

GROUP FARMING PRACTITIONER



**TRAINER
HANDBOOK**



PATANJALI BIO RESEARCH INSTITUTE



GROUP FARMING PRACTITIONER



Patanjali Bio Research Institute

Food & Herbal Park, Village - Padartha, Laksar Road Haridwar-249404 Uttarakhand (India)
Disha Block, Patanjali Yogpeeth Phase-1, Haridwar-249404 Uttarakhand (India)

Website ► info.pfsp@patanjali farmersamridhi.com

Contact No : 8275999999

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Patanjali Farmer Samriddhi Program team.....

Forward

In Indian agriculture, 85 percent of land owners are marginal and small farm categories of less than two hectares and the average size of landholding is estimated as 1.15 hectares. During last five decades, agricultural production has increased at an average annual rate of 2.5–3 percent. Being unorganized, these farmers are unable to realize the good value for their produce and remains poor. For small and marginal farmers, one of the main problems, apart from credit and extension, is marketing of their produce. The challenge also lies in organizing small and marginal farmers for marketing and linking them to high-value agriculture. It indicates that the problems encountered by the small and marginal farmers can be mitigated to a large extent by organizing them in to Producer Organizations (POs). POs enable member-farmers to reap the benefits of economics of scale in purchase of inputs, processing and marketing of their produce. Advancing Farmers knowledge towards producer organizations can also provide farmers to access to timely and adequate credits and linkage to the markets.

The Patanjali Farmers Samriddhi Program (PFSP) was initiated as part of the Patanjali Bio Research Institute from 1st September 2018 at Haridwar, with the support from National Skill Development Corporation, Government of India and in association with the Agricultural Skill Council of India. The PFSP has successfully completed giving training for the job role of Organic Grower to several thousand farmers of 19 States of India and its journey marked by both achievements and challenges. The PFSP has emerged with a strong scientific team and commitment on Organic Agriculture and Farmer's Welfare of the Nation. Subsequently the job role for Group Farming Practitioner is being implemented for organizing the farmers and facilitating their collective efforts leading to improvement of livelihoods of small and marginal farmers for robust skill & entrepreneurship development in Agriculture & Allied sector.

I am sure all the stakeholders especially in the Skilling Ecosystem engaged in advancing and promotion of group farming and establishment of producing organizations will be enormously benefitted through this important document that will be primarily be used by the trainer farmers under PFSP.

Acharya Balkrishna
Managing Director.
Patanjali Bio Research Institute

HANDBOOK ON GROUP FARMING PRACTITIONER

Indian agriculture has come a long way since independence, from chronic food scarcity giving way to grain self-sufficiency. Farmers in India remain poor as they are not able to obtain better prices inspite of the hard work they do in order to reap harvests. They are not in a position to determine the price for their own produce. The future of the Indian farmer depends on re-engineering the whole process of agriculture and its allied activities from input purchase, production, value addition and marketing, upgrading quality of farm produce while continuing to maintain their cost competitiveness. The need of the hour is to establish commodity groups, farmers interest groups and farmers federation so that they gain the confidence to fix price for their produce.

Given the importance of agriculture sector, Government of India took several steps for its sustainable development. The Ministry of Skill Development and Entrepreneurship (MSDE) had launched National Skill Development Council (NSDC) under Pradhan Mantri Kaushal Vikas Yojana (PMKVY) scheme in the year 2015. Agriculture Skill Council of India (ASCI) is established under MSDE and works towards capacity building by bridging gaps and upgrading skills of farmers, wage workers, self-employed & extension workers engaged in organized / unorganized segments of Agriculture & Allied Sectors. The objective of this Skill Certification Scheme is to enable a large number of Indian youth to take up industry-relevant skill training that will help them in securing a better livelihood for individuals with prior learning experience or skills will also be assessed and certified under the Recognition of Prior Learning (RPL) component of the scheme. RPL mainly focuses on the individuals engaged in unregulated sectors. PBRI (Patanjali Bio Research Institute) is dedicatedly working for the rising destiny of rural farmers and transforming Indian Agriculture through developing the skills of country's manpower in emerging areas of agriculture with the association of ASCI.

This Trainers Handbook is intended to make efficient and skillful use of the Group Farming Practitioner. Every National Occupational Standard (NOS) is spread over Units and the Group Farming Practitioner is responsible for participating in formation of group of common interest farmers, structuring it into model group farming based on local conditions, adoption and practicing latest techniques of farming. The person is also responsible for enthusing the group to initiate formation of Farmer Producer Company. The Trainees are going to expand the capacity to exhibit abilities to utilize different responsibilities in the Group Farming Practitioner. The mentor should guide and prepare the trainee in the accompanying abilities:

- **Knowledge and Understanding:**
Satisfactory operational learning and comprehension to play out the required duties in group farming.
- **Performance Criteria:**
Pickup the required skills through hands on preparing and play out the required operations inside the group farming
- **Professional Skills:**
Capacity to settle on operational choices relating to group farming.

In Group farming, multiple individuals are involving and aiming to cultivate the land and raising crops by using of sustainable resources to increase crop production in an eco-friendly pollution free environment. The purpose of the Group farming is to collectivize farmers, especially small producers, at various levels across several states, to foster technology penetration, improve productivity, enable improved access to inputs and services and increase farmer incomes, thereby strengthening their sustainable agriculture based livelihoods through FPO/FIG/CIGs.

In this training course, we are going to learn the following modules:

Module 1:

The chapter is going to explain the basics of Understand general discipline in the class room (Do's & Don'ts), Understand the role of a Group Farming Practitioner and the progression pathways, Study the success stories of Farmer Producer Organization (FPO)/ Cooperatives, Get acquainted with the benefits of formation of Farmers Interest Groups (FIGs)/ Common Interest Groups (CIGs)/Producer Groups (PGs) and Understand State farmers' right under PPV & FRA act 2001 (9 rights).

Module 2:

Familiarizing in facilitating participatory management skills, identifying common interest group, organizing meetings, setting the goals and missions of the group, efficient management of group activities and resources, networking with various stakeholders, record keeping and registration of group

Module 3:

Going to more proficient in basic farm management skills, like crop planning, maintaining crop calendar, financial management, analyzing market demand & supply.

Module 4:

Expertise in harvest & post-harvest management & aggregation of produce for drying, cleaning, sorting, grading, storage, safe handling, packaging, transportation, food safety, aggregation of produce.

Module 5:

Familiarizing in identifying of input/service provider, negotiation, information on buyers need, price negotiations, timely payment, proper measurements and supply of produce.

Module 6:

Through this course we will assimilate market information's locating and analyzing of market information followed by decision making.

Module 7:

This training will explain the best utilizations methodologies of farm waste management from basic step collection of farm waste by baling of hay to compost making.

Module 8:

Maintain health and safety is very important to each and every individual, hence become well versed with health and safety measures in terms of personal safety and others as well.

KLO 1: Understand general discipline in the class room (Do's & Don'ts)

We labored all night creating a thoughtful, **engaging lesson**. We were confident that our trainees (Farmers) would enjoy it, only to have our excitement—and theirs—dashed by the antics of a handful of trainees. We spent all our time calling out troublemakers' names, and “ssshh-ing” them. We are exhausted, irritated—both with them and ourselves—and dispirited because we didn't get through everything we needed to. Crushed, we don't even want to think about planning for the next day, let alone doing it all again in our next class.

Learning simply cannot occur alongside misbehavior, so instruction hinges upon **classroom management**. Effective teachers are effective classroom managers. It's essential that you **handle disruptions** in a non-confrontational manner, reinforcing rather than undermining our authority.

Instead of pulling our hair out in frustration, give these **Classroom Management** “Dos” and “Don'ts” a try:

Classroom Management DOs

Establish Rapport: Rapport with farmers (trainees) to reduces misbehavior because trainees want to please you. By greeting trainees at the door with a simple “hello” and a “goodbye” after class, you demonstrate care. Nurture relationships by taking an interest in trainees' lives. Talk with them about their likes, dislikes, **hobbies** and interests, and then find appropriate ways to share in them. Providing positive recognition and calling on a range of trainees can also help build rapport and minimize disruptions.



Achieve Consensus on Rules: Developing rules with trainees also creates rapport. It expresses that you value them as partners in the training classroom while also establishing expectations. By facilitating a discussion about what constitutes acceptable behavior and why it is needed, you give trainees a sense of ownership. Limit rules to 3-5 and be sure they are specific and visible.

Utilize Proximity: When trainees engage in off-task behavior, simply moving in their direction or standing near them sends a message that you are aware of what they are doing and don't condone it. Proximity preserves instruction and trainees' dignity while helping you monitor what trainees are doing.



Use Mobility: Usually, many teachers/trainers are attached to the stage. While trainees in the front might be engaged, a larger majority are free to tune out. Instructing from different places in the room throughout class keeps trainees on-task and discourages off-task behavior. Some teachers/trainers configure their room in a way that makes mobility impossible, so be sure to have a room arrangement that encourages movement to all areas.

Try Non-verbals: If you can't move toward a misbehaving farmer, try some nonverbal cues. Sometimes a well-practiced "look" can redirect him. Holding eye contact with him is another simple way without calling attention to him. In other instances, a well-placed pause in your instruction or directions can refocus trainees because there is a noticeable break in what was occurring. Hand signals and gestures work too.



Create Structure: A classroom lacking organization encourages off-task behavior. The more structure you introduce, the more likely your trainees will exhibit positive behavior. Additionally, the more familiar your trainees are with routines, the less likely they are to find "down time" to engage in misbehavior.

Offer Rewards: Many trainers/trainers experience success by implementing reward systems in their class. We could reward individuals or the entire class with small tokens, prizes, or privileges for exhibiting positive behavior or staying on task.

Call Early, Call Often: We should not delay calling and handling misbehaving trainees. The behavior will not eventually correct itself. We only invite more trouble by postponing calls. Communicating early and often increases the chance of eliminating misbehavior and fostering relationships.

Classroom Management Don'ts

Refer Every Infraction: Disciplinary referrals should be the exception, not the rule. Reserve them for major infractions, not minor ones like side-talking, off-task behavior, or being unprepared for class/training. When you refer trainees for these kinds of infractions, you convey the message: “I don’t know how to deal with you, so I need someone to do it for me.” In essence, you hand over control of your classroom/session.

Redirect Trainees with Questions: Avoid calling on a farmer to answer a question when he is off-task. Instructional questioning is to assess learning, but redirection through questioning embarrasses the trainees and calls attention to him in a negative way. If you need to redirect a trainee, consider “reminding” the trainee by saying: “We’re on question 5 right now,” “I need you to respect everyone’s right to learn,” or another statement that reinforces our expectations.



Lose Control: The moment we lose control of our emotions, we lose control of the class. We have unwittingly shown trainees what buttons to push. Losing control takes a variety of forms, including insisting on having the last word, saying something regrettable, or crying. Instead, learn to take a deep breath and emotionally detach ourselves from the behavior or words, making sure our emotions don’t register on your face.

KLO 2: Understand the role of a Group Farming Practitioner and the progression pathways

1. **Facilitate participatory management:** identifying common interest group, organizing meetings, setting the goals & missions of the group, efficient management of group activities & resources, networking with various stakeholders, record keeping and registration of group
2. **Undertake basic farm management:** crop planning, maintaining crop calendar, financial management, analyzing market demand & supply
3. Undertake harvest & post-harvest management & aggregation of produce: harvest, post-harvest treatment-drying, cleaning, sorting, grading, storage, safe handling, packaging, transportation, food safety, aggregation of produce



4. Coordinate & negotiate with input / service providers and buyers: identify input/service provider, negotiation, information on buyers need, price negotiations, timely payment, proper measurements and supply of produce.
5. **Assimilate market information:** locating information sources; analyzing information, using market information for decision making
6. **Undertake farm waste management:** collection of farm waste, crop residue incorporation, baling of hay, compost making
7. **Maintain health & safety:** well versed with health & safety measures in terms of personal safety and others as well

KLO 3: Study the success stories of Farmer Producer Organization (FPO)/ Cooperatives

Why are farmer success stories so important? They're important because it's human nature for people to care about what their peers are doing. We look to our peers to see what they did or what they were capable of achieving. An effective success story does that somewhat for prospects.

FPOs are Farmers Producers Organizations consists of group of farmer members - Farmer Producer Organisation (FPO) is an entity formed by primary producers, viz. ... The main aim of an FPO is to ensure better income for the producers through an organization of their own.

The declining profitability and rising risk associated with agriculture and allied its activities is being considered some of the major challenges in improving the livelihoods of the rural population in India. Mainly small and marginal farmers constitute the largest group of cultivators (about 85%) in Indian agriculture; having smaller than or about two hectares of operational holdings. The vulnerability to these households is largely attributed to lower scale of operation, lack of information, poor access to cheaper credit, weak participation in the consumers' markets and consequently, exploitation by intermediaries in procuring inputs and marketing of their produce.



A variety of approaches have emerged over the years to address these problems. Agricultural cooperatives, formed under the Co-operative Credit Societies Act, 1904, have long been the dominant form of farmer collectives; however, the experience with cooperatives point to many limitations, except few successful exceptions in the field of dairy farming. In recent years, collectivization of producers, especially small and marginal farmers, into producer organizations has emerged as one of the most effective pathways to address the many challenges of agriculture. Hence, on the recommendations of a high-power committee, the Government of India introduced the Companies (Amendment) Act 2002, which paved the way to Producer Companies (PCs).

Onion growers' co-operative purchase and sale society limited- Case study

In Maharashtra, the major onion growing districts are Nasik, Pune, Ahmednagar, Satara, Dhule and Jalgaon. In Ahmednagar district, Parner taluk is leading the taluk for onion area and its production. The onion growing farmers are not able to keep the benefits of production because of dominance of middle men, highly fluctuating prices, poor storage facilities, lack of holding capacity by farmers and post harvest losses like sprouting, rotting and evaporation. Due to this problem, it is necessary to construct the onion shed for storing onions up to 4-6 months period for marketing of onions etc. The Government of India has also declared Ahmednagar district as an "Export Zone" area for onions. Taking this into consideration, in Ahmednagar, the onion growers have cooperatively established a society named as Ahmednagar District Onion Growers' Co-operative Purchase and Sale Society Limited on 10 January 2003. The Society has taken the membership of the NAFED, APEDA, NHB, Maharashtra State Agricultural Marketing Board (MSAMB), Exporters, etc. Presently there are 1100 members in 300 villages in 14 blocks in Maharashtra. The Society office is at Ahmednagar and packaging and grading centre is at Supa in Parner taluk of Ahmednagar district.

For example the Government of Andhra Pradesh (GoAP) has envisioned double digit growth in primary sector and in collaboration with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) has developed a strategy to enable higher and faster growth in the Primary Sector across its 13 districts of the state. To give further fillip to the mission, the GoAP had brought out the Policy and Operational Guidelines to promote Farmer Producers Organizations (FPOs) and requested ICRISAT to carry out a comprehensive scoping study of the FPOs in the state, which can provide a strong base for setting up of 1000 FPOs in the state spread across the 13 districts catering to all farm and off-farm needs. This study is an outcome of intensive discussions with several proposed and functional FPOs and other stakeholders in the state of Andhra Pradesh. The study covered the mapping of various commodities produced in the state, their consumptions, extent of regulated market coverage and marketable surplus; and documented the functions and operations of selected FPOs- proposed and functional. It is also identified that, the potential clusters of different commodities to set up FPOs and; in the end, the study distils out key issues and possible options to move forward.

As per secondary sources of information, there are 98 FPOs that are being registered formally and which are functioning in the state. They are formed based on two sources of funds: 1) SFAC and 2) PRODUCE fund under NABARD. The present study conducted an extensive survey of 45 FPOs. Currently, five FPOs are registered with help of SFAC, while NABARD has set-up nearly 93 (30 proposed and 15 functional) in thirteen districts of Andhra Pradesh covering diverse commodities and mandals (smallest administrative unit) in the state. Currently, five FPOs are registered with help of SFAC, while NABARD has set-up nearly 93 FPOs. Besides, various state departments and SERP are planning to set up 689 FPOs across different sub-sectors like agriculture, horticulture, animal husbandry, fisheries, etc. The Department of Agriculture has proposed to support 131 FPOs under natural farming/ non-pesticide management scheme, SFAC has proposed 56 FPOs, also 47 FPOs has been planned for revival of millets in the state. Similarly, the department of Horticulture has a target to set up 105 FPOs along with the support of NABARD's PRODUCE fund, out of which 26 are already registered, while Animal Husbandry department has target of 246 FPOs to register as dairy/sheep & goat/ poultry/fodder FPOs. Besides, fisheries department has proposed to set up about 65 FPOs for freshwater fish, shrimp/prawn, marine, seabass/mud-crab, etc. In this process, several independent organisations like NGOs, have been empanelled to act as POPI for these FPOs.



AMARAVATHI AGRICULTURE AND ALLIED PRODUCERS' MACS,
FPO REGD NO: AMC/GNT/DCO/2817/3591

1. Amaravathi:

FPO arranged distribution of Green manure seed to farmers for taking up Pre-chillie green manuring. Farmers supplied with Trichoderma viridi from Dept of Agriculture on subsidy for soil application to improve crop performance and as wilt & root rot management. PSB & KSB & VAM bio fertilizers were supplied to farmers from ANGRAU.



AMARTHALURU AGRICULTURE AND ALLIED PRODUCERS' MACS,
FPO REGD NO: AMC/GNT/DCO/2817/3199

2. Amarthaluru:

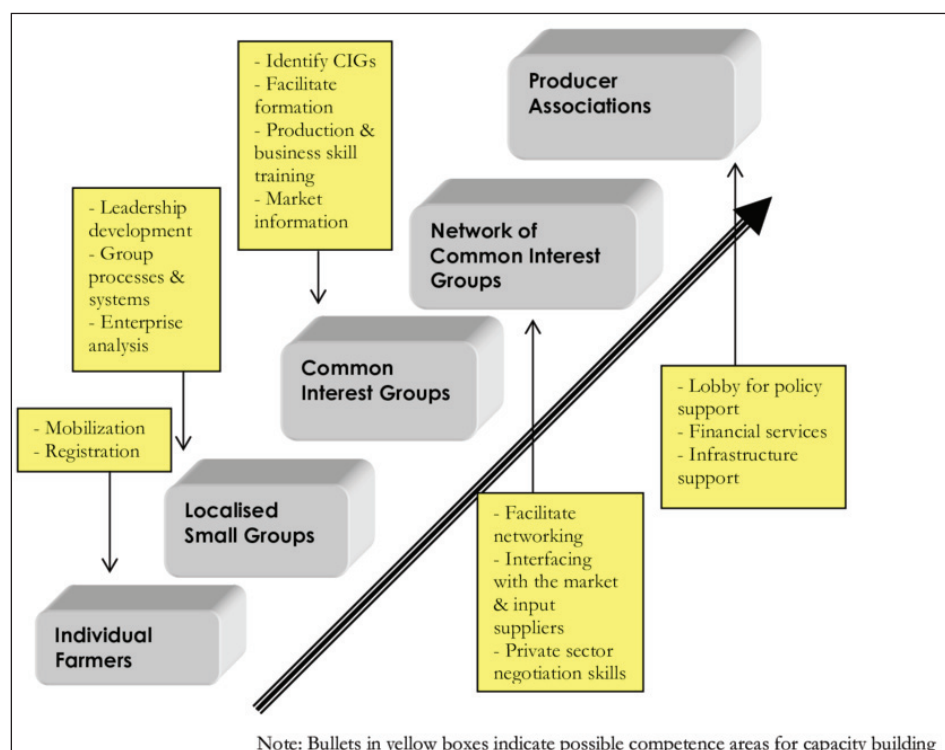
Arranged BPT-5204 Foundation seed from ARS, Bapatla to farmers to take up seed multiplication. Farmers adopted Pre-Kharif blackgram as innovative method. FPO arranged distribution of Paddy reapers to members on subsidy.

The FPOs from AP represents field crops, horticulture, animal husbandry and fisheries. They are at different stages of formation about half of them have just identified the priority commodities and are in the process of group formation. About 17% of them have registered as 'Producer Company', though membership number varied from less than 50 to 500. Initial financial support is the major hiccup for these FPOs. In the absence of

any business plan for most of the FPOs, the members are reluctant in contributing the equity, as the expected benefits are obscure. However, many of the FPOs, where some financial support from external agencies has come, initiated the field visit and less capital intensive training program was initiated. The lack of experts for technical guidance and fuzzy business plan are creating major roadblocks in wider acceptability of the concept among rural households. These new institutions also need liberal financial support for creating basic infrastructure, particularly at the initial stage. In case of some of the functional FPOs, a group of large farmers have invested personally to initiate business aggregation services.

KLO 4: Get acquainted with the benefits of formation of Farmers Interest Groups (FIGs)/ Common Interest Groups (CIGs)/ Producer Groups (PGs)

Farmers' Organizations or Farmer Interest Groups (FIG) are seen as a useful organizational mechanism for mobilizing farmers' collective self-help action aimed at improving their own economic and social situation and that of their communities. Such organizations were perceived to have an ability to generate resources from their members. The members work together to achieve this goal by pooling their existing resources, gaining better access to other resources and to share in the resulting benefits. They could operate at different levels from the local to the national.



Major Benefits:

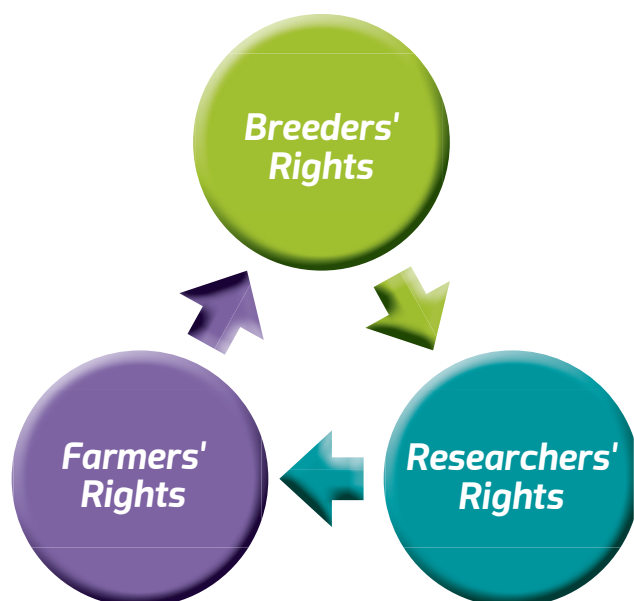
- ✓ Access to technical and market information
- ✓ Improved buying and selling power
- ✓ Likely to maintain useful and relevant activities
- ✓ High motivation for sustainability
- ✓ Builds social cohesion

KLO 5: Understand State farmers' right under PPV & FRA act 2001 (9 rights)

Introduction: In order to provide for the establishment of an effective system for the protection of plant varieties, the rights of farmers and plant breeders and to encourage the development of new varieties of plants it has been considered necessary to recognize and to protect the rights of the farmers in respect of their contributions made at any time in conserving, improving and making available plant genetic resources for the development of new plant varieties. The Govt. of India enacted "The Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act, 2001" adopting sui generis system. Indian legislation is not only in conformity

with International Union for the Protection of New Varieties of Plants (UPOV), 1978, but also have sufficient provisions to protect the interests of public sector breeding institutions and the farmers. The legislation recognizes the contributions of both commercial plant breeders and farmers in plant breeding activity and also provides to implement TRIPs in a way that supports the specific socio-economic interests of all the stakeholders including private, public sectors and research institutions, as well as resource-constrained farmers.

The **three streams** merged to this PPV & FR act, 2001



Objectives of the PPV & FR Act, 2001

- ✓ To establish an effective system for the protection of plant varieties, the rights of farmers and plant breeders and to encourage the development of new varieties of plants.
- ✓ To recognize and protect the rights of farmers in respect of their contributions made at any time in conserving, improving and making available plant genetic resources for the development of new plant varieties.
- ✓ To accelerate agricultural development in the country, protect plant breeders' rights; stimulate investment for research and development both in public & private sector for the development new of plant varieties. Facilitate the growth of seed industry in the country which will ensure the availability of high quality seeds and planting material to the farmers.

Rights under the Act

Breeders' Rights: Breeders will have exclusive rights to produce, sell, market, distribute, import or export the protected variety. Breeder can appoint agent/ licensee and may exercise for civil remedy in case of infringement of rights.

Researchers' Rights: Researcher can use any of the registered variety under the Act for conducting experiment or research. This includes the use of a variety as an initial source of variety for the purpose of developing another variety but repeated use needs prior permission of the registered breeder.

Farmers' Rights

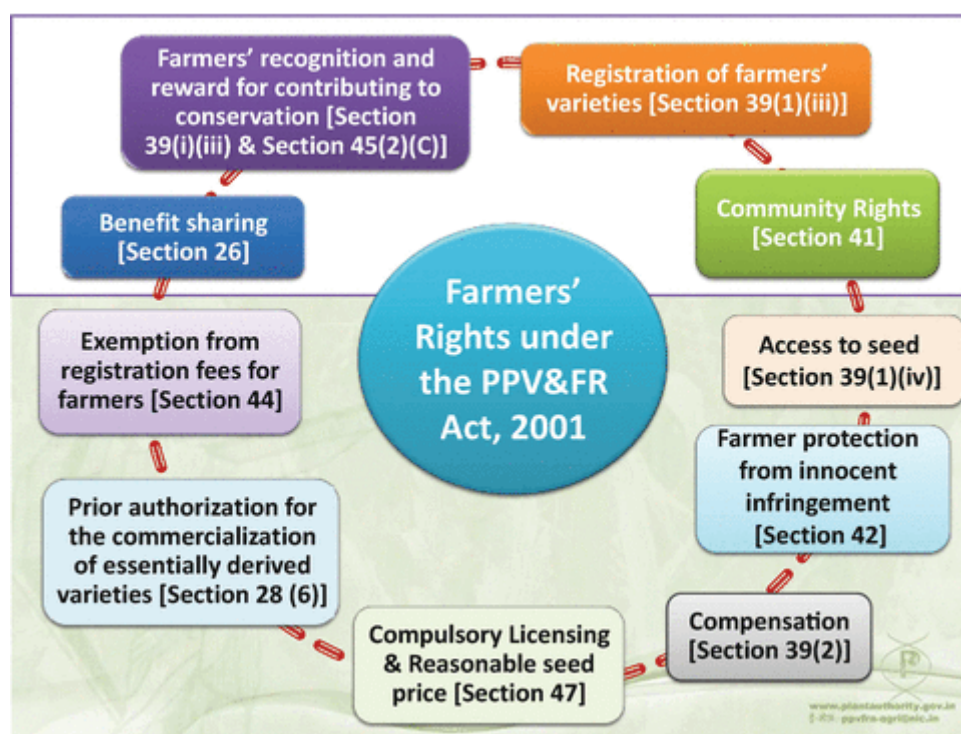
A farmer who has evolved or developed a new variety is entitled for registration and protection in like manner as a breeder of a variety; Farmers variety can also be registered as an extant variety;

A farmer can save, use, sow, re-sow, exchange, share or sell his farm produce including seed of a variety protected under the PPV&FR Act, 2001 in the same manner as he was entitled before the coming into force of this Act provided farmer shall not be entitled to sell branded seed of a variety protected under the PPV&FR Act, 2001;

Farmers are eligible for recognition and rewards for the conservation of Plant Genetic Resources of land races and wild relatives of economic plants;

There is also a provision for compensation to the farmers for non-performance of variety under Section 39 (2) of the Act, 2001 and

Farmer shall not be liable to pay any fee in any proceeding before the Authority or Registrar or the Tribunal or the High Court under the Act.



