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GREEN FODDER PRODUCTION THROUGH HYDROPONICS

Introduction

Green fodder is one of the important inputs and plays major role in feed of milch animals. Green fodder provides essential or required nutrients/minerals to the livestock. It is also container of nutrients/mineral for milk and meat production which ultimately affect the health of the dairy animals or livestock. Control of feed cost in dairy animals impacts the profits and result in successful dairy farming. In the country rapid urbanization and industrial areas have shrinked the range lands/grazed areas and availability of lands that produces green fodder. This situation caused the dairy owners to look for alternative and sustainable method of quality green fodder production. Due to high labour costs, non-availability of irrigated lands and high land prices made the dairy business to face many challenges to meet the growing milk demand in the country. It is very clear that with increasing costs and depleting natural resources, sustainable technology like "Hydroponics" would be the key driver of the dairy industry future.

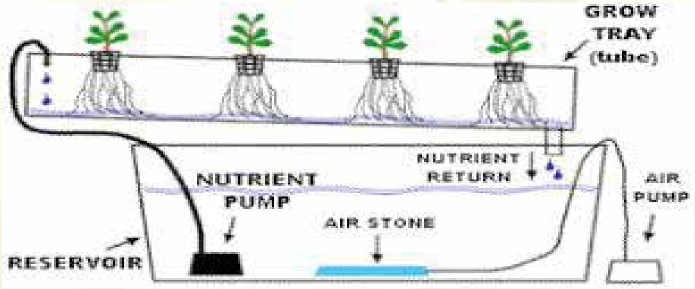
Hydroponics Technology

Hydroponics is a method of growing plants without soil. Only moisture and nutrients are provided to the growing plants. There are many advantages to hydroponics. Hydroponic growing systems produce a greater yield over a shorter period of time in a smaller area than traditionally-grown crops. There is a reduction or exclusion of pesticides and herbicides because the plants are in a more protected growing environment. Hydroponics is a year-round growing system that produces a consistent quantity and quality of plant material, regardless of outside weather.

Fodder (livestock feed) can be grown hydroponically much the same as vegetables, flowers, and other plants.

Hydroponic fodder systems are usually used to sprout cereal grains, such as barley, oats, wheat, sorghum, and corn, or legumes, such as alfalfa, clover, or cow peas. Barley is the most commonly grown forage, because it usually gives the best yield of nutrients.

Using hydroponics technology to produce the quality green fodder would be a revolutionary step in country's green fodder production. Limited Irrigation Facility inclines farmers to use hydroponics technology in production of green fodder. Greenhouse/Polyhouse would be the right choice for implementing the hydroponic technology. Fodder grown through such technology can be fed to sheep, goat, cattle and other livestock animals.



A hydroponic fodder system usually consists of a framework of shelves on which metal or plastic trays are stacked. After soaking overnight, a layer of seeds is spread over the base of the trays. During the growing period, the seeds are kept moist, but not saturated. They are supplied with moisture and (sometimes) nutrients, usually via drip or spray irrigation. Holes in the trays facilitate drainage and the waste water is collected in a tank.

The seeds usually sprout within 24 hours and in 5 to 8 days have produced a 6 to 8 inch high grass mat. After the mat is removed from the tray, it can go into a feed mixer or be hand-fed to livestock. Livestock will eat the whole thing: seeds, roots, and grass. There is minimal waste. Livestock may not eat the fodder initially because it is novel, but should soon learn to eat it with relish.

Selecting and Sowing Seed

The seeds that you select for your hydroponic fodder system must be clean and unbroken seed. They need to be seeds that are meant for growing or "seed" quality and not "feed" quality. If you start with broken seeds, they probably will not germinate and then begin to mold in the system. Barley is the most common seed used for fodder production because the ratio of seed weight to fodder production is the best about 1 pound of seed to 7 pounds of fodder.

To plant the barley seed, soak them for 5-8 hours and then rinse seed to remove some of the sugars. Spread the seeds about ½" thick on the bottom of the channel, as evenly as possible.

The seeds should be watered between 4-6 times per day, long enough for the water to flow from the feed end of the channel to about halfway down the length of the channel. This should take about 2-3 minutes on a 12' channel from the time the water starts to flow. After the feed is turned off the water will continue to flow to the other end of the channel and drain.

Harvesting The Crop

In just 8 days, barley fodder is ready to harvest. If you leave it longer than 8 days, the foliage will begin to yellow because the light requirements increase. At this stage the entire mat of seeds and foliage can be removed from the trays and fed directly to your animals. Allow the mat to dry out some and don't water for 2-3 hours and roll up the mats for ease of handling. Clean your fodder tray and start the process over again.

Benefits and Advantages of Hydroponics Green Fodder Production

There are many advantages of hydroponic farming especially growing green fodder.

- ***Water Conservation***: The hydroponic system requires only 2 to 3 liters of water to grow 1 kg of quality green fodder as compared to 55 to 75 liters of water used in conventional/traditional system of green fodder production . Apart from this advantage, there will be no water wastage as the water is always recycled.
- ***Utilization of Minimum Land***: Generally hydroponic green house requires marginal land to cover the area of 10 meters x 5 meters for 600 to 500 kg green fodder per day per unit. To produce the same amount of green fodder in conventional green grass field, it requires 1 hectare of land. This is very useful whereas procuring of irrigated land is difficult and green fodder demand is very high.
- ***Less Labour Requirement***: In hydroponics, the labour required for green fodder production is about 2 to 3 hrs a day where as conventional fodder production system requires continuous intense labor from cultivation to harvesting of the grass.
- ***Less Time to Grow Green Fodder***: To get the optimal growth stage of nutritious green fodder, it requires just over 7 to 8 days from seed germination to fully grown plant of 20-30 cm height. In hydroponically grown fodder, the biomass conversation ratio is as high as 6-7 times as compared to traditional fodder grown for 65-80 days.
- ***Round the Year Production:*** Constant supply of green fodder is possible round the year to meet the dairy industry demand.
- ***Increase Nutrition Value***: The green fodder grown from hydroponic system will be highly nutritious as compared to conventionally grown fodder. So using hydroponic grass, one can supply quality milk from dairy animals.
- ***Natural Green Fodder Supply***: Production of green fodder through hydroponic technology is completely through natural source and no pesticides are used in green fodder production that could contaminate milk and milk products.

