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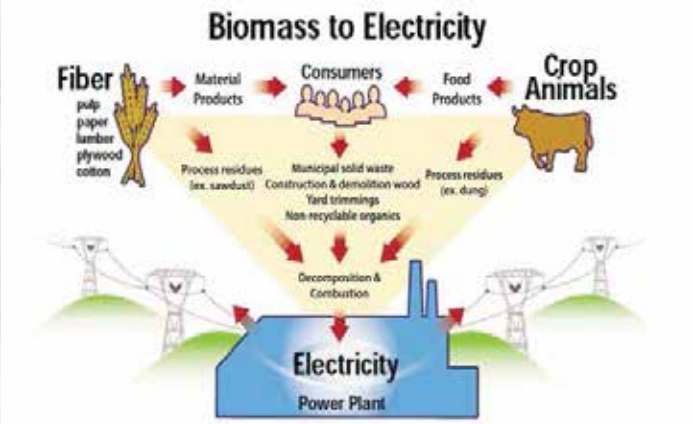
PRODUCTION OF POWER THROUGH BIOMASS



Introduction

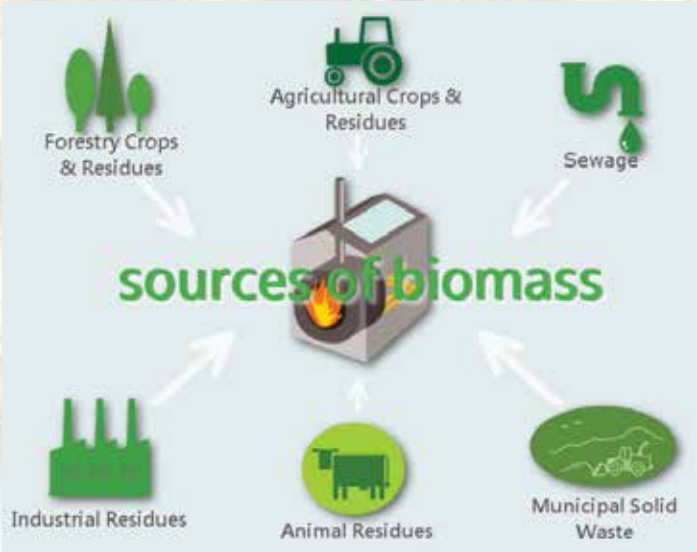
The current total population of Pakistan is about 207 million, with an annual growth of 1.93%. It is much larger than any individual European country. As the population of the country is increasing rapidly, it is creating an alarming situation for the future consumption of power as the country is already facing energy crisis due to demand outstripping with supply and frequent power cuts. Demand of electricity reaches at a peak level in summer monsoon season due to the extensive use of air conditions. The Electricity and Gas shortages have directly impacted the common man, Industry and commercial activities. Generating power by traditional means is either costly or requires a long period of time.

In this regard renewable sources of energy like wind power, solar, biogas and biomass offer sustainable solution. We can easily develop bio energy using indigenous technology and resources. The country having largest livestock population coupled with agricultural base is blessed with tremendous potential for producing biomass. Besides animal dung, agricultural residue like cotton stakes, sugarcane waste, fruit/vegetable waste, grass, weeds, marine and fresh water algae produce millions of kilograms of biomass on a daily basis which can give millions cubic metres of biogas per day.

Biomass Sources and Potential in Pakistan

Statistics show that Pakistan possesses tremendous potential for generating renewable energy from biomass. Biomass energy can be used as a short-term strategy, requiring as low time as 18-24 months. Being an agrarian country, Pakistan has numerous sources of biomass available from agricultural crops, also due to high population density in the urban centers solid waste is also being generated in quantities suitable for power generation.

Biomass Energy Potential in Pakistan



The potential to produce power from biomass is very promising in Pakistan. As per statistics around 22 million hectares of land is under cultivation in Pakistan. The major sources of biomass energy are crop residues, animal manure and municipal solid wastes.

Agricultural residues

Wheat straw, rice husk, rice straw, cane trash, bagasse, cotton sticks are some of the major crop residues in Pakistan. Sugar cane is a major crop in the country which is grown on a wide scale. During 2016-17, the area under sugarcane cultivation was 1.127 million hectares which is 5% of the total cropped area. Cane trash which constitutes 10% of the sugar cane is currently burned in the fields. During the year 2016-17, around 73.607 metric tons of sugarcane was produced in Pakistan which could produce large amount of trash. As per conservation estimates, the bioenergy potential of cane trash is around 9,475 GWh per year.

Cotton is another major cash crop in Pakistan and is the main source of raw material to the local textile industry. Cotton is grown on around 10% of the total

cropped area in the country. The major residue from cotton crop is cotton sticks which material left after cotton picking and constitute as much as 3 times of the cotton produced. Majority of the cotton sticks are used as domestic fuel in rural areas so only one-fourth of the total may be considered as biomass energy resource. The production of cotton sticks during 2010-2011 was approximately 1,474,693 metric tons which is equivalent to power generation potential of around 3,071 GWh.