Implementation of the Act: To implement the provisions of the Act the Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare established the Protection of Plant Varieties and Farmers' Rights Authority on 11th November, 2005. The Chairperson is the Chief Executive of the Authority. Besides the Chairperson, the Authority has 15 members, as notified by the Government of India (GOI). Eight of them are ex-officio members representing various Departments/ Ministries, three from SAUs and the State Governments, one representative each for farmers, tribal organization, seed industry and women organization associated with agricultural activities are nominated by the Central Government. The Registrar General is the ex-officio Member Secretary of the Authority.

General Functions of the Authority

Registration of new plant varieties, essentially derived varieties (EDV), extant varieties; Developing DUS (Distinctiveness, Uniformity and Stability) test guidelines for new plant species; Developing characterization and documentation of varieties registered; Compulsory cataloging facilities for all variety of plants; Documentation, indexing and cataloguing of farmers' varieties; Recognizing and rewarding farmers, community of farmers, particularly tribal and rural community engaged in conservation and improvement; Preservation of plant genetic resources of economic plants and their wild relatives; Maintenance of the National Register of Plant Varieties and Maintenance of National Gene Bank.

Registration of varieties: A variety is eligible for registration under the Act if it essentially fulfills the criteria of Distinctiveness, Uniformity and Stability (DUS). The Central Government issues notification in official Gazettes specifying the genera and species for the purpose of registration of varieties. So far, the Central Government has notified 157 crop species for the purpose of registration. To access the list, click here. The PPV&FR Authority has developed "Guidelines for the Conduct of Species Specific Distinctiveness, Uniformity and Stability" tests or "Specific Guidelines" for individual crop species.

Fees for registration: Application for registration of plant varieties should be accompanied with the fee of registration prescribed by the Authority. Fee for registration for different types of variety is as under:

The Registration of a variety is renewable subject to payment of annual and renewal fee as notified in the Plant Variety Journal of India of the Authority and Gazette of India dated 15.06.2015.

S.No	Types of Variety	Fees for Registration
1	Extant Variety notified under section 5 of the Seeds Act, 1966	Rs 2000/-
2	New Variety/Essentially Derived Variety (EDV)/ Extant Variety about which there is common knowledge (VCK)	Individual Rs. 7000/- Educational Rs.10000/- Commercial Rs.50000/-
3	Farmers Varieties	No Fee

DUS Test Centers: Authority has notified DUS test Centers for different crops with a mandate for maintaining and multiplication of reference collection, example varieties and generation of database for DUS descriptors as per DUS guidelines of respective crops.

Certificate of Registration: The certificate of registration issued will be valid for nine years in case of trees and vines and six years in case of other crops. It may be reviewed and renewed for the remaining period on payment of renewal fees subject to the condition that total period of validity shall not exceed eighteen years in case of trees and vines from the date of registration of the variety, fifteen years from the date of notification of variety under the Seeds Act, 1966 and in other cases fifteen years from the date of registration of the variety.

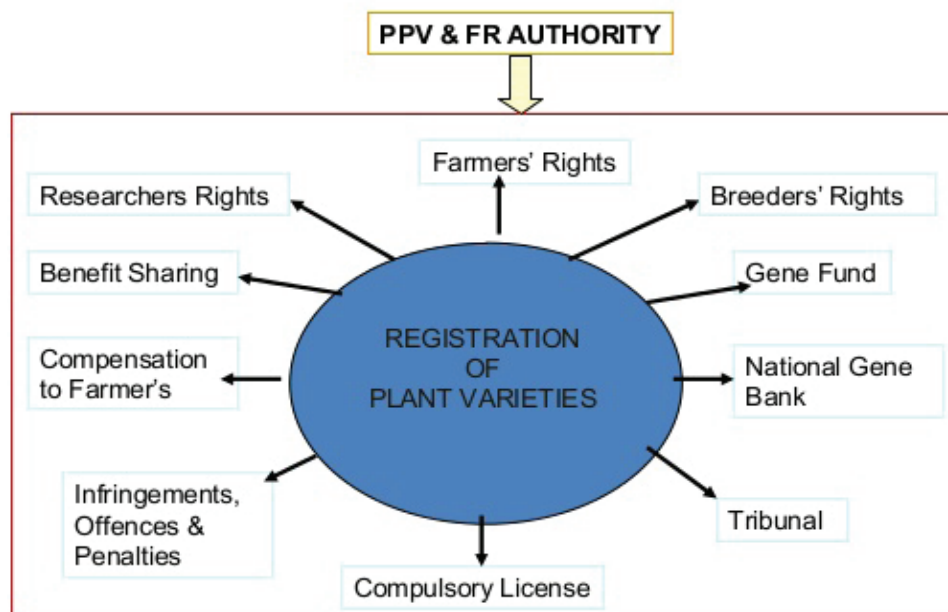
Benefit Sharing: The benefit sharing is one of the most important ingredients of the farmers' rights. Section 26 provides benefits sharing and the claims can be submitted by the citizens of India or firms or non-governmental organization (NGOs) formed or established in India. Depending upon the extent and nature of the use of genetic material of the claimant in the development of the variety along with commercial utility and demand in the market of the variety breeder will deposit the amount in the Gene Fund. The amount deposited will be paid to the claimant from National Gene Fund. The Authority also publishes the contents of the certificate in the PVJI for the purpose of inviting claims for benefits sharing.

Rights of Community: It is compensation to village or local communities for their significant contribution in the evolution of variety which has been registered under the Act.

Any person/group of persons/governmental or non- governmental organization, on behalf of any village/local community in India, can file in any notified centre, claim for contribution in the evolution of any variety.

Convention countries: Convention country means a country which has acceded to an international convention for the protection of plant varieties to which India has also acceded or a country which has law of protection of plant varieties on the basis of which India has entered into an agreements for granting plant breeders' rights to the citizen of both the countries. Any person if applies for the registration of a variety in India within twelve months after the date on which the application was made in the convention country, such variety shall, if registered under this Act, be registered as of the date on which the application was made in convention country and that date shall be deemed for the purpose of this Act to be the date of registration.

Registration of Plant Varieties



Plant Varieties Protection Appellate Tribunal: There is transitory provision by which it is provided that till the PVPAT is established the Intellectual Property Appellate Board (IPAB) will exercise the jurisdiction of PVPAT. Consequently the Plant Varieties Protection Appellate Tribunal (PVPAT) has been established by appointing Technical Member. All orders or decisions of the Registrar of Authority relating to registration of variety and orders or decisions of the Registrar relating to registration as agent or licensee can be appealed in the Tribunal. Further, all orders or decisions of Authority relating to benefit sharing, revocation of compulsory license and payment of compensation can also be appealed in the Tribunal. The decisions of the PVPAT can be challenged in High Court. The Tribunal shall dispose of the appeal within one year.

Farmers' Rights in the PPV&FR Act, 2001: The Protection of Plant Varieties and Farmers' Rights Act (PPV&FR Act) seeks to address the rights of plant breeders and farmers on an equal footing. It affirms the necessity of recognizing and protecting the rights of farmers with respect to the contribution they make in conserving, improving and making Plant Genetic Resources (PGR) available for the development of new plant varieties.

The PPV&FR Act recognizes the multiple roles played by farmers in cultivating, conserving, developing and selecting varieties. With regard to developing or selecting varieties, the Act refers to the value added by farmers to wild species or traditional varieties/ landraces through selection and identification for their economic traits. Accordingly, farmers' rights encompass the roles of farmers as users, conservers and breeders. Farmers are granted nine specific rights, which are as under:

Right 1: Access to seed [Section 39(1)(iv)]

Farmers are entitled to save, use, sow, re-sow, exchange, share or sell their farm produce, including seed of protected varieties, in the same manner as they were entitled to before the coming into force of the PPV&FR Act. However, farmers are not entitled to sell branded seed of a variety protected under this Act. Farmers can use farm saved seed from a crop cultivated in their own.

Right 2: Benefit sharing [Section 26]

Plant breeders and legal entities including farmers who provide Plant Genetic Resources (PGR) to breeders for developing new varieties shall receive a fair share of benefit from the commercial gains of the registered varieties. Out of all the national plant variety protection laws enacted since 2001, the PPV&FR Act is the first that integrates a provision for access and benefit-sharing (ABS) along with Plant Breeder's Rights (PBRs). Accession of the genetic resource used in breeding is permitted under the Biological Diversity Act, 2002. However, the PPV&FR Act requires a breeder to make a sworn declaration on the geographical origin of the genetic resources used in the pedigree of the new variety, and its accession.

Right 3: Compensation [Section 39(2)]

Registered seed must be sold with the full disclosure of their agronomic performance under recommended management conditions. When such seed is sold to farmers but fails to provide the expected performance under recommended management conditions, the farmer is eligible to claim compensation from the breeder through the intervention of the PPV&FR Authority.

Right 4: Reasonable seed price [Section 47]

Farmers have the right to access seed of registered varieties at a reasonable and remunerative price. When this condition is not met, the breeder's exclusive right over the variety is suspended under the provision concerning compulsory licensing, and the breeder is obligated to license the seed production, distribution and sales of the variety to a competent legal entity. Most of the laws for plant variety protection have provisions on compulsory licensing of protected varieties to ensure adequate seed supply to farmers, and several of them also use unfair pricing as grounds for compulsory licensing.

Right 5: Farmers' recognition and reward for contributing to conservation [Section 39(i)(iii) & Section 45(2)(C)]

Farmers who have been engaged in PGR conservation and crop improvement, and who have made substantial contributions in providing genetic resources for crop improvement, receive recognition and rewards from the national gene fund. The gene fund receives resources from the implementation of the Act, which in turn are complemented by contribution from national and international organizations. The expenditures of the fund are earmarked to support the conservation and sustainable use of PGR, and in this way it can be considered to be a national equivalent to the global benefit-sharing fund operating within the International Treaty on Plant Genetic Resources for Food and Agriculture.

Since 2007, the Plant Genome Saviour/Community awards, associated with the national gene fund, has been rewarding farming communities and individual farmers for their contribution to in-situ and on farm conservation to the selection of PGR. The Authority in consultation with Government of India, has established five Plant Genome Saviour Community Awards of Rs 10 Lakh each along with citation and memento to be conferred every year to the farming communities for their contribution in the conservation of Plant Genetic Resources.

In accordance with the Protection of Plant Varieties and Farmers' Rights (Recognition and Rewards from the Gene Fund) Rules, 2010 the Authority also setup ten Plant Genome Saviour Farmer Reward of Rs 1 Lakh each with citation & memento and also twenty Plant Genome Saviour Farmer Recognition annually from 2012-13 to the farmers engaged in the conservation of the Genetic Resources of the landraces and wild relatives of economics plants and their improvement through selection and preservation.

Right 6: Registration of farmers' varieties [Section 39(1)(iii)]

The PPV&FR Act allows for the registration of existing farmers' varieties that fulfill requirements for distinctness, uniformity, stability and denomination, but does not include that of novelty. This right provides farmers with a one-off opportunity for a limited period of time, from the moment when a crop species is included in the crop portfolio under the PPV&FR Act for registration. Once registered, these varieties are entitled to all PBRs.

Right 7: Prior authorization for the commercialization of essentially derived varieties [Section 28 (6)]

When farmers' varieties, whether extant or new, are used by a third party as source material for the development of an essentially derived variety, the farmers need to provide prior authorization for its commercialization. Such a process can allow farmers to negotiate the terms of authorization with the breeder, which may include royalties, benefit-sharing, etc.

Right 8: Exemption from registration fees for farmers [Section 44]

Under PPV&FR Act, farmers have the privilege of being completely exempted from payment of any kind of fees or other payments that are normally payable for variety registration; tests for distinctness, uniformity and stability (DUS), and other services rendered by the PPV&FR Authority; as well as for legal proceedings related to infringement or other causes in courts, tribunal, etc.

Right 9: Farmer protection from innocent infringement [Section 42]

If a farmer can prove before court that he or she was not aware of the existence of any rights at the time of an infringement on any such rights, as detailed in the PPV&FR Act, he or she will not be charged. This provision is made in consideration of the centuries-old unrestrained rights that the farmers had over the seed of all varieties, the novel nature of the PPV&FR Act and the poor legal literacy of farmers.

References:

1. <https://www.teachhub.com/top-12-classroom-management-dos-and-donts>
2. https://www.isapindia.org/pages.php?url_key=promotion-fpo-under-govt
3. www.fao.org/3/W5830E/w5830e0n.htm
4. <https://www.manage.gov.in/studymaterial/PGs.pdf>
5. http://www.agritech.tnau.ac.in/farm_association/farmers%20association_about.html
6. Ch Ravinder Reddy, senior scientist, ICRISAT: OCP-ICRISAT Morocco project
7. <http://vikaspedia.in/agriculture/policies-and-schemes/crops-related/protection-of-plant-varieties-and-rights-of-farmers/farmers2019-rights-in-the-ppv-fr-act-2001>.

MODULE 2

Undertake participatory management practices to form CIGs/FIGs/PGs (AGR/N7825)

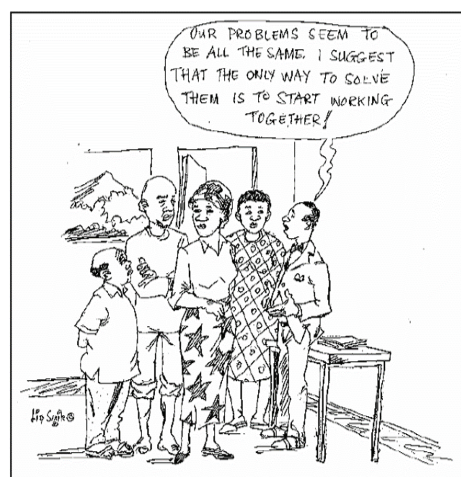
KLO 1: Participate in the formation of farmers interests groups (FIGs)

A collection of individuals who have regular contact and frequent interaction, mutual influence, common feeling of camaraderie, and who work together to achieve a common set of goals

In general farmer groups are formal and informal and these farmer groups form within location for different reasons. Formal groups gather to perform various tasks. Informal groups evolve to gratify a variety of members' needs not met by formal groups. Both go through similar stages of development.

A Farmer Interest Group (FIG) is a self managed, independent group of farmers with a shared goal and interest. The members work together to achieve this goal by pooling their existing resources, gaining better access to other resources and to share in the resulting benefits. In general, the progressive farmers have a passion for building and leading an elite FIG. But participating and leading elite FIG takes persistence and a consistent pursuit of personal and professional development. Constant personal reflection and taking action based on regular feedback.

Motivation and Commitment: The farmers group has largely resolved the interpersonal and task issues. Members' attention is directed to self-motivation and the motivation of other farmers for task accomplishment. Some farmers focus on the task of initiating activity and ensure that the work of the group really gets moving. Other farmers contribute to the group through maintenance functions such as supporting, encouraging and recognizing the contributions of their teammates or through establishing the standards that the team may use in evaluating its performance. The emphasis during the farmer organizations (FO) development is on execution and achievement, whether through a process of questioning and prodding or through facilitation and workload sharing. If key decisions or plans established in the second stage of development need to be revisited, they are. However, this is only done in the context of getting the work done.



Objectives of a group	Activities of a group
<ol style="list-style-type: none"> 1. To address production and marketing issues 2. To develop 'self-help' approaches 3. To provide pooled resources 4. To allow members to exploit an economy of scale 5. To provide a forum for training and information sharing 6. To provide a focal point for technical and training activities 	<ol style="list-style-type: none"> a) Conduct meetings b) Engage in information sharing (including networking with other groups) c) Receive technical training d) Conduct field trials e) Organise bulk selling and purchasing f) Develop market networks and make market assessments g) Support individual members on a needs basis h) Manage a 'revolving' fund for group activities i) Identify technical and product opportunities j) Invest in issues that cannot be covered by individuals k) Gain access to credit not available to individuals

The leadership positions:

The actual leadership positions required will vary from group to group, but it is likely that each group will require at least some of the following positions:

Position	Responsibilities
Group Leader	Chair meetings; represent group; overall management responsibility; spokesperson; co-financial signatory
Deputy Group Leader	Deputize when Group Leader is unavailable, share tasks with Group Leader when Group Leader needs support
Secretary	Receives, prepares and sends correspondence; takes and maintains minutes
Treasurer/Bookkeeper	Keeps groups financial records; has responsibility for banking and petty cash; manages revolving fund; collects fees from members; manages credit facility if applicable; co-financial signatory
Record Keeper	Stores and maintains records and reference material

Issues Influencing Participation in FOs/FIGs

The following issues will influence the extent of participation:

- ✓ The degree of the farmer's dependence on the outputs of the organized activity.
- ✓ The degree of certainty of the availability of the outputs.
- ✓ The extent to which the outputs will be available only as a result of collective action.
- ✓ The extent to which the rewards associated with the collective action will be distributed equitably.
- ✓ The extent of availability of rewards within a reasonable time frame.
- ✓ The extent to which the rewards are commensurate with the costs associated with continued participation

The five key skill sets considered for FIG/FOs:

- ✓ Group organization and management;
- ✓ Internal saving and lending;
- ✓ Experimentation and innovation (knowing how to access and apply new technology);
- ✓ Basic market skills; and
- ✓ Sustainable production (including improved natural resource management)

Reaching the poorest in large numbers means forming farmer groups among the poor for several reasons:

1. Groups can help lower support costs per farmer, and the poorest farmers are seldom organized appropriately to make the shift to producing for the market without considerable support
2. Successful market engagement by poor farmers will depend on their capacity to organize collective marketing and improve their bargaining power
3. To have an impact on reducing poverty, very large numbers of groups of poor people have to participate.

KLO 2: Organize group meetings

Meetings are an important way for farmers to come together for a common purpose. A big focus is making sure everyone affected by the issue can have their say if they want to, and be fully engaged in what's going on. This helps make the meeting a good experience for different farmers and brings a wider range of perspectives into our discussions and decisions. Ideally, everyone leaves a meeting feeling heard, understood and positive about the group and any plans or decisions we have made.

Planning the meeting: Putting thought in before the meeting can make a big difference to how it goes. This includes deciding how the meeting is run, and practical choices like what venue to use. What's the purpose of meeting? Start by getting clear about what you are trying to achieve. This will impact on all kinds of decisions about how the meeting should work. If you are holding a public meeting it is especially important to be clear about your purpose before you invite farmers.

There are lots of factors affecting when farmers can turn up to meetings - and how awake and relaxed they will be when they get there! If we are holding a farmers meeting, make sure you give lots of advance notice so that farmers can plan to be there if they are really keen. Publicize an end time as well as a start time - and consider keeping the meeting short so more people can fit it in. Consider whether to choose a regular time,

(e.g. the first Sunday of every month). This makes it easier to remember meetings, but you will lose anyone who can never make that day. The success of meeting depends on how many farmers will come, and how easy it will be for everyone to participate when you get there. Hence, there is need to keep in mind the following points *meeting venue, Location, Comfort, Accessibility, Being welcoming, Cost, Letting people know about the meeting, Creating publicity materials, Distributing the publicity* (e.g. social media, email lists, inviting people personally, fliers through doors, a stall, posters, events listings and writing an article in the local paper) *Find people for key roles, Facilitator and Minute-taker* (e.g. decisions and action points) etc.



Making an agenda: A meeting agenda is a list of what you intend to talk about, in what order. This might be a list of decisions you need to make, or broader topics like ‘Share how we’re feeling about the group.’ It may include your finish time and when you’ll have breaks. Sometimes you will decide this at the start of the meeting, but you can save time if it is drawn up in advance. In this case, make sure you have an easy method for people to put items forward. Ideally, send round the agenda with enough time to get input from people who can’t attend, (e.g. they could email the group). Sample Meeting Agenda as follows:

- 7.00** Introductions and Check-in
- 7.15** Report back from working groups: media, finance, stalls
- 7.35** Meeting with planning farmers: agree which issues to raise
- 8.00** *Break: Tea and Snacks*
- 8.20** Organizing more stalls
- 9.00** Evaluation and Close.

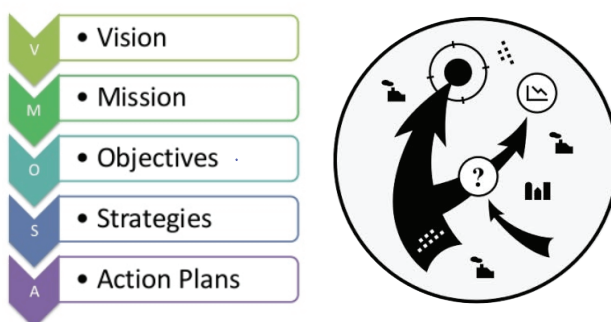
During the meeting: Some of them are mainly the responsibility of the facilitator or organizers or active farmer, but it helps when everyone pays some attention to making the meeting work. Following tips and points can help to conduct a successful farmers meeting and runs well: *Setting up the room, Make space for everyone to participate, Make the meeting engaging, Stay welcoming, Notice and address emotional tensions and disagreements, Personal introductions, Introducing the meeting, Agreeing the agenda, Running through the agenda, Next steps* (Make sure everyone knows what happens next. For example, set a next meeting date. Check you have everyone’s contacts to circulate minutes), *Evaluation, Closing, Social* (Lots of groups follow a meeting with an informal social. Look for an option that works for everyone who wants to take part, e.g. a cafe that opens in the evenings, or sharing food within the meeting venue.), *Facilitation tools, Go-rounds* (Each person takes a turn to speak without interruption or comment from anyone else) *Small groups or pairs* (Many people are more comfortable voicing their opinions in a smaller group), and *Ideastorms* (It can help to get lots of ideas out before you start evaluating and deciding what to do. Many people feel more creative when they know their suggestion won’t be immediately criticised. Plus, thinking up lots of possibilities helps the group to not get stuck on the first idea. Announce the question, encourage ‘thinking outside the box’ and impractical suggestions, and write down every idea anyone shouts out. Ask people to hold back on commentary if they can. Emphasise that unworkable ideas may have the seeds of a new idea that would work). All these roughly run in order, from beginning to end of the meeting.

Practical Activity: For example, imagine you are calling a meeting to a planning for a new FO near your village. Do you want to share information, start a debate, or launch a campaign against the traders? Being explicit on your publicity will help people decide if the meeting is for them. Whatever the main focus of your meeting, it will also be a space where people get a ‘feeling’ for what your group is like. Recognising ‘community-building’ as one of your goals can help you prioritise creating a welcoming atmosphere and strengthening relationships as well as practicalities like decision making.

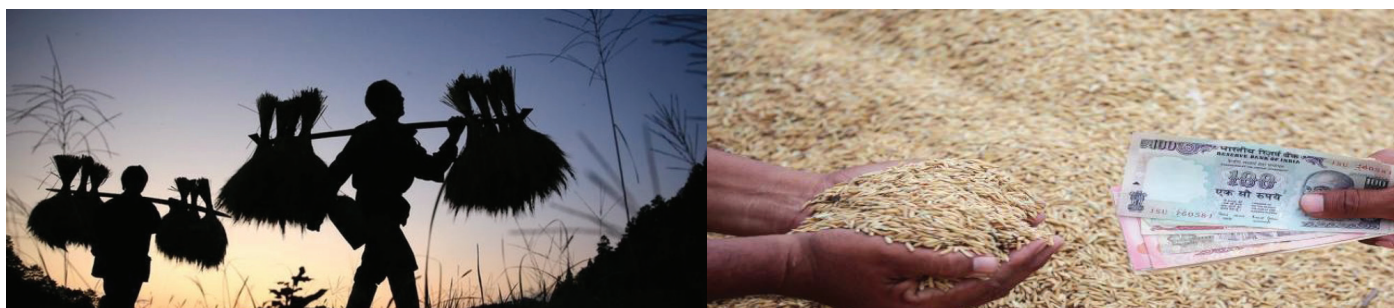
KLO 3: Contribute in setting goals and mission of the group

VMOSA (Vision, Mission, Objectives, Strategies, and Action Plans) is a practical planning process used to help farmer groups define a vision and develop practical ways to enact change. VMOSA helps FO set and achieve short term goals while keeping sight of farmer’s long term vision. Implementing this planning process into farmer’s group efforts supports developing a clear mission, building consensus, and grounding farmer group’s dreams.

STRATEGIES PLANNING VMOSA



Vision (The Dream): Our vision communicates what our FO believes are the ideal conditions for farming community – how things would look if the issue important to you were perfectly addressed. By developing a vision statement, farmer organization makes the beliefs and governing principles of farmer organization clear to the greater farming community (as well as to farmer own staff, participants, and volunteers).



Mission: Developing mission statements are the next step in the action planning process. The farmer organization’s mission statement describes what the farmer’s group is going to do, and why it’s going to do that.



The following mission statements are examples that meet the above criteria.

- “To promote people health and development through a comprehensive family and farming community initiative.”
- “To develop a safe and healthy neighborhood through collaborative planning, community action, and policy advocacy.”

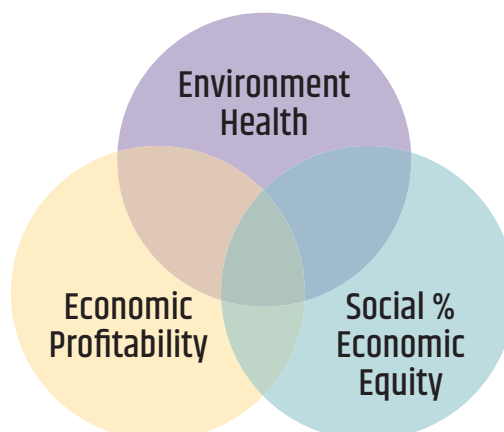
Objectives: Once the farmer organization has developed its mission statement, its next step is to develop the specific objectives that are focused on achieving that mission. Objectives refer to specific measurable results for the initiative’s broad goals. The farmer organization’s objectives generally lay out how much of what will be accomplished by when.

There are three basic types of objectives. They are:

- Behavioral objectives. These objectives look at changing the behaviors of people (what they are doing and saying) and the products (or results) of their behaviors. For example, a neighborhood improvement group might develop an objective around having an increased amount of home repair taking place (the behavior) or of improved housing (the result).
- Community-level outcome objectives. These are related to behavioral outcome objectives, but are more focused more on a community level instead of an individual level. For example, the same group might suggest increasing the percentage of decent affordable housing in the community as a community-level outcome objective.
- Process objectives. These are the objectives that refer to the implementation of activities necessary to achieve other objectives. For example, the group might adopt a comprehensive plan for improving neighborhood housing.



Strategies (The How): Strategies explain how the initiative will reach its objectives. Generally, farmer organizations will have a variety of strategies that include farmers from all of the different agriculture sectors, of the farming community. These strategies range from the very broad, which encompass farmers and resources from many different parts of the farming community, to the very specific, which aim at carefully defined areas.



Action Plan: Finally, the farmer organization's action plan describes in great detail exactly how strategies will be implemented to accomplish the objectives developed earlier in this process. The plan refers to: a) specific (community and systems) changes to be sought, and b) the specific action steps necessary to bring about changes in all of the relevant sectors, or parts, of the farming community.



Summary: Every farmer has a dream. But the most successful individuals - and farmer organizations - take that dream and find a way to make it happen. VMOSA helps groups do just that. This strategic planning process helps community groups define their dream, set their goals, define ways to meet those goals, and finally, develop practical ways bring about needed changes.