The Main Forages in Pakistan

Fodder is a traditional crop in Pakistan. In the irrigated tracts, it is usually grown under basin irrigation which makes mechanical harvesting very difficult, so forages are usually cut by sickle. On barani lands the fields are usually levelled terraces. Due to increased demand, improved forage crops such as multi-cut oats, berseem, lucerne, sorghum- sudan grass hybrids, sorghum, maize and millet have been developed. These have become very popular in irrigated areas such as Kasur, Sheikhupura, Gujranwala, Faisalabad, Sargodha, and Renala Khurd (Punjab), Nowshera, Charsada, Mardan, and Peshawar (Khyber Pukhtoonkhwa Province), and Hyderabad, Sukkur, Larkana, Halla, and Nawabshah in Sindh, for sale to peri-urban dairies. Average forage yields in Pakistan are extremely low as compared to yields obtained on research institutes and from well managed farms and fields. Krischke (1987) also reported in his research that an intensive fodder cultivation system and organization of farm input supply assists smallholders in Punjab to avoid forage shortages and to earn additional income through increased milk production.

Most dairy animals are reared in the intensively cultivated irrigated plains with no fallow or natural pasture and are kept around the homesteads and stall-fed on forages, crop residues and some concentrates. The vast irrigated tracts of Punjab, Khyber Pukhtoonkhwa Province and Sindh, which are the major source of forage for urban dairies, are at low altitude with a sub-tropical monsoon climate and hot summers.

Cash crops such as wheat, cotton, sugar cane, maize, rice, and forage crops like sorghum- sudan grass hybrids, lucerne, berseem, and oats are commonly grown. These areas supply the grain and forage requirements of urban dairies. Due to suitable temperatures and availability of irrigation, green forage is produced year-round. In the semi-arid deserts of Balochistan and the Northern Areas (a territory administered by Pakistan comprising the disputed territories other than Azad Jammu and Kashmir - the old Gilgit Agency) there is a seasonal movement of livestock, usually to high pastures in summer, and small quantities of forage are produced where irrigation is possible. Successful improvement of fodder production in the Northern Areas is possible, by introducing better cultivars and improved husbandry alongwith implying Hydroponics Technologies.

Source:

http://www.agrifarming.in/hydroponic-green-fodder-production-guide/

BIOCHAR PRODUCTION

Introduction

Biochar is defined as charcoal that is used for agricultural purposes. Charcoal is created both naturally as a result of vegetation fires and intentionally by humans in burn pits and hand-made structures. When charcoal is made for the purpose of adding it to soil as an amendment, it is then called biochar. It is a fine-grained, highly porous charcoal substance that is distinguished from other charcoals in its intended use as a soil amendment. It it created using a pyrolysis process, heating biomass in a low oxygen environment. Once the pyrolysis reaction has begun, it is self-sustaining, requiring no outside energy input. Archaeological evidences suggests that ancient people piled and covered wood in earthen pits, then burned it slowly with limited air. This method, still used today in developing countries.

Background

Biochar is a relatively new term, yet it is not a new substance. Soils throughout the world contain biochar deposited through natural events, such as forest and grassland fires. There are some areas high in naturally occurring biochar, such as the North American Prairie. They have some of the most fertile soils in the world. Historical use of biochar dates back at least 2000 years. In the Amazon Basin, evidence of extensive use of biochar can be found in the unusually fertile soils known as Terra Preta and Terra Mulata. This material comes from charred organic materials like manure, crop residue and bones that were added to the soil. Without sophisticated kilns and ovens to produce modern biochar, this ancient material was likely made by setting a light pile of organic material before covering it with dirt to eliminate oxygen but hold in the heat from the fire which, in turn, bake the organic matter. Due to the large amounts of biochar incorporated into its soils, this region still remains highly fertile despite centuries of leaching from heavy tropical rains. In parts of Asia, notably Japan and Korea, the use of biochar in agriculture also has a long history. Recently, heightened interest in more sustainable farming systems, such as Korean Natural Farming, has revived the use of biochar in Western agriculture.

How it is Produced?

Biochar is made using a process called pyrolysis. Pyrolysis involves placing the biomass into a special oven before heating in the presence of little or no oxygen. The result is a stable solid material rich in carbon content that can effectively capture carbon and lock the carbon into the soil. There are many ways to achieve this result. The type of organic matter or feedstock that is used and the conditions under which a biochar is produced greatly affect its relative quality as a soil amendment. The most important measures of biochar quality appear to be high adsorption and cation exchange capacities and low levels of mobile matter e.g. tars, resins, and other short-lived compounds. Production of biochar generally releases more energy than it consumes, depending on the moisture content of the feedstock.. A sustainable model of biochar production primarily uses waste biomass, such as greenwaste from municipal landscaping, forestry or agriculture.

Modern Technology for Biochar Production

Biomass is super-heated in the absence of oxygen at high temperatures (350-700° C) in specially designed furnaces. The most sustainable feed stocks are considered now is excess manure, wood debris, construction waste, slash from forest thinning, food processing waste, residue from methane digesters or urban tree trimmings. Most of this would be left to rot, be open-burned or dumped in a land fill.

