waste and its open dumping is negligible.

This project was designed by MNSUA Multan to educate the local communities and school students through outreach regarding the hazards of improper solid waste collection and management. Interactive meetings were conducted where training participants were convinced regarding the sources of domestic waste generation. Participants were provided with the current status of waste in international and local scenarios. They were asked to do logical analysis to find out the "source" of the trash, which they see in their streets and were provided the knowledge of domestic trash management by sorting it in to Reusable, Recyclable and Non-recyclable categories. Domestic Waste Management Kits were introduced to the participants consisting of different colored waste collection bags: green bags for garbage (Kitchen waste), blue bags for Recyclable and red bags for non-recyclable trash. In addition, stalls were equipped with the information and practical demonstration of domestic trash management. Different gadgets of daily life made from refuse trash items were displayed.

INTERNATIONAL CONFERENCE ON PLANT-BASED FOOD AND FOOD EXPO 2018

Plant-based foods, that is, vegetables, whole grains, legumes and fruits are enriched with essential nutrients that are beneficial for human health. Strategies need to be designed to promote nutritional medicine from plants. Keeping in view the significance of plant-based food, the Department of Food Science and Technology, MNSUA Multan organized international conference on "Plant Based Food: Current Scenario and Future Perspective and Food Expo 2018" in March, 2018 in collaboration with HEC, PARB and Private Sector. The basic aim of this international conference was to provide for all those closely connected with Food and Agriculture, a forum for sharing experience and expertise in creating innovative and successful learning, teaching, research and outreach environments.

Scientists from Sri Lanka, Malaysia, South Korea, Indonesia, Oman, China, UAE and from all over the Pakistan participated in the conference. In food expo more than 15 organizations participated and displayed the products. The private sector also provided financial assistance for the conference including Higher Education Commission Pakistan, PARB, and local food industries in Multan. In the technical sessions, the experts highlighted the importance of plant origin foods in human health and shared their research activities and outcome related to safety, quality, value addition, processing technologies and nutritional aspects of plant-based foods. The conference including a competition on Innovative Food Business Ideas where more than 50 teams from South Punjab region participated with cash prizes awarded to the top 3 position holders. An MoU between MNSUA, Multan and University of Sri Jayewardenepura, Sri Lanka for coordination in research and academic activities was also signed.

INSECTICIDAL BIOACTIVITY OF ESSENTIAL OILS OF LOCAL MEDICINAL PLANTS AGAINST INSECT PESTS OF STORED WHEAT (Department of Entomology, UAF)

Stored products are prone to insect pest infestation. A possible insect attack can deteriorate the quality and quantity of the attacked commodity. Significant decrease in volume, substantial weight loss and reasonable germination damage result in considerable loss. Optimum pest management is heavily dependent upon chemical control measures. Excessive use of insecticide and their environmental contamination serves as a major threat to ecosystem sustainability. Moreover, the phenomenon of insecticide resistance and resurgence are in progress and resulting in development of resistant biotypes. The progressively rigorous ecological regulation of pesticides has, therefore, stimulated research in non-chemical methods of insect control. The use of safe, low-toxicity botanical pesticide is now emerging as one of the prime means to protect crops and their products. Plant products have been found promising for effective control of insect pests of stored grains and are environmentally safe.

In this project essential oils, extracts and components from more than 50 plant species were studied for their bioactivity against insect pests of stored wheat. Rotary shaker and Soxhlet apparatus were used for extraction purposes. The materials were tested in different concentrations against adults and larvae of major insect pests of stored cereals. Synergistic effects of screened plants were also studied to develop an 1PM protocol for safe storage of food grains at farm level, using plant extracts/oils. Comparative efficacy of these finally selected essential oils and extracts along with new chemistry insecticides and phosphine were also studied. The overall results revealed that among plant extracts, Colocynthus citrulus is the most effective, followed by Azadirachta indica, Datoora anoxia, Nicotiana tobaccum and Euclayptus globulous. When these plant extracts are applied in combination with phosphine, they give more promising results. To guarantee sustainable management of insect pests of stored wheat, it was recommended that farmers ensure proper sanitation of storage structure and the walls and floor of the godowns be treated with the plant extracts. In case also used, old storage bags should be treated with plant extracts applying light sprays at regular intervals to prevent the attack of stored wheat insect pests. Integration of phosphine fumigation along with plant extracts should be carried out at 3 tablets per tonne or 25-30/1000 ft3.

Another patent (publication number: ES2589171) entitled "Method and installation for extraction and purification of essential oils from natural resinsto produce dynamic flavors and fragrances", has been granted from Spain, Europe in favor of senior faculty of Department of Chemistry, UAF.

SINO-PAK HORTICULTURAL CONFERENCE

Horticulture is an important component of agriculture sector in Pakistan, having significant contribution towards food security, human nutrition and national economy. Sino-Pakistan Horticultural Conference was organized by Department of Horticulture, MNSUA, Multan on 22-23 March 2018 with the financial support of Punjab Higher Education Commission (PHEC) and Punjab Agricultural Research Board (PARB). The theme of the conference was 'Innovation in Horticultural Crop Production, Protection and Value Addition' with key objectives including understanding, exchanging and strengthening collaborations related to horticulture industry issues and recent R&D work on it in Pakistan and China. Moreover, the conference is one milestone towards strengthening bilateral collaboration between Pakistan and China in Horticulture Sector under the umbrella of Belt & Road Initiative with special focus on CPEC. More than 200 stakeholders from diverse background participated in the Sino-Pakistan Horticultural conference, which highlighted the opportunities of various horticultural business and bilateral cooperation as per modern day needs. New dimensions of horticulture were identified including novel edible fruits crops, vegetable grafting to induce resistance, vegetable industry in the molecular field of science, seedless production of fruit crop to reduce acid contents in juices and different products for processing industry.

SINO-PAK INTERNATIONAL CONFERENCE ON INNOVATIONS IN COTTON BREEDING AND BIOTECHNOLOGY

In pursuance of establishing international relations to reach out for new technologies for enhancing Cotton production in Pakistan, MNSUA Multan in collaboration with Biotechnology Research Institute, Chinese Academy of Agricultural Sciences (BRI, CAAS), Beijing, China and Department of Plant Breeding and Genetics, Bahauddin Zakariya University (BZU), Multan organized the first "Sino-Pak International Conference on Innovations in Cotton Breeding and Biotechnology" during November 22-24, 2017. The conference provided a pragmatic platform to discuss challenges faced by cotton crop and innovative technologies to address these challenges to ensure higher average cotton productions.

The cotton community along with the international scientists drafted recommendations to set the future course of action in order to maximize cotton production. The recommendations emphasized on provision of certified seeds to farmers, mechanical picking, employing smart agriculture practices, breeding climate smart varieties, establishing efficient cotton transformation systems, exploring new genes inculcating resistance against insect pests and pathogens, implementing GM regulations properly, efficient Bt toxin testing, balanced use of nutrients, effective integrated pest management strategies to cope with Pink bollworm menace and latest bio-technologies like RNAi and genome editing. Pakistan is in dire need of implementing the proposed recommendations because of changing climatic conditions, ever increasing insect pest pressure and diseases.

A Sino-Pak Agri-Biotechnology Laboratory was inaugurated at MNSUA Multan on November 24, 2017. Moreover, a trilateral MoU was signed between MNSUA, AARI Faisalabad and Biotechnology Research Institute (BRI), Beijing, China. The MoU has underpinned the output-oriented collaboration between Chinese and Pakistani researchers in cotton, which could serve as an excellent model to be replicated in other major crops eventually benefiting both countries.

ZARAEE BAITHAK

On April 30, 2019, a Zaraee Baithak was arranged by the **Department of Plant Breeding and Genetics, UAF**. The Baithak discussed various topics as varied as the significance of adoption of modern agri methods and smart agriculture machinery to small farmers; timely sowing of crops as a prerequisite to increase agricultural yield and ensure food security; and better climate resilient fodder techniques needed to be implemented for better milk extraction. The Baithak provided an opportunity to all stakeholders including farming community, scientists, policy makers and others to address theproblems of the farming community and identify sustainable solutions.

ADOPTION OF MODERN AGRICULTURAL HYDROPONIC TECHNIQUES

On May 3, 2019, the UAF Vice Chancellor Prof. Dr. Muhammad Ashraf (H.I, S.I) inaugurated the hydroponic Unit. Agricultural Experts are certain that the country can increase vegetables and fruit production by 20 times with the adoption of modern agricultural technique hydroponic. On May 9, 2019, the National Institute of Food Science and Technology University of Agriculture Faisalabad set up RO Water Plant under the supervision of qualified food scientists to provide pure mineral water for campus community and general public at affordable prices. On the occasion, the Vice Chancellor said that the University is moving ahead to provide hygienic food and drinks at the doorstep of common people.

SENIOR DELEGATION VISITS

The Honourable Governor Punjab paid a visit to **UAF Sub-Campus Toba Tek Singh** on March 5, 2019, announced the establishment of University of Toba Tek Singh by upgrading the sub-campus.