KLO 4: Contribute in efficient management of group farming

The key to this approach for strengthening capacity of poor farmers for market engagement is the combination of the skill sets each set strengthens a specific capability that complements and reinforces one or more of the other skill sets For example:

- Farmer Group management skills are strengthened when a farmer group does internal savings and lending, or when the group learns together in a farmer field.
- Once a farmer group learns to analyze market opportunities they often feel the need to learn experimentation and innovation skills because they need to improve some aspect of their production or post-harvest technology in order to compete in the market.
- Planning how to meet market demand often stimulates farmer groups to tackle aspects of sustainable production because they need better pest or disease control, soil fertility or irrigation.



KLO 5: Contribute in efficient management of resources

Sustainable production and resource management skills are the knowledge and skills that enable farmers to sustain the soil, water, fauna and vegetation upon which their agricultural livelihoods depend. Natural resources may be managed individually or collectively. The skills needed to manage natural resources require the understanding that changes in the environment depend on the way natural forces and agricultural practices interact (like soil erosion and grazing for example), as well as on how individuals and communities interact (like water users at the head and tail of an irrigation channel, for example).



Often, the natural resources upon which poor farm families depend are degrading. Soil is eroding, its fertility is being exhausted, vegetation is being removed and water tables are dropping. Gains in income via agro-enterprise development will be short lived unless the natural resource base for farm production is protected or improved. Investments in natural resource management are necessary to ensure positive and sustainable enterprise results and poverty alleviation. Since the returns on immediate investments in sustaining natural resources often happen in the future, it is often unattractive for poor farmers to devote scarce resources to natural resource management. At the same time, wise investments in natural resource management can improve the productive potential of the environment. Therefore, teaching the skills for natural resource management together with agro-enterprise activities and supporting this with some smart subsidies is very important.

- *Build farmers understanding of the ecosystem*
- *Assist farmers to develop the skills for simple mapping of the landscape that matters for their farming and to maintain an inventory of its natural resources*
- *Assist farmer groups to develop the skills for understanding how changes in the way natural resources are managed can affect various interest groups inside and outside their communities.*
- *Promote broad participation in resource management* Encourage all farmer groups in the landscape of mutual importance, such as a watershed, to get together and take active roles in planning how to manage natural resources.
- *Phase in natural resource management interventions over time rather than all at once* This will help farmer groups to adapt to new ways of doing things and increase the chances for success
- *Promote the participation of farmer groups along with other groups in monitoring natural resource management interventions* Farmer groups need to develop and then apply skills for monitoring and evaluation on a number of fronts
- *Link resource management to agro-enterprise development* Make sure that farmer groups understand that the planning, monitoring and evaluation of the environmental effect of their farming practices and natural resource management interventions should be an integral part of their agro-enterprise development.

- *Meet minimum standards of environmental management:* 1) Assist communities to ensure that individuals receive fair compensation if they lose land because of community decisions about natural resource management. 2) Encourage farmers to avoid the overexploitation of natural resources.
- *Be careful when using subsidies* Consider providing subsidies only for those natural resource investments with a delayed return. The subsidy may be needed to make the investments attractive to poor farmers. Ensure subsidies are not excessive or open-ended in order to discourage dependency.

Do not consider a subsidy without ensuring community participation, commitment and contribution. Groups and communities should know the purpose of the subsidy and be ready to assume their responsibility when the subsidy ends.

Tracking progress in the development of natural resource management skills, the following characteristics you should be able to observe in a farmer group that is successfully developing its skills for sustainable production and natural resource management.

Sustainable production and natural resource management skills:

1. Farmer groups have good natural resource management skills when they:
2. Have the capacity to visualize the interconnections between their own farms and the landscape
3. Have the capacity to interact and negotiate with other households and communities about natural resource use
4. Design and implement effective rehabilitation plans for natural resources
5. Have collective rules to efficiently and fairly manage their natural resources

Efficient and fair management of natural resources means to:

- Manage crops to decrease erosion and the loss of soil fertility
- Optimize the capture, use and protection of water sources
- Avoid overexploitation and promote the diversity of flora and fauna

KLO 6: Maintain registers and records for group farming activities

Record keeping is a necessary element of good business management. With no written records, farmers have to depend on their memory while making decisions regarding their farm practices. But, memories can become unreliable after a few days, months or years. Thus, recording of the performances of the plants and animals can be done easily if plant/animals have some identifications / numberings. Thus, both animal recording and identification are always required. There are several useful records such as production and financial transactions in the agro-enterprise. If we know what is happening on the farm we need to maintain some useful farm records. Farm records are like the progress report cards students get at school. If farmers have farm records, they can tell how well they are managing their farm in comparison to other farmers. They can also see the strengths and weaknesses in their farm operations. It is also important to have accurate facts and figures when borrowing money, seeking government loans and tax returns.

Maintenance of Records & Registers: under section 29 of the Act, it states that there shall be the maintenance of records & registers by every principal employer and every contractor in a prescribed form. The rules framed under the Act by the Central Government and the State Government. Therefore, explains in detail the returns to be submitted by the contractors. The registers and record's maintenance, the display of notices and the principal employer to the registering officers or/and licensing office. Also, the principal employers and the contractors are too required to keep exhibited in a prescribed manner in premises of the establishment. Notices in the prescribed form containing particulars about the hours of work, where the contract labour is employed. Therefore, including the nature of duty and such other information in a prescribed form.

As per this Act "small establishments" (establishments employing not less than 10 persons and not more than 19 persons) are required. To furnish a core Return in Form A and maintain Registers Form B, Form C, and Form D. And "very small establishments" (establishments employing not more than 9 persons) are required to furnish the return in Form A and maintain Register in Form E prescribed under this Act. Therefore this requirement is in lieu of furnishing of such returns/maintaining of such registers. As prescribed under various labour laws mentioned in Schedule I to this Act.

Practical Activity

Advantages of record keeping at farm (**Ex: Dairy farm**)

- Records provides basis for evaluation of animals from past records hence helps in selection and culling animals
- Helps in preparing pedigree and history record of animals.
- Helps in assessing the past records and designing better breeding plans to check inbreeding, selecting superior parents and helps in better replacement and culling practices.
- Helps in progeny testing of bulls.
- Helps in analysing feeding cost and benefits from animal product outputs. Hence helps to formulate economic feeding strategies for optimal productions.
- Helps in detection of abnormal conditions or disease status of the herd that leads to loss in body weight, loss in milk production etc.
- Helps in finding the commonly occurring diseases in the herd and thus to formulate in time precautionary measures like vaccination, deworming etc.
- Helps in fixing proper prices of animal meant for purchase and sale.
- Helps in overall better supervision and management of herd.
- Helps in ascertaining the income and expenditure (economics) of dairy farm.
- Helps in estimating the cost of milk production.
- Helpful in comparing the efficiency of labour and herd with other farms.
- To compare the herd performances in different years to determine the amount of profit/loss each year and setting future goals/directions for the farm.

Types of records to be maintained at a dairy farm

1. **Livestock register:** This register records the number of the animals at the farm along with their identification number, date of birth, sire number, dam number, calf and its sex, date of calving, date of purchase, date of sale/auction/death.
2. **Calving register:** This register maintains the records of calving that take place in the farm. It maintains dam and sire number of the calf, calf number, sex and its date of birth and any other remarks like type of calving (normal/abnormal).
3. **Daily milk yield register:** This register records the daily milk yield performance of the cows.
4. **Calf register:** maintains the records of calf at the farm, calf number, sex of the calf, sire number, dam number, birth weight etc.
5. **Growth record of young stock:** this record maintains the weight of the young stocks at different intervals.
6. **Daily feeding register:** This register records the amount concentrate, dry fodder, green fodder and other feeds given to the animals daily.
7. **Herd health register:** This register maintains the record of the diseased animals along with history, symptoms, diagnosed disease, treatment given and name of the veterinarian who treated.
8. **Cattle breeding register:** This register maintains the details of breeding practices in the farm such as cow number, date of calving, date of heat and services along with the bull number, date of successful service, pregnancy diagnosis records, expected date of calving, actual date of calving, calf number etc.
9. **Animal History sheet:** This maintains animal number, breed, date of birth, sire and dam number, lactation yield records, date of drying, date of disposal/death, cause of disposal etc.

KLO 7: Facilitate the registration of the FIGs

Department of Agriculture and Cooperation (DAC), Ministry of Agriculture, Government of India launched a pilot program for promoting member-based Farmer Producer Organisations (FPOs) during 2011-12, in partnership with state governments, which was implemented through the Small Farmers' Agribusiness Consortium (SFAC). The pilot involved the mobilisation of approximately 2.50 lakh farmers into 250 FPOs (each with an average membership of 1000 farmers) across the country, under two sub-schemes of the Rashtriya Krishi Vikas Yojana (RKVY), namely National Vegetable Initiative for Urban Clusters and Programme for Pulses Development for 60,000 Rainfed Villages. The purpose of the project is to collectivise farmers, especially small producers, at various levels across several states, so as to foster technology penetration,

improve productivity, enable improved access to inputs and services and increase farmer incomes, thereby strengthening their sustainable agriculture based livelihoods. SFAC is supporting these FPOs through empanelled Resource Institutions (RIs), which provide various inputs of training and capacity-building, and linking these bodies to input suppliers, technology providers and market players.



The investment in the capacity of FPOs will be spread over two years. SFAC is also monitoring the project on behalf of DAC and the states and reporting on its progress. The pilot has already shown encouraging results and more than 3.00 lakh farmers are presently mobilised into village-level Farmer Interest Groups (FIGs), which are being federated into registered FPOs. Besides empowering farmers through collective action, these grassroots bodies are emerging as nodal points for the transmission of cultivation technology, inputs and credit and pooling their production to leverage the market for better prices. To mainstream the process of institutional development of Farmer Producer Organisations, DAC is issuing these guidelines to encourage states to directly support FPO promotion as a regular activity under RKVY during the XII Plan. These guidelines are meant to help the states follow a standard methodology for FPO promotion, as well as to provide indicative costs and a monitoring framework. States may directly engage RIs (such as NGOs, private companies, research bodies, cooperatives, farmers' groups) to mobilise farmers (in which case they are advised to follow open bidding norms suggested in these guidelines).

Alternatively, they can invite SFAC to empanel suitable RIs on their behalf. A third option would be to award the work directly to SFAC, to undertake FPO promotion on behalf of the State, by providing the necessary budget to SFAC from the RKVY head. States are free to choose their preferred option. The following paragraphs delineate the project guidelines, stages of project development, key verifiable indicators and outcome.



FPO registration is available for following products:

Synthetic beverages syrups and sharebats, Vinegar whether brewed or syntheric, Pickles, Dehydrated Fruits and Vegetables, Squashes crushes, Cordials, Barley water baralled juice and ready to serve beverages fruit sector, or any other beverages containing fruit juices or fruit pulp, Jams, Jelleys and marmalades, Tomato products, ketchup and sauces, Preserves candid and crystallized fruit and peels, Chatnies, Cancel and bottled

fruits juices and pulp, Canned and bottled Vegetables, Frozen fruits and vegetables Sweetened aerated waters with or without fruit juices or fruit pulp, Fruit cereal flakes, any other unspecified item relating to fruits or vegetables etc.

Requirement for FPO Application Proceedings

- Copy of test report(s), duly authenticated, from independent FPO recognized laboratory.
- Document authenticating enterprise of the firm, such as Registration by Company Registrar OR State Authority or Memorandum of Article in case Applicant Firm is a Limited Company OR Partnership Deed in case the applicant firm is under Partnership

Documents required

- PAN card
- ID proof
- Passport Size Photo
- Bank statement/Electricity bill/Mobile bill/telephone bill – Anyone.
- Other documents as necessarily required for producer company

Following Document are Necessary for FPO Certification

- D.D. Of rs.1000 for Govt. Fee
- Application Form
- Affidavits
- Offices / Factory Map
- Partnerships / Memorandum of Company
- Three Years S.t., C.s.t., Pan Number in the Name of Company
- List of Machinery, Pollution Certificate for N.o.c. Certificate
- Declaration of Fpo Grade Certificate By Mfg. Company
- Agreements /order Copy for Providing Goods By Mfg. Company
- Bank Reference for A / C Number Of company
- Specimen Copy of Work Done
- Export License No. with True Copy
- Company Registration Certificate
- Trademark Registration No.

Practical activity on Registration:

<https://www.enam.gov.in/NAM/home/index.html>

<http://sfacindia.com/FPOS.aspx>

References:

1. Farmer producer organizations policy & process guidelines for **Ministry of Agriculture** dept. Of agriculture and cooperation Govt. Of India.
2. https://pgsindia-ncof.gov.in/pdf_file/Operational%20Manual%20for%20Local%20Groups.pdf
3. http://apeda.gov.in/apedawebsite/organic/organic_contents/Chapter_5.pdf
4. <https://www.seedsforchange.org.uk/meeting>
5. www.fao.org/3/W5830E/w5830e0n.htm
6. <http://www.indiatrademarkregistration.com/fpo-registration/>.
7. <http://sfacindia.com/FPOS.aspx>
8. <https://www.enam.gov.in/web/>



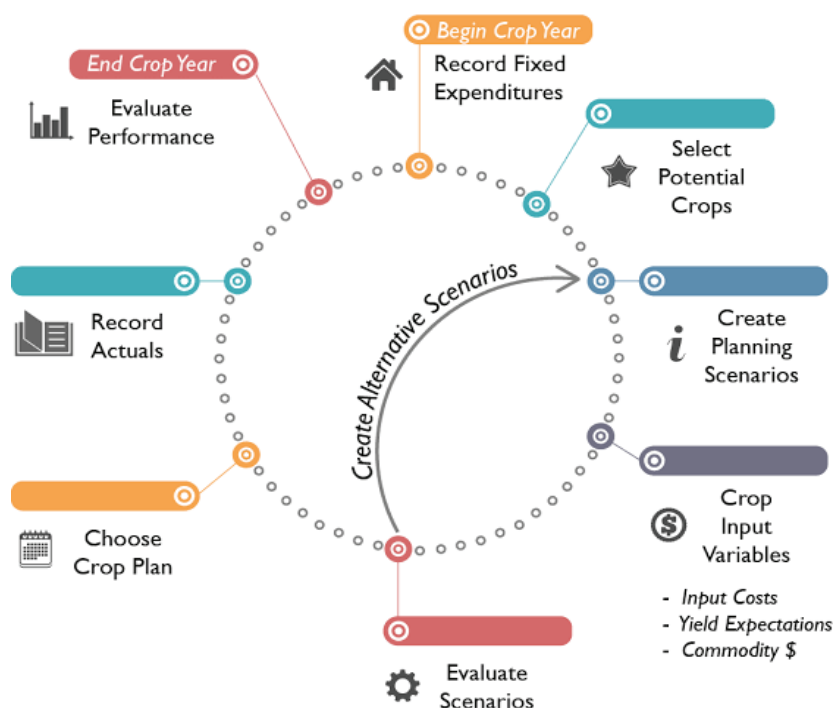
MODULE 3

Basic Farm Management (AGR/N9901)

KLO 1: Estimate the cost of production (COP) of the selected crop

Agriculture has been a way of life and continues to be the single most important livelihood of the masses in India. Commercialization of agriculture had a fundamental impact on incomes from agriculture. On the one hand, the high-value nature of crop cultivation raised prospects of higher revenue inflows. On the other hand, input costs also rose and the ultimate benefit to farmers depended on how the input-output price ratios moved. Government policies on input subsidies and the political economy of input production and prices, thus, played a major role in determining the nature of income growth in agriculture. Further, given the changes that commercialization wrought in the nature of land distribution, benefits from commercialization were also skewed across land size classes and social groups.

COP Planning Process



Production costs refer to the costs incurred by a business from manufacturing a product or providing a service. Production costs can include a variety of expenses, such as labor, raw materials, consumable manufacturing supplies, and general overhead. Taxes levied by the government or royalties owed by natural resource-extraction companies also are treated as production costs. Similarly the cost of production of the selected crop has to be estimated for the successful running of farmer organizations. Crop production incurs both direct costs and indirect costs. Direct costs for produce a crop, for example, would be material like seed and fertilizers, as well as workers' expenditure. Indirect costs would include overhead such as land lease, administrative cost, and utility expenses.

Practical Activity		
Estimated Average Costs of Production for Kh- Rice Crop in 2019 Season		
Activity Cost	Cost per Acre Correctly Grown	Cost per Acre Actually Grown
Cost of Land		
Cost of plowing		
Cost of land preparation		
Cost of irrigation		
Cost of Certified Seed		
Cost of labor for sowing		
Cost of transplanting-irrigation		
Cost of Weed control		
Cost of Fertilizer		
Scaring		
Cost of Services (spraying/advisory/information)		
Cost of harvesting at the field		
Cost of Sacks		
Cost of Harvesting/Gathering		
Cost of threshing		
Transportation Cost		
Other expenditure (if any)		
Total Cost of Production		
Yield per acre		
Income from Sales		
Gross profit		
Net profit		

KLO 2: Estimate the required investment

An investment is an asset or item acquired with the goal of generating income or appreciation. In an economic sense, an investment is the purchase of goods that are not consumed today but are used in the future to create wealth. In finance, an investment is a monetary asset purchased with the idea that the asset will provide income in the future or will later be sold at a higher price for a profit. Investment farms are owned by investors who typically do not live on the farm or take part in any day-to-day operations. The investor will generally hire farm hands and other employees to do the actual farming. Many investment farms exist as commercial farming businesses that grow cash crops which sell in the commodities markets. Commodity or cash crops include soybeans, corn, wheat, cotton, and livestock such as cattle and hogs. Cash crops find uses in many industries. As an example, soybeans may be processed for oil, serve as an animal feed, is processed into food products, and used in the plastics, rubber, and paper industries as filler. Some cash crops are grown for biofuel purposes. Biofuel is a type of energy derived from renewable plant and animal materials. Examples of biofuels include ethanol, often made from corn in the United States and from sugarcane in Brazil.

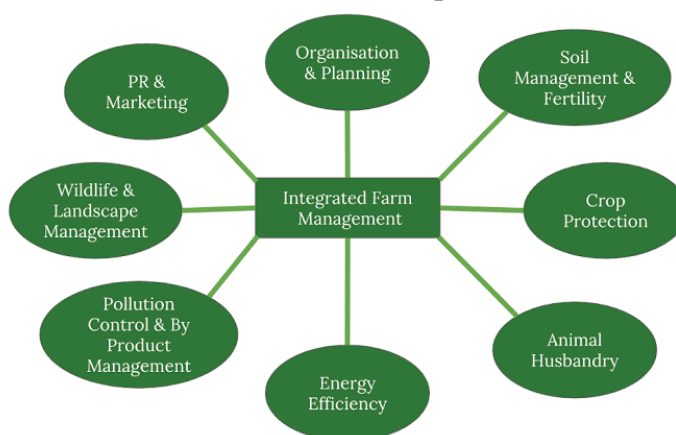
Basic concepts: Investment versus expenditures

Broadly speaking, investment involves giving up something today in order to accumulate assets that generate increased income or other benefits in the future. Farmers make investments on their farms by acquiring farm equipment and machinery, purchasing animals or raising them to productive age, planting permanent crops, improving their land, constructing farm buildings, etc. Governments may invest in, inter alia, rural roads and large-scale irrigation infrastructure, assets that generate returns in terms of increased productivity over a long period of time. Determining whether expenditure, public or private, constitutes an investment can be difficult both conceptually and empirically, and in some cases it is not clear-cut. Investment is generally defined as activities that result in the accumulation of capital (which may be physical, human, intellectual, natural, social or financial) that yields a stream of returns over time.

In agriculture, a distinction is usually made between investments and spending on inputs, based rather arbitrarily on the length of time required to generate a return. Thus, planting trees is typically considered an investment because it takes more than a year to generate a return, but applying fertilizer to a maize crop is not considered an investment because it generates a return during the current crop cycle.

KLO 3: Practice Farm management- Soil testing, selection of crop variety, Crop Calendar, Crop rotation, inter crops, schedule for fertilizer, pesticide/ chemical application, irrigation schedule, harvesting schedule etc

Farming is an economic venture – farmers work the land to gain an income. Many farmers have an interest in preserving and enhancing the land for future generations. In order to maximise economic returns and look after the environment, there are a number of farm management practices that help to minimise the effects of nutrient leaching and run-off and reduce sediment loss from paddocks.



There are many good ways of managing a farm, but what about the best ways to carry out farm management? Following tips are applicable to every farmer, whether you're into no-till, precision agriculture, smart farming, cattle... the list goes on.

Make a note of these and ensure that your current farm procedures abide by these rules.

Invest Modestly: Be modest with your money. Live modestly, with a few luxuries but nothing too extravagant. Remember that while your farm might be super successful when the market is good, it could fall in a matter of months – could you maintain your current lifestyle? When it comes to making good investments, pick products and technologies that are useful, ones that will save you money, time or energy. Don't invest in tech just because it's new or will reduce your tax bill this year: in the long run it will just have cost you more.

Monitor Carefully: Keep good financial records of all the ins and outs. Work out where money is going, where it's wasted and where more money should be invested. You need to draw a defined line between personal finance and farm finances. Even if you're hiring your own family to work on the farm, be very clear in your finances that they are paid like an employee. This will really help when it comes to tax time and if you need to make cuts to your outgoings, you'll be able to identify the best places that money can be taken from.

Realistic Farm Management: Your farm might be booming as a business, but bear in mind that the economy and markets are always fluctuating. What goes up must come down, as they say. So, expanding your farm might make a lot of sense when the economy is great, but do you have a plan for when the economy goes bad? Will you need to scale everything down or will you be left with half the farm deserted? Plan realistically for all eventualities.

Scrutinise workers: It's a tough job to do, especially when you've grown close to workers, but you'll be helping both them and your farm by closely scrutinising them. Look at how they perform, the qualifications they have and if they're really earning the money that you pay them. Once you've figured out who's not pulling their weight, you have a few options. Firstly, you can try talking to them, working out why they aren't doing as well as is needed. Then you've got to work on a solution with them, whether that be more training, reduced hours or demotion. The other option is to fire them and send them on their way with a good reference and no hard feelings.



Small Steps: Rome wasn't built in a day. You should take the same attitude with your farming. Of course, it's very important to have long term goals to give your farm a direction, but they won't be completed so easily. Having smaller, baby steps that lead up to one big goal allow you to better track your progress and feel like you're really achieving something. Boosting morale like this will create further enthusiasm for improvement amongst yourself and your employees.

An Open Mind: You might have made mistakes in the past and you're certainly going to be making some mistakes in the future. That's ok! Don't worry. The important thing is that you get back on your feet, understand why you made the mistake and learn how to never make it again. If you keep getting bogged down by all the negative things in life, you'll never work up the momentum to get over the next hurdle. Sometimes taking a little break from farming to gain perspective can do wonders for opening your mind to new possibilities.

Ongoing Research: You need to keep researching and stay up to date with latest developments. That means political news that could affect your rights to farm certain crops, local news about what's going on in the area, and agriculture news about the latest techniques and technology. Luckily you've got this fantastic blog to come back to each week (add us to your bookmarks now before you forget) and with the internet at your fingertips, you can catch up on all the latest stories while you're eating your breakfast! All these farm management practices are steps on the road to great success.



Soil Testing: Soil may be defined as a thin layer of earth's crust which serves as a natural medium for the growth of plants. It is the unconsolidated mineral matter that has been subjected to, and influenced by genetic and environmental factors – parent material, climate, organisms and topography all acting over a period of time. Soil testing is well recognized as a sound scientific tool to assess inherent power of soil to supply plant nutrients. The benefits of soil testing have been established through scientific research, extensive field demonstrations, and on the basis of actual fertilizer use by the farmers on soil test based fertilizer use recommendations.



Practical Activity Demo Soil Testing using SITA Kit



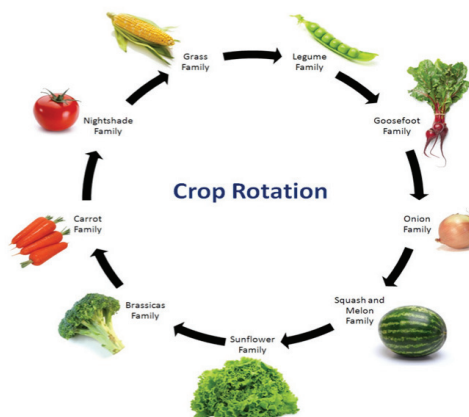
Selection of crop variety: Proper crop selection is an important factor in successful crop farming. Various factors should be considered in crop selection. This is a requisite that must be undertaken before actually starting a farming venture. Even without a predetermined location and site of a farm, the crop to be grown can be decided though based mainly on its marketability and profitability.



Crop Calendar: The Crop Calendar is a tool that provides timely information about seeds to promote local crop production. It contains information on planting, sowing and harvesting periods of locally adapted crops in specific agro-ecological zones. It also provides information on the sowing rates of seed and planting material and the main agricultural practices. This tool supports farmers and agriculture extensionists across the world in taking appropriate decisions on crops and their sowing period, respecting the agro-ecological dimension. It also provides a solid base for emergency planning of the rehabilitation of farming systems after disasters.

Season 	Kharif				Rabi				Zaid				Major Producing States
Crops 	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April	May	
Soybean	S	S		H	H								MP, MH, Raj
Cotton (Kapas)	S	S	S		H	H							Guj, MH, AP, MP, Kar
Turmeric	S	S	S				H	H	H	H			AP, TN, Or, WB, Kar, MH
Castorseed		S	S				H	H	H	H			Guj, AP, Raj
Guarseed [Cluster bean]		S	S		H	H							Rajasthan, Haryana, Punj.
Chilli (Kharif)			S				H	H					AP, Kar, Or, MH, WB, Raj
Chilli (summer)			H								S		AP, Kar, Or, MH, WB, Raj
Maize(Kharif) [Corn]	S	S	S	H									Kar, AP, MH, MP, UP
Potato (Kharif)	S	S		H	H								Karnataka, AP, TN
Potato (Rabi)				S	S	S		H	H	H			UP, WB, Punjab, Bihar, Orissa
Wheat					S	S	S			H	H	H	UP, MP, Punjab, Haryana
Maize (Rabi)[Corn]					S	S			H	H	H	H	Bihar, AP, TN, Kar
Rmseed					S	S			H	H			Raj, UP, Punj. Har, MP, WB, Guj
Chana[Gram/chickpea]					S	S				H	H		MP, UP, Raj
Barley					S	S				H	H		Rajasthan
Jeera [Cumin]					S	S			H	H			Gujarat, Rajasthan
Dhaniya [Coriander]					S	S	S		H	H	H		Rajasthan, MP, AP
Black Pepper				S	S		H	H	H	H			Kerala, Karnataka
Mentha	H	H							S	S		H	UP

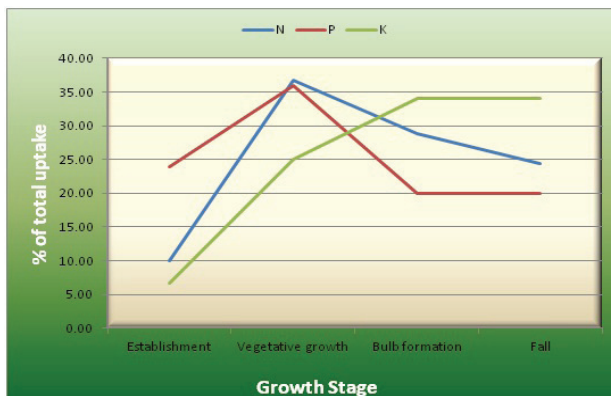
Crop rotation: Crop rotation is the systematic planting of different crops in a particular order over several years in the same growing space. This process helps maintain nutrients in the soil, reduce soil erosion, and prevents plant diseases and pests. There is no universally accepted rotation schedule as the types of plants in a particular farm or garden depend on the local soil, climate, and resources available. The length of rotation time between different plants will also vary depending on the needs of the gardener.