Another 150 million cubic meters of biogas a day can be produced from almost 3.65 million tones of fruits and vegetables that gather in markets every year. Poultry waste, organic (solid/sewage) waste can also be used to produce millions of cubic meters biogas.

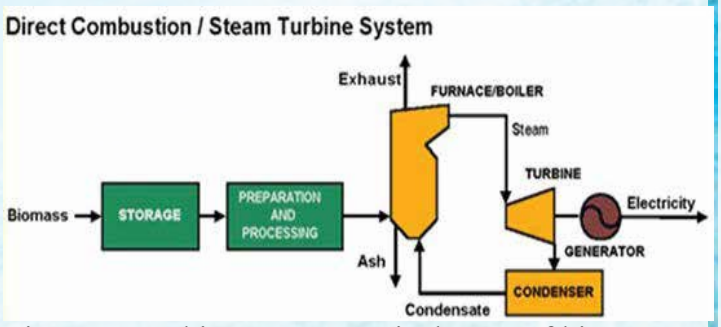
Animal manure

Pakistan is the world's fourth largest producer of milk. The total population is around 191.3 million while the animal manure generation is estimated at 1.244 million tons. Biogas generation from animal manure is a very good proposition for Pakistan as the country has the potential to produce electrical energy equivalent to 23,654 GWh.

Municipal solid waste

The generation or solid wastes in 9 major urban centers is around 7.12 million tons per annum which is increasing by 2.5% per year due to rapid increase in population and high rate of industrialization. The average calorific value of MSW in Pakistan is 6.89 MJ/kg which implies power generation potential of around 13,900 GWh per annum.

Bio Power System Technology



Biopower, or biomass power, is the use of biomass to generate electricity. A simple biomass electric generation system is made up of several key components. A steam cycle, includes some combination of the following items:

- Fuel storage and handling equipment
- Combustor / furnace
- Boiler
- Pumps
- Fans
- Steam turbine
- Generator
- Condenser
- Cooling tower
- Exhaust / emissions controls
- System controls (automated).

The steam boilers produce steam by burning biomass as fuel. Then steam is fed to a condensing type steam turbine which drives a power generator. The steam is then returned to the liquid state in a condenser by circulating cooling water around the condenser tubes containing the steam. The condensed water is then recirculated to the boiler to again be heated into steam. The main equipment i.e. steam boiler and the ancillary equipment like cooling towers and pumps can be manufactured within Pakistan, whereas the steam turbine generator (constituting 40% of the power plant) are imported from overseas. Similar systems are being used by the sugar industries in Pakistan using the sugar cane bagasse (another waste agricultural biomass) as fuel. Some of the newly installed sugar factories using this arrangement are exporting their excess power to the grid during the sugar cane grinding season.

This technology also includes direct-firing, co-firing, gasification, pyrolysis, and anaerobic digestion Systems.

Direct firing: Most bio power plants use direct-fired systems (as discussed above) in which combustion of biomass directly occur in a combustor or furnace to generate hot gas, which is fed into a boiler to generate steam, which is expanded through a steam turbine or steam engine to produce mechanical or electrical energy.

Co-firing: Refers to mixing biomass with fossil fuels in conventional power plants. Coal- fired power plants can use co-firing systems to significantly reduce emissions, especially sulfur dioxide emissions.

Gasification systems: Use high temperatures and an oxygen-starved environment to convert biomass into synthesis gas, a mixture of hydrogen and carbon monoxide. The synthesis gas, or "syngas," can then be chemically converted into other fuels or products, burned in a conventional boiler, or used instead of natural gas in a gas turbine.

A biomass power plant typically requires 15 to 100 acres for all the facilities. The total area of the site is usually larger, landscaped, and serves as an exclusion area to the public. The efficiency of a direct combustion or biomass gasification system is influenced by a number of factors like following:

- Biomass moisture content
- Combustion air distribution and amounts (excess air)
- Operating temperature and pressure
- Flue gas (exhaust) temperature

Benefits of Using Biomass

Biomass can provide an array of benefits. For example:

- It is a renewable
- It is environmental friendly
- Biomass production and consumption follow the cyclic process so the net effect of carbon dioxide CO_2 generation is negligible therefore it is very helpful in reduction of Green House Gases emission.
- Can be substituted with coal in existing power plant.
- Economically feasible.

Drawbacks

The main drawback of biomass is its handling as it is a low bulk density fuel with high moisture content. The long distance transport of these biofuels requires larger volume than coal. The higher moisture content makes shipping and road transport expensive.

Economics

The major capital cost items for a biomass power system include the fuel storage and fuel handling equipment, the combustor, boiler, prime mover (e.g. turbine or engine), generator, controls, stack, and emissions control equipment.