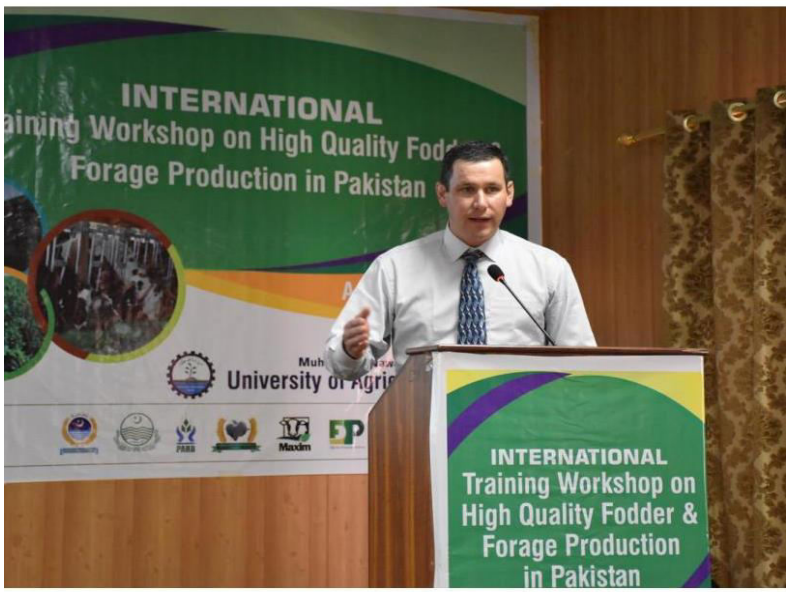
On June 15, 2019, the Federal Minister for Science and Technology Fawad A. Chaudhry visited the **University of Agriculture Faisalabad**. He said that he intended to set up an Agriculture Technology Taskforce that will be led by Vice Chancellor of University of Agriculture Faisalabad in order to strengthen academia-industry and farmers' linkages, reduce agricultural import bill and address different agriculture issues.

The Minister expressed that access to good seed was the major problem for farming communities, while alternatively, markets contained abundant inflicted seeds that were hampering good results in the sector. He urged the University to devise standards of seeds and pesticides that will be implemented across the country.

INTERNATIONAL TRAINING WORKSHOP/CONFERENCE ON HIGH QUALITY FODDER AND FORAGE PRODUCTION IN PAKISTAN

JOINT COLLABORATION: MNSUA, MULTAN, UAF AND AYUB AGRICULTURAL RESEARCH INSTITUTE (AARI), FAISALABAD

To encourage produce of high-quality fodders and forages in Pakistan, MNSUA Multan and UAF Faisalabad organized an international workshop in April 2018. One-day workshops were organized at MNSUA, Multan and AARI, Faisalabad. A consultative session at USPCAS-AFS UAF, Faisalabad, series of meetings with research scientists and policy makers, and a visit to different fodder farms also took place with participation of international delegates from USA and Argentina, and national scientists working on fodder and forage. Students, university faculty members, representatives of seed companies from public and private sectors, representatives of agro-chemical companies, farmers and other stake holders also attended the workshops.



The event provided a pragmatic platform to discuss challenges faced by fodder crops and innovative technologies to address these challenges to ensure higher yields. Prof. Dr. Daniel Putnam and his team from UC Davis assured their technical cooperation for the improvement of yield and nutritional quality of fodder crops especially alfalfa and their conservation during the lean periods. Dr. Daniel Basigalup from Argentina also encouraged collaborations among the institutions within and outside the country for progress in this sector. Enhancement in fodder yield and quality can be achieved through developing new high yielding, multicut, abiotic and abiotic resistant varieties/hybrids of different fodder species by exploiting diverse germplasm, introducing new fodder species, mechanized farming, preservation of fodders in the form of hay and silage, awareness and training of farmers, use of improved production technology, and growing fodders in mixtures. Emphasis was laid on developing public-private partnerships in R&D activities for certified seed production of fodder crops to ensure high quality production of fodder for the improvement of dairy sector in the country.

This was the first event on fodder and forages in Central and South Punjab regions of Pakistan as a collaborative effort of three organizations, which was well received by all the participants. The forum contributed towards networking of scientists, academia, growers, business and industry to start joint ventures in future for improvement of fodder crop sector. MoUs for output-oriented collaboration between institutes of Pakistan, USA and Argentina were also signed to initiate joint research projects, exchange of human resource and plant material, mutual sharing of experiences and expertise.

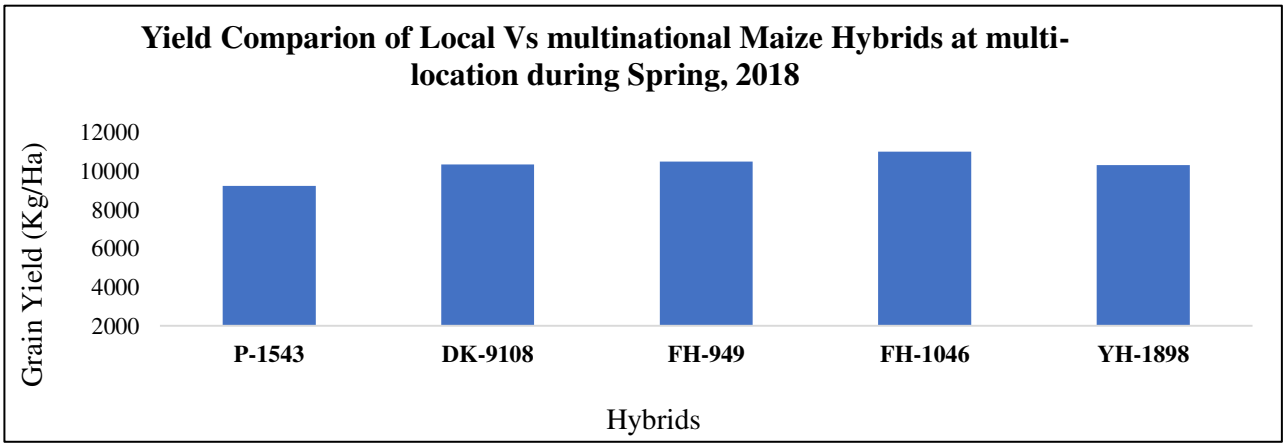
Success Stories of Research

Maize

Maize is an important crop used as food, feed and fodder in Pakistan and globally. It is sown on an area of 1,109 thousand hectares, which requires 38,815 metric tons seed for cultivation. The private sector is producing 8,080 metric tons (MT) of seed, while the public sector is producing 41 metric tons of seed. Still, there is demand for 29,794 metric tons seed. To meet this, multinational seed companies imported 9,196 metric ton of seed during FY 2017-18 worth PKR 6.5 billion, sold to farmers at a very high price. However, there is still a shortfall of 21,498 metric ton of maize seed. Special attention is required to bridge the gap between supply and demand of hybrid seed at affordable price to the farmers.

In the public sector, Maize and Millets Research Institute (MMRI), Yusafwala has recently developed three high yielding and heat tolerant maize hybrids, that is, YH-1898, FH-949 and FH-1046 for general cultivation in Punjab. These hybrids have green character so can also be used as fodder after cob picking. Seed production of one maize hybrid YH-1898 is being executed at Punjab Seed Corporation at a very small scale. However, other two maize hybrids should also be considered for large scale seed production through public private partnership.

As locally developed maize hybrids have higher yield, greater adaptability and more heat tolerance than imported maize hybrids, so special focus should be given on seed production of these hybrids. This will not only curtail import bill of country regarding maize hybrid seed but also helpful in employment generation and poverty alleviation. Furthermore, it will also reduce the cost of production consequently increasing the profit margin of farmers. Agro-based industries like poultry, livestock and pharmaceuticals will also be improved though the availability of enough maize commodity at reasonable price round the year.



Success Story Wheat Research Institute, Faisalabad

Anaj-2017

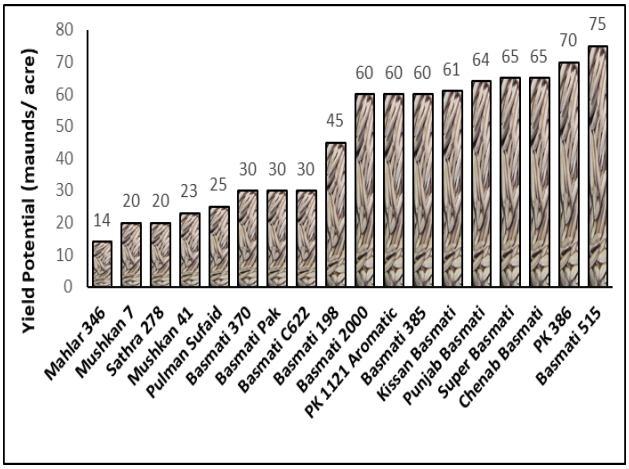
Wheat variety Anaj-2017 is high yielding (7284 kg ha^{-1}) and have durable rust resistance mechanism against leaf rust and yellow rust. It possesses medium maturity duration, hence suitable for early and late sowing of wheat after harvesting of Kharif crops. It gives 5 percent higher yield in national uniform yield trials. As far as quality characters are concerned, it has medium to bold sized grains with amber color, 14-16 percent protein and good chapatti quality. It is a semi dwarf variety with moderate tillering and can perform well at moderate seed rate (40-50 kg ha^{-1}). Morphological features of Anaj-17 given below:

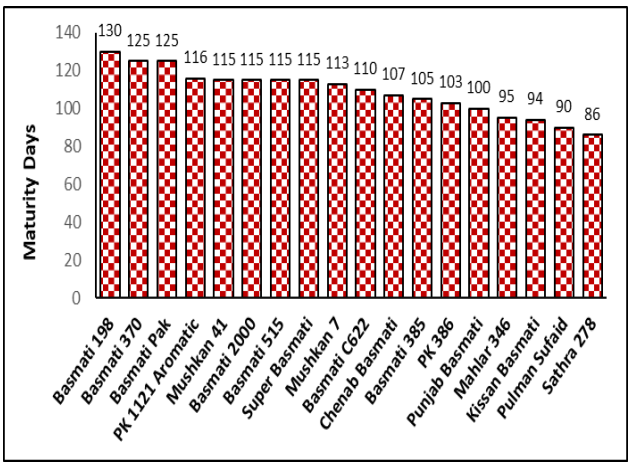
Sr	Characters	Range
1	Plant Height	105-115
2	Head Shape	Tapering
3	Seed Color	Amber
4	1000 Kernel Weight	35-40 g
5	Protein Contents (%)	14-16
6	Days To Heading	105-110
7	Days To Maturity	140-145
8	No. Of Tillers/m^2	390
9	Yield Potential	7284 Kg ha-1
	Average Yield	
	NUWYT (N) 2014-15	3840 kg ha^{-1}
	NUWYT (N) 2015-16	4068 kg ha^{-1}

Success Story: Rice Research Institute, Kala Shah Kaku

To develop quality rice varieties, Rice Farm was established at Kala Shah Kaku in February, 1926. As a result of concentrated efforts, the first basmati rice variety “Basmati 370” was released in 1933 having yield potential of 3 tons/ hectare with average grain length of 6.7mm. This variety proved to be a landmark in the history of basmati rice.