In this modern method, volatile gases, hydrocarbons and most of the oxygen and hydrogen in the biomass are burned or driven off and captured, including GHG's. These captured emissions are known as syngas (synthetic gas) and can be used like natural gas. Liquids, called bio-oils, are also captured creating another source of energy, leaving carbon enriched biochar. The heat generated during the pyrolysis process can generate electricity too. As shown in Figure, biomass in the form of crop residues, bio-energy crops, manure or organic wastes will produce about 50 percent biochar, which is returned to the soil, and 50 percent bioenergy in the form of gas and bio oil.

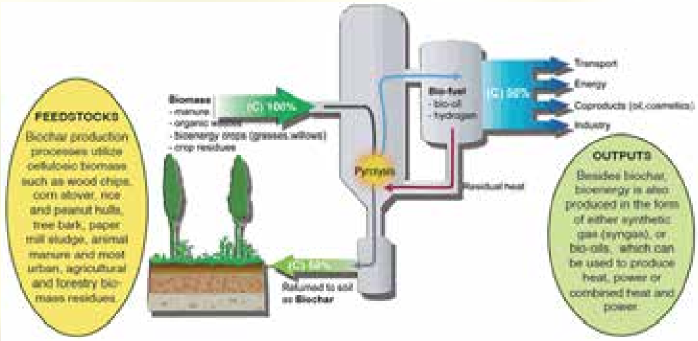


Figure: Slow pyrolysis produces biochar and bioenergy.

The pyrolysis of biomass into biochar and energy creates four primary benefits.

1) Improvement of the productivity of soil to achieve higher yields.
2) Creation of a bioenergy as a substitute for fossil fuels.
3) Sequestration of carbon in the soil that will reduce atmospheric carbon dioxide.
4) Management of waste.

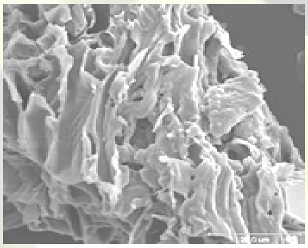
Types of Biochar

Not all biochar is the same. The raw materials used are different and apparently, the temperatures. The feed material was heated to changes the chemical composition of biochar are also different. As an example, biochar made from manure will have a greater nutrient content than that formed from wood chips. A wood based biochar, on the other hand, will remain more stable for a longer time. Higher firing temperatures will result in a greater amount of microporosity and adsorptive capacity. Therefore, a better potential for adsorption of toxic substances and soil rehabilitation.

Soil Benefits of Biochar

Soil's Best Friend: Because of biochar's physical and chemical nature, it has a unique ability for attracting and holding moisture, nutrients, and agrochemicals even retaining difficult to hold nutrients like nitrogen and phosphorous. Nitrogen tends to run-off from the regular soils, upsetting ecosystem balance in streams and riparian areas. Biochar also holds gases. Recent research has proven biochar-enriched soils reduce carbon dioxide (CO_2) and nitrous oxide (NO_2) emissions by 50-80%. NO_2 is a significant greenhouse gas which is 310 times more potent than CO_2.

***Porous Structure*:** Biochar's immense surface area and complex pore structure (a single gram can have a surface area of over 1000 square yards) provides a secure habitat for micro-organisms and fungi. Certain fungi form a symbiotic relationship with plant root fibers and this allows for greater nutrient uptake by plants. There is speculation that this fungus may play a part in *terra preta's* ability to regenerate itself.



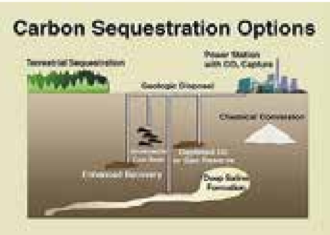
Persistency in Soil: It is undisputed that biochar is more persistent than any form of organic matter commonly applied to soil. Because of biochar's long-term persistence in soil, all the associated benefits of nutrient retention, water retention and overall soil fertility are longer lasting than with common fertilizers alone. Biochar, comparatively is inert and doesn't break down like other organic soil amendments and resists chemical and microbial degradation, especially when buried.

Soil Acidity: Biochar reduces soil acidity decreasing liming needs but does not actually add nutrients. Biochar made from manure is the exception; it retains a significant amount of nutrients from its source. Because biochar attracts and holds soil nutrients, it reduces fertilizer requirements - something common organic matter cannot do. As a result, fertilization costs are minimized and fertilizer (organic or chemical) is retained in the soil for far longer. Chemical fertilizers are typically fossil-fuel based, thus biochar provides additional indirect climate change benefits by reducing fertilizer needs.

Enhanced Crop Yields: When added to soil, biochar improves plant growth and enhances crop yields, increasing food production and sustainability in areas with depleted soils, limited organic resources, insufficient water and/or access to agrochemical fertilizers. Not all the soils react the same to biochar and it frequently can take up to a year to see results. On poor soils with low carbon content, many studies have shown that biochar can increase crop yields up to four times.

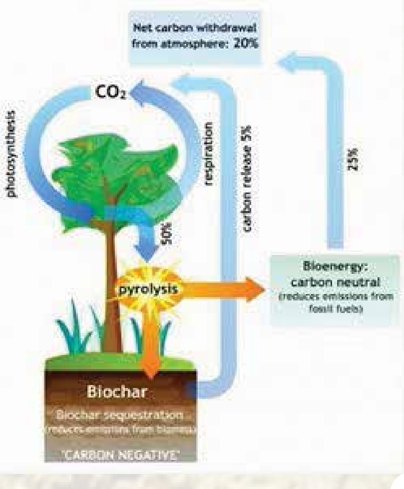
Clean Energy Benefits of Biochar

CO_2 Sequestration: In the carbon cycle, carbon is always on the move. Living organisms exchange CO_2 regularly with the atmosphere. Forest fires and volcanic eruptions belch CO_2 into the air. But trees, plants, algae, the oceans, soils and fossil fuels are all carbon sinks or sponges. This natural carbon sequestration has been happening for billions of years. These sinks release carbon at different rates and times.