System cost intensity tends to decrease as the system size increases. For a power-only (not combined heat and power) steam system in the 5 to 25 MW range, costs generally range between $3,000 and $5,000 per kilowatt of electricity. Levelized cost of energy for this system would be $0.08 to $0.15 per kWh, but this could increase significantly with fuel costs. Large systems require significant amounts of material, which leads to increasing haul distances and material costs. Small systems have higher O&M costs per unit of energy generated and lower efficiencies than large systems. Therefore, determining the optimal system size for a particular application is an iterative process.

Sources:

- *https://www.wbdg.org/resources/biomass-electricity-generation*
- *https://www.bioenergyconsult.com/biomass-pakistan/*
- *https://www.nrel.gov/docs/fy13osti/56962.pdf*

FARMERS FIELD SCHOOL (FFS) FOR DISSEMINATION OF IMPROVED RESEARCH BASED AGRICULTURAL TECHNOLOGY AMONG THE FARMERS

By. Muhammad Fakhar Imam
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Introduction

Farmers Field School (FFS) is described as an agricultural extension approach used to transfer the research based agricultural technologies among the farmers. Farmers Field School is defined as a "school without walls" that is used for capacity building of farming communities to adopt innovations for sustainable agriculture. It is a group extension teaching method, which teaches basic farm management skills to make farmers experts in their own farms. In this approach, farmers meet on regular basis during the entire growing seasons to learn new production techniques in groups of 25-30 farmers. Upon completion of training, farmers continue to meet and share information with each other even with extension workers. FFS aims at increasing the capacity of farmers to apply new technologies at their fields to assess their relevance to their specific circumstances, and interact with the researchers & extension workers for help where needed to solve a specific problem.

Objectives of Farmers Field School

The objective of Farmers Field School (FFS) is to make farmers trained; to analyze their production systems, to recognize their main problems and to test possible solutions eventually identifying and adopting the practices most appropriate to their farming system. Knowledge is one of the most important mechanisms of behavior and plays an important role in the covert and overt behavior of human beings. Once the farmer's knowledge is increased and he starts understanding his problems and agrees with the extension staff that means farmer wants change and it helps to develop positive attitude towards improved practices and thereby motivate an individual to take certain action in accepting a new innovation or any practice. The knowledge acquired enables the farmers to adopt new improved technologies and enhance their farm yield. By FFS approach farmers go through a learning process in which they are presented with new technologies, new ideas, new situations and ways to fight with the field problems.

History

The first Farmers Field Schools were designed and introduced by the Food and Agriculture Organization (FAO) in Indonesia in 1989. Farmers were being taught about crop management techniques by understanding the agro-ecology, particularly the relationship between insect-pests and about insects those are beneficial. More interestingly FFS are inclined toward biological control of pests and organic farming, with a clear goal to reduce the extreme use of pesticides that are serious health hazards for humans and animals.

FFS approach in early 2000 across the Globe has been started to build the relationship between farmers, extension and research. These linkages have changed the role of extension worker to facilitation, beyond training to learning, and includes helping farmers to form groups, deal with marketing issues, and partner with a broad range of service providers and other agencies.

Farmer's Field School in Pakistan

In Pakistan, agricultural extension services have traditionally been organized as part of the provincial Ministry of Agriculture. Several extension models and styles have been tried since independence, including Village Agricultural and Industrial Development Programme (Village -AID Programme), Basic Democracies System (BDS), Integrated Rural Development Programme (IRDP), and Inputs at Farmers' Doorsteps Approach. Based on the linear approach, these programmes met with limited success and were abandoned one after another. The present Training and Visit or T & V System, while specifically focused on agriculture, also suffers from inherent inflexibilities, namely the over reliance on contact farmers to diffuse technical information to surrounding farmers.

Govt. of the Punjab chalked out a comprehensive

integrated situation plan to increase per acre production of crops in the province and introduced as innovative approach i.e. FFS approach.

It was also introduced by Pakistan Agricultural Research Council (PARC), Government of Pakistan for cotton Integrated Pest Management (IPM) during 2002 and for fruit and vegetables during 2005. This approach was also adopted by Punjab Government during 2004. Under this approach an intensive training has also been introduced in last decade in many developing countries to promote knowledge and production enhancement with minimum use of pesticides for sustainable agricultural development.

Impact of Farmers Field School in Pakistan

Different researches have been conducted in Pakistan to check the impact of the FFS trainings in Pakistan, Reported that Farmers Field Schools helped the farmers in Integrated Pest Management, Identification of different pests and diseases and their biological as well as chemical control. An overwhelming majority of farmers who attended Farmers Field Schools in districts Rawalpindi, Chakwal, Sargodha, D.G. Khan,

Swabi, Upper and Lower Dir are highly satisfied with these trainings, furthermore farming community has suggested the government must continue FFS after Fruit and Vegetables Development Project and Grow More Cotton project. Therefore it has been suggested that Government should continue FFS projects in future to provide more benefits to the farmers of the area even after the abolishment of F&V Project and Grow More Cotton Project.