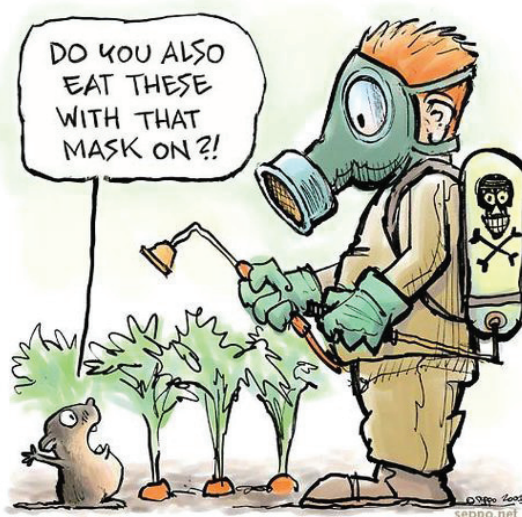
Intercrops: Intercrops are two or more crops that are planted together in a field at the same time or to be planted close in time and overlap for some or all of their life cycle. Intercrops may provide a range of benefits including: 1) Improving soil fertility, 2) Increasing crop diversity and 3) Reducing pest pressure. The mixtures also often produce higher yield and crop quality. There are multiple types of intercrops that vary in their spatial arrangement.



Schedule for fertilizer: Timing of fertilizer application has a significant effect on crop yields. Proper timing of the fertilizer application increases yields, reduces nutrient losses, increases nutrient use efficiency and prevents damage to the environment. Applying fertilizers at the wrong timing might result in nutrient losses, waste of fertilizer and even damage to the crop. The mechanisms by which losses occur depend on the properties of the nutrient and its reactions with the surroundings.



Pesticide/chemical application: Pesticides are used in agriculture to control various pests and disease carriers, such as insects, ticks, rats and also control weeds, insect infestation and diseases. Although pests consume or harm a large portion of agricultural crops, without the use of pesticides, it is likely that they would consume a higher percentage. There are many problems associated with the use of pesticides. When pesticides are used, they do not always stay in the location where they are applied. They are mobile in the environment and often move through water, air and soil. The problem with pesticide mobility is that when they travel, the pesticides come in contact with other organisms and can cause harm.



Example: As the rivers of the Ganga basin leave the steep topography of the Himalaya and enter the hill country to the south, they flow through the first of many cities spread along their courses. Cities such as Kathmandu, Nepal, along the tributary Bishnumati River, release a variety of contaminants into the rivers, and water quality deteriorates rapidly downstream. Organic pollution comes from the tens of thousands of bodies cremated on the Ganga itself, as well as human and animal wastes. More dangerous and persistent chemical contaminants released by the hundreds of factories along the Ganga and its tributaries include mercury, highly toxic heavy metals such as lead and copper, and various synthetic chemicals. Crop lands leak **pesticides** and excess fertilizers into the rivers.

Activities on Controlling methodologies of Pesticides- Farmer Views

Irrigation schedule: Irrigation scheduling is the process used by irrigation system managers to determine the correct frequency and duration of watering. The following factors may be taken into consideration:

- Precipitation rate of the irrigation equipment - how quickly the water is applied, often expressed in inches or mm per hour.
- Distribution uniformity of the irrigation system - how uniformly the water is applied, expressed as a percentage, the higher the number, the more uniform.
- Soil infiltration rate - how quickly the water is absorbed by the soil, the rate of which also decreases as the soil becomes wetter, also often expressed in inches or mm per hour.
- Slope (topography) of the land being irrigated as this affects how quickly runoff occurs, often expressed as a percentage, i.e. distance of fall divided by 100 units of horizontal distance (1 ft of fall per 100 ft (30 m) would be 1%).
- Soil available water capacity, expressed in units of water per unit of soil, i.e. inches of water per foot of soil.
- Effective rooting depth of the plants to be watered, which affects how much water can be stored in the soil and made available to the plants.
- Current watering requirements of the plant (which may be estimated by calculating evapotranspiration, or ET), often expressed in inches per day.
- Amount of time in which water or labor may be available for irrigation.
- Amount of allowable moisture stress which may be placed on the plant. For high value vegetable crops, this may mean no allowable stress, while for a lawn some stress would be allowable, since the goal would not be to maximize production, but merely to keep the lawn green and healthy.
- Timing to take advantage of projected rainfall
- Timing to take advantage of favorable utility rates
- Timing to avoid interfering with other activities such as sporting events, holidays, lawn maintenance, or crop harvesting.

Harvesting schedule: Harvesting is the operation of gathering the useful part or parts of the plant and is carried out at the time when all the nutrients have developed and the edible parts have reached the appropriate degree of maturity.

In general, the harvest takes place 10 or 15 days after the grain has reached physiological maturity. At the time of maturity, the grain has specific moisture content and special physical characteristics. The most appropriate time of harvest is determined based upon the length of the growing cycles (which differ according to the crop and varieties) and also the degree of maturity of the grain.

The harvest should take place at a time when the grain has moisture content in the range 15-20%. The higher the moisture of the grain at harvest time, greater the risks of losses from moulds, insects and germination. On

the other hand, the longer the grain remains in the field (for further drying of the product), the greater are the risks of losses due to shattering of grains, or from attacks by birds, rodents and other pests.

Activity on Harvesting and Post Harvest Management

1. Good harvesting method at proper maturity,
2. Curing, grading, cleaning and sorting of harvest
3. Drying to maintain optimum moisture
4. Treatment
5. Packing and storage

KLO 4: Identify the near market area and keep update on the market prices

Cereals and pulses need drying of produce to reduce moisture content level up to desirable level. But vegetables etc... Should be freshly taken to the market. Depending upon market demand, distance from the place, harvesting should be done to meet the supply/ demand ratio. Farmers need to identify a good nearest market place for selling agriculture products. Farmers need to adapt for online e-Trading platforms to sell/ buy/lease the crops, natural manures, cattle, used farm machinery etc.

Activity on online portals

- 1) <https://agmarknet.gov.in/>
- 2) <http://www.kisanpoint.com/mrb/listbestpractice.jsp>



KLO 5: Keep record on the investment and expenditures

Investment and expenditure records are very important to the financial health of farmer organization (FO). Good records do not ensure our FO will be successful; however, success is unlikely without them. Besides use as a management tool, FO records are essential for preparing income tax reports. Also, most banks require extensive records from FO to formulate credits ratings and establishing for participation in government programs, determining proper level of insurance coverage, and negotiating lease arrangements. There are three basic types of farms records:

1. Resource inventories
2. Production accounts of crop or live stock
3. Income and expenses records

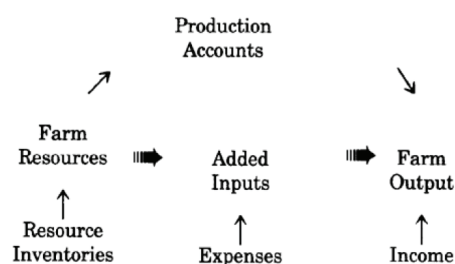


Figure 1. Types of Farm Records

KLO 6: Understand various uses of the crop by-products

Agricultural products are derived from cultivating plants or animals to sustain or enhance human life. Food is the most widely produced agricultural product, and, the global per-person food supply as measured in calories per person has risen more than 20 percent in the past 50 years. But people also use a vast array of agricultural products every day for other reasons, ranging from the clothes we wear to the paper we write on. We decorate with flowers often produced by agriculture and run our cars in part on ethanol produced by agriculture. We also use agricultural products to make plastics. As technology advances at breakneck speed, new uses for agricultural products will continue to expand. Hence every farmer must aware of crop by products and their demand in the market. Based on the market demand of the byproduct farmer/FO can choose the crop and can gain the profits.

Activity on By-Products of Plant Origin

Milling industry by-products: bran; waste flour; wastes resulting from grain cleaning processes; wheat, corn and rye germs; hulls of some seeds, e.g. pea, barley, buckwheat.

By-products of the oil industry: solvent-extracted cake from soybean and oil-yielding rape, sunflower, flax, and products formed during refining of plant oils, lecithin and fatty acids.

By-products of the sugar industry: beet pulp, molasses, defeco-saturation residue.

By-products of the starch industry: potato pulp, potato cell juice and other, when corn or wheat is processed - residues of seeds after starch extraction, gluten, germs.

By-products of the fruit and vegetable industry: products resulting from peeling fruits and vegetables, pomace, stones of some fruits, e.g. tomatoes.

References:

1. <https://www.farmmanagement.pro/7-best-farm-management-practices/>
2. Methods Manual Soil Testing in India
3. www.fao.org
4. <http://agritech.tnau.ac.in/horticulture/FERTILIZER%20SCHEDULE%20FOR%20VEGETABLES.pdf>
5. <http://www.globalwaterforum.org/2012/03/05/special-essay-the-ganges-eternally-pure/>
6. https://en.wikipedia.org/wiki/Irrigation_scheduling

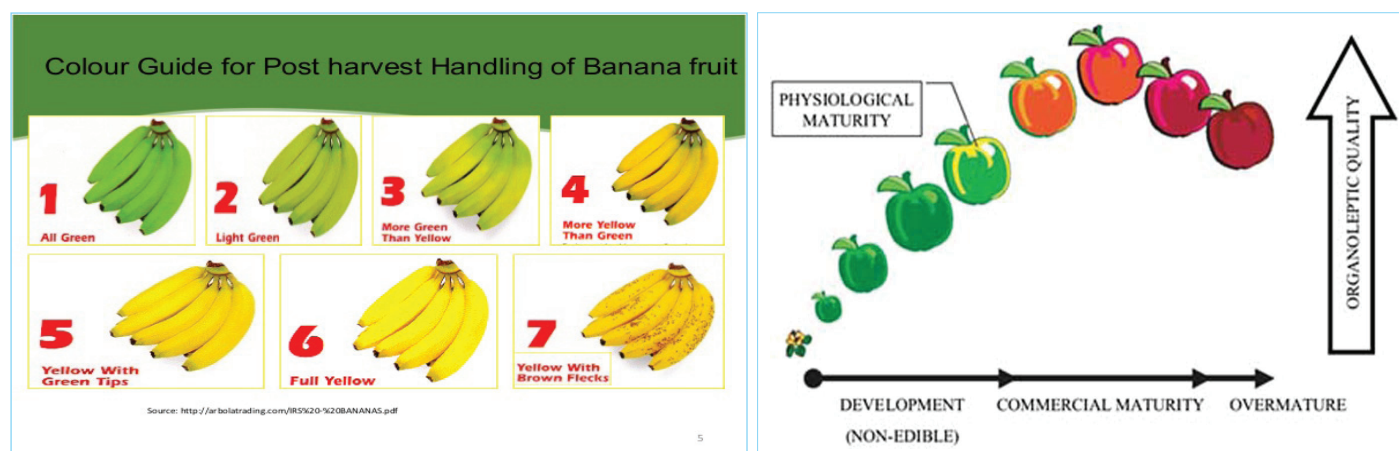
MODULE 4

Undertake harvest, post-harvest management and aggregation of the produce (AGR/N7826)

KLO 1: Ensure physiological maturity of crop at harvest

Physiological maturity refers to the stage in the development of the fruits and vegetables when maximum growth and maturation has occurred. It is usually associated with full ripening in the fruits. The Physiological mature stage is followed by senescence. The stage at which the crops should be harvested has an important bearing on quality. Good quality is obtained when harvesting is done at the proper stage of maturity. Fruits harvested before optimum maturity may not ripen adequately and may not develop adequate flavour, while crops harvested late (over mature) will have a shorter postharvest life and will deteriorate easily.

Example: A French bean pod of okra is at its physiological maturity when seeds are fully developed and the pod is which will dehisce with little pressure.



Horticultural/Commercial maturity: Horticultural maturity refers to any stage of development when the commodity has reached a level of development sufficient for its intended use. It is sometimes referred to as commercial maturity.

Example: A papaya with green pulp and peel that has attained maximum size in already commercially mature as a vegetable but a tinge of yellow colour has to develop when it is used for dessert.

Harvest Maturity: It may be defined in terms of Physiological maturity and horticultural maturity. It is a stage, which will allow fruits/vegetables at its peak condition when it reaches to the consumers and develop acceptable flavour or appearance and having adequate shelf life.

Example: For local market and for processing, fully coloured tomato fruits are harvested. However, for a distant market fruit which have started developing colour are harvested.

Practical Activity on Determination of maturity

Maturity can be determined either by subjective or objective observation. The methods of determining harvest maturity are as follows

- Physical methods: Size, shape, colour, texture etc.
- Chemical methods: Total Soluble Solids (TSS), acidity etc.
- Physiological methods: Respiration and ethylene production.
- Apart from the above measures, abscission, accumulated heat unit, specific gravity, duration after flowering, firmness, dry matter, juice content, Oil content, waxiness, tenderness etc can also be used to determine the optimum stage of harvest maturity.

Some important measures of maturity of fruits and vegetables are described in the following

- (i) Fruit Color:** Fruit skin or flesh color changes as the fruit matures or ripens. These changes can be determined subjectively by the harvester. However, color meters and color charts have been developed for determining harvest times for apples, tomatoes, peaches, chili peppers etc. However, some fruits do not exhibit any perceptible color changes during maturation and thus this parameter cannot be effectively used. Color changes also differ among different cultivars of the same fruit.

For example, the Hayward cultivar of kiwifruit maintains its green flesh during maturation while 'Sanuki Gold' cultivar changes gradually to golden-yellow. Some cultivars of avocado also maintain their green skin color during maturation.

- (ii) Firmness:** Some fruits may change in texture during maturation and these changes can be used to determine the harvest time. Textural changes are detected subjectively by touch or gentle squeezing. However, objective measurement can be achieved using pressure testers and texture analyzers.

- (iii) Soluble Solids Content and Starch content:** During maturation, starch in non-climacteric fruits is converted to sugars. For climacteric fruits, starch accumulates during maturation. Therefore, harvest maturity can be determined by measuring the sugar content or starch content. Usually, the sugar content is measured in terms of total soluble solids content using a Brix hydrometer or refractometer. Starch content is measured using iodine to qualitatively determine the amount of starch. This method is used in determining the maturity of pear cultivars whereby the fruit is cut into two and dipped into a solution containing potassium iodide and iodine.

- (iv) Number of days from Fruit set:** Fruit set refers to the transition of a flower to fruit after fertilization. It usually involves rapid cell division and expansion of the ovary and development of seeds. In some fruits, the time taken between fruit set until the fruit starts showing signs of maturity has been recorded and this can be used to determine harvest time. For instance, in *alpanso* and *pairi* mango varieties, it takes about 110 to 125 days after fruit set for surface color to change from dark green to olive-green and flesh color from white to pale yellow. *Langra* and *Mallika* took 84 and 96 days after fruit set respectively to attain harvest maturity.

- (v) Specific gravity:** The specific gravity of fruit can be considered as an index for maturity grading. Water has a specific gravity of 1.00 and common salt solution (2.5% NaCl) has a specific gravity of 1.02 and both are used in the maturity grading of mango fruits. e.g. specific gravity of mango range between 1.01-1.02.

Vegetable Harvest Time: Timing is everything when it comes to the home vegetable garden harvest. Once vegetables are picked they immediately begin to lose flavor, tenderness, and nutritional value. Harvest your crops as close to the time you plan to serve them, within an hour or less of serving time is best.

How do you know when it is time to harvest your crops? Here are a few indicators:

- **Color:** Many vegetables turn colors as they ripen—tomatoes and peppers are examples. Check the seed packet or look at the description for each crop listed here so that you know when to pick.
- **Sheen:** Vegetables ready for picking commonly have a shiny, healthy look. If the skin of the crop is dull, the peak time for harvest may have passed. (Watermelon is one exception.)

- **Size:** Most vegetables are ready for harvest when they reach a useable size. To check the tenderness and flavor of a vegetable bite into it. Don't delay the harvest simply to grow bigger crops—flavor will likely be lost.

Most vegetables can be harvested when they are just half-grown; this is when most vegetables are at their height of tenderness and flavor. Crops that mature in late summer and fall have a relatively lengthy harvest period—sometimes as long as two weeks or more. These crops can usually be stored for early winter use if you can't get them to the table right away. Early season usually require serving very close to harvest time.

Experience and taste will teach you when a crop is ready for the kitchen—when it has reached peak flavor and tenderness. The best time for harvest—the horticultural and culinary harvest—can be different from when a crop reaches botanical maturity. Botanically mature cucumbers are yellow and seedy—past time for the cook's harvest. The culinary and botanical harvest for tomatoes, however, is the same.

KLO 2: Dry the produce to the desired level

Drying is the process of the removal of water (moisture) from hygroscopic materials at low to medium moisture contents (normally <30% wet basis) by means of evaporation. When the moisture content of the agricultural products is high (usually >50% wet basis) the process of removal of moisture is referred to as dehydration. The examples of the products that are dried include cereals, oilseeds, legumes, and some processed foods; and examples of the products that are dehydrated include fruits, meats, and vegetables.

Drying/dehydration is one of the most important postharvest treatments being adopted worldwide to reduce the spoilage and increase the shelf life or storage durability of agricultural products. Removal of moisture is a complex simultaneous heat and mass transfer process but treating it as such is not sufficient because end use characteristics or quality of the product cannot be handled this way.



Chilli drying in Solar Tunnel Dryer

Ideal Moisture Contents (MC) for Various Grains:

One of the difficulties in answering the question of “what is the ideal %MC for grain crops?” is that there are so

many different kinds of grain. Another difficulty is that various experts have differing opinions about the best %MC to start harvesting grain at based on their own research and experience. Excess moisture in the crops promotes the growth of micro-organisms and can rot the crops and cause huge losses. Moisture may also germinate the stored seeds, which has to be avoided. Ineffective drying reduces the grain quality and causes huge losses.

With that in mind, here are a few examples of ideal grain moisture contents for harvesting purposes:

Corn: According to the Channel.com agronomics site, the ideal time to harvest corn is when it “is between 22 to 25 percent” moisture content.

Wheat: As noted by the DuPont Pioneer agronomy page on wheat, wheat should always be harvested “between 20% and 14% moisture.” Above this, damage to kernels is more likely and storage issues can crop up. Below this, cutterbar losses are more likely.

Rice: Rice is a staple crop that is very sensitive to moisture conditions. As stated by organizations like the International Rice Research Institute, the ideal %MC of rice at harvest is between 20% and 25%.

Rye: The harvest process of rye requires a bit of preparation. As noted by the Alberta Agriculture and Forestry page, rye should “be swathed when the kernel moisture content is 40 to 45 per cent.” The actual harvest should take place after a slow drying process in the field wherein the %MC of the rye is reduced to below 20%. These are just a few of the different grain crops that farmers may commonly encounter. Timing a harvest to coincide with when the crop is at its ideal moisture content is crucial for maximizing the quality and value of a grain crop.

Activity on Measuring Moisture in Grain

There are a few different methods for measuring the moisture content percentage of grain.

The most accurate method is to use the weight-based “oven” test. This method has the farmer check the weight of a set amount of grain, put the grain in an oven, dehydrator, or microwave to dry it out, and check the weight of the grain again after it has been completely dried. To make sure the grain is completely dried, it may be necessary to put it through multiple drying cycles and recheck the weight until it stops changing.

After the grain is fully dried, the dry weight is divided by the wet weight to determine what the moisture content of the grain was prior to the test.

However, while accurate, this method is very slow and it destroys the grain being tested. The slowness and destructive nature of oven tests makes them unsuited for checking grain moisture in the field.

The alternative is to use a specialized device such as a grain moisture meter—sometimes referred to as a grain moisture tester or grain moisture content meter. These devices can provide near-instant measurements of grain moisture in the field. Best of all, many grain moisture meters, such as Delmhorst’s D999-FR, are hand-portable and designed to be used in the field with ease.

This makes it easy to verify grain moisture content in the field, just prior to starting the harvest. Additionally, because grain moisture meter testing is non-destructive, there isn’t as much worry about wasting grain for testing purposes.



KLO 3: Carry out cleaning, sorting, grading, packaging and storage of produce

Almost all the food, feed, fibre and fuel commodities go through a number of post harvest processing operations such as cleaning, grading, separation, drying, storage, milling, food processing, packaging, transport and marketing before it reaches the consumers. Agricultural processing is directed towards conservation of produce and value adding to make the material more readily usable and economically more remunerative

Cleaning/ grading/ separation: Harvested grain (threshed/ shelled/ dried) needs further processing to get rid of various types of contaminations or undesirable matter, viz., inert material, common and seeds of noxious weeds, other crop/variety seed, decorticated seed, damaged seed and/or off-size seed. Cleaning and grading result in reduced bulk of the material, high value products, safe and longer storage, more out-turn of better quality milled products.

- i. Winnowing of grain and pulses is a common practice in every home in Himachal. It is performed using a container made of tin, called Stoop or Chhaj. The grains are placed in the Chhaj and slow winnowing leads to separation of dirt and husk from the grain. Almost all types of dry grain like wheat, maize, paddy, pulses etc. can be cleaned in this manner.
- ii. Bulk cleaning of grain is done using a container made up of bamboo sticks called Panaudi. The dry grain, placed in the Panaudi, are allowed to fall from a height of about 4-5 ft in a thin vertical flow in the path of a cross wind. The lighter dirt particles and husk are blown away and the heavier grain is thus separated as it falls straight to the ground. The use of a fan (mechanical or electrical) greatly accelerates this process of cleaning. This method of cleaning is based on the differences in density of the materials to be separated. The use of modern air separators/cyclone separators for grain cleaning is based on this principle.



Storing: To protect the grains, they have to store in closed containers. On a small or medium scale, farmers store them in metal containers or jute bags. On a larger scale, silos or granaries are the preference. Storing in closed containers prevents moisture from re-entering, and protects against rodents and insects also.

Activity on Grading of Fruits and Vegetables

Grading of fruits and vegetables after harvesting is an essential step in post-harvest management. Grading of fruits and vegetables on the basis of physical characteristics like weight, size, colour, shape, specific gravity, and freedom from diseases depending upon agroclimatic conditions. The known methods of grading of fruits and vegetables are manual grading, size grading.

Grading of fruits and vegetables in the fresh form for quality is essential, as the people are becoming quality conscious day by day. Further, upon arrival of fruits and vegetables at the processing centres, they should be graded strictly for quality. The immature properly mature and over mature fruits and vegetable should be sorted out for the best attributes.

Definition of Grading:

Grading is sorting of vegetables and fruits into different grades according to the size, shape, colour, and volume to fetch high price in market.

For International market three general grades are considered as:

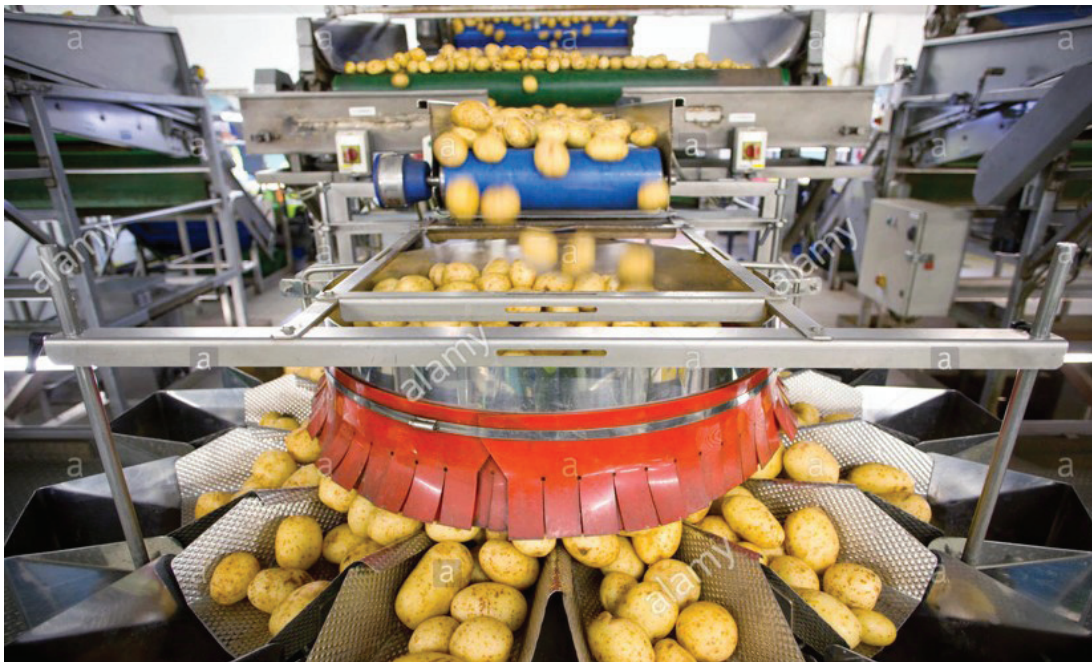
1. **Extra Class:** The extra class is of superior quality possesses the shapes and colour of the variety and without internal defect likely to affect the inherent texture and flavour. A 5% tolerance is allowed for errors. It must be carefully presented taking into accounts the uniformity of the produces in size colour, condition arrangement of the produce in the package quality and appearances of the packing or pre-packing material.
2. **Class I:** Almost having a same quality is like the Extra Class except that a 10% tolerance is allowed. Individual fruit is allowed a slight defect in shape, colour and minor skin defect which do not affect the general appearance for keeping qualities. In packing the size range may be wider and product need not always be arranged in the package.
3. **Class II:** This class product may exhibit some external or internal defects provided they are fit for consumption while fresh. This class is best fitted for local or short distance market. This category will satisfy the needs of customers who are not too demanding and for whom price is more important than quality.

Advantages of Grading:

1. Losses the selling price due to presence of substandard products or specimen can be easily avoided.
2. It increased marketing efficiency by facilitating buying and selling a produce without personal selection.
3. Grading enhanced to set good price for graded products.
4. Heavy marketing cost in packing and transportation can be avoided by grading.
5. In grading diseased and defected specimen are not damaged due to contact of diseased specimens and thus gets high price in market.
6. By grading there is fairness to both Buyers and Sellers.
7. Properly graded vegetables and fruits are purchased by the consumer easily without inspection.

Grading of Fruits: Generally, the fruits are graded on the basis of size, weight, sp. gravity, colour, variety, etc. Size grading is predominantly followed in almost all types of fruits on the basis of size. The fruits are graded as a small, medium, large and extra large. On the basis of maturity, the fruits are graded as immature, properly mature and over mature. Grading on the basis of maturity decides both quality and shelf life. The Alphonso and Pairi mango fruits are graded on the basis of weight as less than 200 g, 200-249 g, 250-299 g, 300-349 g and more than 350 g. out of these grades the weight grade 250-299 g account for about 30% of the fruits. The mango fruits are also graded on the basis of Sp. gravity (3 grades on the basis of sp. Gravity as less than 1.0 sp.gr, 1.0-1.02 and more than 1.02. The sp.gr Grade 1.0-1.02 accounts for about 50% of the Alphonso and Pairi mango fruits.

Grading of Vegetables: The fruit vegetables such as bitter melon, okra, bell pepper, brinjal, green chill, etc. also graded on the basis of size into three grades as small medium and large. The vegetables like tomato are graded on the basis of colour.



