Facilitators' Guide

Farmer Field School on Production of High-Quality Inbred Rice, Seed Certification, and Farm Mechanization

in partnership with

Masaganang ANI Mataas na KITA

RICE COMPETITIVENESS ENHANCEMENT FUND

RCEF

RICE EXTENSION SERVICES PROGRAM

RCEF FACILITATORS' GUIDE

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RCEF FACILITATORS' GUIDE

FARMER FIELD SCHOOL ON PRODUCTION OF HIGH-QUALITY INBRED RICE, SEED CERTIFICATION, AND FARM MECHANIZATION

AGRICULTURAL TRAINING INSTITUTE

FOREWORD

ROSANA P. MULA, Ph.D.
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Rice Competitiveness Enhancement Fund-
Rice Extension Services Program

I wish to acknowledge the joint efforts of the offices under the Department of Agriculture (DA) namely Philippine Rice Research Institute (DA-PhilRice), Philippine Center for Postharvest Development and Mechanization (DA-PHilMech), and Agricultural Training Institute (DA-ATI) with the Technical Education and Skills Development Authority (TESDA) in developing this Facilitators' Guide.

Over the issue of rice self-sufficiency, boosting domestic production is critical for ensuring the supply for the growing population. Improving rice productivity can help in alleviating poverty within the rural areas by increasing the income of farmers and farm workers who depend on rice for a living.

The Rice Competitiveness Enhancement Fund (RCEF) was developed to increase Filipino farmers' competitiveness against international producers through the provision of machinery, high-quality inbred seeds, credit assistance, and extension services.

Through RCEF- Rice Extension Services Program (RESP), Filipino farmers' knowledge, skills, attitudes, and practices on the latest rice farming technologies are enhanced through the conduct of Farmer Field School (FFS). The FFS are efficiently conducted by the local farm schools using this Facilitators' Guide, contributing to the empowerment and prosperity of the agricultural sector.

The continuous conduct of FFS will help us achieve our collective mission of "Masaganang Ani at Mataas na Kita" for every Filipino farmer.

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ACRONYMS

AESA	Agroecosystem Analysis
ATI	Agricultural Training Institute
BLB	Bacterial Leaf Blight
BPH	Brown Planthoppers
BPI	Bureau Plant Industry
BS	Breeder Seeds
CS	Certified Seeds
DA	Department of Agriculture
DAT	Day after transplant
DAS	Day after seeding
DBP	Development Bank of the Philippines
DS	Dry Season
DWSR	Direct Wet-Seeded Rice
EPI/PI	Early Panicle Initiation/Panicle Initiation
FFS	Farmer Field School
FS	Foundation Seeds
GHL	Green leafhoppers
ICM	Integrated Crop Management
INM	Integrated Nutrient Management
IPM	Integrated Pest Management
ISTA	International Seed Testing Association
LBP	Landbank of the Philippines
LCC	Leaf Color Chart
MC	Moisture Content
MCDB	Moisture Content, dry basis
MCWB	Moisture Content, wet basis
MOET	Minus One Element Tool
MSTC	Mechanization Specialist Training Course
NSQCS	National Seed Quality Control Services
PHILMECH	Philippine Center for Postharvest Development and Mechanization
PHILRICE	Philippine Rice Research Institute
PTD	Participatory Technology Demonstration
RCEF	Rice Competitiveness Enhancement Fund
RCM	Rice Crop Manager
RESP	Rice Extension Services Program
RS	Registered Seeds
RSBSA	Registry System for Basic Sectors in Agriculture
RSTC	Rice Specialist Training Course
RTD	Rice Tungro Disease
RTL	Rice Tariffication Law
TESDA	Technical Education and Skills Development Authority
TOT	Training of Trainers
TPR	Transplanted rice
STK	Soil Test Kit
SWOT	Strengths, Weaknesses, Opportunities, and Threats
WBPH	White Backed Planthoppers

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Production of High-Quality Inbred Rice, Seed Certification, and Farm Mechanization

Preliminaries

Introduction

Rice Competitiveness Enhancement Fund

Republic Act No. 11203 otherwise known as the Rice Tariffication Law (RTL) created RCEF or Rice Fund to improve rice farmers' competitiveness and income amidst liberalization of the Philippine rice trade policy that lifted quantitative restrictions on rice imports and replaced it with tariffs, among others.

RA 11203 Section 13.d further states that *"ten percent (10%) of the rice fund shall be made available for the extension services provided by PHilMech, PhilRice, ATI, and Technical Education and Skills Development Authority (TESDA) for teaching skills on rice crop production, modern rice farming techniques, seed production, farm mechanization, and knowledge/technology transfer through farm schools nationwide as follows: seventy percent (70%) to TESDA, and ten percent (10%) each to ATI, PhilRice, and PHilMech".*

The law specifically stated that all training for farmers should be conducted in farm schools. The Farm Schools shall refer to existing TESDAregistered Farm Schools (FS), Technology Institutions (TTIs), ATI Learning Sites for Agriculture (LSAs), Schools for Practical Agriculture (SPAs), Extension Service Providers (ESPs), Agricultural State and Local Colleges and Universities (S/LUCs), and other training providers (e.g., DA-ATI, DA-PhilRice, DA-PHilMech, and DA-Regional Field Offices (RFOs) with TESDA accredited agriculture/rice-related training programs under RCEF.

These farm schools shall be strengthened by allowing their owners/managers and their staff to undergo capacity enhancement on inbred rice and seed production, mechanization, knowledge/technology transfer to be offered by DA-PhilRice, DA-PHilMech, and DA-ATI, as well as on training methodology by TESDA. In areas where there are no FS or training providers, the FFS shall be conducted using a community-based (on-site) approach through TESDA Provincial Offices in collaboration with the Local Government Units (LGUs).

The Rice Fund has four key components: 1) rice farm machinery and equipment; 2) rice seed development, propagation, and promotion; 3) expanded rice credit assistance; and 4) rice extension services, which shall be implemented in an integrated manner.