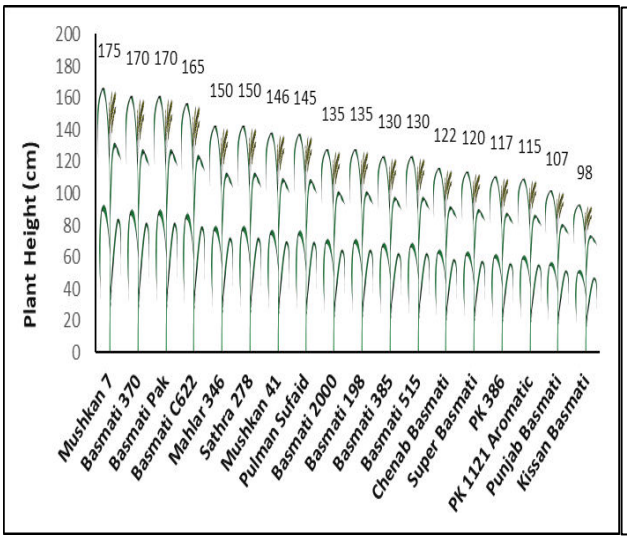
Rice Research Institute, Kala Shah Kaku has focused on improving commercial plant traits like plant height, maturity period, grain length and yield and developed 25 rice varieties including 18 fine varieties with 7 long

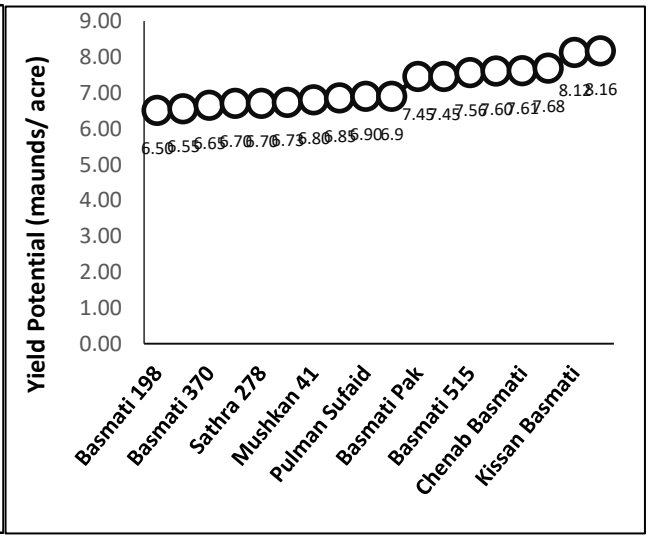




(Basmati 370, Mushkan 41, Mushkan 7, Sathra 278, Mahlar 346, Pulman Sufaid, Basmati C622) and 11 extra long grains (Basmati Pak, Basmati 198, Basmati 385, Super Basmati, Basmati 2000, Basmati 515, PK 1121 Aromatic, PK 386, Kissan Basmati, Chenab Basmati and Punjab Basmati). So far, yield potential of fine varieties of basmati improved from 14 to 75 maunds/acre, with reduction in maturity time from 130 to 86 days, reduction in plant stature from 175 to 98cm and grain quality improvement from 6.50 to 8.16mm. These research benefits uplifted the socio-economic status of farmers and raised foreign exchange earnings. Furthermore, Super Basmati alone adds a benefit of PKR 20-30 billion annually to the Punjab economy.

Yield Potential Reduction in maturity period from transplantation





Reduction in plant stature

Grain quality improvement

Success Story of Oilseeds

Pakistan is deficient in its edible oil requirement and spends more than US$ 3.00 billion annually on the import of edible oil, which is a huge burden on the economy of the country. Palm oil occupies major share in imported edible oil which is low in quality and causes serious health problems. Rapeseed and mustard are the major oilseed crops grown in Pakistan, but mustard oil is inferior in quality due to presence of high erucic acid content. Whereas, high priced commercial Canola hybrids (rapeseed) available in the market are not well adopted to the local climatic conditions due to long growing period and susceptible to high temperature fluctuations in the changing climatic conditions. To solve these issues, Oilseeds Research Institute (ORI), Faisalabad has developed Pakistan's first Canola quality mustard

variety “AARI Canola” having high yield potential, drought/heat tolerance, shattering tolerance and early maturity period (130 days). AARI Canola was approved in 2016 by Punjab Seed Council for general cultivation. During 2017-18, farmers cultivated AARI Canola as a sole crop as well as inter cropped in sugarcane and got good seed yield (up to 28 maunds/acre). Farmers received more profit as compared to wheat by cultivating AARI canola.

ORI Faisalabad also developed a rapeseed variety “Super Canola” having good quality oil, lodging tolerance and high yield potential. Super Canola ranked 1st position in National Uniform Rapeseed Trials FY 2015-16 and showed better adaptability as compared to commercial hybrids. Super canola has been approved by Punjab Seed Council during 2018 for general cultivation.

To strengthen the prevailing seed system of Punjab Seed Corporation, ORI provided pre-basic seed of AARI Canola and Faisal Canola for 350 acres for mass multiplication of Canola seed on affordable price to serve the farming community. Sowing of small seeded crops was a big issue in the country and mostly small seeded crops were sown through broadcast method. To overcome this, scientists of this institute designed and developed a tractor driven Small Seeded Drill, which has been registered by Intellectual Property Organization of Pakistan (IPO) with patent No. 17551-D. It is hoped that small seeded drill will prove a first step towards mechanization in oilseed crops.

GOVERNMENT OF PAKISTAN
THE PATENT OFFICE

CERTIFICATE OF REGISTRATION OF DESIGN

Design No.	**17551- D**
Dated:	**31/12/2014**

Certified that the design, of which a copy annexed hereto, has been registered as of the number and date given above in respect of the application of such design **"Small Seeded Drill (Class-01)"** in the name of **Muhammad Anwar S/o Noor Ahmad, R/O H.No. P-411, Street No. 5/2, Green View Colony (Rajawala) Faisalabad, Pakistan** in pursuance and subject to the provisions of the Patents and Designs Rules 1933 and the Registered Designs Ordinance, 2000.

(Dr. Muhammad Fayyaz Ahmad)
Registrar of Designs

Date of issue of certificate..... 17 APR

Address for service:-

M/s. Naeem Agri. Company (Regd.),
P-6, Main Sumandri Road,
Faisalabad

All communications should quote the number of this notice and should be addressed to:

(Copyright in the design will subsist for ten years from the date registration and may, under the term

Memorandums of Understanding signed by MNSUA Multan

Through proactive collaboration, the University of Multan has signed agreements / MoUs with the following national and international organizations and institutes:

i. UC DAVIS, USA
ii. Hochschule Geisenheim University, Germany
iii. Alanya Alaadin Keykubat University, Turkey
iv. University of Sri Jayewardenepura, Sri Lanka
v. National Agricultural Technology Institute, Argentina
vi. British Council, UK
vii. Huazong Agricultural University, China
viii. ACIAR, Australia
ix. Better Cotton Initiative, Switzerland

The following international agencies have been engaged in funding research projects at MNSUA Multan:

i. USPCAS-AFS
ii. DFID
iii. ACIAR, Australia
iv. AIP, USDA

IV. MoUs / Agreements

Sr. No.	MoU / Agreements	Country
1	Biotechnology Research Institute, CAAS, Beijing	China
2	Plant Protection Research Institute, Guangzhou,	China
3	Institute of Plant Protection and Soil Science, Hubei Academy of Agricultural Sciences, Wuhan	China
4	Huazong Agricultural University,	China
5	German Bio-Pesticide Farm Trifolio-M	Germany
6	University of Sri Jayewardenepura,	Sri Lanka
7	Alanya Alaadin Keykubat University Turkey, Mevlana Exchange Program	Turkey
8	University of California Davis	USA
9	National Agricultural Technology Institute, Cordoba,	Argentina
10	Punjab Agriculture Research Board (PARB)	Pakistan
11	Syngenta Pakistan Limited	Pakistan
12	South Asian Conservation Agriculture Network (SACAN)	Pakistan
13	Technology Upgradation and Skill Development Company (TUSDEC)	Pakistan
14	Allahdin Group of Companies	Pakistan
15	Pakistan Meteorological Department	Pakistan
16	NAVTTC	Pakistan