Packing and Storage: A package provides protection, tampering resistance, and special physical, chemical, or biological needs. It may bear a nutrition facts label and other information about food being offered for sale. Packaging has several advantages like Physical protection, Barrier protection (A barrier from oxygen, water vapor, dust, etc.), Containment or agglomeration (Small items are typically grouped together in one package), Information transmission (Packages and labels communicate how to use, transport, recycle, or dispose of the package or product), Security and Convenience.

Crop Storage is an essential and unavoidable part of the crop production process. When crops are cultivated for commercial purposes, they are cultivated on a huge scale. We are talking about quintals upon quintals of grains and crops. It requires absolute planning and management so these grains can be stored without spoilage. The crops have to be stored at the recommended level of moisture, which varies for different types of grains.



Insecticide Treatment: To prevent rodents and insects from attacking your stored crops, they have to be treated with insecticides and pesticides. The process of fumigation, where the granaries are filled with gaseous pesticides to suffocate the pests, may also be carried out. There are alternate bio-friendly pesticides such as dried neem leaves.

An innovative pulses seed storage method for seed security in Odisha – A case study

Establishment of appropriate seed systems for rainfed crops for supply of improved varieties seed to smallholder farmers in tribal dominated areas of Koraput district is a herculean task especially for pulses. In the case of Greengram, and Blackgram, inappropriate seed storage facilities at farmers' level are forcing smallholder farmers to buy and look for quality seed every season because, loss of germination due to storage pests. Ensuring quality seed supply of improved variety to smallholder farmers is a difficult task for public sector agencies as private seed industry has shown limited interest because of economic reasons. Under OCPF, Morocco project interventions has demonstrated and conducted experiments with Purdue Improved Crop Storage (PICS) technology based triple layer plastic bags in storing pulses seed at village level to mitigate storage constraints from severe infestations of bruchid (*Callosobruchus chinensis* L.). A village based community organization, VIMAS - a grass root institution promoted under the project has procured 0.4 tons of Green gram and 0.35 tons of Black gram varieties seed in 2014 -15, was stored in triple layer plastic bags in village seed bank for a period of 9 months. Farmer's conventional practice of storing in jute bags, tin bins and polypropylene woven sacks (fertilizer bags) included as check. Triple layer polythene bags were also given to 100 selected farmers (one bag for each farmer) in two clusters villages of Biporiguda block in Koraput district on trial basis for storing pulses seed for 9 months ie., from seed harvesting to next sowing season.



Fig. 1. A farmer showing black gram seed stored in triple layer bags

The results clearly indicate that, significant differences were observed in terms of seed damage and seed germination between triple layer bags and control bags (Table 1). Seed damage by storage pests (bruchids) was around 2-4% in triple layer bags and 44.5 % in control and average germination percentage was 91% and 78 % respectively. Seed damage by storage pests in village seed bank was 3 and 4 percent for greengram and blackgram and germination was 91 and 89 percent respectively. Overall cost effectiveness and easy to adopt nature of the technology for storing precious pulses seed by the tribal communities in Odisha project villages realized the potential of the technology in strengthening pulses seed security.

Table 1: Seed storage studies using triple layer plastic bags in Odisha state clusters (2014-16).

Particulars	Cluster -1**		Cluster -2**	
	Greengram	Blackgram	Greengram	Blackgram
No. of farmers conducted storage studies	45	46	35	42
Percent seed damaged by bruchids in triple layer bags	3	4	2	3
Percent seed damage by bruchids in control bags *	45	48	44	41
Percent germination in triple layer bags	90	89	90	95
Percent germination in control bags*	75	78	79	80

*control bags - gunny bags/tin bins/ fertilizer bags are used for storing seed by farmers

**for each cluster 5 villages were taken and 100 farmers were selected for storage studies

Farmers perceptions:

1. The technology is easy to adopt without any preconditions
2. The bag can be reused for 4-5 years
3. Cost of the bag is affordable by farmers
4. Precious seed quality and quantity can be maintained

5. The seed rate per hectare was reduced because of high germination percentage, thus reducing seed cost
6. Once seed is stored in the bag, no need to apply any pesticide and intermittent drying to reduce moisture content and insect attack. Hence, Women drudgery is reduced in seed maintenance.
7. Cost on seed maintenance (frequent drying, cleaning, chemical for storage pest application) is reduced to zero.
8. Seed can be stored at village level and farmer's seed and food security ensured.

KLO 4: Ensure safe handling of the produce and quality assurance

In recent years, agricultural exports to developed country markets have emerged as a potentially major source of export growth for many developing countries. Exploiting this potential, however, poses many challenges. The capacity of developing country exporters to enter these markets depends critically on their ability to meet stringent food safety standards imposed by developed countries. Not only are these standards stringent, but they are increasingly demanding. They now go well beyond traditional quality standards, as suppliers must pay close attention to the responsible use of agrochemicals, energy, water and waste, as well as social and environmental impact. These standards are significantly higher than those prevailing in developing countries, they are subject to frequent changes and are, ultimately, often difficult and costly to meet.

Food safety: Assurance that food will not cause harm to the consumer when it is prepared and/or consumed according to its intended use.

Food quality: The totality of features and characteristics of a product that bear on its ability to satisfy stated or implied needs.

Food safety versus food quality: Defects and improper food quality may result in consumer rejection and lower sales, while food safety hazards may be hidden and go undetected until the product has been consumed. If detected, serious food safety hazards may result in market access exclusion and major economic loss and costs. Since food safety hazards directly affect public health and economies, achieving proper food safety must always take precedence over achieving high levels of other quality attributes.



Food Corporation of India (FCI) Quality Control- Overview

The Quality Control (QC) wing of FCI manned by qualified and trained personnel is entrusted with enormous task of procurement & preservation of food grains. The food grains are procured as per laid down Specifications of Government of India and inspected regularly during storage to monitor the quality. Representative samples of the stocks are drawn for physical and chemical analysis to ensure whether the quality standard meets the parameters of laid down Specifications of Government of India. Food grain samples are also referred to NABL accredited laboratories and get tested for its conformity of parameter under FSS Act also.

Food Corporation of India's testing laboratories spread across the country for effective monitoring of quality of food grains providing quality assurance as per FSS Act 2006, leading to improved satisfaction level to the customers (consumers).

Laboratories across the country are being upgraded with latest equipment. The IFS (Institute of Food Security) Lab, Gurgaon is in process of up gradation to a State of Art Lab.

Food Quality relevant Website in India:

1. India Standards Portal: Export Inspection Council of India(EIC) <http://indiastandardsportal.org/ExportInspectionCouncil.aspx>
2. Food Corporation of India's: <http://fci.gov.in/qualities.php>
3. Ministry of Agriculture and Farmers Welfare Government of India: <https://dmi.gov.in/GradesStandard.aspx>
4. Commodities | National Portal of India: <https://www.india.gov.in/topics/food-public-distribution/commodities>

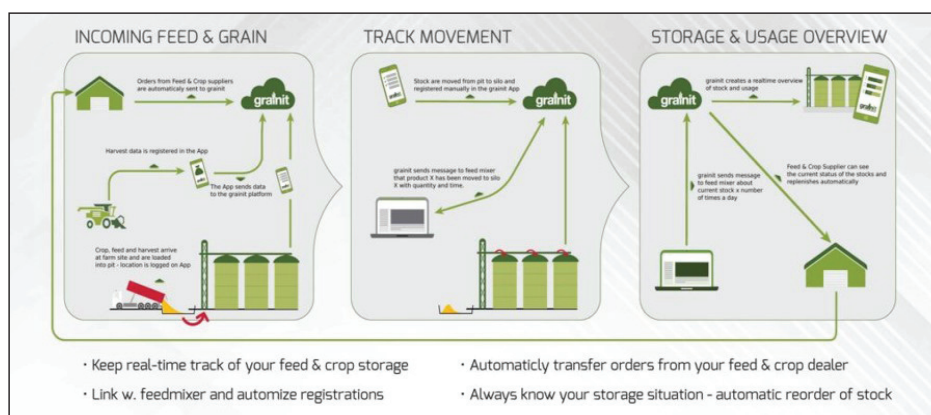
KLO 5: Organize and set up collection points at strategic location

The purpose of the storeroom location is to store crop harvest in a safe, clean, secure, and organized environment. Having too much distance between the storeroom and where the crop materials are needed can cause delays and creates an opportunity for crop materials to get lost or damaged in transit. There are three primary aspects that make up the crop materials management process:

- Acquisition – Procurement (right parts, right quantity, right quality, lowest total cost)
- Control – Stores
- Movement – Logistics (right place, right time)

The requisition of crop materials is generally triggered by a planner who determines specific crop material needs such as items, quantities and required dates for each harvest. The acquisition of crop material is accomplished through procurement, which is responsible for ordering exactly what the customer wants from an approved vendor. Vendors provide parts that meet prescribed specifications. After the required parts are received, the store's organization assumes responsibility for the proper handling and control of those items in the warehouse area until they're needed in the field.

At that point, logistics arranges the movement of the crop harvest to its final destination when it's needed. In most organizations, crop material movement is done by storeroom personnel, which means that Logistics and Stores are the same team. Stores are embedded in the middle of the material flow, so they can have an effect on every one of the elements of the mission.



KLO 6: Ensure proper measurement of the produce

Information on crop area, yield and production plays a vital role in planning and allocating resources for the development of the farming sector. Reliable and timely information on crop area, yield and production acts as a fundamental input to the planners and policymakers responsible for formulating efficient marketing policies, and for making important decisions with respect to procurement, storage, public distribution, import, export and other related issues. The availability of crop area statistics is an essential requirement of the agricultural statistical system of any country, as it is a key variable in estimating crop production and crop yield.

Accurate, early estimations of grain yield and crop loss are important skills in grain production. Farmers require accurate estimates for:

1. Crop insurance purposes
2. Forward marketing and delivery planning
3. Planning harvest and storage requirements
4. Cash-flow budgeting.

Extensive personal experience is essential for estimating yields at early stages of growth. As crops near maturity, it becomes easier to estimate yields with greater accuracy.

Activity: Record of grain yield (example form)

Name.....

Date.....

Crop type.....

Variety.....

Location.....

Anticipated 100-grain weight.....grams

Therefore K =

KLO 7: Ensure timely and safe delivery of the produce to transportation

The time of transport has both positive and negative impact on crop marketing. However, the bad conditions affect the cost of transportation of agricultural produce which in turn affect the rural farmers' income. There are considerable losses in crop output at all these stages. This is best brought about by an efficient, high volume, transport and marketing system where the transporting and marketing unit costs are low. If the margin between what the farmer receives from the sale of his produce and what the urban consumer pays for his produce is high then the effective demand transferred to the farmer will be correspondingly be reduced. Likewise, if internal transport costs in a country are considerably high then the scope for agricultural exports will also suffer as compared to other more efficient countries.



REFERENCES:

1. <http://cststudy.blogspot.com/2018/06/maturity-maturity-indices-types-of.html>
2. Jayas D.S., Singh C.B. (2011) Drying of Agricultural Products. In: Gliński J., Horabik J., Lipiec J. (eds) Encyclopedia of Agrophysics. Encyclopedia of Earth Sciences Series. Springer, Dordrecht.
3. <https://www.delmhorst.com/blog/whats-the-ideal-moisture-content-for-grain>
4. <https://farmer.gov.in/dacdivision/Machinery1/chap6a.pdf>
5. https://unctad.org/en/docs/ditccom200616_en.pdf
6. <http://agriculture.vic.gov.au/agriculture/grains-and-other-crops/crop-production/estimating-crop-yields-and-crop-losses>
7. https://harvesttotable.com/vegetable_harvest_times/
8. <http://fci.gov.in/qualities.php>



MODULE 5

Undertake farm waste management (AGR/N9913)

Agricultural substances are those substances that are produce on earth with the change of seasons. Basically these substances are produce in the nature and are very important for survival of animals and human beings who are consumers. These substances are widely available on earth can be a good source of energy or can be converted into useful products. The wastes generated from crop have a good potential to convert in energy in related energy sector. The waste produce from animal waste or from crop residues called biomass which has an interdependent relationship with ecosystem from production to disposal and has physicochemical properties.

KLO 1: Identify and segregate different types of farm waste according to their use

Agricultural waste is waste produced as a result of various agricultural operations. It includes manure and other wastes from farms, poultry houses and slaughterhouses; harvest waste; fertilizer run- off from fields; pesticides that enter into water, air or soils; and salt and silt drained from fields. Other common waste materials found on farms include: plastic wrap, baling twine, plastic chemical containers, feed and fertiliser bags, paper and cardboard, machinery, motors, electrical parts, fencing, railing, corrugated iron, vehicle batteries, household rubbish (furniture, appliances, food waste), paints, glass, rubber, piping and fittings, timber, concrete, engine and hydraulic oil, dead livestock and animal medicines.

S. N.	Agro-Waste	Utilization
1	Rice Husk Ash & Charcoal	•Additive in cement mixes •Water glass manufacture •Active carbon
2	Rice Husk	•Electricity production
3	Banana Peel & Sugarcane fibers	•Paper making pulp
4	Oil Palm Empty Fruit Bunch (EFB)	• Mulching, Organic Fertilizer
5	Oil Palm stems, Rubber wood	•Particleboards • Softwood furniture
6	Onion skin, Groundnut husk	•Heavy metal removal
7	Husk, Bagasse	•Mushroom cultivation
8	Bagasse, Banana Fruit Reject	•Ethanol production •Animal feed
9	Husk, Straw, Cow Dung	• Biogas production • Electricity generation
10	Sunflower stalk, Corn Stalk, Bagasse Fibers	• Reinforcement for thermoplastics
11	Animal waste (dung)	• Compost and Fertilizer

KLO 2: Familiarize with the ill effects of farm waste burning

Burning of farm waste causes severe pollution of land and water on local as well as regional scale. This also adversely affects the nutrient budget in the soil. Burning of crop residue also contributes indirectly to the increased ozone pollution. It has adverse consequences on the quality of soil.



Air pollution from smoke can severely impact human health. People exposed to these air pollutants can experience eye and nose irritation, difficulty breathing, coughing and headaches. People with heart disease, asthma, emphysema or other respiratory diseases are especially sensitive to air pollutants. In China, there is a government ban on stubble burning; however the practice remains fairly common. In northern India, despite a ban by the Punjab Pollution Control Board, stubble burning is still practiced.

Case Study on ACRB

Variations in pulmonary function tests (PFTs) due to agriculture crop residue burning (ACRB) on children between the age group of 10 to 13 years and the young between 20 to 35 years are studied in Punjab. The effects of exposure to smoke due to rice–wheat crop residue burning on pulmonary functions like Force Vital Capacity (FVC), Force Expiratory Volume in one second (FEV₁), Peak Expiratory Flow (PEF) and Force Expiratory Flow in 25 to 75% of FVC (FEF_{25–75%}) on 40 healthy subjects of rural/agricultural area of Sidhuwal village of Patiala City were investigated for a period from August 2008 to July 2009. Measurements were taken by spirometry according to the American Thoracic Society standards. High volume sampler (HVS) and Anderson Impactor were used to measure the concentration levels of SPM, PM₁₀ and PM_{2.5} in ambient air of the Sidhuwal village. A significant increase in the concentration levels of SPM, PM₁₀ and PM_{2.5} was observed due to which PFTs of the subjects showed a significant decrease in their values, more prominently in the case of children. PFTs of young subjects recovered up to some extent after the completion of burning period but the PFT values of children remained significantly lower (PBO.001) even after the completion of burning episodes. Small size particulate matter (PM_{2.5} and PM₁₀) affected the PFTs to a large extent in comparison to the large size particulate matter (SPM). The study indicates that ACRB is a serious environmental health hazard and children are more sensitive to air pollution, as ACRB poses some unrecoverable influence on their PFTs.

KLO 3: Get acquainted with different machineries used in the handling of farm waste

Farm machinery, mechanical devices, including tractors and implements, used in farming to save labour. Farm machines include a great variety of devices with a wide range of complexity: from simple hand-held implements used since prehistoric times to the complex harvesters of modern mechanized agriculture.

Paddy Straw Shredder is tremendously capable to process the agriculture waste. The three in one device makes the agriculture residue the perfect manure for the farm soil and converts it for composting or fuel. The paddy straw shredder is specialized in preparing organic manures, feed for the animals made from the agriculture waste or local organic garbage included in the waste.



KLO 4: Prepare compost from the farm waste

A mass of rotted organic matter made from waste is called compost. The compost made from farm waste like sugarcane trash, paddy straw, weeds and other plants and other waste is called farm compost. The average nutrient contents of farm compost are 0.5 per cent Nitrogen, 0.15 per cent Phosphorus and 0.5 per cent Potassium. The nutrient value of farm compost can be increased by application of super phosphate or rock phosphate at 10 to 15 kg/t of raw material at the initial stage of filling the compost pit. The compost made from town refuses like night soil, street sweepings and dustbin refuse is called town compost. It contains 1.4 per cent Nitrogen, 1.00 per cent Phosphorus and 1.4 per cent Potassium.



Farm compost is made by placing farm wastes in trenches of suitable size, say, 4.5 m to 5.0 m long, 1.5 m to 2.0 m wide and 1.0 m to 2.0 m deep. Farm waste is placed in the trenches layer by layer. Each layer is well moistened by sprinkling cow dung slurry or water. Trenches are filled up to a height of 0.5 m above the ground. The compost is ready for application within five to six months. Composting is essentially a microbiological decomposition of organic residues collected from rural area (rural compost) or urban area (urban compost).

KLO 5: Convert farm waste into small pieces by use of scribbling machine

Organic composting forms the backbone & basic necessity of a poor farmer. The traditional methods are not sufficient & satisfactory for chopping the crop residues. Whereas buying the chemical fertilizer is not possible for every farmer due to its high cost and also food waste contains high calorific and nutritive values. Inadequate management of wastes like uncontrolled dumping bears several adverse consequences. Shredding machine is used for shredding and converting macro organic waste products into small or micro easily decomposable form, which can be used as organic manure. Organic waste shredder designed should perfect to shred all kinds of waste products. The organic waste shredded will be in small pieces to enable the farmer to make use of it as feed for manure or organic manure and biogas feed. This shredder can be operated with a motor.

Organic Waste Shredding Machine



KLO 6: Incorporate green manure in the soil for in-situ decomposition

In agriculture, green manure is created by leaving uprooted or sown crop parts to wither on a field so that they serve as a mulch and soil amendment. The plants used for green manure are often cover crops grown primarily for this purpose. Typically, they are ploughed under and incorporated into the soil while green or shortly after flowering. Green manure is commonly associated with organic farming and can play an important role in sustainable annual cropping systems.



Green Manuring: India has changed from a region of food scarcity to food sufficiency by increased fertilizer use with subsidized prices, but use of organic manures including green manure, declined substantially. Inorganic fertilizers are becoming more expensive, therefore sustainability of soil productivity has become a question. Hence, alternate sources to supplement inorganic fertilizers are thought. Green manuring are low cost and effective technology in minimising cost of fertilizers and safeguarding productivity.

In-situ sunnhemp green manuring in maize-wheat cropping system of sloppy soils of Himalayan states is a cost effective conservation technology which not only produces 16% higher system productivity over 100% recommended dose of NPK through inorganic fertilizers but also reduces runoff and soil loss by 27 and 33%, respectively. This technology makes farmers self-sufficient on his own low cost renewable on-farm resources and ensures saving of costly chemical fertilizers and increases soil organic carbon for soil quality improvement.

KLO 7: Make bales of straw after harvesting.

Straw is an agricultural byproduct consisting of the dry stalks of cereal plants after the grain and chaff have been removed. It makes up about half of the yield of cereal crops such as barley, oats, rice, rye and wheat. It has a number of different uses, including fuel, livestock bedding and fodder, thatching and basket making.

Straw is usually gathered and stored in a straw bale, which is a bale, or bundle, of straw tightly bound with twine or wire. Straw bales may be square, rectangular, or round, and can be very large, depending on the type of baler used. Baling wheat straw is unique compared with baling hay. It is common for the baler to follow the combine as it is harvesting wheat for grain (or soon after).



The combine will have the shredder fans turned off, and wheat straw is windrowed for baling. Therefore, baling costs will be less than hay since mowing, raking, or tedding are not required. In addition to the baling costs, there are costs associated with handling and moving the bales in the field, hauling bales to market, and the value of nutrients removed from the soil due to baling the straw. According to the University of Kentucky AGR -1 Lime and Nutrient Recommendations, the baling of wheat straw removes nitrogen, phosphorus, and potassium at a rate of 12 lbs, 4 lbs, and 20 lbs per ton of straw, respectively. Thus, as commercial fertilizer prices fluctuate, so would the cost for baling wheat straw.

KLO 8: Store and transport compressed bails

Straw as a byproduct of the harvest of cereal crops is suitable for many agricultural and industrial applications. Mostly it is saved as fodder or bedding in animal production or for energy utilization. Both quality assurance and the minimization of supply costs require an optimization of the entire logistic chain from the field where it is harvested to the store. Due to the bulkiness of straw, an appropriate level of compaction is particularly important, to reduce the transport and space requirements. The span of density from 50 to 300 kg m⁻³ depends upon the handling and compaction procedures. The highest density (up to 500 kg m⁻³) is achieved by forming pellets or briquettes. These are preferred for long transport distances as well as in logistic chains for the

supply of fibrous bio-fuel. With normal compaction systems, the density spectrum ranges from 80 to 160 kg m⁻³. These procedures are described as related to harvesting machines as well as to transport, handling and storage equipment. Procedures are also presented as related to the high pressure compaction of straw, which are favorable for large transport distances and in logistic chains for the supply of fibrous bio-fuels. Criteria for the evaluation and selection of such procedures are presented as well as future trends, which can be expected in straw handling.



KLO 9: Make pellets/ briquettes to be used as fuel from the farm waste

The reduction of material density is the reason for undertaking briquetting as it determines both the savings in transport and handling costs and any improvement in combustion over the original material: the art of briquetting. This art essentially involves two parts: the compaction under pressure of loose material to reduce its volume and to agglomerate the material so that the product remains in the compressed state. Later effect, the cohesion of the particles, is based on three main mechanisms:

1. Generating a positive coupling of particles by fibre connections
2. Attraction forces between particles through hydrogen bonds
3. Creating of form-closed bonds through the sticking effect of several biomass contents (lignin, protein, starch) or added binders



Comparison between Pelleting and Briquetting

Briquette processing is more efficient than pelleting because the biomass materials do not necessarily have to be preprocessed or uniformly ground up, which results in less preparation. Another advantage of briquetting is it can be set onsite. Briquetting waste byproducts and reusing them onsite for energy rather than transporting them to another location or to a landfill can save on disposal costs. Briquetting generally use less horsepower. From the investment point of view, the purchase capital and maintenance costs to make briquettes are less than for pellets. If transportation is one of the main criteria, pellets are more advantageous because there are more pounds per foot than briquettes. This is especially true if the briquettes are larger because it allows for more air between them when they are stacked.

- Densification essentially involves two parts: the compaction under pressure of loose material to reduce its volume and to agglomerate the material so that the product remains in the compressed state.
- An internal or external binding agent is necessary to prevent the compressed material from springing back and eventually returning to its original form. The lack of inherent binders is the main difference when comparing charcoal with biomass briquetting.
- The main presses for briquetting are piston and screw presses; for pelletizing pan grinder presses are most common; to produce charcoal normally roller presses or agglomerators are used.
- The quality and the quantity of the raw material as well as the market availability are the main factors for the choice of the adapted technology.
- Often, briquetting is not a stand-alone process. Different pretreatments might be considered: storage, handling, drying, and sizing.
- Capital costs for different investments and operating costs (such as labour, maintenance, raw material etc.) determine the production costs of briquettes.
- The economic viability of briquetting plants depends crucially on whether or not these factory costs are comparable or less than the prices of the main competitive fuel.

KLO 10: Familiarize with the use of various types of briquetting machines

The Agro-waste cum Biomass Briquette Making Machine is one of the offered models of Briquette Making Machines which can prepare briquettes from various agriculture and wood wastes. The agro and wood wastes should be used in powdered form (5 mm to 8 mm) having moisture content between 10 to 12% only. In case you would like to crush the raw materials to powdered form then you can use Crusher Machines and for drying purpose you can use Dryer Machines.

The following agro and wood wastes can be suitably used as raw materials: Groundnut Shells, Sugarcane Bagasse, Corn Cob, Coffee Husk, Coffee Shells, Jute Sticks, sawdust (Mixed), Tannin Waste, Almond Shells, Soya bean Stalks, Areca Nut Shells, Castor Stalks, Coconut Shells, Coir Pith, Sunflower Stalks, Jowar Straws, Bean Straws, Barley Straws, Arhar Stalks, Paddy Straws, Lantana Camara, Dust, Subabul Leaves, Just Dust, Tea Waste, Rice Husk, Tamarind Husk, Deoiled Bran, Rice Husk.



The Pellets cum Briquette Making Machine 20mm/30mm is one of the models for the Pellets Making Machine which as the name suggests can prepare 20 mm pellets/briquette as well as 30 mm pellets/briquette. The Pellets cum Briquette Making Machine 20mm/30mm can be widely used in both rural and urban areas, biomass power plants, as agro-industrial fuels, in production of biogas, gasification units, industrial boilers etc.

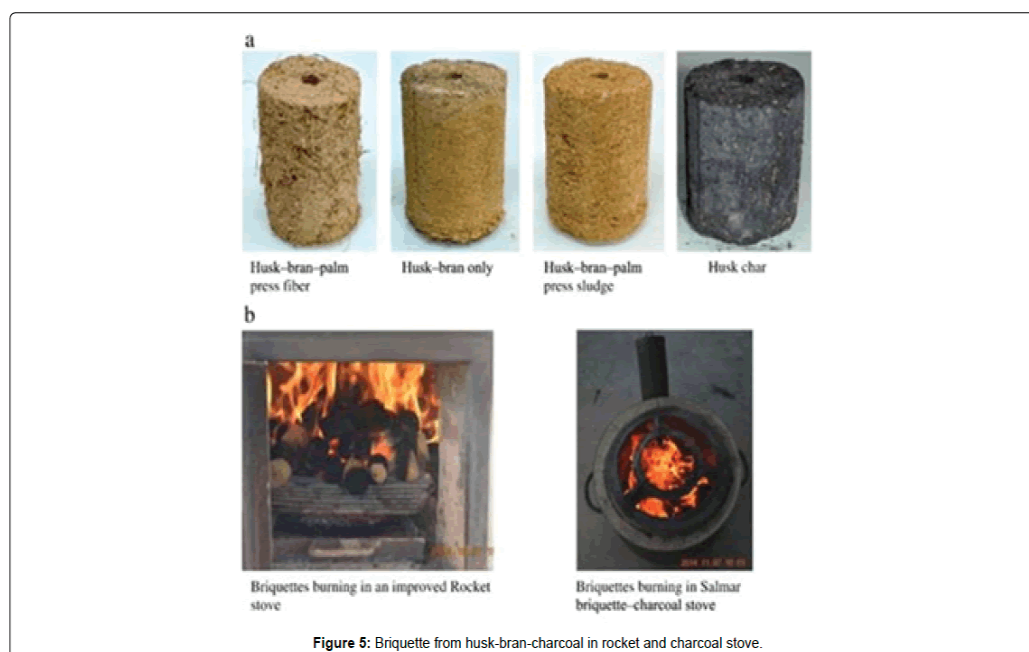
KLO 11: Familiarize with the various uses of pellets or briquettes

Farm waste or biomass Briquettes are widely used for any type of Thermal Application like steam generation in boilers, heating purpose, drying process & gasification plant to replace existing conventional fuel like coal, wood & costly liquid fuel like FO, Diesel, LDO, Kerosene etc.