FFS on Production of High-Quality Inbred Rice and Seed Certification, and Farm Mechanization

The FFS on Production of High-Quality Inbred Rice, Seed Certification, and Farm Mechanization brings the farmers together for an intensive training on the most current rice farming system. The FFS shall be designed to train farmers on various topics such as pests and diseases management; soil fertility and water resources management; local varietal selection and purification; farm mechanization; marketing; record keeping; and financial literacy.

The principles of the FFS learning process are:

Field as a learning place. All learning activities shall take place in the field and shall be based on what is happening in the field.

Learning through experience. The activities that take place in the field and their farms shall serve as an experiential learning process for the farmers to share their experiences and knowledge to improve their existing practices leading towards sustainable agriculture production.

Informed decision-making guides the learning process. Training focuses on the analysis of the agroecosystem of the crop. It combines the domains of ecology and non-formal education to allow farmers to gain insights into the ecological interactions in the field and empower them to build their capacity for informed decision-making.

Training duration is for the entire cropping season. The training shall be designed for the farmers to acquire a firm understanding of the relevant rice production concepts for each growth stage as well as the factors that influence pest control decision-making in all stages of the plant's growth. They will also gain experience in the application of farm machines related to rice production. Farmers should also learn the latest policies and guidelines in inbred rice seed grower's accreditation and certification.

The Training curriculum is based on local conditions of the FFS. The FFS curriculum and materials shall be based on their appropriateness, local conditions, and the problems and needs of the farmers in the FFS.

About 25 farmers shall consist of 1 batch of FFS with 14 sessions and meetings for 1 day each week. The farm school has a 5,000-7,500 m^2 demonstration field with participatory techno demo, Agricultural Ecological System (AESA), and roguing field (2,000 m^2), and machine demo area (2,500-5,000 m^2).

Using the Manual

This manual for facilitators and trainers is intended for extension workers and service providers in the field who plan to conduct FFS on Production of High-Quality Inbred Rice, Seed Certification, and Farm Mechanization. Symbols are used to guide you as you go through the manual, which includes the following:

 Session

 Objectives

 Duration

 Key Learning Points

 Activity

 Note to Facilitator

Implementation Guide

Groundwork Activities	Conduct of Sessions	Post Implementation
• Identification and Selection of Participants • Financial Arrangement • Schedule of Activities • Coordination of Farm School with Resource Speakers • Establishment of a Demonstration Field	• Arrival, Registration, and Billeting • Introduction • Administer Pre-test • Overview of PalayCheck System and Key Checks 1-9 • Conduct of AESA • Final Analysis • Closing the session • Evaluation of the Facilitators • Administer Post-test • Field Day and Graduation	• Payment to Farm Schools

A. Groundwork Activities

Identification and Selection of Participants

About 25 rice farmers who have met the eligibility criteria for the scholarship grant shall comprise 1 batch for the FFS.

Financial Arrangement

Prepare a budget for the training cost which includes the expenses on supplies (e.g., PPE, farm inputs, materials for graduation and field day), utilities, and honorarium for trainer and field facilitator.

Schedule of Activities

The starting month of the FFS is determined by the planting season (wet/dry). FFS shall have 14 sessions with 5 hours each session including the graduation and field day.

Coordination of Farm School with Resource Speakers, Trainer/s and Field Facilitator/s

Graduates of Rice Specialist Training Course (RSTC), Mechanization Specialist Training Course (MSTC) and Training of Trainers (ToT) on Production of High-Quality Inbred Rice and Seeds, and Farm Mechanization, and specialists from RCEF implementing agencies can be tapped as resource speaker, trainer, and field facilitator.

Establishment of a Demonstration Field

The demonstration field is a necessary component in the conduct of FFS. More than just showcasing the advantages of following the recommended inbred rice

production technologies (PalayCheck System), it also serves as a demonstration field for the trainees.

Each FFS batch should have an area of 5000-7500m^2 allocated for the purpose. The area will be divided as follows:

a. 2000m^2 – for the Participatory Technology Demonstration (PTD)-cum-AESA and roguing field;

b. 500m^2 – for hands-on activities such as seedbed establishment, transplanting, repair and construction of dikes and ditches, and other activities; and,

c. 2500 -5000 m^2 - for hands-on and or demo on machine use.

Thus, if a farm school will conduct 2 batches of FFS in one cropping season, there must be at least 10,000m^2 of area dedicated for the purpose. In case the farm school doesn't have that size of area, they can partner with a farmer/farm owner in a nearby area for the utilization of their field.

For the procedure on establishing a demonstration field, refer to Annex A.

B. Conduct of Sessions

a. Arrival, Registration, and Billeting
b. Introduction
c. Administer Pre-test (see Annex B)
d. Overview of PalayCheck System and Key Checks 1-9
e. Conduct of AESA
f. Final Analysis
g. Closing the Session
h. Evaluation of the Facilitators
i. Administer Post-test (see Annex B)
j. Field Day and Graduation

C. Post Implementation

Payment to Farm Schools

The TESDA National Office shall facilitate the training of farmers. The training expenses shall be reimbursed by farm school owners made upon the submission of the following documents:

- Billing statement of training provider;
- Farmers' Profiles encoded in the TESDA Training Management
- Information System (T2MIS);
- Daily Attendance Sheet; and
- TESDA copy of the RESP Scholarship Grant duly signed by the beneficiaries and concerned officials.