CULTIVATION OF ISABGOL

By. ZUBARIA WAQAR (HORTICULTURE)

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Plant Profile

Family : Plantaginaceae

English Name : Blond psyllium, Spogel Seeds Wheat

Botanical Name : *Plantango Ovata P.psyllium*

Distribution : India, West Asia, Pakistan, Persia Mexico and Mediterranean Regions

Botanical Description:

- Isabgol plant grows up to 30-45 cm height. It is almost stem less (pseudostem) with hairs and has adventitious roots.
- Every plant produces 25-100 pseudostems after 60-70 days of sowing. Leaves arise in large number from the base of plant.
- Inflorescence (flowers arrangement) of isabgol is long and its length may be 1.5 - 4.0 cm, which is known as awn or bristle. In isabgol, the female flower matures early than the male flower, hence mainly cross pollination takes place.
- Flowers are petioleless, non-leafy small, bisexual, incomplete and irregular.
- Fruit is a capsule which is ellipsoid in shape. Its length is 8 mm. Every fruit contains 2 seeds. Seed has 3mm length, boat shape and pinkish brown colour.

Health Benefits

- Isabgol relieves constipation.
- Isabgol may control diarrhea.
- Isabgol improves digestion
- Isabgol cleanse colon.
- It helps in weight loss
- It helps in relieving from acidity
- It helps in lowering blood pressure
- It helps in lowering cholesterol
- It also helps in controlling of diabetes.

Production Technology

Soil and climate

- It can be grown on all types of lands. However, well drained sandy loam to loamy soils with pH range 7.3-8.4 are ideal to raise crop.
- It requires a cool season with dry sunny weather during maturity.
- Even a mild dew, cloudy weather or light showers cause seed shedding.

Inputs

Sr.No.	Materials		Per Acre	Per Hectare
1.	Seeds (kg)		3	8
2.	Farm Yard Manure (t)		6	15
3.	Fertilizers (kg)			
		N	20	50
		P_2O_5	10	25
		K_2O	12	30

Note

Apply 50% N at sowing and the remaining 50% after one month.

Land preparation and sowing

- The land is brought to fine tilth stage and laid out into beds of convenient sizes of irrigation.
- It is preferable to add 15-20 tones FYM/ha during the preparation of land.
- Optimum time of sowing is October to November.
- Seeds are sown in rows at 15 cm apart or broadcasted. About 3 kg seed is required for one acre.
- After sowing they are covered thinly by raking the soil.

Irrigation and weeding

- A first light irrigation is required immediately after sowing.
- Seeds start germination after 6 to 10 days.
- Second irrigation is given after 3 weeks and third one at the time of formation of spikes.
- Crop needs about 7 –10 irrigation.
- To control weeds in crop 2-3 weeding operations are required.

Insects and Diseases

Major insect : White grub.

Major diseases: Powdery mildew; downy mildew and rhizoctonia wilt.

Control measures

- To control insects i.e. white grub, apply 5% Aldrin or Lindane per hectare at the time of land preparation.
- To control powdery mildew, spray the crop with 0.2 per cent wettable sulphut at 15 days interval two or three times.
- Spray Bavistin at 0.1 per cent to control downy mildew immediately after the appearance of the disease and repeat the spray 15 days later.
- Seed treatment with Captan 5g/kg of seed followed by drenching the soil and spraying the plants with 0.2 per cent Captan solution and repeat the same a week after first application to control the spread of rhizoctonia wilt.

Harvesting and yield

- This crop is ready for harvesting after 5-6 months of sowing. The indication of maturity is yellowing of lower leaves and change in the color of spikes to brown.
- The crop should be harvested at early morning to avoid seed shattering.
- Fruit is stacked for 1 to 2 days and then trampled by bullocks, winnowed to separate seeds from fruits.
- Seeds are processed through a series of grinding mills to separate the husk. About 30 per cent husk by weight is thus recovered.
- A good crop may yield about 700-1000 kg of seeds per hectare.

Isabgol Seeds

Isabgol Seed Husk Powder

LEGUMES CULTIVATION FOR SOIL FERTILITY

Introduction:

Legumes, usually known as Beans and Pulses, are plants which belong to family Fabaceae, (Leguminosae). Legumes are 2nd in rank after cereals in providing food to world. In comparison to cereal grains, legume seeds are rich in protein, providing a highly nutritional food source. The major staple foods such as Soybean, Mustard, Gawara, Lentils, Peas and Chickpeas are all legumes. Many legumes are used as food plants.