1. Briquettes and pellets are both products deriving from the densification of a raw material.
2. Biomass briquettes and pellets for fuel use are a product which aims to improve the characteristics of a certain raw material.
3. The main reason for the densification is to increase their energy content per volume.

Application of Eco-friendly Bio Fuel Briquettes/Bio-Coal in various Industries:

Gasifier System Applications	Ceramic Industries
Refractory Industries	Solvent Extraction Plant
Chemical Industries	Dyeing Units
Milk Plant	Food Processing Industries
Vegetable Plants	Textile Unit
Spinning Mill	Lamination Industries
Leather Industries	Brick Making Units
Rubber Industries	Any Industrial Thermal Application



REFERENCES

1. Harshwardhan K, Upadhyay K (2017) Effective Utilization of Agricultural Waste: Review. J Fundam Renewable Energy Appl 7: 237. doi:10.4172/20904541.1000237
2. Amit Awasthi, Nirankar Singh, Susheel Mittal, Prabhat K. Gupta, Ravinder Agarwal , Effects of agriculture crop residue burning on children and young on PFTs in North West India. Science of the Total Environment 408 (2010) 4440–4445
3. <http://vikaspedia.in/agriculture/agri-inputs/bio-inputs/bioinputs-for-nutrient-management/compost-preparation>
4. Raman Jeet Singh Raman Jeet Singh, In-situ Green Manuring in Maize-Wheat Cropping System to Check Soil Degradation and Carbon Improvement in Sloppy Soils of Himalaya. 2014
5. https://energypedia.info/wiki/Biomass_Briquettes_-_Production
6. Agricultural Mechanization and Automation–Vol. II - Baling, Transportation, and Storage of Straw - J. Hahn, A. Herrmann

KLO 1: Get acquainted with the existing trade systems and environment

Agricultural marketing is mainly the buying and selling of agricultural products. In earlier days when the village economy was more or less self-sufficient the marketing of agricultural products presented no difficulty as the farmer sold his produce to the consumer on a cash or barter basis.

Today's agricultural marketing has to undergo a series of exchanges or transfers from one person to another before it reaches the consumer. There are three marketing functions involved in this, i.e., assembling, preparation for consumption and distribution. Selling on any agricultural produce depends on some couple of factors like the demand of the product at that time, availability of storage etc. The products may be sold directly in the market or it may be stored locally for the time being. Moreover, it may be sold as it is gathered from the field or it may be cleaned, graded and processed by the farmer or the merchant of the village. Sometime processing is done because consumers want it, or sometimes to conserve the quality of that product. The task of distribution system is to match the supply with the existing demand by whole selling and retailing in various points of different markets like primary, secondary or terminal markets.



Most of the agricultural products in India are sold by farmers in the private sector to moneylenders (to whom the farmer may be indebted) or to village traders. Products are sold in various ways. For example, it might be sold at a weekly village market in the farmer's village or in a neighboring village. If these outlets are not available, then produce might be sold at irregularly held markets in a nearby village or town, or in the mandi.

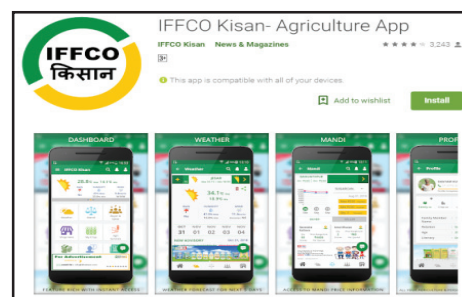
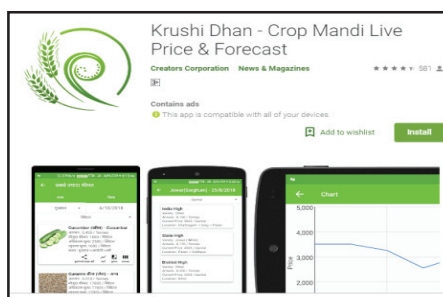
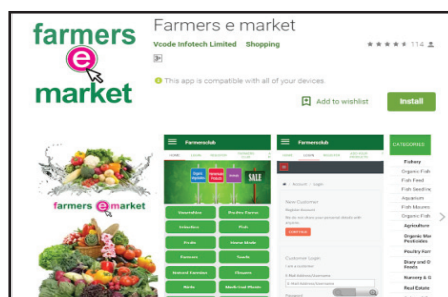
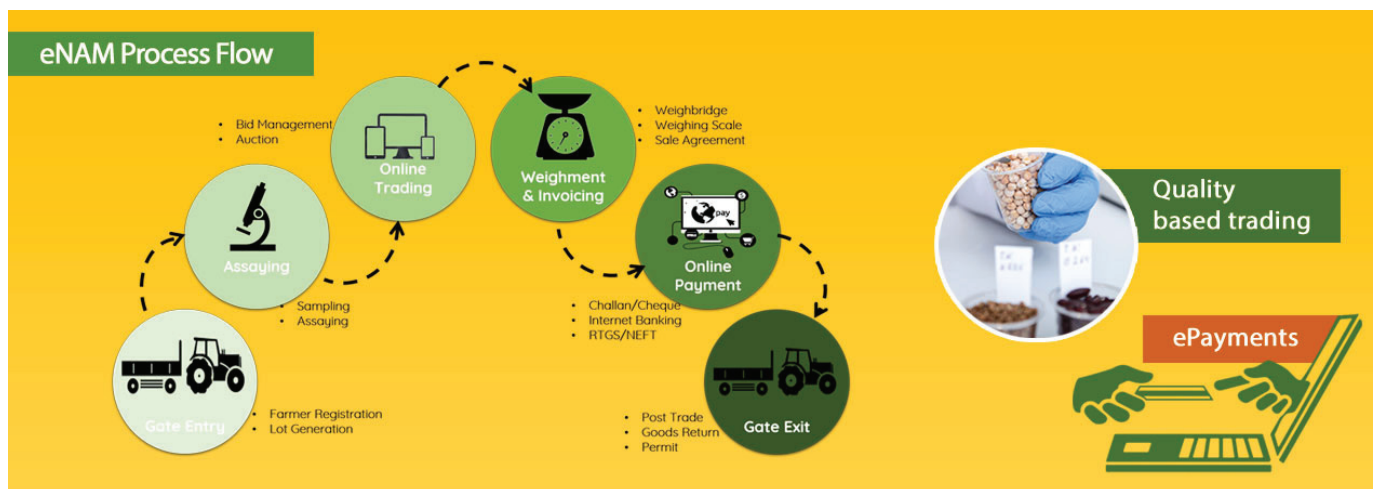
In India, there are several central government organisations, who are involved in agricultural marketing like, Commission of Agricultural Costs and Prices, Food Corporation of India, Cotton Corporation of India, Jute Corporation of India, etc. There are also specialised marketing bodies for rubber, tea, coffee, tobacco, spices and vegetables.

Under the Agricultural Produce (grading and marketing) Act of 1937, more than forty primary commodities are compulsorily graded for export and voluntarily graded for internal consumption. Although the regulation of commodity markets is a function of state government, the directorate of marketing and inspection provides marketing and inspection services and financial aid down to the village level to help set up commodity grading centers in selected markets.

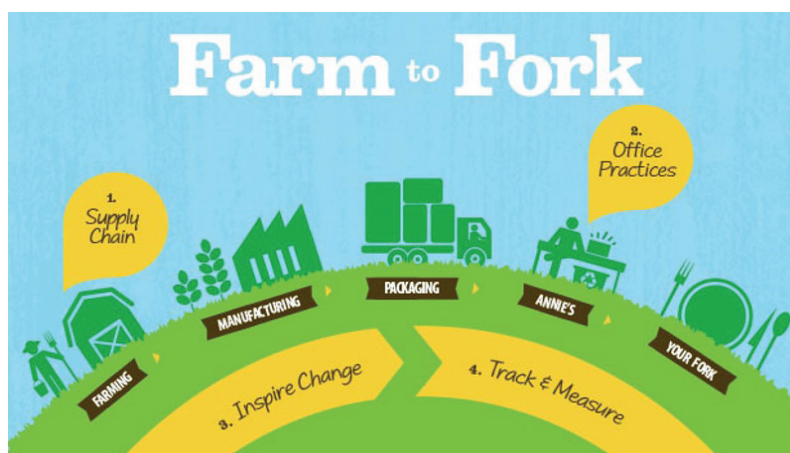
As we have a tradition of agricultural production, marketing and allied commercial activities, now it is the time for us to brainstorm and come out with new ideas of value added services. These value added services will give the existing agricultural engine a new dimension. The next logical step could be food-processing which not only could be another revenue generating area but also can provide lots of full-time employment to our youths. With the changing agricultural scenario and global competition, there is a need of exploiting the available resources at maximum level.

National Agriculture Market (eNAM) is a pan-India electronic trading portal which networks the existing APMC mandis to create a unified national market for agricultural commodities.

Small Farmers Agribusiness Consortium (SFAC) is the lead agency for implementing eNAM under the aegis of Ministry of Agriculture and Farmers' Welfare, Government of India.



Farmer to consumer - Farmer to Fork - Farm Direct Marketing: Farm direct marketing is a long felt need of the farmers and consumers of the country as it goes a long way in ensuring higher remuneration to the farmers and meeting the satisfaction level of the consumers through direct sale of the agricultural commodity by the farmers to the consumer at affordable prices. Direct marketing of agricultural produce helps in complete elimination of middle men and commission agents who charge high level of commission fee from the agriculturists/farmers coming to the market yards for selling their produce and then artificially inflate the retail prices.



What farmers need to consider when selecting which direct marketing channels fit best with a farm's resources, goals and accessible customer base.

All successful farming operations require mastering the delicate balance of production and distribution. Many growers choose to direct market their products because it allows for better potential profit margins compared to selling wholesale. The benefits realized by cutting out the middleman and getting direct feedback from the customer can make these marketing avenues worth the labor required to sell directly.

Farm Direct Marketing: Farm direct marketing involves selling a product from the farm directly to customers. Often, the farmer receives a price similar to what the grocery store charges. This method of marketing is more entrepreneurial or business-like than wholesale marketing. In a manner of speaking, the farmer using this method grows a “product” more than a crop. The opportunity to interact with growers is one of the reasons consumers like to purchase this way. The experience of the purchase is often part of the product.

Here sales to restaurants, retail stores and institutions are included among farm direct marketing approaches because the farmer has some control over the price and the transaction is based on a relationship with a business owner. Pricing varies and may be higher for sales to restaurants, but lower for grocery stores.

Farm direct marketing Advantages: Since small quantities of farm products can be sold, small producers can participate. The farmer sets the price or is more control of the price. Good products and services can get attractive prices and therefore, small farms can be profitable.

Payment is usually immediate: In addition, farmers receive instant feedback from customers on products and service. The farmer can improve his/her business through this input and increase farm profitability.

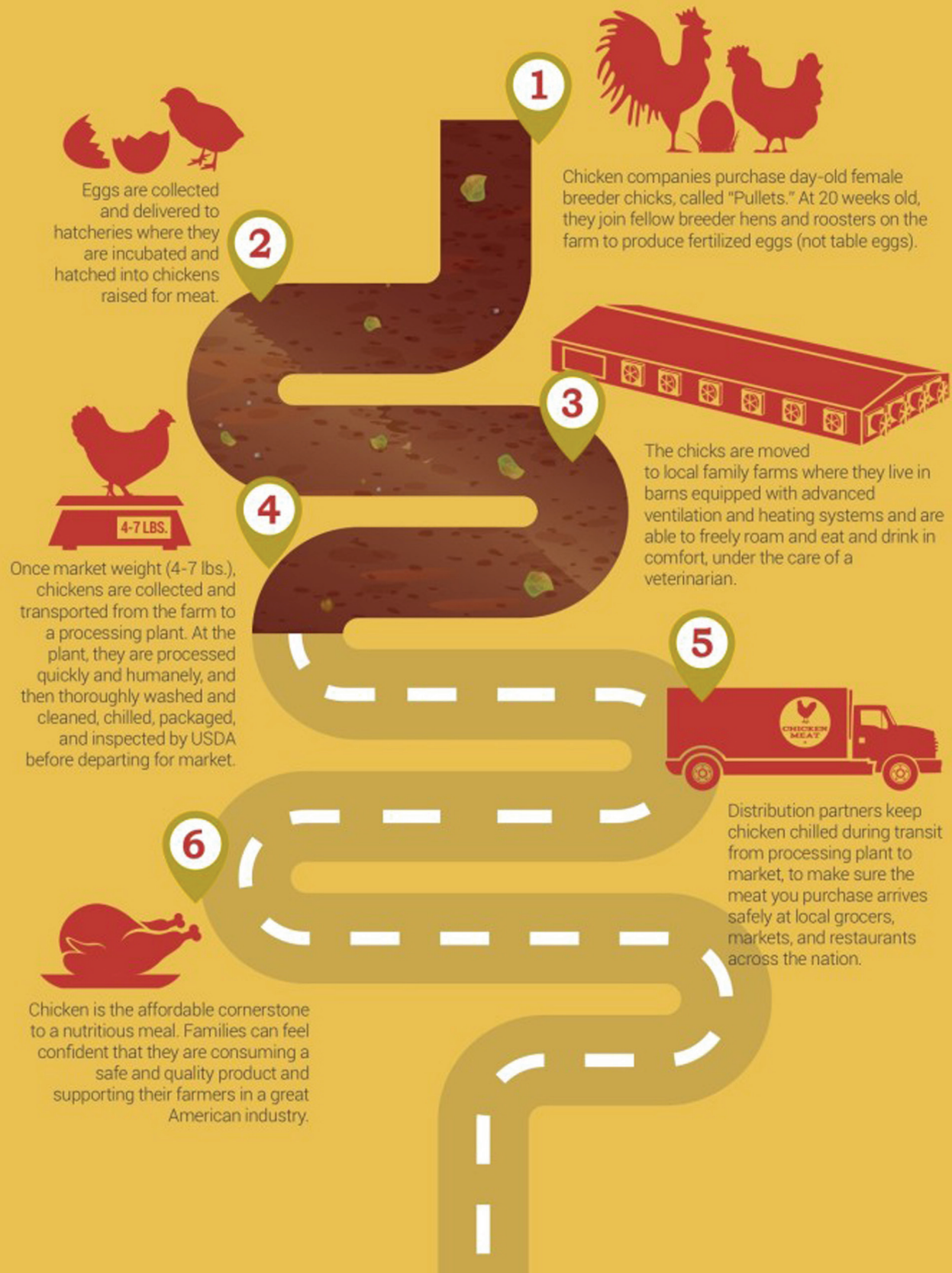
Direct Marketing Channel: Roadside Markets - This option allows the farmer to stay on or near the farm, minimizing transport to market. If set up as an “honor-system” stand, this option has minimal time and infrastructure needs. A more substantial roadside stand requires an investment in infrastructure, directional signage, marketing, and staffing. Location is also a major consideration with this outlet.

Farmers Markets: Ensures your product is exposed to a higher volume of consumers who will generally pay the highest price per Kg / piece, while also putting you in direct competition with other vendors. A great way to build customer loyalty, get direct feedback, and promote your farm business. Farmers market sales can make for notoriously long days, being off property or investing in staff, running trucks, and dealing with weather related uncertainty on market days. Selling at market requires a high level of customer interaction. Farmer need to have proper transportation and storage, the ability to accept multiple forms of payment, and will need to develop a pretty good idea of what you'll sell on a given day. Farmer also want to keep in mind the required vendor fees and other requirements for the market.

Pick Your Own: This option rather new but can require less labor on the farmer's end, but requires a lot more attention to public relations, crowd control to prevent theft and damage to crops, and staff on picking days. You'll need to be prepared for the potential crop damage and the possibility of someone getting injured on the farm. This marketing channel works well with particular crops, and is common with orchards. A convenient location is helpful with this model.

Subscription Farming, or Community Supported Agriculture (CSA) Programs: In this model, your customer base signs up and pays for their share of the produce in advance of the growing season, usually in winter. This gives you capital when you need it early in the season, and guarantees an outlet for your product. It also has the benefit of creating customer loyalty and a sense of community. It does require interaction with members and figuring out the logistics of on-farm pickup, and/or off-farm delivery, as well as dealing with back-up plans to ensure a well-rounded box each week. You'll also want to consider the established competition in your area and changing customer perceptions and expectations for CSA.

FROM FARM TO TABLE



Restaurants/Hotels/Dhabas: Can be well suited for niche crops and specialty varieties. Marketing through restaurants provides a year-round outlet, can be great PR and has potential for contract growing. Some drawbacks to consider are that quantities of order can be small and/or unreliable; greater pressure on meeting quantity and quality standards; as well as the potential difficulty of working with Chefs who have a different schedule and demands, and may not have a grasp on seasonality.

Farm Direct Marketing Challenges: Since a farm using direct marketing is responsible for what it grows and how and to whom it markets its products, risk is much higher than it is for farms using wholesale markets. Farm direct marketing is equivalent to starting a small business in addition to the farm. Using farm direct marketing, the farmer takes on new roles and becomes responsible for marketing, retailing, advertising, customer relations and so on. The method requires the personality and patience to work with people: the farm's customers. There are also regulations that pertain to farm direct marketing that other farms do not worry about. Lastly, even though the potential for profit is much greater for small farms marketing directly, there is no free lunch. This approach will require long hours to produce crops, service customers, keep up with competition, and more.

Selecting What Crop or Product to Sell: Deciding what to sell is an integral part of marketing; especially farm direct marketing. Farm direct marketing is closely related to the concept of "niche marketing." Niche marketing is producing a product that differs somehow from what others are growing. Through its uniqueness, the product fills a niche or gap in the market. Niche marketing provides a customer base for sales and allows the farm the ability to more closely control the price for the product. Niche marketing is counter to the traditional approach to agriculture in which commodities that are virtually all alike are marketed to "everyone." Instead, a specific product is marketed to a specific segment of the population that desires it and is willing to buy it.

A few guiding question can help this process, here are a few examples:

Consider the type of consumer and the demand in your geographical area.

- Is there someone to buy our product? How much will they pay?
- Determine where to market our product, and how to get it there. Proximity to our consumer should play a major role in this decision. Are they close enough to make a Pick-Your-Own or on-farm CSA pickup feasible?
- Are the farmers markets close enough to us that it's worth the trip?
- Can we afford the time and cost to run a delivery truck?
- Familiarize ourselves with the competition. What advantages do they have? Can we bring something to the table that they can't?
- Familiarize yourself with market prices (current and overall trends) for the product(s) we plan to sell. Compare that to the cost of production to ensure a profit.
- General infrastructure - Can we have, or can we acquire the necessary transportation, supplies, labor and meet food safety requirements?
- Post harvest handling capabilities - If we plan to move our product anywhere and keeps it looking fresh and palatable, can we have the necessary washing and cooling equipment? Will we be able to package properly?
- Are we needed to prepare processed foods and deal with the related regulatory obligations?
- Take the risks into account - When marketing directly, we'll need to protect ourselves against potential problems.

KLO 2: Identify and negotiate with input sellers/service providers

Strong negotiation skills are paramount in agri-business. If we want to succeed, we must know how to negotiate. Samanvay Consulting's core leadership and management skill enables us to negotiate effectively in a wide range of business contexts, including deal-making, corporate team building, contracts and handling disputes all with a win-win objective. By being objective and fair to both sides, we ensure that all successful negotiations fall within ethical guidelines.

Crop sales negotiation can be a source of dread for salespeople. It's especially painful when a rep thinks they've closed a deal and then the prospect surprises them by wanting to "talk about the details."

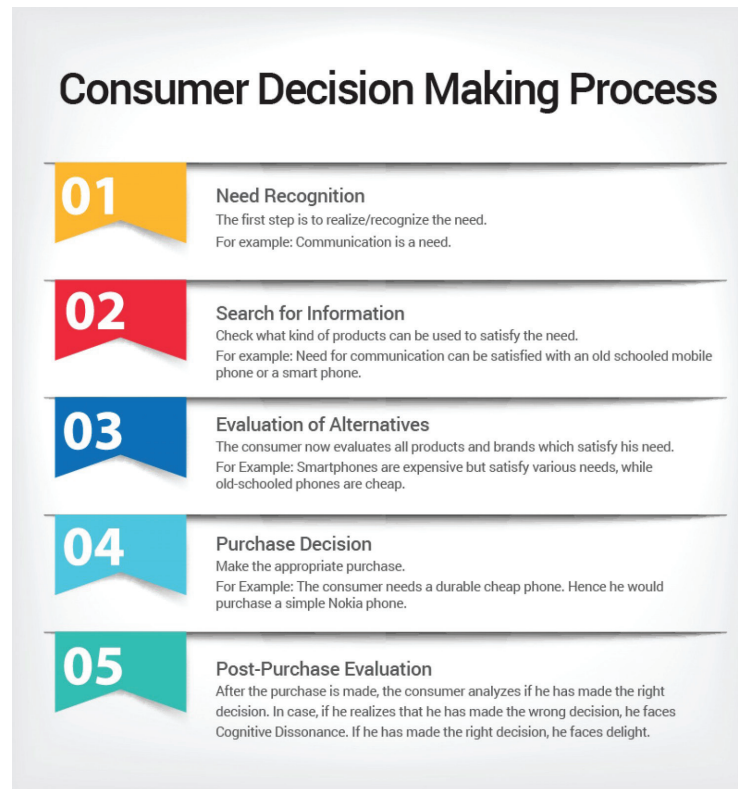
With the right sales negotiation strategy, even this part of the sales process can remain warm and result in a win-win outcome for all parties. Here are 9 Crop sales negotiation skills your salespeople need to master to avoid price concessions and protect your profit margins.



- 1. Talk to the Right People:** Nothing is more disheartening than settling on a deal with someone; only to find out they don't have the final say in the decision-making process. Help your farmers to reduce the odds of this happening by coaching them how to identify and reach decision makers early in the sales process.
- 2. Establish the Customer's Pain:** Prospects who understand their own pain will be more motivated to alleviate it, and less likely to push back on price. Skilled farmers identify customer pain early, bring it to the prospect's attention, and quantify its financial and emotional cost out loud to the prospect.
- 3. Build the Relationship:** Buyers are far less likely to "play hardball" when they're negotiating with someone they view as a trusted partner. Teach your farmers to establish trust and build the relationship early in the sales process to reduce negotiation friction later.
- 4. Quantify the Value:** When a prospective client clearly understands the value of a solution, they are much more likely to be willing to pay what it's worth. Help your farmers learn to clearly identify and, when possible, quantify the value of the solution as differentiated from competitors.
- 5. Know Your Bottom Line:** Sometimes, following steps one through four can eliminate the negotiation process altogether. If the sale does go into a negotiation process, teach your farmers to be thoroughly prepared by knowing in advance exactly how low they can go and still result in a win-win situation for all parties. This will ensure they don't make promises in the heat of the moment that they later regret.

KLO 3: Get information on the needs of the buyer

A farm product buyer and purchaser concentrates on buying farm products to resale. They may even be interested in purchasing any biproducts made at the farm that can be used to create an entirely new product. Buyers and purchasing agents can work to buy grain, fruit, tobacco, and even trees!



1. Build trust and rapport. Nobody likes to be interrogated with questions; it can make them uncomfortable - or even worse- defensive. ...
2. Ask the right questions at the right time. Have a list of questions prepared before the meeting, but don't be a slave to your script. ...
3. Dig deeper. ...
4. Summarize and set the stage.

KLO 4: Make necessary negotiations for appropriate price and timely payment to member farmers

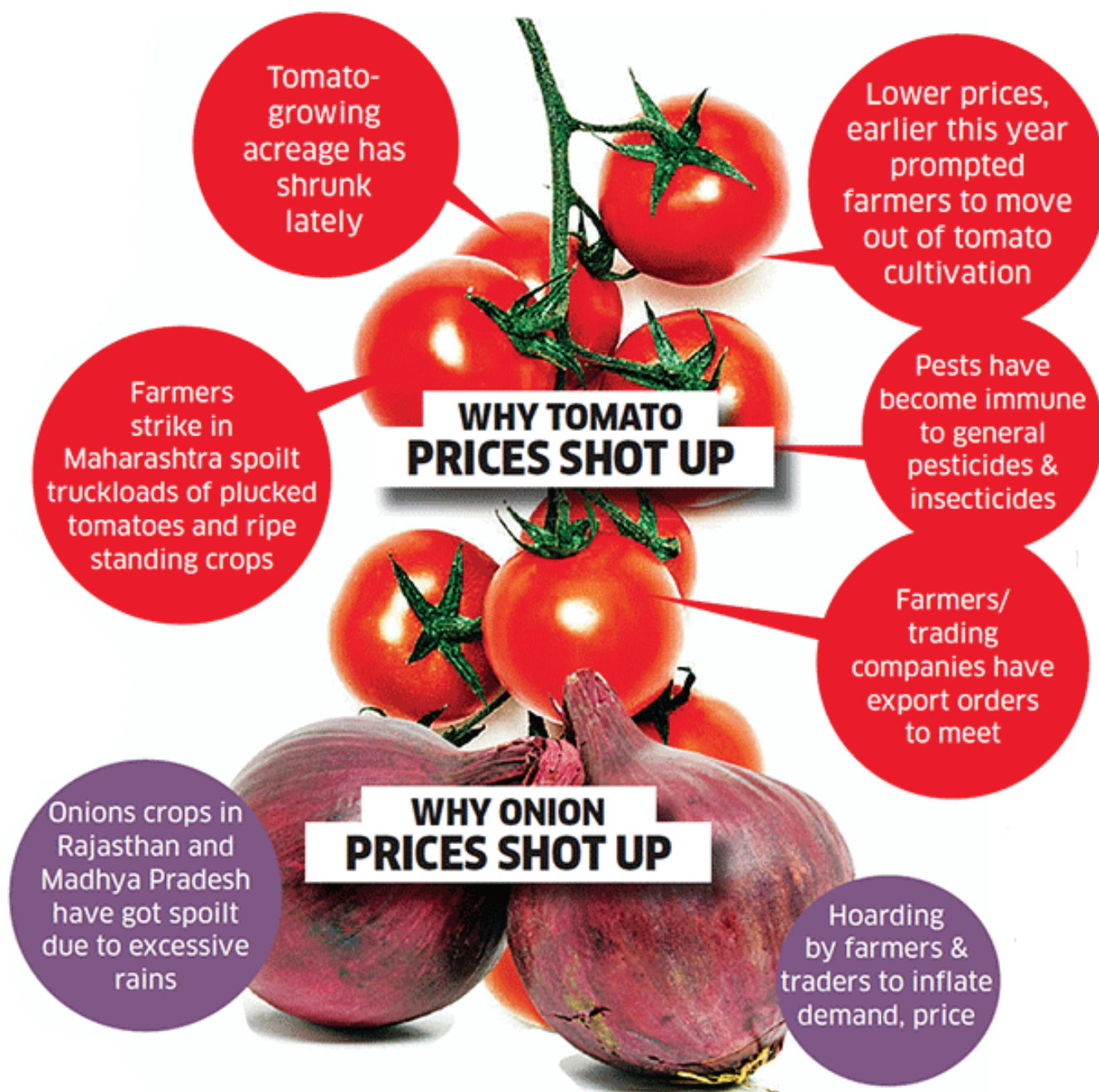
Negotiation is a process where two or more parties with different needs and goals discuss an issue to find a mutually acceptable solution. In agri-business, negotiation skills are important in both informal day-to-day interactions and formal transactions such as negotiating conditions of sale, lease, service delivery, and other legal contracts. Good negotiations contribute significantly to agri-business success, as they:

1. Help you build better relationships
2. Deliver lasting, quality solutions - rather than poor short-term solutions that do not satisfy the needs of either party
3. Help you avoid future problems and conflicts.