Curriculum Design/Outline

SESSION	LESSON	SCHEDULE
Session 1: Philippine Rice Industry, RCEF, and Transformational Leadership	1. The Philippine Rice Industry Situation 2. Understanding RCEF and Implications to Rice Farmers 3. Transformational Leadership	Week 1
Session 2: Rice Morphology and Growth Stages, Overview of the PalayCheck System, and Review of Key Checks 1-5	1. Rice Morphology and Growth Stages 2. Overview of the PalayCheck System 3. Review of Key Checks 1-5 a. Key Check 1 - Used high-quality seeds of recommended variety b. Key Check 2 - Well-leveled field c. Key Check 3 - Practice synchronous planting after a rest period d. Key Check 4 - Sufficient number of healthy seedlings e. Key Check 5 - Sufficient nutrients from tillering to Early Panicle Initiation (EPI) and flowering	Week 2
Session 3: Water Management, Harvesting, and Postharvest Practices	1. Review of Key Checks 6, 8 and 9 a. Key Check 6 - Avoided stress caused by drought or excessive water that could affect the growth and yield of the crop b. Key Check 8 - Harvested the crop at the right time c. Key Check 9 - Dried, cleaned, and stored grains properly	Week 3
Session 4: Pest Management	1. Review of Key Check 7 - No significant yield loss due to pests 2. Integrated Pest Management (IPM) Concepts and Principles 3. Insect Pests and Its Natural Enemies 4. Conducting AESA	Week 4
Session 5: Rouging and Methods of Crop Establishment	AESA 1 1. Rouging 2. Methods of Crop Establishment	Week 5
Session 6: Farm Machinery Operation	AESA 2 Rouging 1. Mechanical Transplanting 2. Farm Machinery Operation and Safety	Week 6
Session 7: Nutrient and Fertilizer Management	AESA 3 Rouging 1. Tools Used to Assess Nutrient Deficiencies 2. Fertilizer and Its Computation	Week 7
Session 8: Nutrients and Its Deficiency Symptoms	AESA 4 Rouging Nutrients and Its Deficiency Symptoms	Week 8

SESSION	LESSON	SCHEDULE
Session 9: Water-saving Technology	AESA 5 Rouging Water-saving Technology	Week 9
Session 10: Postharvest	AESA 6 Rouging Postharvest	Week 10
Session 11: Basic Financial Management	1. Farm Business Cycle and Components 2. Competencies for Business Success 3. Five Cs of Credit 4. Credit/Loan Management 5. Farm Record Keeping	Week 11
Session 12: Seed Certification Process and Seed Testing	1. Seed Certification Process 2. Seed Testing	Week 12
Session 13: Yield Estimation and Final Analysis	1. Crop Cut, Yield, and Yield Components 2. Final Analysis	Week 13
Session 14: Field Day and Graduation	Field Day and Graduation	Week 14

Session 1: Philippine Rice Industry, RCEF, and Transformational Leadership

Learning Objectives

At the end of the session, the participants will be able to:

a. Explain the Philippine Rice Industry Situation;
b. Share the implications of RCEF to the rice farmers; and
c. Explain their role in the rice industry in the context of the transformational leadership framework.

Duration

5 hours

LESSONS	METHODS	TOOLS
1. The Philippine Rice Industry Situation	Lecture and presentation	Visual Presentation
2. Understanding RCEF and Implication to Rice Farmers	Lecture and presentation	Visual Presentation
3. Transformational Leadership	Lecture and presentation Interactive activity	Visual Presentation Manila paper Meta cards Markers Pencil Paper Masking tape

Note to Facilitator

- During discussion and activity, encourage the exchange of ideas and participative interactions among participants.
- Video presentations on RCEF from the RCEF Extension Program YouTube channel may be shown.

Lesson 1: The Philippine Rice Industry Situation

Key Learning Points

- Rice consists of around 20% of the total food consumption of Filipinos.
- The majority of our rice is produced in irrigated environments (14.35 metric tons) and the rest in rainfed environments (4.72 mt). Our rice is from the 4,800,406 ha of area harvested, of which 3.29M ha are irrigated; 1.51M ha are rainfed areas.
- Our total 2018 dry palay (14% moisture content (MC)) yield reached 19.07M mt. This means that on average, each hectare of rice field yields 3.97 tons or

3,972 kg/ha, which is equivalent to 79 bags/ha. When computed a fresh weight (22% MC), this is equal to 21.04M mt. Thus, the average fresh palay yield in the Philippines is 4.40 tons/ha, which is equivalent to 4,400 kg/ha or 88 bags/ha.

Computation:

Dry Palay = (19,066,094 tons) / (4,800,406 ha) = ((3.97 tons/ha)*(1,000 kg/ton)) / 50 kg/bag = 79.44 bags or cavan

Fresh Palay = ((19,066,094 tons)*(100-14)) / (100-24) = (21.04 M tons) / (4,800,406 hectares) = ((4.40 tons/hectare)*(1,000 kg/ton)) / 50 kg/bag = 88 bags or cavan

As expected, yield in irrigated areas is higher with 4.37t/ha relative to the yield of rainfed areas at 3.12t/ha.

- Challenges in Rice Production
  - Smaller land suitable for rice farming (area harvested, 2017)
  - We have more people to feed (Ratio of population to area harvested, 2017)
  - Geography and resource endowments

- In determining the resulting retail price of rice, we first determine the cost of production. On average, the cost to produce one kilo of dry palay in irrigated areas is Php 14.38, lower-cost in irrigated areas because of higher yield. The cost of production is higher in rainfed areas at Php 17.58 because of the lower yield.

- Tariffs are taxes imposed by the government on goods. Where importation of goods becomes a business decision to meet the market demand, the use of tariffs also generates revenues for the government to fund more development projects. Moreover, it is our commitment to the World Trade Organization (WTO) to replace all Quantitative Restrictions (QR) on agricultural products with tariffs since 1995. In the past, we have allowed the tariffication of all agricultural products except for rice.

Lesson 2: Understanding RCEF and Implications to Rice Farmers

Key Learning Points

- Republic Act No. 11203 otherwise known as the "Rice Tariffication Law" was promulgated to ensure food security and to make the country's agriculture sector viable, efficient, and globally competitive. The law seeks to replace the quantitative restriction (QR) on rice imports with tariffs and lifts the quantitative export restrictions on rice.

- RA 11203 has created the Rice Competitiveness Enhancement Fund or Rice Fund. The Rice Fund shall consist of an annual appropriation of 10 billion pesos (Php 10,000,000,000) for the next 6 years. Together with existing programs for rice and rice farmers of the DA and other agencies, the Rice Fund is expected to greatly contribute to the vision of a rice-secure Philippines and, ultimately, to the attainment of Ambisyon Natin 2040 — the long-term shared life goal of Filipinos of a Matatag, Maginhawa, and Panatag na Buhay.