Humans are racing to find ways to artificially sequester carbon, primarily by pumping captured industrial CO_2 back into the ground. This emerging and costly technology has potential but will take years to get to be perfect. In the meantime, increasing the rate of natural sequestration and reducing emissions of greenhouse gases remains critical whereas biochar technology can do both.

Integrated Energy Solution: Biochar and clean energy (heat and power) can be produced by pyrolysis (super-heating biomass in closed system-ovens). This alternative energy reduces greenhouse gases by off-setting fossil fuel use, and since all emissions are captured, doesn't emit more. So to produce both biochar and renewable energy is a carbon neutral process as it neither adds to the climate change problem nor reverses it.



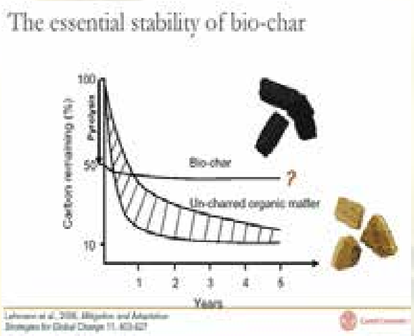
When creating biochar, 50% of the original carbon in the biomass is captured and stored in the char. Human experimentation about thousands of years ago revealed that biochar is a great soil amendment, increasing the productivity of most soils (thereby enhancing plant growth which absorbs more CO_2). Now we realize, when added to soil, biochar also captures and stores carbon that otherwise would oxidize and return to the atmosphere as CO_2.

Biochar amended soils also provide a 50-80% reduction in nitrous oxide emissions. Nitrous Oxide released from certain fertilizers is a more potent greenhouse gas with 310 times more impact than an equal amount of CO_2.

Biochar is Carbon Negative: Biochar reverses the fossil fuel deposition of CO_2 in the atmosphere by removing carbon from the active cycle and sequestering it in the inactive carbon cycle. This process not only enhances soil fertility, it displaces much of the need for fossil fuel-based fertilizers, thereby making the biochar process carbon negative — as long as biomass production is managed in a sustainable manner.

Other Environmental Benefits of Biochar

While reducing the amount of greenhouse gases in the atmosphere, biochar can have other environmental benefits. In the ground it can remediate soils, improve water quality, increase fertility of the soil and increase agricultural productivity.



The carbon in biochar resists degradation and can hold carbon in soils for hundreds to thousands of years. Biochar is produced through pyrolysis or gasification processes that heat biomass in the absence (or under reduction) of oxygen.

Sustainable biochar practices can produce oil and gas byproducts that can be used as fuel, providing clean, renewable energy. When the biochar is buried in the ground as a soil enhancer, the system can become "carbon negative."

Biochar and bioenergy co-production can help combat global climate change by displacing fossil fuel use and by sequestering carbon in stable soil carbon pools. It may also reduce emissions of nitrous oxide.

Source:

International Biochar Initiative http://www.biochar-International.org/biochar/soils

Tenenbaum, D. 2009. Biochar: Carbon Mitigation from the Ground Up. Environmental Health Perspectives.

SILAGE MAKING

Introduction

Silage and hay are preserved feeds that come in handy for dairy cows during periods of scarcity of green forage. Silage ensures high milk production and healthy dairy animals, especially during dry seasons. It is palatable, laxative, digestible, nutritious and requires less floor area for storage than hay.

Background

For smallholder farmers with limited production capacity, finding enough feed in the winter months to maintain good milk production is always a problem. Many are forced to buy hay, concentrates or silage just to keep their animals alive and are unable to benefit due to the higher prices paid for animal feed in the winter months.

Forage which has been grown while still green and nutritious can be conserved through a natural 'pickling' process. Lactic acid is produced when the sugars in the forage plants are fermented by bacteria in a sealed container ('silo') with no air. Forage conserved this way is known as 'ensiled forage' or 'silage' and will keep for up to three years without deteriorating. Silage is very palatable to livestock and can be fed at any time.

Why Silage not Hay?

Forages can be made into hay to conserve the nutrients, especially protein, before they decline in the plant. However it is often too wet to dry the successfully and special machinery, has to be used to assist the forage to dry quickly. Forage crops such as maize, are too thick-stemmed to dry successfully as hay.

Silage is considered the better way to conserve forage crops. A forage crop can be cut early and only has to have 30% dry matter to be ensiled successfully. There is no need to dry out the plant material any more than that, so wet weather is not such a constraint as it is with making hay. Silage making is long practiced by the larger agricultural sector, but the production method relies on heavy equipment and large production, in order to dig or build storage pits and to compress the green mass, putting it beyond the reach of smallholder farmers.

Principle of Silage Making

At harvest, plant cells do not immediately "die"; they continue to respire as long as they remain adequately hydrated and oxygen is available. The oxygen is necessary for the physiological process of respiration, which provides energy for functioning cells. In this process, carbohydrates (plant sugars) are consumed (oxidized) by plant cells in the presence of oxygen to yield carbon dioxide, water and heat (sugar + oxygen = carbon dioxide + water + heat).

Once in the silo, certain yeasts, molds and bacteria that occur naturally on forage plants can also reach populations large enough to be significant sources of respiration. In the silage mass, the heat generated during respiration is not readily dissipated, and therefore the temperature of the silage rises. Although a slight rise in temperature from 80° to 90°F is acceptable, the goal is to limit respiration by eliminating air (oxygen) trapped in the forage mass.

Some air will be incorporated into any silo during the filling process, and a slight increase in silage temperature is likely. These temperature increases can clearly be limited by harvesting at the proper moisture content and by increasing the bulk density of the silage. Generally, it is desirable to limit respiration during the fermentation process by using common sense techniques that include close inspection of the silo walls prior to filling, harvesting the forage at the proper moisture content, adjusting the chopper properly (fineness of chop), rapid filling, thorough packing, prompt sealing and close inspection of plastics for holes.