Legumes are primarily grown for their grain seed called pulses, for livestock forage and silage, and for increasing soil fertility as green manure. Well-known legumes include Alfalfa, Clover (Barseem), Peas, Beans, Chickpeas, Lentils, Peanuts and Tamarind (Imli).

Problems Statement

Majority of Pakistani farmers do not include legume crops in their cropping patterns as they are mostly cultivate the cash crop, only i-e Wheat-Rice, Wheat – Cotton, Sugarcane- Cotton, etc, whereas these cash crops require much more nutrients/ fertilizer and with passage of time soil reaches at its cropping intensity resulting in decrease in soil fertility which ultimately effects crop yield.

Legumes and Nitrogen Fixation

All plants have ability to absorb nitrogen from the soil in the form of ammonium (NH_4+) and nitrate (NO_3-) ions together. In addition to taking up available N from the soil, legumes are also able to acquire N from the abundant supply in the atmosphere through special soil bacteria called Rhizobia which are fixed in nodules on their roots.

Legumes crop fix atmospheric nitrogen and makes the land fertile for the next crop. Legumes fix atmospheric nitrogen by small out growths or nodules on their roots. The bacterium is medium sized, about two microns long and 0.7 micron wide bacterial cells. Nitrogen released from a legume plant occurs as the above ground plant residues and below ground as roots and nodules which decompose gradually. After decomposition, Nitrogen becomes available to the next crop.

Biomass Production

The amount of nitrogen fixed by an individual legume crop is strongly linked to their biomass productivity. Research showed that each ton of legume biomass fixes 50 kg of nitrogen per hectare on an average, moreover there is no need to till the soil to release legume nitrogen into the soil. Different legume crops have different ability to fix atmospheric nitrogen according to their biomass production and amount of nodules on their roots. For example, Sweet Clover, Peas, Lentil, Soybean and Chickpea can fix 105, 80, 60, 60 and 50 kg nitrogen per acre, respectively. Perennial legumes, such as alfalfa, can fix several hundred pounds of nitrogen per acre per year.

Benefits of Legumes Crop

- Legumes crops can improve quality of soil by addition of organic matter with nitrogen and more carbon. Legumes facilitate decomposition of crop residues in the soil and their conversion to soil building organic matter through the soil microorganisms. Legumes are faster growers and produce greater biomass which ultimately adds organic matter to the soil.
- Legumes also improve physical properties of the soil. Legume crops increase soil pore space and improve soil tilth, which reduce soil erosion and compactness of soil.
- Legumes root deeply into the soil and thus they have more ability to recycle the plant nutrients from deeper soil profile. This ability of legumes crop makes possible for plants to use more nutrients which are leached down beyond the root zone. This also increases the fertilizer use efficiency of the crop. Penetration of legume roots deeper increases soil porosity, air movement and water percolation in the soil.
- As crop rotation, Legumes decrease the grassy weed problems. The legume plants break the life cycle of various insects and diseases which is very important for Integrated Pest Management. Rotation of leguminous crops especially with grasses is very helpful for the control of soil erosion problems and for moisture conservation particularly in dry areas.
- Legumes crops acquire their nitrogen from the air rather than from the soil as nitrate. As a result pH of the soil becomes low which is more helpful for better crop growth and development.
- Legumes are highly drought tolerant and grow well even in small amounts of water.
- Among the many important benefits that legumes deliver to society, their role in contributing to climate change mitigation has been rarely addressed. Legumes can lower the emission of greenhouse gases (GHG) such as carbon dioxide (CO_2) and nitrous oxide (N_2O) compared with agricultural systems based on mineral N fertilization, have an important role in the sequestration of carbon in soils, and reduce the overall fossil energy inputs in the system.

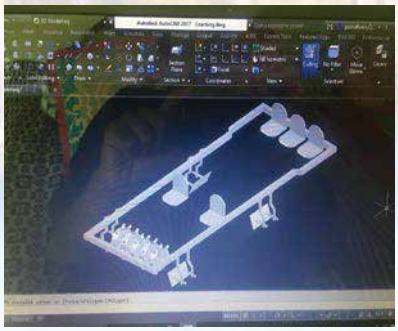
Suggestion:

This is time to educate the farmers and demonstrate them the change in cropping system and importance of legumes in maintaining the Nitrogen fixation in the soil and to utilize their fallow land in legumes plantation.

SUCCESS STORY OF SULTAN BHATTI, A PROGRESSIVE FARMER

Sultan Bhatti is a progressive farmer and works for disseminating new methods & ideas to farmers. He is a resident of Sukhakee, District Hafizabad, Punjab. He owns 100 acres of agricultural land, out of which wheat is grown on 15 acres.

Agricultural Engineering



He is in farming business since last 6-7 years. He designs his ideas on autocad and arranges fabrications of agriculture machinery required by utilizing the services of local iron smith and keeps on improving his prototype machine through necessary modifications as per field conditions.