- The Php 10B of RCEF will be divided among these four components:

    - Mechanization Program – Php 5B
    - Seed Program – Php 3B
    - Credit Program – Php 1B
    - Extension Program – Php 1B

- Seed Program

    The 30% of the RCEF will be used for inbred rice seed development, propagation, and promotion and be led by the PhilRice. This program aims to increase the adoption of certified inbred seeds and integrated crop management through these four projects:

    1. Promoting and distributing certified seeds of inbred rice varieties;
    2. Mobilizing and strengthening local seed production;
    3. Supporting a variety of development; and
    4. Strengthening farmer organizations.

    Beneficiaries:

    Farmer organizations

    1. Must be accredited by DA or any accrediting government agency recognized by DA; and
    2. With members whose rice farms can cover a cluster of at least 20 ha in one to two adjacent villages in one selected city or municipality

    For farmer-recipients

    1. Must be included in the DA-updated Registry System for Basic Sectors in Agriculture (RSBSA);
    2. Must be a member of DA-accredited FO; and
    3. Must be farming in rice fields located in the selected municipalities

- Mechanization Program

    The 50% of RCEF will be used for rice farm machinery and equipment by the PHilMech. This program aims to strengthen the access and use of appropriate production and postproduction mechanization technologies. Furthermore, it specifically aims to:

    1. Provide access to rice production and postharvest machinery and equipment through the farmer cooperatives associations (FCAs);
    2. Promote the use of efficient and cost-reducing rice mechanization interventions; and
    3. Strengthen local agricultural machinery manufacturing industry through aggressive technology development, fabrication, and manufacturing.

The following are technologies available under the mechanization program:

1. Agricultural Tractors
2. Farm Tillers
3. Rice Seeders
4. Rice Transplanters
5. Irrigation Pumps
6. Small Solar Irrigation
7. Rice Threshers
8. Rice Harvesters
9. Rice Reapers
10. Mechanical Rice Dryers
11. Rice Mills

Beneficiaries

1. Eligible and registered rice-based FCA with existing and active members.
2. FCA should be an accredited organization of DA.

- Credit Program

The 10% of the RCEF will be used for the expanded rice credit assistance and be divided between the Landbank of the Philippines (LBP) and the Development of the Philippines (DBP). This program aims to:

1. Provide a simplified lending program with streamlined requirements and shorter processing time;
2. Make financial services and literacy available to Filipinos in the agricultural and rural areas through access to formal credit; and
3. Ensure food security and improve the viability, efficiency, and competitiveness of the agricultural sector and at the same time uplift the lives of marginalized farmers.

Eligible Borrowers:

1. Individual rice farmers

Note: Farmers which have already availed of assistance in the seed and mechanization components are ineligible to avail of RCEF loans unless the loan being applied shall be used to finance another rice-related project.

2. DA-accredited cooperatives with rice farmers as members

Note: Cooperatives that have already availed of assistance in the seed and mechanization components are ineligible to avail of RCEF loans unless the loan being applied for shall be used to finance another rice-related project.

3. Members-Borrowers (for re-lending/rediscounting)

Maximum loanable amount:

The loanable amount is up to 90% of the total project cost.

Example 1: If it will cost a farmer Php 55,000 to produce one hectare of rice. A farmer can borrow up to Php 50,000 per hectare.

Example 2: If a farmer wants to purchase a hand tractor including testing and delivery costing Php 140,000, a farmer can borrow up to Php 126,000 to purchase the equipment and the difference of Php 14,000 will be his/her equity.

- Extension Program

The remaining 10% of the RCEF will be used for rice extension services and be divided among ATI, PhilRice, PHilMech, and TESDA. This program aims to enhance the capability of the rice fund beneficiaries on inbred rice and seed production and other relevant skills for improved competitiveness and income through these three components:

1. Design and delivery of training programs, enterprise development assistance, and communication support services;
2. Establishment and strengthening of the capacities of farm schools on rice knowledge/technology transfer; and
3. Development and implementation of a scholarship program.

Lesson 3: Transformational Leadership

Note to Facilitator

This lesson is delivered in two parts. Part 1 will be done in the early part of the training while Part 2 will be done at the end of the training, as a closing activity.

PART 1

Time Allotment: 3.5 hours

ACTIVITY 1 | PART 1

Title: KKK

Methodology: Interactive Activity

Procedure:

1. Divide the class into three groups.
2. Having heard the discussion on the rice industry situation and RCEF, have them think of their KKKs. Ask each group to write these in the manila paper.

Group 1- Kinatutuwa (something that you are happy about or something that excites you about the rice industry situation and RCEF)

Group 2- Kinababahala (your fears; something that bothers or concerns you about the rice industry situation and RCEF)

Group 3- Katanungan (questions about the rice industry situation and RCEF)

3. After 10 minutes, have them srotate or change places with another group. Looking at the initial answers of the other group, allow them to add their inputs on the specific "K" for another 5 minutes. They should not repeat what is already given in the paper.
4. Rotate one more time until all groups have given their inputs in the three Ks.
5. Once back in their paper, have them examine the answers provided by other participants (non-group members) and ask each group to present their outputs to the class.

Processing:

1. What insights come to mind through the KKK exercise?
2. What are the positive thoughts? What are the major concerns? What are the common questions and which of these can be answered through the training?

Key Concept:

Through the KKK exercise, you will have an idea of how the participants understand the current situation of the Philippine rice industry and the rationale for why there is RCEF. Through this, you may be able to boost their positive feelings, minimize their apprehensions, and correct mis-conceptions or clear out any questions that trainees may have at the beginning of the course. With a better understanding of the context, they may be able to better appreciate their role and what they need to do to fulfill their role relative to RCEF and the lives of rice farmers they serve.

Connecting Statement:

The Philippine rice industry and our rice farmers are facing a lot of challenges. The government is doing its best to implement programs and policies such as RCEF to benefit farmers. Having understood that, the challenge now is to realize our role and how we can contribute to that effort.

ACTIVITY 2 | PART 1

Title: Why am I here?