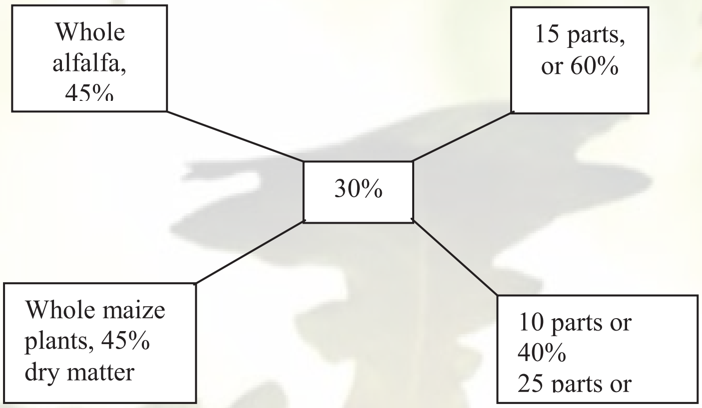
Dry Matter and Moisture

Ideally, corn silage should be harvested at the moisture content appropriate for the type of silo used. Recommended moisture contents are 65–70 percent for horizontal silos, 63–68 percent for conventional tower silos, 55–60 percent for limited-oxygen silos, and 65 percent for silo bags. Corn silage yield and quality as influenced by growth stage are stated below.

Maturity Stage	Moisture %
Early dent	73
1/2 milkline	66
3/4milkline	63
no milkline	60

Delaying harvest can reduce both the fiber and starch digestibility as the stover gets more lignified and the over mature kernels become harder and less digestible if left unbroken after ensiling. Corn that is ensiled extremely wet will ferment poorly and lose nutrients by seepage, which also has potential to damage the silo and if not contained, contaminate local water supplies. Another problem with chopping silage with too much moisture is that a larger amount of lactic acid is needed to reduce the pH. This result in a longer period of time before the silage becomes fermented, producing lower quality silage. Silage that is too dry may result in poorly packed material, causing more mold and spoilage due to air trapped in the silage. In dry, over mature corn silage, the stover portion of the plant is less digestible and contains lower amounts of sugars and vitamin A. It will not pack well in the silo, more oxygen will be present and it will take longer to get through the aerobic phase into the anaerobic phase of fermentation. Nutrients will be used for respiration during the aerobic phase, the temperature of the silage will increase and possibly burn.

Increased moisture or lack of dry matter in silage components should be avoided when possible, as the activity of the lacto-acidic bacteria is decreased and the activity of the butyric acid producing bacteria is increased. The optimal quantity of dry matter is achieved in the last phase of vegetation of the plants. When the weather conditions do not allow timely harvest, resulting in too wet or too dry silage materials, the desired moisture can be achieved by mixing dry and wet components. The composition of the dry and wet components is determined through use of the Pierces' square as show below:



Preparation of Silage from whole Maize Plant

Corn silage serves as high-energy forage for dairy cows. This is most important for high-producing herds and on farms experiencing problems with making or buying high quality hay crop forage. Corn silage, with its relatively high-energy content, is also well adapted for use in low-cost rations for fattening cattle. Corn silage requires less labor per ton to produce than many other forage crops. It can extend the harvest period for the entire corn acreage and provide an opportunity for salvage of stressed or damaged cornfields. Also, corn silage can efficiently recycle plant nutrients, especially large amounts of N and K. The most adequate moment for harvest of maize during the vegetation is the so called wax ripening phase of the maize grain.

The presence of a dark colored layer at the base of the maize grain is also an indicator for the appropriate time of harvest for silage production. Once the first grains with dark layer are noticed you should wait for 3-4 weeks more before harvesting. The particles of the maize plant, when chopping it for silage should be between one and three centimeters in length, although the optimal length depends on the vegetation phase as shown in the table.

Phase of Vegetable	Dry Matter(%)	Length of Particle (cm)
Milk	20-25	3-5
Milk - Wax	25-30	1-3
Wax	30-35	0.7-1

Combined Silage

If more crops are available, it is highly recommendable to produce silage trough combining of more products or by products. The most economically feasible results are obtained when low quality components, (crops that cannot be silaged on their own, such as fruits and leaves of sugar beat and sunflower) are added to more qualitative components (maize, alfalfa etc.) up to 30%.

Silage in Bags

The 'new' method, whereby cut green mass is stored in large sacks made from polythene, has in fact been tested in research stations for some years. It is not, however, a complex process. Ideally, the green mass is cut into small pieces, of about 3 cm long, and these, are used to fill the bags. The material is pressed removing the air and thereby preventing decomposition once the bag has been filled and shut. The feed can be stored in this way, without losing the nutritive quality, for up to a year. This allows farmers to maintain feed levels through the winter.

The purpose of chopping and compacting forage for silage is:

- To release as much plant sugar as possible for fermentation
- To ensure that all the air is pushed out of the plant material so that when the silo is sealed, the plant material is free of air. This is when fermentation works best to produce lactic acid.

Chopping can be done by hand but this can take too much time for forage on more than 0.1 hectares, so it is preferable that a forage chopper be used. It is important to time the cutting of the forage so that the cut forage is not sitting for more than a day waiting to be chopped and ensiled, otherwise it will become moldy or to dry.

It is important that once the forage has been chopped it is placed in the silos and compacted as much as possible to get the air out before the silo is sealed. A key feature of silage bags is that it allows conservation of available fodder in small quantities, over a long period of time. This strongly contrasts with traditional silage making techniques, where large amounts of fodder are harvested and chopped at one time. As example a farmer family might conserve a couple of bags a day over the growing season, which would allow their milking animal to be fed over the 200 days of autumn and winter. The fodder might include all parts of the corn plant, leafy grass weeds, etc., which could be also partly air-dried before chopping and ensiling. It is also possible to progressively remove leaves from maize plants as they commence to senesce.