Recently he has designed the wheat seed drill which drills wheat seed at the distance of 9 inches plant to plant. This seed drill also has the quality to drill 4 kg seed/acre when rotated clockwise and 10 kg seed/acre when rotated anticlockwise.

Permanent Raised Beds

He also used the permanent raised bed system for crop cultivation. During the development of Raised Beds, he uses organic matter prepared by himself at his field along with Effective Microbes (EM). He cultivated wheat crop in 2016 with 4kg seed/acre and attained 52 Maunds/acre yield. He said that once a Raised Bed is developed then there is no need to plough the land, only need to cultivate with zero tillage. He applied same method on Rice-Wheat system by cultivating Wheat crop in heavy residue of Rice Crop without ploughing the land.

Relay Cropping

Sultan Bhatti has set best example of practical implementation of extensive relay cropping and biodiversity being practiced in his fields. On one plot he cultivated Peas, Carrot, and Reddish along with wheat crop. On another piece of land he cultivated Maize and sugarcane along with wheat crop.

Maize Nurseries

He is the first Pakistani farmer who grew maize nurseries in side tunnel and transplanted it in wheat crop field. According to him the best time to transplant the maize nurseries is at spike formation stage of wheat crop, because at this time aphids attack on wheat crop, but maize crop is the source to bring lady birds beetles which can attack on aphids as well their spray cost can be saved.

Compost Making

Sultan Bhatti prepares compost on his own land. He uses dry mango leaves and animal dung. For speedy decomposition of compost he uses Effective Microbes (EM) which are also generated at his own land. Before planting a new crop, he first uses his own made compost on permanent raised beds.

زرعی سفارشات برائے کسان

مونگ پھلی

- مونگ پھلی کی کاشت کا موزوں ترین وقت اپریل کے آخر تک ہے۔
- کاشت بذریعہ پوریا ڈرل قطاروں میں کریں۔ بیج کی گہرائی 5 سے 7 سینٹی میٹر تک رکھیں۔ قطاروں کا درمیانی فاصلہ 45 سینٹی میٹر جبکہ پودوں کا آپس میں درمیانی فاصلہ 15 سے 20 سینٹی میٹر رکھیں۔
- کاشت کے لیے خاص اور منظور شدہ اقسام باری 2011، پوٹھوہار اور باری 2016 اور بارڈ-479 کاشت کریں۔
- کاشت کے لیے شرح بیج 70 کلوگرام پھلیاں یا 40 کلوگرام گریاں فی ایکڑ یا 5 کلوگرام گریاں فی کنال استعمال کریں۔
- 15 جولائی کے بعد 200 کلوگرام فی ایکڑ یا 25 کلوگرام فی کنال جپسم ڈالیں۔

کپاس

- کپاس کی کاشت مرکزی علاقوں میں 15 اپریل سے 31 مئی تک ہے کپاس کی بوائی یکم اپریل سے پہلے ہرگز نہ کریں تاکہ گلابی سنڈی کے حملے سے بچا جا سکے۔
- بُرا ترا ہوا بیج 6 تا 8 کلوگرام فی ایکڑ کے حساب سے استعمال کریں۔ بوائی سے پہلے بیج کو مناسب کیڑے مار زہر لگائیں۔ تاکہ شروع میں ایک ماہ تک رس چوسنے والے کیڑوں خاص طور پر سفید مکھی کے حملے سے بچا جا سکے۔
- اپریل میں کاشتہ فصل کے لیے سفارش کردہ سونا یوریا 1/4 حصہ بوائی سے 30 تا 35 دن بعد جبکہ باقی ماندہ سونا یوریا موسم، زمین اور فصل کی حالت کو مدنظر رکھتے ہوئے استعمال کریں۔

بہاریہ مکئی

- ڈرل سے کاشت کی گئی فصل کی اچھی پیداوار حاصل کرنے کے لیے چھدرائی نہایت ضروری ہے۔ کمزور اور بیمار پودے نکال دیں اور دوغلی اقسام کے لیے پودوں کا درمیانی فاصلہ 6 سے 8 انچ اور مکئی کی عام اقسام کے لیے 7 سے 8 انچ پودوں کا درمیانی فاصلہ رکھیں۔
- ڈرل یا پلانٹر سے کاشتہ فصل کو پہلی آبپاشی بوائی کے 10 سے 12 دن بعد کریں۔ اور وٹوں پر کاشت کی گئی فصل میں وتر برقرار رکھیں۔