Methodology: Interactive Activity

Procedure:

1. Individually first, have them think of persons in the same line of work that they look up to or who inspires them. That person may be a trainer, a resource person, a facilitator, etc). What makes these persons inspiring or effective?
2. Then, as a group, have them list as many as they can the qualities (knowledge, attitudes, skills, competencies, etc.) of effective and excellent trainers/resource persons/facilitators.
3. Post the outputs for the rest of the participants to see.
4. Provide each participant with a piece of paper. Have them divide the paper into four parts and make an individual SWOT table

Processing:

As a farmer leader, how can you enhance your strengths through this training? What opportunities can you take advantage of to be able to improve yourself or be more effective in helping co-farmers? What specific weaknesses and threats should you overcome to be more effective at helping co-farmers?

Key Concepts:

Participants in the training are rice farmers in their respective areas seeking to improve their knowledge and skills in rice farming. Having learned of the challenges being faced by farmers and the thrust of the government to help them, they need to be able to situate themselves and realize how they can contribute to the situation. They need to realize that the training is one of the ways by which they can enhance their strengths (e.g., knowledge on rice production and skills training farmers), learn and develop skills to minimize weakness, and overcome threats. Also, they need to realize that training is an opportunity to improve themselves to become more competitive farmers.

Connecting Statement:

Now that you understand the challenges faced by farmers, why is there RCEF? Have you assessed yourself as a farmer leader? How do you see yourself contributing to the situation? What is the role of a farmer?

ACTIVITY 3 | PART 1

Title: New Thinking

Methodology: Interactive Activity

Procedure:

1. Review with the participants the objectives of the training course.
2. Then, show trainees the 'Amazing Dance' (featuring two differently ablead dancers) or 'Journey of life together' (the story of Dick and Rick Hoyt) video. (Note: any other similar video that is available may be used for this purpose).
3. After seeing the video, ask some participants to share their thoughts about what they saw in the video.
4. As a group, ask them to illustrate their learnings and realizations so far. They may answer the following questions as a guide in making their illustrations:
    a. What are the challenges faced by farmers? How do you want to see them after a few years (after RCEF)?
    b. Why are you here in this training? You are doing this for whom?
    c. What is the role of a farmer leader? How do you see yourself fulfilling this role?
    d. As a farmer leader, how can you help your co-farmers?
5. Ask a representative of each group to explain their illustrations to the class.

Processing:

1. Do you see yourself being an improved and competitive farmer?
2. What do you need to do in this training to help yourself fulfill that role?

Key Concepts:

NEW thinking means going beyond the usual strategies and solutions by acknowledging the different challenges and the current situation of the industry. Likewise, new thinking means going beyond self-gain but realizing our critical roles to play given the various stakeholders and on how to be effective actors who will make positive contributions to the country's economic development.

PART 2

ACTIVITY 1 | PART 2

Title: Commitment Ceremony

Methodology: Interactive Activity

Procedure:

1. Have trainees reflect on everything that they went through during the training – from Lesson 1 to Lesson 3. You may guide them by going through the major lessons and activities.
2. Individually, have trainees write in meta cards what they commit to doing after the training. Ask them to write their names and sign their commitment statements.
3. One by one, have them state their commitment in front of the class. End with a closing prayer or message.

Reference/s:

Flordeliza H. Bordey; Jesusa C. Beltran; and Marco Antonio A. Baltazar

Session 2: Rice Morphology and Growth Stages, and Overview of thePalayCheck System and Review of Key Checks 1-5

Learning Objectives

At the end of the session, the participants will be able to:

a. Explain rice morphology and the different growth stages;
b. Explain the concept of the PalayCheck System; and
c. Enumerate Key Checks 1-5.

Duration

5 hours

LESSONS	METHODS	TOOLS
1. Rice Morphology and Growth Stages	Lecture and presentation	Visual Presentation Live specimen of rice plant in each growth stage (seedling, transplanting, maximum tiller number, panicle formation, flowering, and maturity)
2. Overview of the PalayCheck System	Lecture and presentation	Visual Presentation
3. Review of Key Checks 1-5		
Sub-lesson 1: Key Check 1 - Used High-Quality Seeds of Recommended Variety	Lecture and presentation Interactive activity	Visual Presentation
Sub-lesson 2: Key Check 2 – Well-leveled Field	Lecture and presentation Interactive activity	Visual Presentation
Sub-lesson 3: Key Check 3 – Practiced Synchronous Planting After a Rest Period	Lecture and presentation Interactive activity	Visual Presentation
Sub-lesson 4: Key Check 4 - Sufficient Number of Healthy Seedlings	Lecture and presentation Interactive activity	Visual Presentation
Sub-lesson 5: Key Check 5 – Sufficient Nutrients from Tillering to EPI and Flowering	Lecture and presentation Interactive activity	Visual Presentation

Note to Facilitator

- This session focuses on the rice morphology and growth stages; overview of PalayCheck System; and overview of Key Checks 1 -5.
- Prepare the necessary tools and materials to be used for the activity.
- Collect information on the common rice production practices/problems of the participating farmers.
- During discussion and activity, encourage the exchange of ideas and participative interactions among participants.
- Explain how Key Checks are assessed.
- Emphasize good management and how to improve the weakness, and the benefits of observing, measuring, and recording.
- Reiterate the importance and recommendations to achieve Key Checks 1 - 5. Regularly monitor the attainment of Key Checks and changes in farmers' current management practices with the use of Key Check monitoring board, and ensure that this is filled-up (see Annex C).
- Encourage farmers to participate in online webinars, courses and other virtual learning activities where available. Share to farmers links to relevant online activities if possible.
- Supplementary reference: PalayCheck System for Irrigated Lowland Rice booklet by PhilRice.

Lesson 1: Rice Morphology and Growth Stages

Key Learning Points

Rice Morphology

Germinating Seed
Depending on where the seeds are germinated, either of the two emerges first:

1. coleorhiza when germinated with light, or
2. coleoptile when germinated in soil or darkness

Seedling

Tiller
The vegetative organs consist of roots, culm, and leaves. A branch bearing the culm, leaves, and roots with or without the panicle is called a tiller.

Growth Stages

There are 3 growth phases of the plant:

1. vegetative,
2. reproductive, and
3. ripening

The duration of the vegetative phase differs from the variety and growing season.