Sr. No	Seminar / Event Titles
	Demonstration and Awareness Services to Scientific and Farming Communities
1	Agro-Industrial Stakeholder's Discussion Forum
2	Awareness Seminar on Weed Eradication
3	Benefits of Medicinal Plants
4	Crops for Future: Quinoa and Proso Millet
5	Cultural Entomology (Spring Festival 2018)
6	Emerging Trends in Tunnel Farming
7	Fruit Fly Management Week
8	Insect for recreation
9	Insect vectors of human and animal diseases
10	International Seminar on "Water Resource Management"
11	International seminar on Pulses and Wheat for Food Security
12	Kissan Mela with the Nawa-e-Waqt Media Group
13	Plant Centric Meal Competition
14	Pollinators Biodiversity, Ecology and Crop Production in scenario of IPBES (Spring Festival 2018)
15	Projecting Impacts of Climate Change on Biodiversity through Ecological Niche Models
16	Prospects of Industrial Entomology
17	Role of Bio-control Agents in Organic Farming
18	Seminar on Entrepreneurship needs in Pakistan
19	Seminar on Water Resources and Agriculture
20	Special lecture on "Biochar: A Potential Source for Soil Health & Sustainable Agriculture"
21	Supply Chain Management
22	Water Resources, Climate Change and High Efficiency Irrigation Management
23	Weed Eradication Week
24	World Food Day 2017
25	Mango Festival at Multan
26	Stakeholder conference "to evolve cotton policy for next year
27	National seminar on Technology and Agriculture Innovation
28	Innovative Business Plan Competition
29	Seminar on Supply Chain Management
	Community Awareness Seminars
30	"Fund Raising & Awareness Seminar to Eradicate the Polio"
31	Seminar on "Current Use of Four Pillars of Knowledge Economy of Pakistan and its Future Promotion"
32	International Seminar on "Business Model Canvas - An approach to Idea Validation"
33	Seminar on 'Youth-led Change making'
34	The Role of Youth in Entrepreneurship for that no Degree Required
35	Volunteers Based, promotion of 10 Years Research & Development Plan and Database Development Activities
36	Train your brain positive thinking for peak performance

b) Faculty development trainings/seminars (National)

Sr. No.	Title
1	Training on Conflict Management
2	A Glance at Public Financial Management and Control Law No. 5018 from Quality Assurance in Public Universities
3	Awareness seminar on Horizon-2020
4	Awareness seminar on Technology Development Fund
5	Conflict Management and affective Communication
6	Faculty Development on start-ups and how to manage business incubation centers by improvement industry, Academia, Government and society linkage
7	How to improve Industry Academia Linkages
8	Institutional Strengthening Programme for Up-gradation of Existing Laboratories & Libraries
9	Master Trainer Faculty Professional Development Program, HEC
10	Seminar on "Presentation Skills"
11	One Week Faculty Professional Training Program 2017
12	Practical Pedagogy Strategies for Lecturers
13	Seminar on Filing of Income Tax Returns
14	Awareness seminar on Technology Development Fund
15	Training on the topic of "Discover Your and Your Students"
16	Training Sessions regarding Accounts Matters

II. Faculty Development Training (International)

Sr. No.	Name of Person	Training Title / Subject
1.	Prof. Dr. Irfan Ahmad Baig Dean, FSS&H	Training for rural transformation, China
2.	Mr. Muhammad Arif Lecturer, Department of Soil & Environmental Sciences	• Advanced international faculty professional development program under master trainers-faculty professional development program. • Good governance strategies for organizational excellence, Turkey
3.	Mr. Babar Farid Lecturer, Department of PB&G	Good governance strategies for organizational excellence, Turkey
4.	Mr. Mudassir Aziz Lecturer, Department of Agronomy	Good governance strategies for organizational excellence, Turkey

III. HR Development Trainings (International)

Sr. No.	Name of Person	Training Title / Subject
1	Mr. Muhammad Rafiq Farooqi	Training at University of Leicester, UK
2	Mr. Zulfiqar Ali Tabassum Deputy Registrar	Leadership training programme under modern university governance program (MUG), Turkey

Memorandums of Understanding signed by University of Agriculture, Faisalabad

Sr. No.	TITLE OF MoUs	Signing Date
INTERNATIONAL MoUs		
1.	MoU between UAF and Inst. of Agronomique, Veterinaire and Forestier De France (Agreenium)	15/9/2018 (Five years)
2.	MoU between UAF and Bogor Agricultural University, Bogor, West Java - Indonesia	12/10/2018 (Five years)
3.	Alliance Agreement between UAF and Jiangnan University, China	15/11/2018 (Three years)
4.	MoU between UAF and South-Central University for Nationalities, China	29/11/2018 (Five years)
5.	MoU between UAF and Human Life Advancement Foundation, Malaysia	14/1/2019 (Three years)
6.	MoU between UAF and Institute of Cotton Research of CAAS, China	17/2/2019 (Five years)
7.	MoU on scientific collaboration between UAF and the Friedrich-Loeffler-Institute (FLI), Germany	22/2/2019 (Five years)
8.	MoU between UAF and China Agricultural University, Beijing, China	1/3/2019 (Five years)
9.	MoU between UAF and Institute of Plant Protection and Soil Science, Hubei Academy of Agri. Sciences, PR China	9/4/2019 (Five years)
10.	MoU between UAF and College of Agriculture and Biotechnology, Zhejiang University, PR China	9/4/2019 (Five years)
11.	Agreement on the establishment of Confucius Set at the University of Engineering and Technology, Lahore between Confucius Institute at the UAF and University of Engineering and Technology, Lahore	19/4/2019 (Five years)
12.	Service Agreement of Access Program 2019-21	5/6/2019 (Two years)
13.	Pakistan English Access Micro scholarship Program Service Agreement issued to UAF under Public Affairs Section, U.S. Embassy/Consulate, Pakistan Bureau of South and Central Asian Affairs U.S. Department of State	16/01/2017 Two years
14.	MoU between UAF and Nasarawa State University, Keffi, Nigeria	10/3/2017 Five years
15.	MoU between UAF and Nasarawa State College of Agriculture, Lafia, Nigeria	10/3/2017 Five years
16.	MoU between UAF and Belarusian State Agrarian Technical University and UAF	11/4/2017 Five years
17.	MoU between UAF and Wuhan Qingfa-Hesheng Seed Co., Ltd. China	12/4/2017 Five years
18.	MoU between UAF and Center for Development Research, University of Bonn, Germany	20/4/2017 Five years
19.	MoU between UAF and The Julius-Maximilians-University of Wurzburg, Germany	20/4/2017 Five years
20.	MoU between University of Prince Edward Island, Canada and UAF	6/5/2017 Five years
21.	MoU between UAF and King Saud University, Riyadh, Saudi Arabia	2017-2019 Two years
22.	Protocol on International Educational Cooperation between AHI EVRAN UNIVERSITY, Kirsehir, Republic of Turkey and UAF	2017 Five years
23.	Memorandum on Contract between the Tajik Agrarian University Named after Shirinsho Shotemur (Dusbanbe, Tajikistan) and UAF	Five years
24.	Mevlana Exchange Program Protocol between Nigde Omer Halisdemir University, Turkey (NOHU) and UAF.	03/08/2017 Ten years
25.	MoU between UAF and Pulseberry Health Consultants, Dubai, UAE	24/08/2017 Five years
26.	MoU between UAF and College of Mechanical and Electrical Engineering, Shihezi University, China	31/08/2017 Three years
27.	Mevlana Exchange Programme Protocol between UAF and Namik Kemal University, Turkey	5/9/2017 Five years

28.	Mevlana Exchange Programme Protocol between UAF and Abant Izzet Baysal University, Turkey	5/9/2017 Five years
29.	MoU between UAF and University of the Gambia	15/9/2017 Five years
30.	Implementation Agreement of the joint project on the cooperation and the intellectual property of new characteristics between XAU, China and UAF	8/12/2017 1.5 years
31.	MoU between UAF and Zhengzhou Fruit Research Institute, CAAS, P.R. China	12/1/2018 Five years
32.	MoU between UAF and Shandong Vocational Animal Science and Veterinary College, China	16/1/2018 Five years
33.	MoU between UAF and Huazhong Agricultural University (HZAU), China	22/3/2018 Five years
34.	MoU between UAF and Federal University of Lavras, Brazil	20/4/2018 Five years
35.	AoC between UAF Nanjing Agricultural University, China	30/6/2018 Five years

MoU with Public Institutions/Organizations

1.	MoU between UAF Livestock & Dairy Development Department, Punjab`	1/8/2018 Three months
2.	Letter of Intent (LoI) between UAF and Tobacco Smoke Free Cities Project, Ministry of National Health Services, Regulations and Coordination, Govt. of Pakistan	2/4/2019 (Two years)
3.	MoU between UAF and Pakistan Institute of Public Finance Accountants (PIPFA), Karachi	18/2/2017 Three years
4.	MoU between UAF and National Textile University (NTU), Faisalabad	2/3/2017 Four years
5.	MoU between Punjab Information Technology Board (PITB) & Youth Affairs, Sports, Archaeology & Tourism (YASA&T) and University of Agriculture, Faisalabad (UAF)	10/2/2017 One year
6.	MoU between UAF and Faisalabad Institute of Cardiology, Faisalabad (FIC)	13/12/2017 Five years
7.	MoU between UAF and Punjab Institute of Agriculture, Marketing (PIAM), Lahore	30/3/2018 Five years
8.	MoU between UAF and Faisalabad Medical University (FMU), Faisalabad	30/5/2018 Five years
9.	MoU between UAF and Government College Women University, Faisalabad	4/6/2018 Five years