بعد از برداشت گندم کی دیکھ بھال

- گندم ذخیرہ کرنے کے لیے ہوادار اور روشن گودام کا انتخاب کریں اور نئی بوریوں کا استعمال کریں بصورت دیگر بوریوں پر زرعی ماہرین کے مشورہ سے سفارش کردہ زہروں کا سپرے کریں اور گندم کو خشک ہونے کے بعد دوبارہ سٹور کر دیں۔
- گوداموں میں میلاتھیان کا 25 فیصد محلول سپرے کریں پھر گوداموں کو دو دن تک بند رکھیں تاکہ گذشتہ سال کے کیڑوں کے انڈے تلف ہو جائیں۔ اس کے علاوہ چوہوں اور باقی ماندہ کیڑے مکوڑوں کے لیے ایلومینیم فاسفائیڈ کی گولیاں بحساب 30 تا 35 فی ہزار مکعب فٹ استعمال کریں۔

آم اور ترشاوہ باغات

- اپریل کے مہینے میں فروٹ فلائی کے انسداد کے لیے جنسی پھندوں اور کیمیائی زہروں کا استعمال کریں۔
- رواں ماہ کے دوران پودوں میں پھل بن جانے پر سونا یوریا 3/4 کلوگرام فی پودا تنے سے 2 فٹ دور اور گھیر کے نیچے ڈال کر آبپاشی کریں۔
- باغات میں سبز کھاد کے لیے جنتر یا گوارہ کاشت کریں تاکہ کھادوں کی افادیت کو بہتر بنایا جا سکے۔ سٹرس سکیب، میلانوز دیگر بیماریوں اور رس چوسنے والے کیڑوں کے خلاف سپرے کریں۔

Source: 1) Ziratnama Government of Punjab (Farmer's Advisory)
2) Fauji Fertilizer Company Limited (Farmer's Advisory Service)

MANAGEMENT TIPS

Recognize Employees' Efforts and Accomplishments

We learned to say "thank you" to strangers who do so little as hold the door open, so how is it then that there is so much neglect in thanking the people who day in and day out put their all into making their managers proud and company successful? Employee appreciation, when done right, will help increase productivity, engagement, team morale, and therefore retention.

Source: by Ali Robins, www.officevibe.com

Show Interest in Employees' Personal Lives

According to reports, 60% of employees don't feel that their employers care about them. It seems obvious enough to say, but in the hustle and bustle of the workday, we sometimes forget that employees are more than just employees. They are also parents, students, caretakers, and potentially many other combinations of roles. People have lives outside of work; hobbies and passions that make them unique. Showing interest in this is one way to differentiate bad bosses from great leaders.

Source: by Ali Robins, www.officevibe.com

How to Give Constructive Feedback to Motivate and Improve Your Team

Here are three (3) simple steps to giving constructive feedback to motivate and improve your team from https:// getlighthouse.com:

- **Prepare.** Doing anything well requires effort. Great, constructive feedback requires preparation on your part. You can't just give someone a drive-by bit of feedback in chat, a rarely used real time feedback app, or even a quick comment before running to another meeting.
- **Listen**. Constructive feedback is a conversation, not a drive by. Not only does that mean you need to take the time to prepare and bring notes to discuss, it also means you need make it a conversation. You're not giving them a dissertation or a monologue on why they failed. You're discussing with them some recent areas for improvement. You need to hear their side, too.
- **Act.** Talking about an issue is good. Hearing their side and getting their buy in is great. However, what really stands out is when you take action. After you have the conversation about their side of the story and your constructive feedback, you need to very clearly establish next steps. "Glad we had this chat" is not enough.

Source: https://getlighthouse.com

Green Energy's Positive Impact on Environment

According to the international panel on Climate Change, green energy sources like solar, wind, hydroelectric, and geothermal energy emit far less carbon dioxide than fossil fuels:

- Coal emits 1.4-3.6 pounds of carbon dioxide equivalent per kilowatt-hour (CO_2E/kwh)
- Wind energy emits 0.02-0.04 CO_2E/kwh (about 99% less than coal)
- Solar energy emits 0.07-0.2 CO_2E/kwh (about 94%less than coal)
- Geothermal energy emits 0.1-0.2 CO_2E/Kwh (about (94%less than coal)
- Hydroelectric energy emits 0.1-0.5 CO_2E/kwh(about 86%less than coal)

Source: https://www.igsenergy.com

NATIONAL NEWS

Connected Agriculture Platform for Punjab (CAPP)

Punjab Agriculture Information Technology Board (PAITB) is providing 3G\4G sim card to 1 lakh and 10 thousands registered farmers under the Kissan Package of Khadim-e-Punjab with the collaboration of Telenor Pakistan in the 1ST phase of Connected Agriculture Platform for Punjab (CAPP). The aim of program is to resolve the longstanding challenges faced by the Pakistani farmers through a suite of digital solutions to improve their access to information, financial resources and market to enhance supply chain efficiency. Farmers can enjoy built-in android applications for results of new research, Latest Production Technologies of crops, Changes of Weather, Government's Subsidy, Market Rates, Contact to Agriculture Experts, Crop Calendar and Kissan T.V. and much more under "Digital Eco system" at their home. Farmers can get help and training from Sahulat Centers of Punjab Government to avail these phones.