The reproductive and ripening phases are generally constant for most varieties. The reproductive phase is approximately 35 days while the ripening phase

The difference in growth duration is determined mainly by the duration of the vegetative phase. For instance, we calculate the growth phases of the 115-day variety: the reproductive phase is 35 days and the ripening phase is 30 days, so the vegetative phase is 50 days. For a 130-day variety; the vegetative phase is 65 days.

There are 10 growth stages of the rice plant:

Stage 0: Germination to the emergence
Stage 2: Tillering
Stage 3 : Stem elongation
Stage 4: Panicle initiation to booting
Stage 5: Heading
Stage 6: Flowering
Stage 7: Milk grain
Stage 8: Dough grain
Stage 9: Mature grain

Lesson 2: Overview of the PalayCheck System

Key Learning Points

PalayCheck System

- A dynamic and integrated rice crop management system that presents the best key technology and management practices as Key Checks.

- The Key Checks serve as a guide to compare the effectiveness of farmers' management practices as well as analyze the relationship of the crop management areas (or the key checks) that contribute to grain yield and other outcomes.

- Enables farmers to recognize and follow the best management practices rather than just being told of the steps to follow.

- The results can assist farmers to recognize the benefits and effectiveness of the best management practices and the disadvantages of poor practices.

Table 1. Key check recommendations under each crop management areas

Crop Management Area	Key Check Recommendation
Seed & Variety Selection	Used high-quality seeds of a recommended variety
Land Preparation	Well-leveled field
Crop Establishment	Practiced synchronous planting after a rest period
Crop Establishment	Sufficient number of healthy seedlings
Nutrient Management	Sufficient nutrients from tillering to early panicle initiation and flowering
Water Management	Avoided excessive water or drought stress that could affect the growth and yield of the crop
Pest Management	No significant yield loss due to pests
Harvest Management	Harvested the crop at the right time
Postharvest Management	Dried, cleaned, and stored grains properly

Lesson 3: Review of Key Checks 1-5

Sub-Lesson 1: Key Check 1 -Used High-Quality Seeds of a Recommended Variety

Key Learning Points

Characteristics of Low vs High-quality Seeds

Low-quality Seeds

- have plenty of impurities (e.g., weed seeds, seeds of other crop species, inert materials)
- damaged, deformed
- show visible seed-borne pests and diseases
- have low germination

High-quality Seeds:

- relatively pure
- have fewer weed seeds
- free from visible seed-borne pests and diseases
- full and uniform in size
- high germination

Classes and Standards of High-quality Inbred Rice Seeds

High-quality inbred rice seeds have corresponding tag colors and seed classes, as listed below:

Table 2. Tag colors and seed classes of high-quality inbred rice seeds

TAG COLOR	SEED CLASS
White tag	Breeder Seeds (BS) - produced from uniform panicles (nucleus seeds)
Red tag	Foundation Seeds (FS) - produced from breeder seeds
Green tag	Registered Seeds (RS) - produced from foundation seeds
Blue tag	Certified Seeds (CS) - produced from registered seeds

It should be noted that certified seeds are grown by accredited seed growers and sold to farmers. Hybrid seeds, which are also considered high-quality seeds, have an orange-colored tag.

ACTIVITY

Title: Identification of Low vs High-quality Seeds

Methodology: Interactive Activity

Procedure:

1. Show the following photos and ask the participants which of the images show low and high-quality seeds:

Processing:

1. What are the characteristics of low-quality seeds?
2. What are the characteristics of high-quality seeds?
3. By merely looking at the pictures, what do you think are the advantages of using high quality seeds over low-quality seeds?

Key Concept:

Seeds are the foundation of farming. The use of high-quality seeds coupled with good production practices, will bring a good harvest in terms of quantity and quality.

Sub-Lesson 2: Key Check 2 – Well-leveled Field

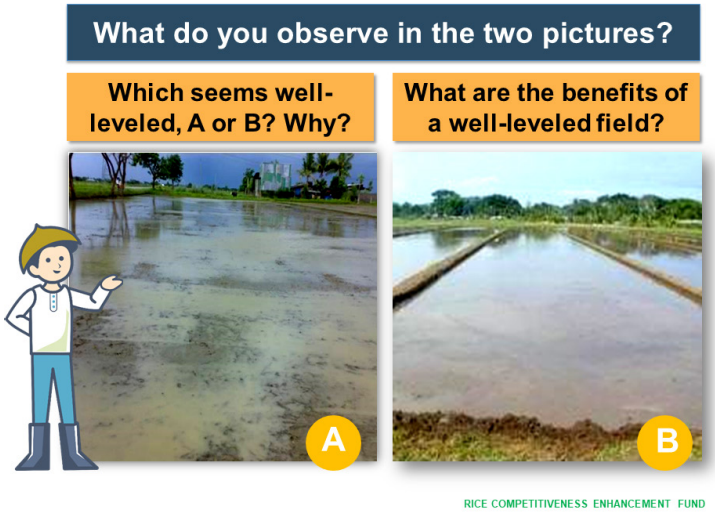
OPENING ACTIVITY

Title: Identification of Well-leveled Fields

Methodology: Interactive Activity

Procedure:

1. Show the following photos and let the participants which field seems well-leveled, A or B.



Processing:

1. What are your observations about the soil or the way the land was prepared?
2. What are the benefits of a well-leveled field?
3. If rice is grown here in A or B, what could happen?

Key Learning Points

- Land preparation is the process of preparing the soil to provide a favorable soil environment for plant germination and growth.

- Tillage is the process of mechanically altering some physical characteristics of the soil for it to be ideal for growing crops.

MID-SESSION ACTIVITY

Title: Advantages of a well-leveled field

Methodology: Interactive Activity

Procedure:

1. Prepare two transparent plastic containers filled with equal amounts of mud from the field. Level the mud in the first container but leave the other unleveled.
2. Prepare two glasses with equal amounts of water that is just enough to cover the surface of the mud in the plastic container.
3. Fill the containers with equal amounts of water and observe

Processing:

1. What are your observations about the amount of water needed to cover the surface of both containers?
2. Which container required more time to fill?