Negotiating requires give and take. Farmer should aim to create a courteous and constructive interaction that is a win-win for both parties. Ideally a successful negotiation is where you can make concessions that mean little to you, while giving something to the other party that means a lot to them. Farmer approach should foster goodwill, regardless of the differences in party interests. A good negotiation leaves each party satisfied and ready to do agri-business with each other again.

KLO 5: Ensure proper measurement and timely supply of the produce

The concept of timely supply relates to the choices crop producers make regarding the production and sale of a crop product. Supply choices are influenced by a number of factors. Those factors include the price of the product in question, the number of farmers, the farming input costs, the technological changes, the price of other possible crop products, and unpredictable factors such as weather. The relationship between quantity supplied and price can be described by the elasticity of timely supply. The two most important supply shifters for farm products are typically technological change and weather.



KLO 6: Get well versed in the communication and negotiation skills

Farmers with communication and negotiation skills have the ability to seek a variety of solutions to several problems. Instead of focusing on his ultimate goal for the negotiation, the farmer with skills can focus on solving the problem, which may be a breakdown in communication, to benefit both sides of the issue.

Regardless of the type of small agri-business/Farmer Organization the lead may be involved in, there are always negotiations that take place on a daily basis. These may be as simple as choosing a meeting time and place, or they could be much more important to the overall business structure, such as working out the details of a big contract. Agri-Business people need to be skilled in negotiation tactics and understand how to effectively communicate during the negotiation process.

Non-Verbal: In every type of communication scenario, including during negotiations, non-verbal communication is sometimes more important than what is actually being said. You should pay attention to the non-verbal cues of the opposing negotiator as well as to any non-verbal cues he may be portraying. For instance, if someone suddenly crosses his arms across his chest during the discussion, it can indicate that he is disagreeing with what is being said. Paying attention to non-verbal cues can help you to change your strategy.



Verbal: What is verbally being stated with the negotiation is also important. Negotiators should aim to follow some simple rules during a negotiation, such as never raising voices, not interrupting the other person when he is speaking and avoiding using jargon that may not be easily understood by the other. A negotiator can easily assess the effectiveness of her verbal communication by asking the listener to paraphrase his understanding of the exchange

Preparation: Before a negotiation begins, you should prepare for the exchange. This includes identifying the goal of the negotiation, brainstorming multiple solutions and determining what the main negotiation tactic may be. In addition, you should create an outline of the main points that you will make during the verbal exchange of the negotiation. You should also take some time to determine which elements of the project you are willing to give up or compromise on in order to reach a successful agreement.

a Case Study of Small Farmers Participation in a Farmer Producer Company (FPC) in Telangana, India

The rise of agribusiness has impacted the agricultural sector worldwide. Specifically in India, many small farmers have been negatively affected by the rise of agribusiness, as they are competing against large farms that have access to more resources and money. In recent decades, alternative food networks (AFNs) have arisen, generally as small-scale, non-governmental programs that provide a way for small farmers to find success and receive fair compensation for their crops.

This study examined how farmers perceive their participation in Sahaja Aharam, a farmer producer company based in Hyderabad, Telangana. Through qualitative interviews with seven farmers who are formally involved in this FPC, it was evident that involvement in the Sahaja Aharam programs has changed the lives of farmers in many ways. Many farmers received assistance in converting from chemical farming to organic farming, which allowed them to benefit financially, environmentally, and in their personal health and happiness. Additionally, Sahaja Aharam links their participating farmers to markets through which they receive a higher producer price, shortening the typically large gap between consumer price and producer price found in markets throughout India. Overall, through these benefits, the small farmers involved in this FPC were able to improve their livelihood. Through providing access to fair-paying markets, knowledge of organic farming, and other forms of support, Sahaja Aharam as an FPC has allowed its members to find greater success in their farming practices and overall lives.

However, through the interviews it was made clear that small farmers in Telangana still face many challenges. Their involvement with Sahaja Aharam linked them with a fair-paying market when they had previously been struggling with market access. Despite this, many participants expressed that there should be an opportunity to expand the program and further improve these farmers' access to markets, which is a key factor in ensuring that they can maintain their livelihood through their farm work.

However, whether or not the Sahaja Aharam program finds success in the future is dependent on the expansion of the urban organic market, as well as their ability to connect with and support farmers via long-term relationships.

Open-Ended Communication: While questions that can be answered with one word such as “yes” or “no” have their place in effective communication and negotiations, open-ended questions can reveal much more information. For instance, asking the person what you would have to do to negotiate this deal today and walk away with a signed contract can reveal his objections to the deal. This tells you exactly what you need to focus on and overcome within your presentation. After asking an open-ended question, sit quietly and wait for an answer from the other person. Do not try to fill the silence with further communication.

Considerations: There are certain power plays that can be used in negotiation strategies and which can impact effective communication during the exchange. For instance, sitting behind a big desk while the other person is effectively exposed in just a chair is a power play that gives power to the person behind the desk. While this may be effective in a psychological manner, it does not facilitate effective communication. Focus on creating a win-win deal with honest and open communication rather than tricks that can possibly provide an upper hand through intimidation.

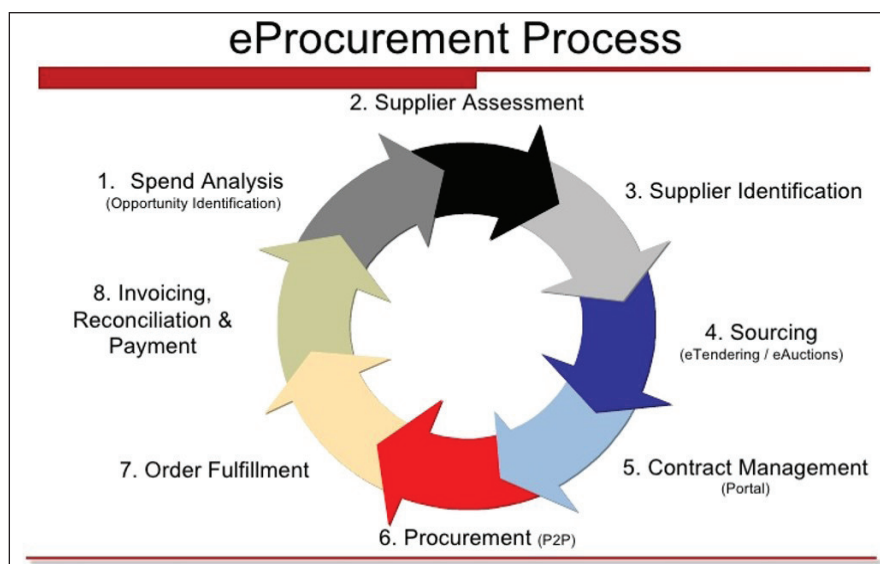
REFERENCES:

1. http://agritech.tnau.ac.in/agricultural_marketing/agrimark_India.html
2. http://agmarknet.nic.in/amrscheme/rythu_bazarmodel.htm
3. http://www.ase.tufts.edu/gdae/education_materials/modules/Trade_and_the_Environment.pdf
4. <https://www.yourfreecareertest.com/farm-product-buyer/>
5. a Case Study of Small Farmers Participation in a Farmer Producer Company (FPC) in Telangana, India ; Rachel Posner; Academic Director: Trilochan Pandey; ISP Advisor: Dr. G.V. Ramanjaneyulu, Center for Sustainable Agriculture; School of International Training India: Sustainable Development and Social Change; Spring 2017
6. <https://www.business.qld.gov.au/running-business/marketing-sales/managing-relationships/negotiating>
7. <https://smallbusiness.chron.com/effective-communication-negotiation-3179.html>

Assimilation refers to the absorption of a new or secondary stock issuance by the public after it has been purchased by the underwriter. When a company/ farmer organization offers shares of its stock for sale to the public, either through an initial public offering (IPO) or through a secondary offering, the shares will first be allocated to one or more underwriters. It is then the underwriters' job to sell the shares to the public.

KLO 1: Get acquainted with the suitable market platform for the selected crop including e-procurement platform

Agricultural marketing is mainly the buying and selling of agricultural products. In earlier days when the village economy was more or less self-sufficient the marketing of agricultural products presented no difficulty as the farmer sold his produce to the consumer on a cash or barter basis. Today's agricultural marketing has to undergo a series of exchanges or transfers from one person to another before it reaches the consumer. There are three marketing functions involved in this, i.e., assembling, preparation for consumption and distribution.



Traditionally, agricultural commodities in India are procured in major agricultural spot market in rural areas known as “mandis” or local market yards. Here the middlemen procure from farmers and receive large share of the profits. These middlemen who are at the forefront of the numerous intermediaries in the complex agrarian distribution channel system, are commonly perceived as using unfair means and unscientific methods to judge the quality of the produce that sets the price a farmer would receive. As a result overtime these practices have served as a disincentive for farmers to invest and produce higher and good quality outputs. e-Choupal aims to address such concerns by giving farmers an option to sell their products directly to the higher level of procurement chain and to diminish the impact of the local first level of procurement middlemen. Through adoption and implementation of information and communication technology it aims to reduce information asymmetry and make agri-business more profitable through lower transaction costs and improved agricultural practices. It further aims to contribute to the larger setup of rural development in India by empowering farmers, an argument well supported by bottom-of-the-pyramid theory.

E-Procurement or electronic procurement refers to the process of purchase and sale of goods or services through electronic methods, primarily the Internet. It is an alternative to the manual process of procurement, and is certainly superior to the latter in many respects. Organizations are increasingly opting for e-Procurement platforms, realizing its potential to curb irregularities and unnecessary costs.

The North Indian state of Haryana wants to help its rural farmers go digital when selling to businesses. Reports by Business Standard on Thursday (Aug. 11) said Haryana Food and Supplies Minister Karan Dev Kamboj will empower farmers to sell their crops online. The announcement will position these farmers with an eProcurement facility ahead of the paddy procurement season. In a statement, Kamboj said commission agents may also be part of the process. A meeting is slated for later this month to discuss aspects and implementation of the eProcurement project, reports noted. India has recently looked to strengthen its eProcurement capabilities in both the private and public sectors. Last year, eProcurement platform cloud Buy said it expects India to push its portal volume to between \$3 billion and \$5 billion as companies in the country flock to digital platforms for procurement needs. But across the globe, farming has also become the center of procurement and payments automation.

Best Apps for e-Market Platforms for Farmers

e-Marketing platforms will reduce the role of middlemen who are hindering the trading sector in the agriculture. These e-Marketing platforms are free of cost and can be accessed from anywhere and made available in understandable language to farmers.

In this online portal, any transaction made is recorded which shows the transparency in the system. The quality of food supply chains is improved and produces are disposed within the stipulated time. These platforms are the sweeping change for farmers. Here are few apps for e-Marketing for agricultural produce:

Smartcrop: While trading farm produces, SmartCrop is an Online Marketplace that comes into action which allows users to buy and sell crops throughout India.

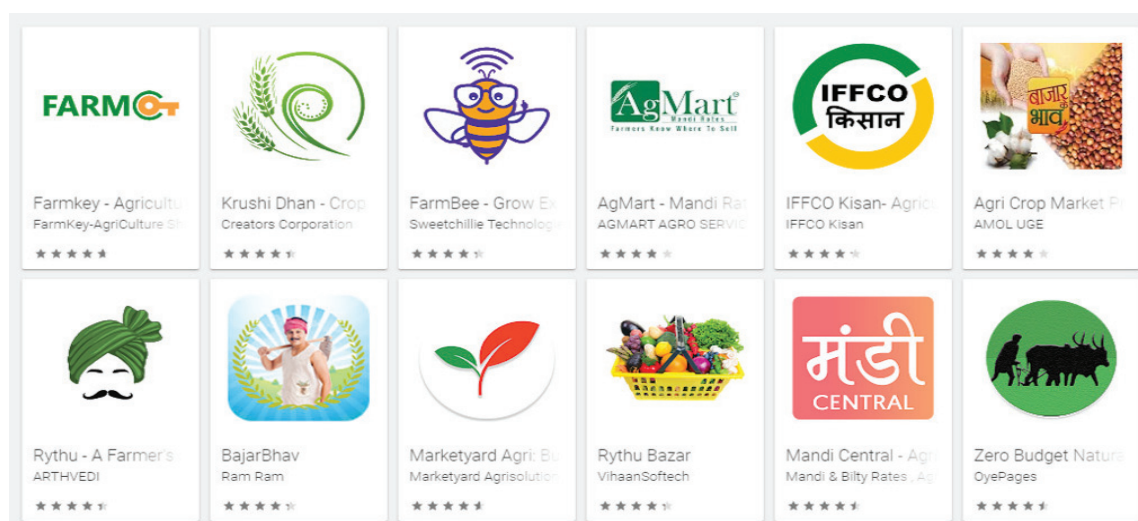
Farmers can post their products and attract more buyers which will save precious time and money. They can get better profits than normal. According to the market prices, the product entries can be removed or re-activated by the users. As these portals reduce middleman buyers and sellers can privately chat to negotiate prices safely.

Dhaan Mandi (Crop Market): Exchanges for various commodities have been offered through digital platforms for meeting the needs. Dhaan Mandi is a free mobile app which acts as an online market for crop market. It is a one-stop marketplace that is open to all buy or sell crops across India. This app provides the end user to advertise their products both in English and Hindi.

Agribuzz — Agriapp: Agribuzz — AgriApp is a free mobile application which is targeted for agriculture practitioners, which provides a platform where app connects and brings together the farming community and helps them in selling, buying and exchanging agriculture commodities and services locally without middlemen through an Add/listing which they can post right from their mobile.

People can connect with each other to buy or sell in over 12 categories and 110 sub-categories. Agribuzz provided with Agribuzz-Chat, seller or buyer can chat with ready-made text templates, details can be shared by e-mail and then discuss the deal on phone contact.

Applets end user to post anything related to Agriculture in one minute. Take a snap or upload a photo, just enter the details of the product, click Submit Ad and instantly end user's Ad will be displayed.



Digital Mandi India: Digital Mandi India is a mobile application helps an end user to check the latest Indian agricultural commodities mandi prices across different states and cities. An end user can browse through various commodity category and states category. It has a simple flow to reach the selected commodities mandi price making it user friendly. The data is synced from the Indian government portal Agmarknet.nic.in — Powered by NIC.

Gramseva/Kisan (Mandi Prices): Gramseva: Kisan (Mandi Prices) application is geared towards farmers and provides market data for farm produce. The app gives real-time market price from the government's website, data.gov.in. Graphs are used to showcase pricing trends which can enable informed decision making. Prices saved by the user can be shared via email and SMS.

Mandi Trades: Agricultural commodity trading platform connecting farmers with traders and enables direct transactions between traders and farmers. Mandi trades is an app where you can find mandi prices, price alert, and food produces in demand. Commodity Prices & Farm Produce data sourced from Govt. of India.

It has a Geo-tagging of farm produce that enables map based identification of procurement source. Direct transactions between farmers and traders — no middlemen.

Agri Market: Agri Market is a user-friendly agriculture application to find market price of crops much easier for the user with the help of Global Positioning System (GPS). The application lets a user identify the market price of the crops within 50Kms of the device's location.

KLO 2: Collect the market information from the reliable sources

Market Research is a term that is used to refer to a process of gathering or collecting information about target audience or target market. The main role of the concept of market research is to provide a farmer organization with an in-depth view of the customers or consumers in order to be able to satisfy their needs better. The process of market research is integral to be able to compete with other players in the same industry and helps to analyze things like market size, competition and market needs.

Benefits of market research

Tapping opportunities – One of the biggest benefits of conducting market research is that it enables you to find out the various market opportunities and makes it possible to tap into them effectively. For example, it may help you to find whether your crop product is suitable for the audience you have targeted or not, and if it isn't, then market research helps to identify the suitable audience.

Encouraging communication – Market research helps you to find out the best way to communicate with your customers. After obtaining research results, one tends to know the audience nature, personalities, likes, dislikes, etc. and this makes it easier to connect with them and reach out to them.

Minimization of the risks – Another major benefit of market research is that it helps businesses minimize risks by taking actions on certain subjects. For example, it may help to add certain qualities to crop products that may reach out to number of people, thus decreasing chances of the product going not used.



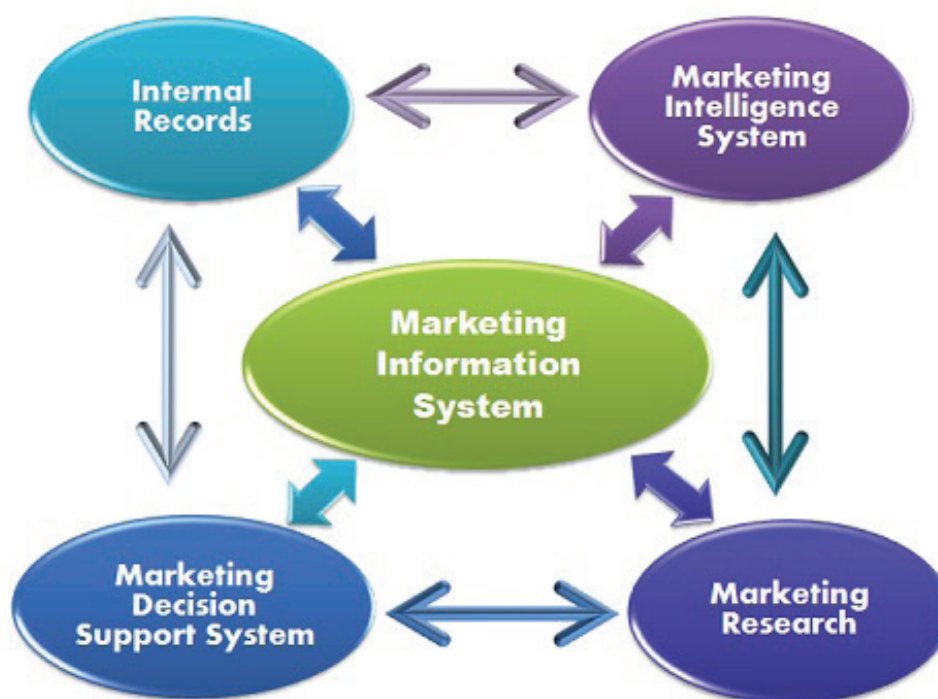
Establish trends and market standing – The market changes continuously and constantly. In such a scenario, only thorough market research can help to establish the ongoing trends and then formulate plans according to the current customer needs and requirements.

Find out possible problems – Since market research brings out the customer reactions, choices, and preferences, a agri-business can alter the crop product while it is still in the manufacturing or designing process. It is easier to find problems and then work on them if one has research results in hand.

KLO 3: Analyze the market information

Marketing Information System is “a system that analyzes and assesses marketing information, gathered continuously from sources inside and outside an organization or a store.” Furthermore, “an overall Marketing Information System can be defined as a set structure of procedures and methods for the regular, planned collection, analysis and presentation of information for use in making marketing decisions.” Developing a marketing information system is becoming extremely important as the strength of economies rely on services and to better understand the specific needs of customers. Insofar as an economy focuses on services, marketing is important to “monitor the marketing environment for changes in buyer behavior competition, technology, economic conditions, and government policies.

The main benefit of MIS systems is to integrate market-monitoring systems with strategy development and the strategic implementation of policies and processes that help capture and act on customer management applications with marketing decision support systems. This area constitute Marketing intelligence that supports the analysis and market based activities that support customer relations and customer service with real time information with real time applications that support market based approaches.



KLO 4: Understand the right time, place for the market of the produce

Some farmers, such as cash grain farmers or dairy farmers, have large, well-established markets. They can use existing organizations to perform the marketing function for them, or they can band together, form a cooperative, and market their products jointly. Small-scale fruit and vegetable growers generally have more difficulty finding established markets; therefore, they usually develop marketing systems tailored to their unique situations.

Fruits and vegetables are produced seasonally, but the market requires products throughout the year. For many decades, this problem of matching product availability with consumer demand was solved in two ways:

- Selling fresh products during harvest and shortly thereafter
- Processing the rest to meet demand during the rest of the year

As technology improved and consumer incomes increased, it became possible to provide fresh produce year-round.



Agricultural Marketing Information System– A Case Study of Traders in Meghalaya

Agricultural marketing information is an essential input for boosting agricultural growth in rural areas. An attempt has been made to identify the various pattern of awareness, sources, utilization and its benefits, constraint, and expectations to agricultural marketing information (AMI) among the traders in the study area of two regulated markets namely, Mawiong Regulated Market in Myllem Block of East Khasi Hills and Garobadha Regulated Market in Selsella Block of West Garo Hills district of Meghalaya. The sample size consisted of 40 traders from both selected regulated market areas were selected for the study based on purposive and random sampling technique. From the findings of the research study, It was revealed that the degree of awareness on prices in local markets placed the I Rank (first) followed by arrivals in local markets, arrivals and prices in reference markets (III Rank). It was observed that traders were always relied on contacts in other market (90%) and fellow traders (75%) for market information. Newspaper placed the III rank on degree of awareness of AMI sources among the traders. It was clearly seen that the agricultural market information was utilized by traders in deciding price to be quoted (I Rank), followed by the quantity to be purchased (II Rank) and the quantity to be store (III Rank). It was observed that traders were most benefited by changing time of sale (90%), followed by mode of storage (85%). About 75 per cent of traders expressed that AMI was not available in required form. The expectation aspects of traders on AMI indicated that the prices in other nearby markets (95%), future price projections (87.5%) and quality wise prices (75%) were given more priority by traders in the study area. It is necessary to ensured flow of regular and reliable data to producers, traders and consumers to derive maximum benefit of their sales and purchases. Emphasis should be given on delivery mechanism of information, so that market information reaches timely to the end users in the hilly regions of Meghalaya.

- (*Hatai and Panda*)

Evaluating Market Demand: Larger growers, particularly those located in major production areas, can pursue either of the two traditional marketing alternatives: wholesale fresh marketing or processing. Small-scale growers who find these marketing avenues closed to them will need to take a direct-to-consumer approach. This requires thorough research of the market and customer behavior before planning crop production.

Some farmers generate profits by planting first and then looking for a market, but this is extremely risky for fruit and vegetable growers. There are far more failures than success stories in this situation. If you are a new grower, or an established one planning to produce a new item, you should first attempt to evaluate the market demand for the product and then decide which direct marketing channel(s) will best meet the needs of your consumers. Your estimates of profitability should include the marketing channel costs as well as production costs.

Small-scale growers should collect three types of information before deciding to produce and market fresh fruits and vegetables. Determine and define the geographic area where you will market fresh fruits and vegetables.

Identify potential customers before you investigate consumer demand. Assess the level of unfulfilled demand among consumers within the defined marketing area. It is advisable to estimate the amount that consumers (buyers) within that market buy at present. In the process, you will gain insight into how they might be better served. Consider the competitive structure of your market. Knowing who your potential competitors are, where they are located, and what services they provide are important pieces of information for you as a new grower-marketer. Note potential competitors who might have marketing advantages (lower costs, better locations, and higher-quality produce) or may provide potential consumers with similar products.

KLO 5: Get acquainted with Agro advisory services facility available through SMS mobile, Radio, TV, etc.

Agro Advisory Services (AAS) provides basic, timely and accurately pre-information of different climate and weather conditions of different crops. Agro Advisory Services (AAS) helpful to farmers for increase interest, knowledge, adoption and impact of climate changes on agricultural practices.

In India 5.13 crore farmers are receiving agro meteorological advisories through m-kisan portal (<https://m-kisan.gov.in>). A total of 25 centres of All India Coordinated Research Project on Agrometeorology (AICRPAM) located in State Agriculture Universities, distributed across the country have made efforts to issue Agromet advisories through Radio, TV, Newspapers etc. in local languages. Agromet bulletins to Line Departments of various state Governments are also distributed by the AICRPAM. The Indian Council of Agricultural Research (ICAR) and India Meteorological Department (IMD) have jointly planned to augment the Agromet Advisory System (AAS) network to sub-district (block) level. Under this plan, 200 Krishi Vigyan Kendras including the 110 Aspirational districts have been identified for setting up of District Agro-Met Units (DAMUs) to provide Agromet services to farmers. The initial fund of Rs. 2.4 cr. (@ Rs.1.2 lakh per unit) has been sanctioned for establishing the required facilities to start the advisory services.

mKisan SMS Portal

mKisan SMS Portal for farmers enables all Central and State government organizations in agriculture and allied sectors to give information/services/advisories to farmers by SMS in their language, preference of agricultural practices and location.

As part of agricultural extension (extending research from lab to the field), under the National e-Governance Plan - Agriculture (NeGP-A), various modes of delivery of services have been envisaged. These include internet, touch screen kiosks, agri-clinics, private kiosks, mass media, Common Service Centres, Kisan Call Centres, and integrated platforms in the departmental offices coupled with physical outreach of extension personnel equipped with pico-projectors and hand held devices. However, mobile telephony (with or without internet) is the most potent and omnipresent tool of agricultural extension.

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mKisan

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s available (Click here to register under state level) **now** Click here to download Kisan Suvidha App

mKisan won Platinum Icon in Web Ratna Awards for Innovative use of Technology. Union IT Minister conferred the honour.

mKisan received Award of Appreciation in CSI-NIHILENT e-Governance Awards 2013-2014.

mKisan bagged SKOCH Gold award and Order of Merit 2014.

Search

Google Custom Search

Since 25th May 2013 To See this site in languages other than English & Hindi, Use this **Select Language**

No. of SMSs 24,62,37,10,138 **No. of Farmers** 5,03,23,985 **Advisory Count** 4,22,545

Unleashing the power of mobile in the hands of farmers to get information/advisories as per his or her preferences in the form of text/voice messages and getting access to numerous databases even without internet!

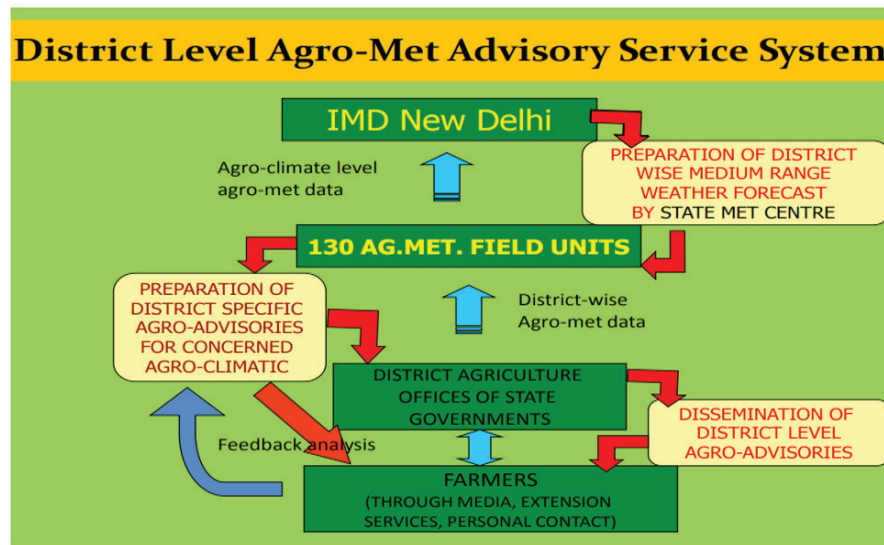
Login Interface

User Name

Password

About mKisan | Dashboard

Further, several awareness campaigns have been undertaken to encourage farmers to register themselves on m-kisan portal and receive crop and weather specific advisories. Many farmers have been registered through Kisan Call Centre also. Farmers can call and get themselves registered for receiving crop advisories. Extension workers have also played an important role in increasing the registration of farmers. They explain the process of registration and benefits of getting registered to the farmers thereby helping farmers to receive crop and weather based advisories.