MoU with Private Institutions/Organizations

1.	MoU between UAF and Spurt International, Faisalabad	26/9/2018 (Three years)
2.	MoU between UAF and The First Micro Finance Bank Limited, Faisalabad	19/9/2018 (Five years)
3.	MoU between UAF and Child Labor Eradication Program	26/3/2019 (Five years)
4.	MoU between UAF and Aziz Fatima Trust Hospital Faisalabad	28/01/2017 Five years
5.	MoU between UAF and Amanah Halal Research Centre	30/03/2017 Four years
6.	MoU between UAF and Dost Muhammad Agricultural Farm, Hyderabad	26/04/2017 Three years
7.	MoU between UAF and Huawei Technologies (Pakistan) Pvt. Ltd.	01/06/2017 One year
8.	MoU between UAF and Syngenta Pakistan Limited	04/07/2017 Three years
9.	MoU between UAF and Oxfam, Islamabad	12/07/2017 18 months

MoUs with Industry

1.	Agreement between UAF and Ghazi Agropoulive Industries, Faisalabad	1/7/2018 (Three years)
2.	MoU between UAF and Pakistan Tobacco Company Limited, Islamabad	11/12/2018

		(Five years)
3.	MoU between UAF and Fauji Foods Limited, Lahore	10/1/2019 (Two years)
4.	MoU between UAF and LeadsTech, Lahore	18/02/2017 Five years
5.	MoU between IHS-UAF and Greenworks, Lahore-Pakistan and PUM, Netherlands Senior Experts	16/5/2017 Two years
6.	MoU between UAF and Punjab Seed Corporation, Lahore	21/07/2017 Five years
7.	MoU between UAF and Interloop Limited, Faisalabad	17/09/2017

Sr. No.	Seminar / Training Title	Date	Participants
1.	How can we ensure fool proof security in the modern world (Training program for security staff)	24-07-2017 to 31-07-2017	35
2.	One day seminar on cell culture and protein biology innovations (Collaborator M/S worldwide scientific)	02-08-2017	98
3.	Research Productivity Award, and encouraging initiative of PCST	07-08-2017	185
4.	International Workshop Beans with benefits potential and limitations for mungbean production	08-08-2017	185
5.	How can we ensure fool proof security in the modern world (Training program for security staff)	19-09-2017 to 27-09-2017	35
6.	Session with MERADD on indigenously developed lab equipment	31-10-2017	45
7.	Awareness seminar on safe use of pesticide in the agricultural field.	08-09-2017	65
8.	How can we save our environment" seminar on the eve of celebration of World Space Week (WSW)	04-10-2017	785
9.	How women can flourish through entrepreneurship Women X program by World Bank	07-10-2017	20
10.	Seminar on Intellectual property	06-11-2017	135
11.	National seminar on "Challenges for research commercialization and way forward" (DICE 2017)	07-11-2017	201
12.	Biofertilizers: pros and cons of entrepreneurship in Pakistan	8/11/2017	195
13.	Seminar on Taxation of start-ups and consultancy service in Pakistan	23-11-2017	114
14.	English language teaching training (English for academic purposes)	12-12-2017 to 14-12-2017	55
15.	First Entrepreneurial Festival (EFF) Faisalabad (Panel discussion on what are issues and options for entrepreneur in Pakistan)	19-01-2018	50
16.	One day seminar on value added food products issues and opportunities for entrepreneur	19-01-2018	115
17.	An awareness seminar on Mobile apps and web development in collaboration with the Saylani Welfare International Trust (SWIT)	26-01-2018	670
18.	Session for principal investigators (PIs) and UAF management	13-02-2018	132
19.	How women can flourish through entrepreneurship Women X program by World Bank	16-02-2018	25
20.	Training on "Project Management Cycle: M&E tools" under the project capacity building of Agriculture Scientists by Govt. Baluchistan	26-02-2018 to 07-03-2018	14
21.	Training on "Environment implication of overuse of pesticides" under the project capacity building of Agriculture Scientists by Govt. Baluchistan	12-03-2018 to 14-03-2018	14
22.	Training on "Off season tunnel farming" under the project capacity building of Agriculture Scientists by Govt. Baluchistan	19-03-2018 to 22-03-2018	13
23.	The citizens foundation "RAHBAR can transform vision into Reality	15-03-2018	145
24.	Training on "Tissue Culture" under the project capacity building of Agriculture Scientists by Govt. Baluchistan	26-03-2018 to 04-04-2018	18
25.	Training on "Water Harvesting" for Agri. Scientist from Baluchistan under the project capacity building of Agriculture Scientists by Govt. Baluchistan	09-04-2018 to 18-04-2018	15

26.	Training on "Laser land leveling techniques" under the project capacity building of Agriculture Scientists by Govt. Baluchistan	23-04-2018 to 26-04-2018	18
27.	Seminar on “Hum Tax Kyoun Dein”	10-04-2018	195
28.	Capacity building of Young scientists on Communicating science to society	10-05-2018	185
29.	Potential of green water use to fight water scarcity for future food security (Dr. Tahir Rasheed, Canada)	17-05-2018	122
30.	Public lecture on "Environmental factors responsible for cotton crop failure during 2015-16 growing season" (Dr. Tahir Rasheed, Canada)	18-05-2018	55
31.	Business canvas model development workshop (In collaboration with FCCI)	29-05-2018	20
32.	Public lecture on "Integrated bio-remediation of fossil fuel contaminated soils" (Dr. Tahir Rasheed, Canada)	01-06-2018	24
33.	Public lecture on "Production of selicornia by produced water" (Dr. Tahir Rasheed, Canada)	04-06-2018	40
34.	Seminar on Sustainable Rural Enterprises (SIOP)	21-06-2018	95

Sr. No.	Training Title	No. of Participants
1	One-day international Seminar titled **“Ensuring food security to uplift nutrition and rural development”** to celebrate World Food Day on 16th October 2017. (25-09-2017).	150-200
2	A series of teacher trainer workshops entitled **“Nutritional awareness of school going children and review of nutrition and food safety curricula practiced at higher educational institute of Pakistan”** at NIFSAT, UAF on 04-07 December 2017-18.	200
3	One-day training on **“Halal Food Safety Assurance”** at NIFSAT, UAF at 21th December 2017. **(12-12-2017)**	100-120
4	One-day Seminar on **“Value Added Food Products: Issues and Opportunities for Entrepreneurs”** at UAF by NIFSAT & ORIC from 19 January 2017.	150-200
5	Workshop entitled **“Nutritional awareness of school going children and review of nutrition and food safety curricula practiced at higher educational institute of Pakistan”** at NIFSAT, UAF on 22 February 2018.	200
6	Participated in **“Nutrition Mela and Product Development Competition”** at 22-23 February 2018 at NIFSAT, UAF.	300-350
7	International seminar on “**Food Processing; A neglected pearl of Food Sector”** at 03 April in NIFSAT, UAF	150-200

ADP ALLOCATION AND PROGRESS OF FY 2017-18 AND FY 2018-19

AGRICULTURE DEPARTMENT TABULATION

Scheme Name	Dept	Size of Scheme (PKR million)							Status of Scheme		
		Total cost of scheme	Budget 2017-18	Revised 2017-18	Utilization 2017-18	Budget 2018-19	Released 2018-19	Utilization 2018-19	Start Date	End Date	Date of DDSCs
Promotion of Pulses Cultivation in Punjab	Extension & AR	127.26	2.23	0.72	0.72	6.63			2014	2018	25.03.14
Promotion of Agriculture Mechanization in Punjab	Extension & AR	1183.60	592.00	715.96	573.87	16.00	157.40	154.40	2015	2017	20.08.15
Extension Services 2.0	Extension & AR	4104.74	513.19	580.32	434.43	268.84	254.26	249.62	2015	2020	
Uplifting of Extension Farms	Extension. & AR	250.00	250.00	250.00	250.00	-	-	-	2017	2018	
Contract Farming through Public Private Partnership (PPP)	Extension & AR	20.00	5.00	5.00	0	0.00	-	-	2017	2019	
Establishment of biomass collection centers & supply chain of biomass to energy projects	Punjab Bio Energy Company	570.62	100.00	100.00	37.00	0.00	-	-	2016	2020	-
Establishment of Punjab Bioenergy Institute (PBI) at UAF	UAF	770.47	216.67	211.47	211.35	30.00	-	-	2014	2018	23.09.17 (PDWP)
Community based integrated Management of Pink Boll Worm and Provision of Missing Facilities to Pest Warning Wing	PW & QCP	96.23	22.43	29.68	28.03	20.00	23.269	21.803	03.02.2017	30.6.2019	03.02.2017
Introduction and adaptation of high value crops and fruits in climatic conditions of Punjab	AARI	34.57	4.66	4.45	4.23	3.25	2.438	2.437	2015	2020	01.08.2015
Evolution of Sorghum and corn genotypes for the production of conserved fodders.	AARI	9.16	2.17	2.17	2.15	-	-	-	2015	2018	01.08.2016
Improvement of Production Technology in Garlic and Ginger.	AARI	78.86	10.62	10.55	10.57	15.00	9.74	6.14	2016	2021	23.12.2016
Provision of Lab. and field equipment for Development of Basmati Rice Hybrids Resistant to Bacterial Leaf Blight, Flood and Salinity in Punjab	AARI	44.01	8.74	8.74	8.09	7.33	5.23	5.20	2015	2020	01.08.2015
Production of pre-basic virus free seed of the approved potato varieties through tissue culture.	AARI	47.74	3.32	2.01	0.81	40.38	32.65	32.26	2016	2019	02.07.2016
Diversification to high value cropping through promotion of horticulture	AARI	1042.77 Govt. Share 780.00 M Farmer Share 262.77 M	100.00	76.46	19.90	10.00	10.00	10.85	2016	2021	10.01.2017
Accreditation of AARI laboratories for ISO-17025	AARI	120.61	45.82	29.99	23.16	-	-	-	2016	2018	19.12.2016
Commissioned Research for development of cotton seed	AARI	350.09	100.00	100.00	94.01	20.00	14.40	14.30	2016	2021	25.04.2017
Development of integrated management of citrus orchards to enhance the yield and improvement of fruit quality	AARI	28.43	9.70	4.50	4.02	4.87	3.45	3.45	2016	2019	02.07.2016
Improvement in breeding and seed production system of fodder crops	AARI	58.30	45.12	43.81	37.19	8.42	6.32	6.08	2016	2019	13.01.2017
Developing Pothwar into an Olive valley	AARI	2629.79 Govt. Share 1672.446 Farmer share 957.34	200.00	166.50	192.10	95.72	95.72	94.27	2015	2020	11.08.2015