Key Concept:

This activity reiterates the importance of a well-leveled field.

Sub-Lesson 3: Key Check 3 – Practiced Synchronous Planting after a Rest Period

OPENING ACTIVITY

Title: Why synchronous planting?

Methodology: Interactive Activity

Procedure:

1. Ask the learners the following:
   - Do farmers usually allow their field to rest after harvest before the next planting season?
   - When you hear synchronous, what usually comes to our mind first?

2. Show the following photos:

3. If this is a field in Brgy. Maligaya, and each picture represents a lot owned by a different farmer, can you say that farmers in Brgy. Maligaya practice synchronous planting?

Key Concepts:

The rest period is when the rice field is not planted with the same crop to be fruitful in the next cropping season. During this period, any crop other than rice or heavy feeders, such as corn, are established after rice production. Meanwhile, the fallow period is when there is no crop established, which breaks the pest cycle and allows the soil to rejuvenate and aerate.

The availability of irrigation water in the locality sometimes limits farmers from following this practice. Also, farmers tend to avoid the peak season to get a higher price of palay so they plant earlier than the majority.

Key Learning Points

The following are the importance of synchronous planting:

- Enables efficient use of irrigation water;
- Avoids overlapping incidence of insect and disease population; and
- Avoids significant yield loss from pests.

OPENING ACTIVITY

Title: Quality Input

Methodology: Interactive Activity

Procedure:

1. Ask participants what materials they think should be used to be able to build a good quality house. How about the case for humans?

Key Concept:

To ensure that a person is healthy, we provide him/ her healthy food, clothing, shelter, vitamins, recreation, etc. Healthy people are more likely to perform better in school or at work and in life in general. The same is true with rice. A good-yielding field requires healthy seedlings as planting materials.

Key Learning Points

The following are the importance of having sufficient number of healthy seedlings:

- Have uniform height and growth
- Have short leaf sheaths
- Have long, dense roots
- No pest damage

MID-SESSION ACTIVITY

Title: Is 40 kg enough for a hectare?

Methodology: Interactive Activity

Procedure:

1. Show the sample computation for proving that the recommended seeding rate of 40kg/ha seeds is more than enough.

Given: 1,000 grains weights about 22 g.
To determine the number of seeds per 40kg:

$$\frac{1{,}000 \text{ seeds}}{22 \text{ g}} \times \frac{1{,}000 \text{ g}}{\text{kg}} = \textbf{45,000 seeds/kg}$$

$$\frac{45{,}000 \text{ seeds}}{\text{kg}} \times 40 \text{ kg} = \textbf{1,800,000 seeds/ 40 kg}$$

Given: Certified seeds have a minimum germination rate of 85%.
To determine the estimated number of seedlings that will grow:

$$\frac{3 \text{ seedlings}}{1 \text{ hill}} = \textbf{750, 000 seedlings/ha}$$

Given: There are 250,000 hills/ha if we use 20x20 cm planting distance.
To determine the estimated number of seedlings you need per ha:

$$\frac{250{,}000 \text{ hills}}{1 \text{ ha}} \quad \frac{3 \text{ seedlings}}{1 \text{ hill}} = \textbf{750,000 seedlings/ha}$$

1, 530, 000 seedlings *(produced from 40 kg seeds at 85% germination rate)*
\- 750, 000 seedlings *(needed per hectare at 20x20 cm planting distance)*

780, 000 excess seedlings

Key Concept:

Forty kilograms (40 kg) is more than enough for one hectare.

Sub-lesson 5: Key Check 5 – Sufficient Nutrients from Tillering to Early Panicle Initiation (EPI) and Flowering

Key Learning Points:

- Nutrients are what plants need to grow and become productive, just like humans.
- Proper nutrient management improves crop growth and yield. Rice plants grow and respond better to fertilizer when there is more sunlight.
- Of all nutrient elements, rice plants need more nitrogen (N), phosphorus (P), potassium (K), zinc (Zn), and sulfur (S).
- Nutrient inputs as fertilizers fill the gap between what the crop needs and what is currently present in the soil, water, and air (indigenous supply).

MID-SESSION ACTIVITY

Title: Right EAT

Methodology: Interactive Activity

Procedure:

1. Using the picture below, ask the participants on "How and what will you feed them?"

Processing:

1. Explain that the kind/type of food that we consume, as well as the quantity and frequency of eating largely, depends on our need (factoring in our body type, lifestyle, etc.).
2. Explain further that the same is true with rice---to grow healthy and be productive, it should be provided with the right nutrients, how much, and the timing of application varies.

Key Concept:

This activity reiterates the right element, amount and timing of fertilizer application.

Reference/s:

Oliver E. Manangkil, Thelma F. Padolina, Arnold S. Juliano, Manuel Jose C. Regalado, Wilfredo B. Collado, Marvin J. Manalang, Genaro S. Rillon, Evelyn F. Javier, Kremlin M. del Castillo, Aurora M. Corales

Session 3: Water Management, Harvesting, and Postharvest Practices

Learning Objectives

At the end of the session, the participants will be able to:

a. Avoid the effects of excessive water or drought on the growth and yield of the crop;
b. Discuss the effects of harvesting the crop at the right time; and
c. Explain the effects of properly drying, cleaning, and storing the grains.

Duration

5 hours

LESSONS	METHODS	TOOLS
1. Review of Key Checks 6, 8, and 9	Lecture and presentation	Visual Presentation
Sub-lesson 1: Key Check 6 - Avoided Stress Caused by Drought or Excessive Water that Could Affect the Growth and Yield of the Crop	Lecture and presentation	Visual Presentation
Sub-lesson 2: Key Check 8 - Harvested the Crop at the Right Time	Lecture and presentation	Visual Presentation
Sub-lesson 3: Key Check 9 - Dried, Cleaned, and Stored Grains Properly	Lecture and presentation	Visual Presentation

Note to Facilitator

- This session focuses on the overview of Key Checks 6, 8, and 9.
- Prepare the necessary tools and materials to be used for the activity.
- During discussion and activity, encourage the exchange of ideas and participative interactions among participants.
- Explain clearly how Key Checks are assessed.
- Emphasize good management and how to improve the weakness, and the benefits of observing, measuring, and recording.
- Reiterate the importance and recommendations to achieve Key Checks 6, 8, 9.
- Regularly monitor the attainment of Key Checks and changes in farmers'

current management practices with the use of Key Check monitoring board, and ensure that this is filled-up (refer to Annex C).