Analysis of Kisan Mobile Advisory Service in South Western Punjab

Kisan mobile advisory service (KMAS) was launched for sending agricultural information through Short Message Service (SMS). The content of message was typed in Punjabi language by using English language alphabets and information related to agronomy of crops, insect pest control, horticulture, dairy farming and weather forecasting etc was sent to the end users. 150 farmers were randomly surveyed to know their reaction about the KMAS. Results of the survey showed that majority of the farmers found agricultural information in the form of SMS through mobile phone as useful (69.3 %), comprehensible (74.7 %) and timely (64.7%). About 15 per cent farmers who registered for KMAS did not utilize the availed service. About nine per cent of the users could not decode SMS due to language barrier. Lack of the interest of the beneficiary due to excessive length of the content was reported by 12.7 percent of the farmers.

REFERENCES:

1. <https://www.investopedia.com/terms/a/assimilation.asp>
2. <https://medium.com/@sumana.T/7-best-apps-for-e-market-platforms-for-farmers-324dd668270b>
3. <https://www.protectourlivelihood.in/government-initiatives/crop-marketing/>
4. https://en.wikipedia.org/wiki/Marketing_information_system
5. <https://extension.psu.edu/fruit-and-vegetable-marketing-for-small-scale-and-part-time-growers>
6. Hatai and Panda, Agricultural Marketing Information System–A Case Study of Traders in Meghalaya Economic Affairs June 2015: 60(2): 263-271; DOI: 10.5958/0976-4666.2015.00039.X.

MODULE 8

Maintain health and safety at the workplace (AGR/ N9903)

In agriculture, farmers work under open condition in natural environment, which expose them to various occupational hazards, especially more caused due to handling of chemicals and machineries. Besides, natural hazards are caused due to snakebite, wild animal attack, etc. Knowledge on preventive and curative aspects of these occupational hazards would reduce risks and ensure the safety to the farmers.

KL01: Maintain a clean & efficient workplace

Many serious incidents on farms involve machinery, often during maintenance or unblocking. In maintenance work, conditions are very different from those normally encountered and new hazards may be introduced. It is essential that everyone involved is trained to be aware of the hazards and the correct precautions to take to prevent harm.



National Policy on Safety, Health and Environment at Workplace (NPSHEW)

On the basis of Directive Principles as well as international instruments the Government of India, Ministry of Labour & Employment, had declared the National Policy on Safety, Health and Environment at Workplace (NPSHEW) on 20th February, 2009 and the policy document has been posted in the website of the Ministry of Labour and Employment and DGFASLI at www.labour.nic.in and www.dgfasli.nic.in respectively. The purpose of this National Policy is to establish a preventive safety and health culture in the country through elimination of the incidents of work related injuries, diseases, fatalities, disasters and to enhance the well being of employees in all the sectors of economic activity in the country.

The salient features of the Policy are as below:-

1. It recognizes safe and healthy working environment as a fundamental human right.
2. It aims at enhancing the well-being of the employees and the society at large by eliminating work related injuries, diseases, etc.
3. It enumerates the goals to be achieved and brings into focus the objective of continuous reduction in the incidence of work related injurious and diseases.

KL02: Practice General Safety and first aid

Work for which protective clothing or equipment is required is identified and appropriate protective clothing or equipment is used in performing these duties in accordance with workplace policy. Minimum protection clothing or equipment required at workplace includes

- Gloves
- Clothing covering arms and legs
- Vest of a bright color
- Safety glasses/goggles
- Face shield for some of the activities
- Chemical resistant closed toe boots or shoes

Serious workers' compensation claims



2800
Serious claims
each year



12% muscular stress
while handling objects



11% falls
from a height



1 in 5 serious claims
due to live four-
legged animals

State & Territory Compliant Kits & Modules



The first-aid kit has to be administered in accordance with workplace procedures. The farmers should have at least two persons trained in first-aid and use of first-aid field kit. In case of accident the person in charge of giving the first-aid should apply the following procedure. Check carefully the injured person and verify the type of injury. Verify the state of consciousness, talk and keep acts. Practice first-aid necessary and appropriate to the case. Transfer to the camp or injured nearest medical assistance.

KL03: Familiarize with various health hazards relevant to workplace and basic first aid training

Farmers and farm workers suffer from increased rates of respiratory diseases, noise-induced hearing loss, skin disorders, certain cancers, chemical toxicity, and heat-related illnesses. There are precautions that can be taken to minimize or eliminate these potential hazards.

Hazard: A hazard may be defined as a condition that has the potential to cause an injury to human beings and adversely affect the environment. A hazard can lead to adverse health effects and physical damage under certain situations at a workplace.

TOP 10 CHALLENGES FACED BY SMALL & MARGINAL FARMERS IN INDIA



- 1 **WATER PROBLEMS** Large farmers have access to canal water for irrigation purposes. But small and marginal farmers mostly depend on ground water
- 2 **CREDIT & INDEBTEDNESS** The problem with indebtedness is, it keeps on increasing for small farmers with time
- 3 **LAND ISSUES** Successful implementation of even a modest package of land reforms can surely improve the prospect of small and marginal farmers
- 4 **CLIMATIC CHANGES** Climate changes have been a major challenge for food security, agriculture and livelihoods for millions of rural farmers
- 5 **GLOBALIZATION CHALLENGES** The protection policies and huge subsidies given by developed countries have negative effects on small holding farmers
- 6 **SOCIAL GROUPS** Scheduled castes have more than half of their holdings with size less than half a hectare and 15.6% of small farmers belong to scheduled tribes
- 7 **LOW LEVEL EDUCATION** In case of marginal farmers, literacy among males and females were 62.5% and 31.2% while the same for medium and large farmers were 72.9% and 39%
- 8 **DIVERSIFICATION** Support systems for diversification need to help the small holder farmers in order to improve the agriculture economy of the nation
- 9 **WOMEN ROLE** In 2004-05, percentage of women among marginal farmers was 38.7% whereas in case of large farmers, it was 34.5%
- 10 **ASSOCIATED RISKS** Health Hazards, Labor Market risk, risks related to harvest, life cycle, and social groups, and Community risks are some of the risks faced by small and marginal farmers

Read the full article at blog.farmguide.in

Respiratory Hazards: Farming situations present several respiratory hazards to farm workers. Exposure to these hazards has been linked to excessive coughing and congestion in 20 to 90 percent of farm workers and families. Symptoms of chronic bronchitis were observed in as many as 50 percent of swine confinement workers and grain handlers.

Organic Dust Toxic Syndrome (ODTS) is a common respiratory illness manifested by temporary influenza-like illness with fever, headache, and muscle aches and pains. Although much less common than ODTS, Farmer's Lung is an allergic reaction caused by inhaling dust from moldy hay, straw, and grain. Dairy and grain farmers are the most common victims. The months when moldy crops are handled indoors are the most dangerous. For those who are susceptible, repeated exposure damages lung tissue, causing shortness of breath and a growing inability to perform strenuous work. Victims eventually may find it a struggle even to get out of a chair.

Dust from moldy hay, grain, and silage can also cause ODTS, which has symptoms resembling Farmer's Lung. However, ODTS does not produce long-term illness or cause permanent lung damage. Nuisance dusts and gases also are hazards. Suspended dust particles not containing spores from moldy organic matter are considered nuisance dusts. Repeated exposure can turn portions of the lung into hardened, non-functioning tissue and cause chronic bronchitis and occupational asthma.

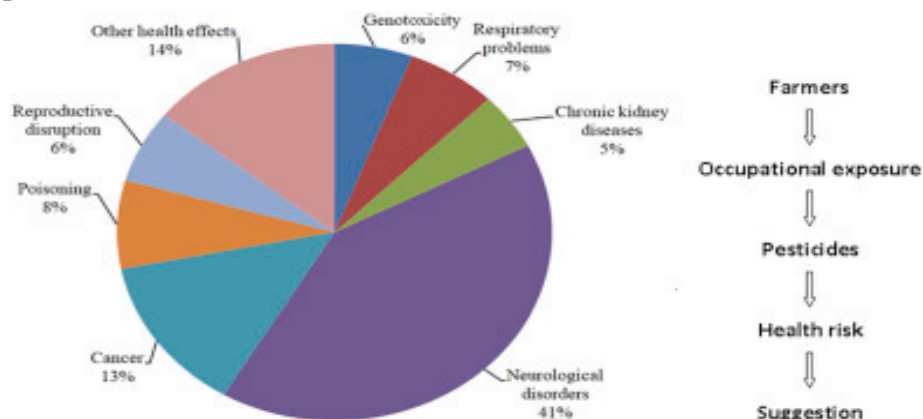
Noise: Agricultural noise is another common health hazard on the farm. Farm workers are exposed to high level of noise daily, which is the "action" level at which hearing conservation program are required for industrial workers. Prolonged exposure to excessive noise, such as that produced by tractors, combines, choppers, grain dryers, and chainsaws, can cause permanent hearing loss unless noise-control measures are taken.

The two types of hearing protection available are ear muffs and ear plugs. Ear muffs are more effective, but the level of protection varies due to differences in size, shape, seal material, shell mass, and type of suspension. Ear plugs may be custom fitted or preformed rubber, plastic, or foam inserts. Preformed inserts are cheaper, but ear plugs properly inserted into the ear and custom-fitted by trained personnel are more effective because the ear canal shape may vary.

Skin Disorders: Contact dermatitis is a skin disorder that occurs among agricultural workers. There are two general categories: irritant and allergic. Irritants act directly on the skin at the place of contact. Allergic sensitizers, however, cause changes in the immune system so that subsequent contact produces a reaction.

Phototoxic or photoallergic reactions occur when light, in combination with certain substances, causes skin disease. Other types of agricultural dermatitis include heat rash, origin infections, and insect and plant irritants.

A number of factors predispose an individual to dermatitis, such as age, sex, race, temperature and humidity, previous skin disorders, skin damage, and personal hygiene. Work-related skin diseases are often easy to detect, but difficult to diagnose. It is important for the physician to know chemicals and other agents to which an individual has been exposed. Wearing proper protective clothing, and washing frequently are the most effective means of prevention.



Cancers: Skin cancer is a concern on the farm due to the long hours farmers spend in the sun and skin cancer is the most common. People at high risk include those with fair skin, blue eyes, and red or blond hair. Ninety percent of all skin cancers occur on parts of the body not usually covered by clothing. A place of particular concern for farmers is the back of the neck. Avoid overexposure, especially between 11 am. and 2 p.m.; use sun blocks that absorb or deflect ultraviolet rays; wear protective clothing, such as long-sleeved shirts, pants, and wide-brimmed hats; and conduct regular self-examinations for early detection.

Chemical Hazards: Many agricultural workers are exposed to chemicals on a daily basis. If they do not observe proper precautions, illness or even death may ensue. Pesticides can enter the body through many routes, but the most common ways are through the skin and by inhaling. To prevent dermal (skin) contact and inhalation of pesticides, applicators should wear personal protective clothing and equipment.

When using diluted pesticides, the applicator should wear chemical-resistant coveralls or an apron. When handling concentrates during mixing and loading, a face shield, unlined rubber gloves and boots, and a lightweight rubber apron should be worn. Boots and aprons should be washed daily with soap and water and dried thoroughly, inside and out, to remove pesticide residues. All clothing worn while handling pesticides should be washed daily, separately from other clothing.

Wear a Government approved respirator when the chemical label calls for it, and be sure to choose the type that protects specifically against the pesticide you are using. Respirators must fit the face well to ensure a good seal. Long sideburns, beards, or glasses may prevent a good seal

First aid measures for pesticide poisoning:

- In case of skin contact, remove contaminant contacts and wash with clean water.
- In case of inhalation, remove from site and provide good clean air site, keep the head and shoulder upright.
- In case of unconscious and breathing stops, provide artificial respiration.
- If pesticide is swallowed, induce vomiting by giving 2-3 liters salt water. Give milk after that.
- Take the patient to doctor at the earliest.
- Take the container along with patient to consult doctor.

Heat Stress: Heat stress occurs when the body builds up more heat than it can handle. High temperatures, high humidity, sunlight, and heavy workloads increase the likelihood of heat stress. Use fans, ventilation systems, and shade whenever possible. A work area sometimes can be shaded by a tarp or canopy. Drink

plenty of water before, during, and after work, and consider wearing cooling vests, which are garments with ice or frozen gel inserts.

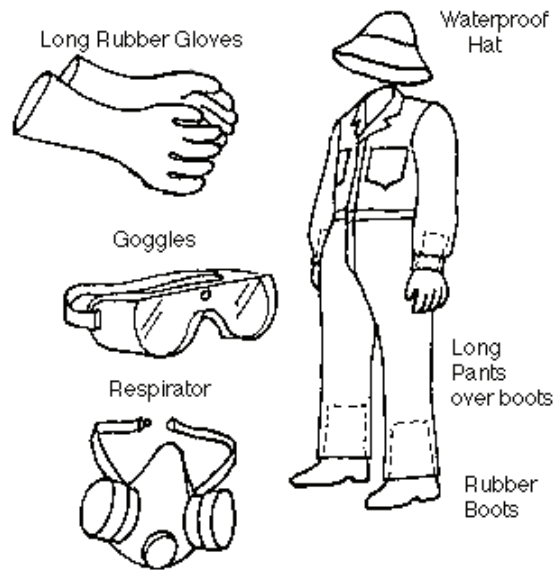
Allow time to adjust to the heat and workload. People who are used to working in the heat are less likely to suffer heat stress. To become adjusted, do about 2 hours of light work per day in the heat for several days in a row; then, gradually increase the work period and workload for the next several days. An adjustment period of at least 7 days is recommended. If the warm weather occurs gradually, workers may adjust naturally.

Good health has long been acknowledged as one of the most critical elements to quality of life. The health of farm workers is a vital resource to protect. Following recommended precautionary measures to protect your health can go a long way to enhancing your quality of life.

Snake and other animal bites or attacks and Precautions: Snakebite is a routinely occurring life threatening emergency in Indian farmers. The mortality and morbidity associated with the diverse presentation of snakebites can be decreased if a proper history of the patient's background and habits combined with a thorough knowledge of the specific features of the regional snakes are kept in mind.

KL04: Undertake basic safety checks for the commonly reported hazards before all farm operation

- Farmers must Assess risks prior to performing manual handling, and work according to recommended safe practices.
- To avoid the risk prior to performing the job, following actions must be ensured by the services mentors.
- Train the farm worker in meeting the working procedure of the activities that are going to take place.
- Monitor and correct activities if violations are detected.
- Have a copy of the working procedure of the activity that is developing in the field.
- Read and understand the hazards of use and contamination mentioned on the labels of pesticides/fumigents etc. Contamination mentioned on the label of pesticides/fumigents should be clearly understood and also have in-depth knowledge of antidotes in case of contamination occurs. Following preservative actions can be taken up
- Use to clean the affected area with cotton or apply blister or wound healer
- Use alcohol to clean the area whose by applying ampoule and disinfect the wound and Use bandages for bruises and minor wounds
- In case of contamination in eyes, splash the eyes with plenty of plain water.
- Use equipment and materials safely and correctly and return to designated storage when not in use. The equipments specially full face air purifying respirators; inner and outer chemical-resistant gloves; hard hat; escape mask and disposable chemical-resistant outer boots must be returned to the appropriate store after the use or when not in use.



KL05: Use equipments, processing machine etc in accordance with the manufacturer's guidelines

Safety tips are very important and should be followed to reduce the risk of injuries and fatalities while handling machineries. Contrary to the popular image of fresh air and peaceful surroundings, a farm is not a hazard free work setting. Every year, thousands of farm workers are injured and hundreds die in farming accidents. Safety in agriculture is one of the main concern, especially when handling with farm tools and machinery. Many accidents in agriculture go unnoticed because they will not be reported. So learning from mistakes will be less.



Safety tips to reduce the risk of injuries and fatalities while handling machineries

- Safety can be improved on farm by increasing awareness of farming hazards and making a conscious effort to prepare for emergency situations including fires, vehicle accidents, electrical shocks from equipment and wires and chemical exposures.
- Be especially alert to hazards that may affect children and the elderly.
- Minimize hazards by carefully selecting the products to ensure safety.
- Always use seat belts when operating tractors.
- Read and follow instructions in equipment operator's manuals and on product labels.
- Undertake basic safety checks before operation of all machinery and vehicles and hazards reported to the appropriate supervisor
- There are two levels of personal protective equipments (PPE) depending on the hazardous substance activity, workers must wear appropriate personal protective clothing and equipment where ever they are near the site. Ask your site supervisor for the appropriate attire that should be for each activity.
- Provide a copy of the work procedure of the activity that is to be undertaken in the field.
- Also provide the worker with at least the personal protection defined for each activity
- Also train the worker in meeting the working procedure of the activities that are being carried out.

KL06: Render appropriate emergency procedures

Recognise risk to bystanders and take action to reduce the risk, associated with jobs in workplace. To recognise the risk for bystanders and how to reduce the risk, the appropriate notice board displaying the hazards of contamination should be placed. Also mark the area where the work is going on as out of bound area so that risks are avoided.

FIRST AID GUIDE

CONSTRUCTION FIRST AID



1 Call for Help '000' <ol style="list-style-type: none"> 1. Check and neutralise hazards to yourself, bystanders and the victim. 2. Check for a response to see if the victim is conscious. 3. One person should stay with victim while another calls for help. If alone, stay with victim and use your phone to make the call. 4. When dialling emergency number, state you need an ambulance. Provide your phone number, incident description, condition of victim, and exact location. 5. Have someone meet emergency team outside your workplace. 	2 Dealing with Burns <ol style="list-style-type: none"> 1. Neutralise hazards before attending to victim. 2. For chemical burns, wash affected area with cool running water for up to 20mins. Ensure water does not carry chemical to unaffected parts. Refer to Safety Data Sheet (SDS). 3. For other burns, flush the area with cool running water for up to 20 minutes. 4. Apply non-adhesive, non-fuffy, wet dressing to affected area. 5. If required, get medical assistance. 	3 Dealing with Bleeding <ol style="list-style-type: none"> 1. Wear gloves. 2. Have the victim sit down and reassure them. 3. Carefully check the wound for foreign objects (do not remove). If severe, call for an ambulance. 4. Minimise bleeding by placing dressing over the wound and applying firm, direct pressure. Keep it elevated and immobilised. 5. Victim might go into shock, so treat accordingly and call for ambulance. 6. Lay the victim down and conserve their body heat. Reassure them and document the incident. 
4 Dealing with Crush Injuries <ol style="list-style-type: none"> 1. Crush injuries result in damage to muscles and bones due to heavy objects. Trains can also build up around injuries, causing complications. 2. Neutralise any hazards before attending to the victim. 3. Call emergency services and reassure the victim. 4. Any crushing weight should be removed from the victim as soon as possible, provided it is safe to do so. 5. Check if victim has suffered any injuries and treat accordingly. 6. Be prepared to treat the victim for shock. 7. If in doubt about how long the person has been crushed, seek medical advice prior to moving the object. 8. Monitor the victim and document the incident. 	5 Fall Injuries <ol style="list-style-type: none"> 1. Any fall greater than 1 meter should be treated as possible head or spinal injury. Stabilise the head and neck and call emergency services. 2. Any head injury should be treated as possible concussion. Call emergency services or seek medical advice. 3. Contusion, vision impairment, nausea and drowsiness are some signs of concussion. 4. If the victim has suffered any fracture, instruct him to remain still, treat any wound, and then immobilise the part that was fractured. Call emergency services. 	6 Dealing with Chemical Burns <ol style="list-style-type: none"> 1. Make sure that there is no danger to you before you respond. 2. Wear appropriate PPE. 3. Look for the Safety Data Sheet (SDS) of the chemical. Follow the instructions. 4. If burn injury was caused by chemicals, then it should be placed under cool running water for up to 20 minutes, repeat if necessary. No ice. 5. Make sure chemical does not reach unaffected areas. 6. Clothing that has been contaminated must be removed if it does not cling to the skin of affected area. 7. Take the victim to a hospital for treatment or await the arrival of the medical help. 8. Monitor the victim and document the incident. 


DISCLAIMER: The information in this poster is not a substitute for proper first aid training.

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Report any accidents, incidents or problems without delay to an appropriate person and take necessary immediate action to reduce further damage. In case of any accident, incidence or problems the supervisor should have at least two persons trained in first-aid and the use of the first-aid field kits. The person incharge of giving the first care should apply the following method. Stay calm, check carefully and thoroughly the injured person to verify the type of injury. Practice first-aid necessary and appropriate for the case and Inform the supervisor of the problems. Transfer the injured to nearest medical assistance.

Emergency Procedures

Follow procedures for dealing with accidents, fires and emergencies including communicating location and direction to emergency. Sometimes even inspite of your best efforts the accident occurs. Turn off the equipment right away (if it is safe to do so) and call for help. Call emergency number to get assistance, be ready to tell the person who answers your call, what is the problem and location of the accident. Don't move the person by yourself. If fire brokes out use the fire extinguisher and inform the fire brigade. Use all the means like water, sand, etc, to stop further spread of fire till fire brigade arrives.

Follow emergency procedures as per the standard and workplace requirements. Sometimes, even if you follow all the emergency procedures at workplace keeping all the company standard/workplace accident still occurs, use the analysis the kind of accident i.e. whether it is a chemical or through equipment or by fire, follow the standard procedures as laid down above during emergency.

Use emergency equipments in accordance with manufactures specification and work place requirements. There are two types personal protective equipments (PPE) depending on the hazardous substance activity, worker must wear appropriate personal protective clothing like gloves, cloth covering arms and legs, vest of a bright colour, safety glasses/goggles etc. If it is two level type equipments then use full face air as purifying respirators escape mask & disposable chemical-resistance outer boots.

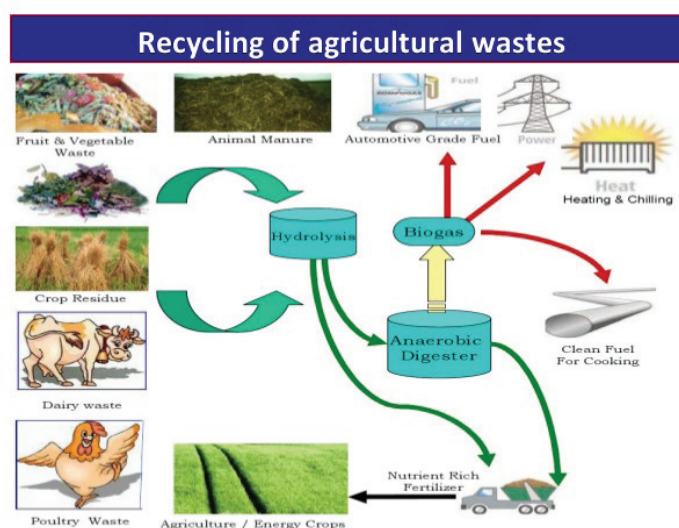
Provide treatment appropriate to the patients injury in accordance with recognised first aid techniques. In case of an accident check carefully and thoroughly to the injured person verify the type of injury. Practice first-aid necessary and appropriate for the case. Use the cotton to clean the area i.e. blister or wound. Then clean the wound with alcohol for applying ampoule and to disinfect wounds.

Recover (if practical), clean inspect/ test refurbish, replace and store the first-aid equipments as appropriate. As already mentioned there are two level of protection equipments i.e. first level (gloves of cloths, vest safety glass, face shield and closed toe boots) and 2nd level equipments like full-face air purifying respirators, inner and outer chemical resistant gloves, hard hat, escape mask, disposable chemical resistant outer boots should be kept in readiness for use.

KL07: Dispose off farm waste in accordance with environmental safety

Dispose of waste safely and correctly in a designated area, for disposing of waste material safely and correctly a continuous, waterproof and chemically resistant structural material usually of a concrete floor should be used. Perform our farming work in a manner which minimize environment damages, all procedures and work instruction for controlling risk are followed closely.

Pesticide waste is considered any substance or material containing pesticide that cannot or will not be used and therefore must disposed of. Pesticide waste includes surplus spray solutions, pesticide leftover which remains in the application equipment after use, pesticide-contaminated water produced by cleaning the application equipment or from rinsing the empty pesticide containers, pesticide-contaminated materials generated from cleaning up spilled pesticides, empty (unrinsed) pesticide containers, and old pesticide products. Proper pesticide waste disposal is an important part of responsible pesticide use. Accidental release or uncontrolled discharge of pesticide waste into the environment can harm people and contaminate the environment. Pesticide-contaminated water poses a great hazard to non-target organisms such as plants, beneficial insects, fish and other aquatic life. Knowledge of farmers' attitudes towards disposal of pesticide waste can be useful to find out critical points of intervention to promote safety during pesticide handling.



Approaches for Non-Pesticide Pest Management used by Socio-Economic and Cultural Upliftment in Rural Environment in Andhra Pradesh, India

ftp://ftp.fao.org/SD/SDA/SDAR/sard/GP%20updates/pest_management_India.pdf

- Using light traps and bonfires to attract moths.
- Placing yellow and white sticky boards in the field to attract and kill insects that suck out the plant's juices.
- Removing by hand leaves on which many insect eggs have been laid.
- Setting pheromone traps to check on the numbers of pests in the field.
- Using biological pesticides such as neem seed-kernel extracts and chilli–garlic extracts to control bollworms and sucking insects. There are also other locally available plants to make biological pesticides.
- Using an extract made from cow dung and urine to control aphids and leafhoppers which also acts as a fertilizer.
- Planting trap crops such as castor and marigold. Insects are likely to lay their eggs on these plants, where they can be picked off easily

References:

1. <http://nasdonline.org/1246/d001050/health-hazards-in-agriculture-an-emerging-issue.html>
2. Farmer's Handbook on Basic Agriculture; published by Desai Fruits & Vegetables Pvt. Ltd. Navsari, Gujarat, India.
3. Source: Penn State University; <https://ag-safety.extension.org/first-aid-kits-for-production-agriculture/>
4. G. Najafi, B. Ghobadian, T. Tavakoli, T. Yusaf, Potential of bioethanol production from agricultural wastes in Iran; Renewable and Sustainable Energy Reviews 13 (2009)1418–1427.
5. ftp://ftp.fao.org/SD/SDA/SDAR/sard/GP%20updates/pest_management_India.pdf.
6. Christos A. Damalas, Georgios K. Telidis, Stavros D. Thanos; Assessing farmers' practices on disposal of pesticide waste after use; Science of the total environment 390(2008) 341 – 345.



Patanjali Bio Research Institute

Food & Herbal Park, Village - Padartha, Laksar Road Haridwar-249404 Uttarakhand (India)

Disha Block, Patanjali Yogpeeth Phase-1, Haridwar-249404 Uttarakhand (India)

Website ► info.pfsp@patanjali farmers samridhi.com

Contact No : 8275999999