Provision of Additional Research Facilities for Development of Heat Resilient Maize Hybrids at Maize & Millets Research Institute	AARI	48.00	8.26	7.89	7.83	3.420	2.57	2.56	2015	2020	01.08.2015
Up-gradation of AARI Infrastructure, Faisalabad	AARI	297.28	100.00	50.00	49.97	50.00	41.21	41.21	2017	2019	19.07.2017
Establishment of Centre for Excellence for Olive Research and Training (CEFORT) at BARI, Chakwal	AARI	300.00	-	-	-	20.00	0.00	0.00	2019	2023	-
Development of short duration high yielding and disease resistant mungbean cultivars for Rice Wheat System	AARI	32.99	5.41	5.41	6.02	0.00	-	-	2015	2020	15.05.2015
Impact of managed Pollination by Apis mellifra on the yield of different crops	AARI	14.93	4.13	4.13		0.00	-	-	2016	2019	31.12.2017
Development of short duration sunflower hybrids with better yield	AARI	31.77	9.26	3.46	1.81	0.00	-	-	2015	2020	06.03.2015
Pre- and post-harvest management of Aflatoxin in groundnut	AARI	28.47	14.06	10.50	10.50	0.00	-	-	2017	2021	15.08.2017
Acceleration of Maize breeding through Inducer Line Mediated Double Haploid Inbred Lines for development of climate smart, high yielding maize hybrids	AARI	40.81	15.93	15.93	4.90	0.00	-	-	2017	2019	12.10.2018
Development of high oil content in cotton Line/ Genotypes through conventional breeding strategies.	AARI	20.00	4.28	4.28	1.59	0.00	-	-	2017	2022	10.12.2017
Nutrition enhancement of crops fruits, vegetables and their products climate change scenario	AARI	349.80	101.97	99.53	54.59	0.00	-	-	2017	2021	12.10.2017
Crop diversification through Soybean and Sesame adaptability studies under changing climate	AARI	31.30	5.08	5.08	2.14	0.00	-	-	2018	2023	12.10.2017
DNA barcoding/fingerprinting for identification of Cotton, Wheat, Maize, Potato, Tomato and Date Palm varieties	AARI	23.03	15.20	15.03	7.55	0.00	-	-	2017	2019	12.10.2017
Weed management in chickpea through identification of post-emergent herbicides and development of herbicide tolerant genotypes.	AARI	27.50	5.45	5.45	1.33	0.00	-	-	2018	2020	15.09.2017
Development of weedicides tolerant lentil germplasm and identification of different weedicide for weed control in lentil	AARI	16.55	3.88	3.88	0.80	0.00	-	-	2018	2022	15.09.2017
Diversification of cropping promotion of wheat (*Triticum aestivum*), Sohanjna (*Moringa olifera*), Castor Bean (*Ricinus communis*), Taramera (*Eruca sativa*), Mustard (*Brassica Juncea*), Pearl Millet (*Pennisetum glaucum*) and Sesame (*Sesamum indicum*) in Lesser Cholistan	AARI	32.25	11.78	11.78	7.78	0.00	-	-	2018	2018	01.11.2017
Enhancement of mung bean and gram production in Thal through development improved genotype and technologies to reduce pulse import bill	AARI	28.74	5.52	5.52	3.32	0.00	-	-	2017	2022	15.11.2017
Development, optimization and technology dissemination of value-added products of selected fruits and vegetables	AARI	14.31	6.08	6.08	3.90	0.00	-	-	2017	2021	12.10.2017
Development and commercialization of tomato hybrids and varieties suitable for sowing in tunnels and open fields of Punjab	AARI	29.11	11.500	11.500	3.75	0.00	-	-	2017	2022	12.10.2017

Nutrients management to control citrus decline	AARI	7.200	3.662	3.662	1.63	0.00	-	-	2017	2020	12.10.2017
Development of cotton variety suitable for mechanical picking	AARI	21.00	5.076	5.076	1.39	0.00	-		2017	2022	10.12.2017
Screening of Exotic and Local Accessions for the Development of Forage and Seed Production Technology of Alfalfa	AARI	8.26	4.734	4.734		0.00	-	-	2017	2019	12.10.2017
Development and dissemination of rice and wheat varieties suitable for irrigated rice-wheat cropping system in the climate change scenario	AARI	39.07	11.50	11.50		0.00	-	-	2017	2023	07.02.2018
Cost effective improvement in the nutritional value of rice wheat crops through nanoparticles doped biochar in saline sodic soil	AARI	4.49				0.00	-	-	2018	2020	15.08.2017
Training of Agri. Extension Wing, Federal Seed Certification and Registration Department and Private sector personnel in detection, identification and quantification of Bt cotton	AARI	10.88	10.88	10.88	5.92	0.00	-	-	2017	2018	12.10.2017
Extension Service 2.0 - farmer facilitation through modernized extension project (Soil Survey component)	Soil Survey	38.45	30.26		12.07	0.00	-	-	2015	2017	
Provision of laser levelers to farmers/service providers on subsidized cost	Water Management (WM)	1350.00	675.00	675.00	675.00	0.00	-	-	2015	2018	20.08.15 (PDWP)
Punjab Irrigated-Agriculture Productivity Improvement Project (PIPIP)- World Bank assisted	WM	41,737.96	3,380.72	3,190.89	2,011.47	5,091.47	5,964.02	5,894.16	2012	2020	Original 16-08-2012 Revised 10-07-2017
Optimizing Watercourse Conveyance Efficiency through Enhancing Lining Length	WM	6,829.70	500.00	1,243.43	1,225.42	427.00	442.18	440.57	2015	2019	20-08-2015
Provision of Laser Land Levellers to the Farmers / Service Providers on Subsidized Cost	WM	1,350.00	668.70	668.70	667.33	-	-	-	2015	2017	20.08.2015
Promotion of High Value Agriculture through Provision of Climate Smart Technology Package	WM	3,475.00	500.00	904.40	895.92	1,682.00	1,689.57	1,689.50	2016	2018	01.11.2016
Rainwater Management in Cotton Fields to Minimize Impacts of Climate Change (Pilot Project)	WM	34.84	12.326	12.33	12.33	0.28	0.28	0.28	2016	2018	30.11.2016
Construction of Watercourse and Laser Levelling Equipment at Chak No. 105/ML, District Layyah	WM	17.53	10.00	10.00	10.00	-	-	-	2016	2017	
Promotion of Gram Cultivation through Life Saving Irrigation and Sprinkler System under Changing Climate	WM	296.08	50.00	36.64	34.32	20.72	20.12	19.89	2017	2019	29.09.2017
Establishment of Hi-Tech Mechanization Service Centers (HMSCs): (2016-17 TO 2020-21)	Field Wing	3830.21	100	89.01	23.89	50.00	46.40	31.52	2016	2020	07.02.17
Introduction and Promotion of Hi-Tech Farm Mechanization Technologies	Field Wing	61.14	26.619	23.671	23.56	9.37	7.03	7.13	2016	2018	25.11.2016 DDSC
Provision of GPS & Tracking system in machinery of field Wing	Field Wing	30.67	15.189	9.785	9.42	0	-	-	2015	2017	20.08.15 (DDSC)