Storage of Silage in Bags

It is important to pick a suitable location for the storage bags. Stacking carefully in a room can protect

them against rats, mice and other pests. Although open storing in a way disabling rodents to form layers, and covering with a thin plastic foil to prevent damage from birds is sometimes most effective. Based on experience the surfaces rated as follows:

Concrete Pad: Provides excellent surface for silage bag, easy removal of feed with little or no damage, can achieve exceptional drainage of water away from bags, discourages pests and makes inspection for damaged bags very easy.

Asphalt surface: Less expensive than concrete. Has most of the same advantages of concrete. Precautions to maintain surface adequate during the hottest hours on summer days.

Gravel: It is good surface for placing silage bags. Weed and pest control are quite good. However the crushed rock surface does not support traffic very well.

Dirt surface: This can work if there is adequate drainage away from bags. Weed control must be practiced and it is very helpful to have a second location of silage for use when it is extremely wet, especially in spring.

Advantages of Silage Making

- Stabile composition of the feed (silage) for a longer period (up to 5 years)
- Plants can be harvested at optimal phase of development and are efficiently used by livestock
- Reduction of nutrient loses which in standard hay production may amount to 30% of the dry matter (in silage is usually below 10%)
- The fermentation in silage reduces harmful nitrates accumulated in plants during droughts and in over-fertilized crops
- Allows by-products (from sugar beat processing, maize straw, etc.) to be optimally used
- Maize silage has 30-50% higher nutritive value compared to maize grain and maize straw
- 2 kg of silage (70% moisture) has the equal nutritive value of 1 kg of hay

Source: Food and Agriculture Organization (FAO) of United Nations

زرعی سفارشات برائے کسان

کپاس

☆ کپاس کے مرکزی علاقہ جات میں فصل کی کاشت 31 مئی تک مکمل کر لیں۔

☆ ڈرل کاشت کی صورت میں 8 تا 10 کلوگرام بُر اترا ہوا بیج فی ایکڑ استعمال کریں جبکہ کھیلیوں یا پٹڑیوں کاشت کی صورت میں 6 تا 8 کلوگرام بیج فی ایکڑ استعمال کریں۔

☆ محکمہ زراعت کی سفارش کردہ روایتی اقسام سی آئی ایم-496، سی آئی ایم-506، سی آئی ایم-554، نیاب-777، سی آئی ایم 608، ایم این ایچ-786، سی آر ایس ایم-38، ایس ایل ایچ-317، بی ایچ-167، نجی-115، ایف ایچ-942، نیاب-112، نیاب کرن، جی ایس-1، سائٹو 124 جیسی موزوں اقسام کا انتخاب کریں۔

☆ ڈرل سے لائنوں میں کاشت کی گئی چھوٹے قدو الی اقسام سی آئی ایم 608، اور جی ایس 1، کو پہلی آبپاشی بوائی کے 30 سے 40 دن بعد جبکہ بقیہ لمبے قدوالی اقسام کو 40 تا 50 دن بعد اور اس کے بعد دونوں اقسام کو آبپاشی 12 سے 15 دن کے وقفہ سے کریں۔

☆ فصل کو ابتدائی مراحل میں رس چوسنے والے کیڑوں کے حملے سے محفوظ رکھنے کے لیے بیج کو کیڑے مار زہر مثلاً امیڈا کلو پرڈ، ایکٹارا، فینیسڈور، کراؤن یا کونفیڈور میں سے کوئی ایک زہر بحساب 10 گرام فی کلوگرام بیج کو لگائیں۔

☆ پودوں کا درمیانی فاصلہ 9 سے 12 انچ رکھیں تا کہ پودوں کی مطلوبہ تعداد بلحاظ قسم (17(1/2 سے 23 ہزار فی ایکڑ پوری کی جا سکے۔

☆ کاشت کے 6 تا 7 دن بعد کھیت میں اگاؤ کا مشاہدہ کریں۔ اگر کہیں پودے نہ اُگے ہوں تو پانی میں 5 سے 6 گھنٹے بھگوئے ہوئے بیجوں میں سے 4 سے 5 بیج فی سوراخ ڈال کر مٹی سے ڈھانپ دیں۔

☆ پودوں کی مطلوبہ تعداد حاصل کرنے کے لیے چھدرائی کا عمل بوائی کے 20 سے 25 دن کے اندر ایک ہی دفعہ مکمل کر لیں۔ چھدرائی کرتے وقت بیمار، کمزور اور وائرس سے متاثرہ پودوں کو نکال کر فی سوراخ ایک پودا رکھیں۔

☆ مرکزی علاقہ جات میں کپاس کو 58 سے 69 کلوگرام نائٹروجن، 35 کلوگرام فاسفورس اور 25 کلوگرام پوٹاش فی ایکڑ ڈالیں۔ جبکہ ثانوی علاقوں میں کپاس کو 46 تا 58 کلوگرام نائٹروجن، 35 کلوگرام فاسفورس اور 25 کلوگرام پوٹاش فی ایکڑ ڈالیں۔

دھان

☆ چاول کی فصل کے لیے پنیری کی کاشت 20 مئی سے 30 جون تک اپنے علاقائی شیڈول کے مطابق مرحلہ وار اسطرح کاشت کریں کہ پنیری کی منتقلی کے وقت اس کی عمر 30 سے 40 دن ہو۔

☆ دھان کی کاشت کے لیے ترقی دادہ اور منظور شدہ موٹی اقسام کے ایس 282، نیاب اری 9، کے ایس کے 133، کے ایس کے 134، نیاب 2013، جبکہ باسمتی اقسام سپر باسمتی، باسمتی-515، باسمتی 385، باسمتی 2000، باسمتی 370 اور باسمتی پاک شامل ہیں۔ ہائبرڈ اقسام وائے 26، پرائیڈ-1، شہنشاہ-2، پی ایچ بی-71، غیر باسمتی اقسام بی ایس-2 اور پی کے 386 کے بیج کا انتظام کر لیں۔