First International Agri. Tech. Expo. 2018 at Lahore

An International Agri. Tech. 2018 Exhibition was organized by The Punjab Agriculture Department (PAD) on April 06 and 07, 2018 at Expo Center Lahore to promote high-tech mechanization in the province. The exhibition was organized on the special directives of the CM Punjab Muhammad Shehbaz Sharif.

The Objective of the exhibition was to promote high tech mechanization and educate farmers about how to use machinery at farm level and how these technologies will prove as a game changer in the arena of agriculture.

This exhibition proved as a blessing of importers and exporters of high tech mechanization by giving them a platform in first time in the history of Pakistan, where there's opportunities waiting for their business growth. At the same time, it enabled our farming community to know how to use services of high tech properly and how they can increase their per acre yield and reduce their in-put cost by usage of high. It is worth to mention here that ZTBL was also participated the event.

Pakistan, Turkey Actively Collaborating In Agricultural Sector: PARC

Pakistan Agriculture Research Council (PARC) organized an inaugural ceremony of Pilot Turkish Black Tea Processing Plant at National Tea & High Valued Crops Research Institute (NTHRI), Shinkiari on April 15, 2018 with the coordination of Turkish Government. This event was chaired by Chairman PARC Dr. Yusuf Zafar, T.I who said that introduction of value agriculture in Mansehra would be a step towards increase of farmers' income. The installed plant has processing capacity of 5 tons/day. PARC has been developing a work plan to foster R&D activities and has identified some better varieties for promotion to operate this plant according to the future needs. At last he also added that this plant would be a step towards achieving success in commercialization of local tea in Pakistan.

New Agriculture Policy Approved by Sindh Government

Sindh Cabinet on April 16, 2018 approved new agriculture policy, new youth policy and establishment of two new universities in the province. The agriculture policy which was presented in the cabinet is complimented by a series of background studies in the areas of macroeconomic factors, poverty and gender; climate change; value chain enhancement; resource use efficiency; nutrition and fiscal space utilization, in addition to consultation with farmers and stakeholders. The agriculture policy is also formulated keeping the Sustainable Development Goals in view.

Source: www.punjab.gov.pk , www.brecorder.com

ZTBL'S NEWS

Delegation of ZTBL Visited Chaudhary Shehbaz Kokhar Farm

Mr. Muhammad Ikram Ul Haq AEVP ATD, ZTBL and Mr. Muhammad Fakhar Imam Subject Specialist Agronomy, ATD, ZTBL attended Farmers Field Day organized by Pakistan Agricultural Research Council (PARC), Islamabad in collaboration with International Center for Agricultural Research in the Dry Areas (ICARDA) on the topic "Demonstration on Sowing of Wheat Crop with the help of PAK Seeder" in Heavy Rice Residue Field at Chaudhary Shehbaz Khokar Farm, Near Engro Food Plant, Sikkam, Mureedkay, Punjab on dated 17th of March 2018.

Dr. Yusuf Zafar Chairman PARC was the Chief Guest of the event along with Executives from ICARDA and NARC Local Machinery Manufacturers, and a number of farmers (about 100) attended the event.

Engr. Shabbir Ahmed Kalwar Project Incharge (ABEI, NARC) explained the working principles of Pak Seeder and demonstrations arranged at Chaudhary Shehbaz Khokar Farm. This new machine drills wheat in heavy rice residue after combine harvesting without land preparation and burning of residue.

Its operational cost is Rs. 1,200-1,500 per acre as compared with traditional method that cost Rs. 6,000-7,000 per acre. This method also increases yield from 10-12 maunds per acre.

He further explained that handling of combine harvested paddy residue is becoming a great concern to the farmers in Rice-Wheat cropping system. Residue appears to be the only organic matter available to most Rice growers. In corporation of crop residue into the soil enhances soil fertility through supplementing Phosphorus 20%, Potassium and Sulphur 5-60%. Therefore, it is appropriate to adjust this issue upfront.

Exploratory Visit of Students of Agriculture Training Institute Peshawar at ZTBL Farm

A Group of 74 students from Agriculture Technology Institute Peshawar along with 2 faculty members visited ZTBL Farm on 20th, March 2018. Mr. Muhammad Ikram-ul-Haq, Acting Executive Vice President, Agriculture Technology Division, and his Team warmly welcomed the students at ZTBL Farm. Brief presentation on objectives, mission and vision of Agricultural Technology Department was given by Subject Specialist Muhammad Fakhar Imam.

Mr. Muhammad Ikram-ul-Haq, Acting Executive Vice President, Agriculture Technology Division gave a brief introduction of various activities being carried out at ZTBL Farm as well as in the Field. Students were also briefed about the role ZTBL in promotion of innovative & latest Agricultural technologies.