Construction of New Agricultural Offices Complex, at Murree Road, and Soil Conservation, Agricultural Engineering Workshops and Offices at Adyala Road, Rawalpindi.	Field Wing	275.34	28	27.845	24.34	0	-	-	2013	2017	02.05.2014 (PDWP)
Pilot testing Crop Insurance for small farmers	CRS	200.00	200.000	168.288	100.00	-	-	-	2017	End Rabi Season 2018-19	1st Steering Committee 1-11-2017
Establishment of MNS University of Agriculture, Multan, Phase-II	MNSUAM	1510.24	725.925	789.053	786.04	184.00	146.501	146.491	2015	2019	PDWP/24.05.2017
Commissioned Research for Development of Cotton Seed. (MNSUAM Share)	MNSUAM	90.94	80.745	73.889	69.92	0.00	-	-	2016	2021	25.04.2017
Improvement in Breeding and Seed Production of Fodder Crops (MNSUAM Share)	MNSUAM	9.47	7.588	7.588	7.59	0.00	-	-	2016	2019	01-08-2016
Establishment of Sub-Campus of PMAS-Arid Agriculture University at Attock (Phase-II)	PMAS-AAUR	879.67	200.00	0.000	98.81	103.57	54.49	26.60	2017	2019	30.11.2016 (PDWP)
Testing Indigenous Hydroponic Greenhouses for Vegetable Growing at Various Locations in Punjab	PMAS-AAUR	77.57	11.221	0.000	9.39	0.00	-	-	2016	2018	23.09.2016 (PDWP)
Construction of Student Hostel For Male & Female at PMAS-AAUR	PMAS-AAUR	428.11	100.00	0.000	0.000	-	-	-	Admin Approval in progress	-	04.08.2017 (PDWP)
Est of Model Farms linked with improved supply chain & value addition	Marketing	3261.19	0.00	0.00	0.00	256.46	255.46	237.42	2017	2021	01.03.17 (PDWP)
Interactive Information Dissemination System Through Use of Modern Technologies for Innovative Agriculture	Information	49.35	24.38	22.557	21.81		-	-	2016	2018	02.07.2016
Scheme for 50 Overseas PhD Scholarships	UAF	656.08	100.000	100.000	100.00	122.16	91.62	91.59	2014	2020	20-08-2015 (PDWP)
Establishment of Laboratory School, Agriculture University, Mohallah Usman Ghani in District Faisalabad (PP-65) - (Prime Minister SDGs)	UAF	12.28	2.500	2.500	2.27	10.02	9.1	7.76	2017	2019	31-08-2017
Replacement of Sewerage system and boundary wall / barbed wire at Residential colony at Ayub Agriculture Research Institute (AARI) Faisalabad (Court Case)	AARI	27.37	27.37	27.37	27.37	0.52	0.39	0.39			
Construction of separate washrooms for female staff	AARI	50.95			0.95	5.00	1.25	0.00			
Effective Pest Management in Cotton Crop to subsidize Provision of Spray Machine	Extension & AR	151.7			0.00	12.89	12.89	9.53			
Improvement / Modernization of Agricultural Produce Markets -Phase-I (PPP mode).	Marketing	384.1			21.48	11.32	9.21	6.99			
Establishment of Punjab Agriculture, Food and Drug Authority (PAFDA) Science Enclave Main Building Premises, Lahore		6,322.00			1,000.00	200.00	175.00	175			

SERVICE DELIVERY DURING FY 2017-18 & FY 2018-19
AGRICULTURE DEPARTMENT TABULATION

Service Delivery Achievements					
Scheme Name	**Dept**	**Type of Service**	**Achievements**	**No. of Beneficiaries**	**Categories of Beneficiaries/ Outcomes**
High Efficiency Irrigation Systems (HEIS)	Water Management	Technical & Financial Assistance	HEIS installed on 12,070 acres in FY 2018-19 at farmer fields on different crops including orchards, vegetables and field crops all over Punjab to enhance water and crop productivities as well as crop diversification	1,000+	Farmers
Technology Farming	Water Management	Technical & Financial Assistance	Installation of Tunnel of 1,510 acres in FY 2017-18; & 1,207 acres in FY 2018-19 for growing offseason vegetables with drip irrigation in various districts of the province for enhancing productivity and improving profitability of the farmers	267	Farmers
Solar Systems for operating HEIS	Water Management	Technical & Financial Assistance	Solar system installation for operating HEIS on 10,002 acres in FY 2017-18; & 9,753 in FY 2018-19 for high value agriculture in the entire province	1,012	Farmers
Improvement of watercourses	Water Management	Technical & Financial Assistance	Improvement of 453 regular watercourses, extension of lining on partially improved 1,212 watercourses, & rehabilitation of 350 irrigation schemes	76,675	Farmers
Water Storage Ponds	Water Management	Technical & Financial Assistance	Construction of 103 water storage ponds / tanks for storing canal / rainwater for subsequent use for irrigation in FY 2017-18	165	Farmers
Sunken Fields	Water Management	Technical & Financial Assistance	Development of 34 sunken fields in cotton growing areas of Bahawalpur and Multan divisions for removing excess rainwater from cotton fields and its use for irrigating high delta crops	34	Farmers
Portable Water Pumps	Water Management	Technical & Financial Assistance	Provision of 141 portable water pumps to farmers (FY 2017-18) in cotton growing areas of Bahawalpur and Multan divisions for removing excess rainwater to save cotton crop	141	Farmers
LASER Land Levellers	Water Management	Technical & Financial Assistance	Provision of 3,000 LASER units to Farmers / Service Providers in FY 2017-18 on subsidized cost in irrigated areas of the Province for strengthening LASER land levelling services in the private sector	3,000	Farmers / Service Providers
Trainings by Soil survey	Soil Survey	R&D	Officers / officials / students trained nominated by other wings, various institutes and army officers of Traffic Ability Survey Unit	287	Trainees
Crop Production	AARI	Crop Production	- 20 varieties in FY 2017-18; & 34 in FY 2018-19 were approved by Punjab Seed Council for general cultivation. - Spot examination of 30 advanced lines & DUS testing of 27 lines conducted in FY 2017-18; spot examination of 27 and DUS testing of 57 advanced lines in FY 2018-19.	Farming community of whole Punjab	Varieties
Seed Production	AARI	Seed Production	100,000 kg pre-basic of various crops was produced	-	PSC Seed companies
True to type nursery plant production	AARI	Nursery production	99,000 nursery plants of various fruits were prepared	-	Orchard growers
Analysis of fertilizer samples	AARI	Analytical services	7,238 fertilizer samples were analysed and 224 deemed unfit in FY 2017; & 9,752 samples analysed and 184 deemed unfit in FY 2018-19	-	Fertilizer Regulation
Registration of fertilizer companies	AARI	Registration	1,450 fertilizer companies were registered as importer/ manufacturer/ distributor	1,450	Fertilizer companies
Microbial inoculant packets	AARI	Microbial packets	14,000 microbial inoculant packets were sold to growers	1,000s	Farmers
Bt & GMO testing	AARI	Analytical services	119 samples for Bt testing in NCVT trials and 600 GMO testing	119 600	Research institutes Private companies
Farmers days / trainings	AARI	Advisory service	75 farmers trainings and 32 farmer days organised in FY 2017-18; & 23 trainings and 55 farmer days in FY 2018-19	1,000s	Farmers
Value addition	AARI	Food items	13,000 squash bottles, 3,500 jam jars and 5,800 ketchup packets	1,000s	Public
Trainings and Quality Assurance by Pest Warning	Pest Warning Wing	Surveys	• 4,741 Extension workers & 10,967 pesticide dealers trained during FY 2017-18; and 354,966 farmers guided. • For quality control of pesticides total 10,670 samples analysed out of which 645	370,674	Govt Dept, farmers

			samples were declared unfit in FY 2017-18; & 10,01 samples analysed and 298 deemed unfit in FY 2018-19.		
Trainees trained in Floriculture	Floriculture	R&D	Conduction of trainings at Lahore, Rawalpindi, Faisalabad and Multan Floriculture Stations	1,141	General public
Advisory services to flower growers	Floriculture	R&D	Provisions of advisory services through 22,617 SMS	1,660	Farmers
Trainees trained in Kitchen Gardening	Floriculture	R&D	Conduction of Kitchen Gardening Trainings in colleges and schools at Rawalpindi and Lahore	10,176 (Male: 3,902; Female: 6,274)	General Public
Preparation of Vegetable Seed Kits	Floriculture	R&D	Provision of vegetable seed kits on cheaper rate	10,013(FY2017-18) 10,000(FY2018-19)	Farmer and household consumers
Extension Services 2.0	Ext & AR, Research	Extension	• Analysed 648,472 samples by labs across Punjab in FY 2017-18; and 1.50 million analysed as of FY 2018-19 • Conducted plant clinics throughout the year • Advisory related processes finalized, gadgets deployed and software development completed • Multiple trials and dry runs executed to test and improve the effectiveness of the technology interventions • All relevant field force of extension wing trained to use the technology • Revamped training and meeting facilities for Tehsil level staff • Improved mobility of field staff by provision of new vehicles	1,000s	Farmers, extension workforce
Subsidy on DAP	Extension & AR	Subsidy	DAP Subsidy initially @ PKR 150/ bag, which was increased to PKR 300/ bag from May, 2018. Disbursement of 262,702 (FY 2017-18); & 1.58 million (FY 2018-19) vouchers.	1,000s	Farmers
Subsidy on Phospate & Potash	Extension & AR	Subsidy	Subsidy rate NP-I (18:18) PKR 120/ bag Subsidy rate NP-II (22:22) PKR130/ bag Subsidy rate SSP-18 PKR120/ bag Subsidy rate NPK-I (08:23:18) PKR 300/ bag Subsidy rate NPK-II (17:17:17) PKR 275/ bag Subsidy rate NPK –III (15:15:15) PKR 250/ bag	44,520 (FY 2017-18) 0.57 million (FY 2018-19)	Farmers
Distribution of Certified Cotton Seed	Extension & AR	Subsidy	• Subsidy amount is PKR 1,000/ bag (FY 2018-19) • No. of bags per farmer: 2 bags (6 kg each) • No. of Districts for subsidy: 11 Multan, Vehari, Khanewal, Lodhran, Bahawalpur, Bahawalnagar, RY.Khan, DG.Khan, Layyah, Muzaffargarh, Rajanpur • Varieties of certified cotton seed: FH-142, FH-Lalazar, IUB-2013, MNH-886	27,250	Farmers of mentioned districts
Wheat Seed Distribution	Extension & AR	Free of Cost	No. of seed bags distributed: 75,000 (50 kg each) In Irrigated areas: 2 bags per farmer In Barani areas: 1 bag per farmer Varieties of wheat seed: Faisalabad-2008, Ujala-2016, Galaxy-2013, Ehsan-2016 and Chakwal-50	44,700	Farmers
Honoring Best Farmers through Yield Competition	Extension & AR	Prizes	Crops / Fruits included for Yield Competition: Cotton, Rice, Potato, Maize, Mango, Kinnow and Guava Prizes were given at District and Provincial Level	282	Winner Farmers
Uplifting of Extension Farms	Extension & AR	Uplifting	• Improvement of 39 Watercourses • Installation of HEIS on 72.23 acres • Land development 288 acres • Purchase of Machinery (17 Tractors & 4 Rice Transplanters with Trays) • Installation of 46 Pumps & Tubewells • Acquisition of 27 new WAPDA Connections • Installation of Tunnel on 4.5 acres	45	Farms of Extension & AR Wing
Contract Farming through Public Private Partnership	Extension & AR	PPP Mode	• The PC-II of the project was approved by the PWDP • Consultant Selection Committee (CSC) was constituted	6	Farms of Extension & AR Wing