☆ اگر پنیری کمزور ہو تو سونا یوریا ایک پاؤ (250 گرام) فی مرلہ لاب کی منتقلی سے تقریباً دس دن پہلے چھٹہ کریں۔

☆ غیر موزوں اقسام مثلاً سپر فائن، کشمیری مالٹا، ہیرو سپر اور اسطرح کی دیگر اقسام ہرگز کاشت نہ کریں۔

کماد

☆ فصل کی زرخیزی بڑھانے کے لیے زرخیز زمین کے لیے 2.5 بوری یوریا+1 بوری ڈی اے پی اور 1 بوری پوٹاشیم سلفیٹ، درمیانی زمین کے لیے 3.25 بوری یوریا+2 بوری ڈی اے پی اور 2 بوری پوٹاشیم سلفیٹ اور کمزور زمینوں کے لیے 4 بوری یوریا+3 بوری ڈی اے پی اور 2 بوری پوٹاشیم سلفیٹ فی ایکڑ ڈالیں۔

☆ کماد کی بھرپور فصل کے لیے فروری کاشتہ فصل کو فی ایکڑ 64 انچ اور ستمبر کاشتہ فصل کے لیے 80 انچ پانی درکار ہوتا ہے۔ پانی کی کمی فی ایکڑ پیداوار پر برا اثر ڈالتی ہے۔ لہٰذا 10 سے 12 دن کے وقفے سے آبپاشی جاری رکھیں۔

☆ بہاریہ کاشت کی فصل میں سونا یوریا کی دوسری قسط مئی کے آخر میں اور تیسری قسط جون کے آخر میں پوٹاش کے ساتھ مکس کر کے ڈالیں۔

☆ گنے کی فصل کو آبپاشی موسمی حالات کے مطابق دیں۔ مئی اور جون میں 10 سے 12 دن کے وقفے سے جاری رکھیں۔

☆ جب گنا بننے کا عمل شروع ہو جائے تو ستمبر کاشت میں اپریل اور بہاریہ کاشت میں جون میں مٹی چڑھانے کا عمل مکمل کر دیں۔

☆ جڑ اور تنے کے گڑوں کے تدارک کے لیے محکمہ زراعت کے عملہ سے مشورہ کے بعد مناسب دانہ دار زہریں کونپلوں میں ڈالیں۔

بہاریہ مونگ

☆ بہاریہ مونگ کو تین تا چار دفعہ آبپاشی درکار ہوتی ہے۔ پہلا پانی اگاؤ کے تین چار ہفتہ بعد دوسرا پانی پھول نکلنے پر اور تیسرا پانی حسب ضرورت دو ہفتہ کے وقفہ سے پھلیاں بننے اور پھلیوں میں دانہ بننے پر دیں۔

سبزیات

☆ موسم گرما کی سبزیوں کی گوڈی کریں۔ جہاں ضرورت ہو تو تنوں کے ساتھ مٹی چڑھا دیں اور 8 تا 10 دن کے وقفے سے آبپاشی کریں۔

☆ ٹماٹر کی فصل کو شام کے وقت توڑیں اور ان کو ٹھنڈا کرنے کے لیے پانی سے دھو لیں تا کہ ان کی تازگی برقرار رہے۔

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

MANAGEMENT TIPS

Managing 'Happiness Decay'

Happiness decay is a reality. No matter how beautifully designed your offices are, or amazing your employee benefits are, there will come a time that your employees get used to what's on offer and eventually fail to be enough to keep them happy. To manage happiness decay, experts say, companies should make social responsibility a core part of their projects as this helps fight happiness decay. As an example, several organizations pay their staff extra for their work on social projects and give them a say which causes company supports.

Source: http://realbusiness.co.uk/

Follow up on leads generated from exhibitions

Companies take sales people off the road, invest in stand space and stand design at great cost and then don't follow up on leads generated. They then say after the event that the exhibition didn't deliver a return on their investment! Within this group are people that make no attempt to even engage the prospects walking past their exhibition stand in the first place. They see exhibiting as a chance to spend three days sitting at the back of the exhibition stand clearing a backlog of emails rather than engaging in conversation with potential customers.

Source: Richard Woodwards, www.richardwoodward.com.au/

The six leadership challenges of the new customer-driven competitive marketplace

For leaders of community businesses, there are six leadership challenges they need to understand and address, if they are to secure their organizations' future success and sustainability in this new world order.

Challenge One: Leaders, reinvent yourselves. If leaders are to develop, drive and deliver a new business model and game changing strategies that enable their organizations to operate in the new customer-centric marketplace, they must become transformational leaders. Therefore leaders must first understand what transformational leadership is and how it is applied, and most importantly, reinvent themselves; moving from existing leadership and management frameworks and processes to new frameworks and processes that will propel both their people and their organizations into the customer-driven, competitive marketplace of human services.

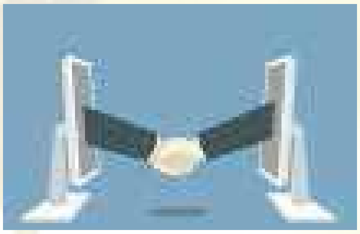
Challenge two: Understand the new paradigm, make the paradigm leap

Understanding and coming to grips with the key principles, parameters and processes of the customer-driven market paradigm is critical.

Challenge three: Operate today's business, create tomorrow's business

When any prevailing paradigm changes, disruption occurs. Chief executive officers and senior managers must therefore get in front of the disruption, the waves of discontinuous change that are driving their human service industry/sector into this new paradigm. Challenge three requires chief executive officers and senior managers to take on two jobs, operating today's business, whilst creating the business of tomorrow.

Challenge four: New entrants to the marketplace have no legacy issues



Legacy issues are organizational elements or characteristics such as cultural, systems, risk management, governance, training, branding or marketing issues. To address legacy issues requires significant time and effort to marshal and redeploy human and financial resources in order to just advance to today's industry "benchmarks".