(PPP)			• RFPs were issued to the P&D of shortlisted consultancy firms • Technical and Financial Proposals were received from 2 P&D shortlisted firms i.e. KPMG Taseer Hadi & Co.; and UHY Naeem Hassan & Co.		
Potash Subsidy Scheme	Extension & AR	Subsidy	Provide subsidy to 112,472 farmers in Punjab Increased use of SOP by 526.6% Increased use of MOP by 409.9%	112,472	Farmers across Punjab
Establishment of Hi-Tech Mechanization Service Centers (HMSCs)	Field Wing	O&M	Allotments made to service providers and contract agreements signed for establishment of 18 hi-tech mechanization service centres under phase 1. 3 HMS centres are near completion	380 (Expected)	Farming community local manufacturers, importers
Introduction and Promotion of Hi-Tech Farm Mechanization Technologies	Field Wing	R&D	Testing and evaluation of performance of different agricultural machinery according to local conditions, imported in FY 2016-17. Development of machines after field testing: Sugarcane Crusher, Sugarcane Loader, Garlic Planter, Garlic Harvester, Precision Sprayer and Tedder-Rake carried out through reverse engineering	-	Farming community, local manufacturers, importers
Provision of GPS & Tracking system in machinery of Field Wing	Field Wing	R&D	Trackers were installed to monitor the operation of field machinery & equipment through GPS based tracking system. • Project activities made it possible to achieve ever highest ambitious targets of 59,139 acres. • Work performance and field efficiency has increased. • Owing to better monitoring, breakdown time reduced and operational cost curtailed.	1,000s	Farming community, Govt of Punjab
Construction of New Agricultural Offices Complex in Rawalpindi	Field Wing	Infrastructure	Construction of New Agricultural Offices Complex has made it possible to settle different wings of agriculture department with diverse service provision to farming community under one roof.		Staff of different wings of Agriculture Department
Soil Conservation interventions and Harvesting Activities	Field Wing	O&M	• Soil & Water Conservation Works (No.) = 514 • Stream Bank Training (Km) = 13.05 • Tree Plantation (Acres) = 104.50	564	Farmers
Agriculture Land development	Field Wing	Service Provision	59,139 acres of culturable waste land developed.	2,180	Farmers
Exploration of ground water through ERM Survey	Field Wing	Survey	4,925 Survey conducted	4,925	Farmers
Exploitation of ground water through Tubewells	Field Wing	Service Provision	3,166 bores of tube well drilled	3,166	Farmers
CRS conducted 2 acreage surveys in Kharif; and 2 in Rabi in 1,240 sample villages	Crop Reporting Service (CRS)	Surveys	District-wise reports on Area, Production and Yield estimates published at provincial level. Beneficial for planning, research, GDP and other varied purposes	1,000s	Govt depts, researchers, universities, farmers, national & intl agencies (WB, FAO)
CRS conducted Agricultural machinery survey	CRS	Surveys	• Compilation of agriculture machinery (tube wells, tractors, thrashers and others) reports & release to Federal Government for Economic Survey	1,000s	-do-
CRS developed android applications for spatial signatures of crops in selected sample villages for analyzing crop acreage through satellite imagery using remote sensing tools; & also developed android applications for crops yield data collection system (Form 6A)	CRS	Surveys	• Application for signature collection for area estimation is in place, and data is being collected as per crop calendar • GIS based yield data collection application is in place and data is being collected on different crops according to the crop calendar • Division wise Acreage assessment through satellite technology	1,000s	-do-
Pilot Crop Insurance for small farmers	CRS		16,570 farmers have been insured in Kharif 2018	16,570	Small Farmers
Testing Indigenous hydroponic greenhouses for vegetable growing at various locations in Punjab	PMAS AAUR	R&D	8 practical training sessions have been conducted for farmers and 12 Hydroponic Units have been erected at different locations of Punjab (6 on Government's locations; and 6 on Farmer's locations)	290 Farmers 6 Farmers 6 Govt. Organizations	Farming and local community
Establishment of Sub-Campus of PMAS-AAUR at Attock (Phase-II)	PMAS AAUR	R&D	Civil work activities are in progress. 200 students are enrolled in FSc. (Pre-Agriculture) and BSc. (Hons) Agriculture at Sub-Campus Attock	200 students 50	Local community of Attock & Surrounding areas

				Employees	
Interactive Information Dissemination System Through Use of Modern Technologies for Innovative Agriculture	Agriculture Information	Information dissemination through Print & Electronic Media	Information was disseminated through FM channel under this project Video Data was secured	8.00 TB	Farming Community
Establishment of MNSUA Multan, Phase-II	MNSUAM	Higher Education	- Produced 408 quality graduates playing their positive role for Pakistan - Provided infrastructure and lab facilities to the 2,000 students enrolled - State-of-the-art labs for research & experimentation by students & agriculture scientists	1,000s	- Agribusinesses and industries, - Students and faculty
Commissioned Research for Development of Cotton Seed (MNSUAM Share)	MNSUAM	Higher Education	- Greenhouse constructed - Lab equipment procured - Cotton regeneration and transformation lab / facility established with experiments underway		- Farmers; seed, fruit & food industry, feed industry, etc, - New gene technologies; all agriculture graduates and faculty especially in the field of Plant Breeding, Biotechnology, Seed Technology, Plant Protection and Horticulture
Improvement in Breeding and Seed Production of Fodder Crops (MNSUAM Share)	MNSUAM	Higher Education	- Quarantine room for exotic material testing has been constructed - Construction of containment area for multiplication of precious material has been completed - Pre-basic seed of Rabi fodders (Berseem, Alfalfa, Oats) and Kharif fodders (Guar, Maize, Sorghum) has been supplied to FRI for onward supply to PSC - Acquisition of exotic germplasm of Berseem (166 accessions), Alfalfa (250), Oats (200), Maize (114), Sorghum (243), Napier hybrid (1), Guinea grass (16), Guar (300) has been completed while Rhodes grass and Rye grass germplasm is under import process - DNA extraction of 242 accessions of alfalfa; 243 of sorghum; 35 of berseem; & 200 of guar completed while 110 genotypes of maize is in process	1,000s	- Fodder growers, Livestock farmers, etc. - DNA fingerprinting - All agriculture grads and faculty especially in Plant Breeding, Biotechnology, Seed Science & Technology and Agronomy - All Seed industry - Punjab Seed Corporation
Establishment of Agriculture Fair Price Shops	Marketing	E&M	307 Agriculture Fair Price Shops established across Punjab. Quality produce (17 Commodities) at subsidized prices provided to general public during Ramzan. Arrangements at Agri Fair Price Shops were appreciated	8.601 million	General Public
Amenities to farmers at Wheat Procurement Centers	Marketing	Marketing	Wheat Procurement Center in Punjab provided with amenities (tents, chairs, tea, lime, etc.) to facilitate farmers visiting the centers to sell their wheat	500 WPCs	Farmers
Collection of Income from Market Committees	Marketing	E&M	PKR136.7 million market fee and PKR 134 million license fee collected	-	Agri. Dept.
Establishment of Punjab Biotechnology Institute (PBI) at UAF	UAF	Surveys	➢ BSc. (Energy System Engineering) launched ➢ 10 R&D Labs have been established and are functional ➢ Algae cultivation at lab scale established for biofuel and animal feed. It may lead to algae farming on saline lands as a cash crop ➢ No. of Research Publications by PBI Faculty: 40 with Impact Factor 65+. ➢ A central lab with state-of-the-art equipment established to facilitate researchers / students for biofuel related analysis • Industrial linkages established for bioenergy R&D activities related to industry with: Packages Industries (Pvt. Ltd); & Nishat Textiles • Training manuals prepared to train research students and stakeholders in bioenergy technologies: Hands-on Biodiesel Production; Floating Drum and Fixed Dome Type Small Scale Family Size Biogas Plant; Biomass Production from Bioenergy Crops and Insect Pest Management; & Biomass Gasification System ➢ 32 students completed MS thesis using research facilities at PBI in the last 2 years	Students, Researchers, Farmers, Industry and R&D Organizations	Students, Researchers, Farmers, Industry and R&D Organizations
Scheme for 50 overseas PhD scholarships for UAF	UAF	R&D	100% utilization against the released amount with enrolment at top global universities	43 Students	Students / Researchers / Non-PhD Faculty
Establishment of lab school, Mohallah Usman Ghani, UAF	UAF	R&D	91% utilization against the released amount. School Building more than 50% completed	200 Children	Local Community