Challenge five: Transform your people, take them on the journey

Transformational leaders must manage the present, selectively forget the past and create the future.

Challenge six: Re-Engineer your organization, align it to your business model

Whilst a new business model should, amongst other things, contain the primary elements of customers and markets, market channels and service categories, it must also provide the foundation upon which the future governance and organizational structure and positions, systems and processes, and strategies and projects should be based.

Source: http://betterboards.net/

NATIONAL NEWS

Soybean: A Transition in Process

Pakistan is currently in the process of going from an importer of soybean meal and soybean oil to becoming an importer of soybean seeds and locally producing these essential byproducts. The historical trend indicates the enormous surge in soybean seed imports from virtually nothing over the past two years.

In order to encourage the local cultivation of soybean (or simply for the purposes of revenue collection), an 11 percent duty was levied on soybean meal imports in FY15, and a further 10 percent was added in FY16. The increase in soybean oil imports in 2015 is anomalous and can be accounted for by an enormous reduction is sunflower and canola seed imports last year; the oilseeds that produce soft oil (sunflower, canola, soybean) are interchangeable. The reduction in sunflower and canola seed imports thus had to be compensated for by increased soybean oil imports in the year 2015.

Source: www.brecorder.com

Pulses to be Cultivated over 169.5 Thousand Hectares

Seasonal pulses including moong and mash would be cultivated over 169.5 thousand hectares of land across the country during current Kharif season for fulfilling the domestic requirements as well as to export. During Kharif season 2017-18, moong pulse would be cultivated over 147.5 thousand hectares and mash to be cultivate over 22.1 thousand hectares of land respectively, According to the Ministry of National Food Security and Research.

Country imported about 175,250 metric ton of leguminous vegetables (pulses) worth U$122.549 million during the months of March, 2017 as compared against the imports of the same month of last year to fulfill the domestic consumption of pulses. The pulses production targets remained slightly below the fixed targets during the last season and government has devised a comprehensive plan to improve their production by introducing the high yield varieties in the country.

Source: www.brecorder.com

Opening of Pak-Iran Banking Channel to Boost Bilateral Trade by 100pc

Federation of Pakistan Chambers of Commerce and Industry (FPCCI) Thursday said opening of the banking channel with Iran would boost bilateral trade by one hundred percent within one year.

Talking to Iranian ambassador Mahdi Honar Doust, he said, "We are pinning high hopes to the second round of Free Trade Agreement (FTA) talks with Iran scheduled in July".

President of FPCCI Zubair Tufail said business can bring people of the two countries together. He also said that Pakistan can import quality pharmaceuticals and steel from Iran while export rice, meat, mutton, fruits and vegetables while chances of barter trade can also be explored. "We want to improve trade relations and a monthly meeting will be held between representatives of FPCCI and the embassy officials to find ways and means to improve the trade and overcome hurdles", he added.

Source: www.brecorder.com

Fruits Worth $325.63mn, Vegetables $356.32mn Exported in Last 3 Quarters

Fresh fruits worth US$ 325.631 million and vegetables valuing US$ 113.167 million were exported during first three quarters of current financial year as compared to the exports of corresponding period of last year.

During the period from July-March, 2016-17 about 439,797 metric tons of fresh fruits and 386,109 metric tons of vegetables were exported as compared the exports of same period last year. During first nine months of current financial year, exports of fruits and vegetables decreased by 8.61 percent and 24.87 percent respectively, according the data of Pakistan Bureau of Statistics.

Fruits and vegetables exports from the country during first 3 quarters of last financial year were recorded at 590.671 metric tons worth US$ 356.32 million and 508,355 metric tons valuing US$ 150.632 million respectively.

Meanwhile, 43,125 metric tons of meat and meat preparations valuing US$ 163.212 million were exported in last 9 months as compared the exports of 61,656 metric tons worth US$ 212.36 million of same period of last year.

During last nine months of current financial year, country earned US$ 276.269 million by exporting the fish and fish products as compared the exports of 92,046 metric tons valuing US$ 240.38 million of same period last year.

Source: www.brecorder.com

ZTBL NEWS

Holding of Computerized Hajj Lucky Draw 2017

A computerized Hajj draw for selecting pilgrims for the year 2017 was held at ZTBL Head Office

Islamabad. This draw was carried out by honorable President of the Bank, Syed Talat Mahmood, and 24 officials of ZTBL were selected through the Hajj draw to perform Hajj sponsored by Bank.

Exposure Visit of Onion & Rice Growers from Sindh Province

A group of progressive Onion and Rice growers along with officials from Agri Research and Agri Extension Departments of Sindh visited ZTBL Farm on 25th April, 2017. The honorable guests were briefed about different agriculture technologies by Head, Agriculture Technology Department. Head, Islamic Banking Department apprised the delegation about Bank's various Lending products, Schemes, Value addition and Lending process. The visitors took keen interest in machineries/technology items displayed at Agri Tech Expo Hall of ZTBL Farm and appreciated the efforts of ZTBL in development and promotion of agriculture sector.

ADB Delegation Visited ZTBL

In continuation to ADB's earlier visit to ZTBL in February 2017 for establishing preliminary understanding for Disaster Risk Financing measures in the sphere of agriculture, an ADB delegation revisited ZTBL to have a first hand feedback on their initial findings of prevalent structure of Disaster Risk Financing in Pakistan. ZTBL team led by Mr. Farhat Karim Hashmi (EVP- PR&TD) and Capt. Rehan-ul-Ghani (SVP-Insurance Department) apprised the mission on comments pertaining to the findings of their report and emphasized the need for State Bank of Pakistan to be taken as the key driver in formulating Disaster risk financing framework in Pakistan including all the stakeholders i.e. Insurance sector, Financial Institutions, Public Policy Departments of the Government and farming community.