- Encourage farmers to participate in online webinars, courses and other virtual learning activities where available. Share to farmers links to relevant online activities if possible.

- Supplementary reference: PalayCheck System for Irrigated Lowland Rice booklet by PhilRice.

Lesson 1: Review of Key Checks 6, 8, & 9

Sub-lesson 1: Key Check 6- Avoided Stress caused by Drought or Excessive Water that could Affect the Growth and Yield of the Crop

OPENING ACTIVITY

Title: Water in Rice Farming

Methodologies: Lecture discussion, hands-on activity

Procedure:

1. Flash Photo/s of water on the screen.

2. Ask participants about the importance of water in their lives.
3. Afterwards, flash photo/s of irrigated rice fields.

Processing:

1. Ask the participants about the importance of water to rice.
2. Summarize the answers of the participants.

Key Learning Points:

- Right amount of water on rice plants results in better nutrient uptake and fertilizer efficiency, good vigor, pest management, and more efficient farm operations.

- An excessive amount of water results in low yield, nutrient imbalance, low fertilizer efficiency, and high greenhouse gas emission.

- Water helps control weeds and aids in land preparation.

- It not only cools the soil to make plant growth favorable but also cools the plant to help regulate stomatal openings and make the plant erect and leaves fully expanded for better sunlight exposure and carbon dioxide intake.

- Water dissolves and carries mineral nutrients from the soil to the plants and distributes photosynthetic product to the different rice parts.

Sub-lesson 2: Key Check 8- Harvested the Crop at the Right Time

OPENING ACTIVITY

Title: Right Timing

Methodology: Interactive Activity

Procedure:

1. Flash a photo of bananas on screen.

Processing:

1. Among these bananas, which do you think is ideal for eating?
2. Compare the analogy of banana to rice.
3. Discuss Key Check 8.

Key concept:

This activity reiterates the importance of harvesting at the right time.

Key Learning Points:

- Harvesting rice at the right time produces high-quality rice leading to high consumer acceptance; thus, high market value.
- Harvesting it too early leads to harvest losses due to low milling recovery given the grain immaturity.
- Harvesting it too late leads to harvest losses due to breakage during milling and grain shattering.

Sub-lesson 3: Key Check 9- Dried, Cleaned, and Stored Grains Properly

OPENING ACTIVITY

Title: Why do we grow rice?

Methodology: Interactive Activity

Procedure:

1. Flash two (2) photos of Food, and planting using the PowerPoint slide on the screen.

2. Ask the participants 'Why do we grow rice? For commercial use or seed purposes?' Have them explain their answer briefly.
3. Inform them that the answer is 'for commercial use'

Key Concepts:

1. You cannot improve the quality of grains after harvest. You can only maintain it through proper postharvest practices.
2. Even after harvest, grains are alive and continue to respire. Grain quality deteriorates because of changes in temperature and relative humidity that affect the moisture content of grains.

Key Learning Points:

- Proper postharvest practices (drying, cleaning, and storage) maintain quality of grains, makes long storage possible, maintain quality of palay suitable for milling, and prevent postharvest losses.

Reference/s:

Jovino L. De Dios, Kristine S. Pascual, Susan R. Brena, Ricardo F. Orge, Arnold S. Juliano, and Manuel Jose C. Regalado

Session 4: Pest Management

Learning Objectives

At the end of the session, the participants will be able to:

a. Explain Key Check 7, its importance, and assessment method; Explain the importance of integrated pest management, its concepts, and principles;
b. Identify the different insect pests and their natural enemies, and the common rice diseases; and
c. Explain the importance and procedure for conducting agroecosystem analysis.

Duration

5 hours

Lessons	Methodology	Tools
1. Review of Key Check 7 - No Significant Yield Loss Due to Pests	Lecture and Presentation Fieldwork	Visual Presentation
2. IPM Concepts and Principles	Lecture and Presentation Fieldwork	Visual Presentation Rice plant Sweep net
3. Insect Pests and its Natural Enemies	Lecture and Presentation Fieldwork	Visual Presentation Manila paper Marker Pen
4. Conducting AESA	Lecture and Presentation Fieldwork Workshop	Visual Presentation Pen/Markers Colored pen/ Crayons LCC Ruler Manila paper Actual specimen of insects (field)

Note to Facilitator

- This session focuses on various rice pest management practices.
- Prepare the necessary tools and materials to be used for the activity.
- During discussion and activity, encourage the exchange of ideas and participative interactions among participants.
- Explain clearly how Key Checks are assessed.
- Emphasize good management and how to improve the weakness, and

the benefits of observing, measuring, and recording.

- Reiterate the importance and recommendations to achieve Key Check 7.
- Regularly monitor the attainment of Key Checks and changes in farmers' current management practices with the use of Key Check monitoring board, and ensure that this is filled-up (see Annex C).
- Encourage farmers to participate in online webinars, courses and other virtual learning activities where available. Share to farmers links to relevant online activities if possible.
- Supplementary reference: PalayCheck System for Irrigated Lowland Rice booklet by PhilRice.

Lesson 1. Review of Key Check 7 - No Significant Yield Loss due to Pests

Key Learning Points:

- Practicing proper pest management helps prevent significant yield loss and produces high-quality grains by:
  - knowing how the rice crop interacts with biotic factors and the agroecosystem; and
  - correctly identifying pests and applying ecologically sound management strategies.

ACTIVITY

Title: Spot

Methodology: Interactive Activity

Procedure:

1. Show images of rice plants damaged by different pests on the screen

Processing:

1. What do you observe?
2. What are the possible effects of each pest and diseases on the yield of rice and to the farmer?

Key Concept:

Identification of potential pests is of vital importance in providing effective and efficient management/control measures.

Lesson 2. IPM Concepts and Principles

Key Learning Points:

IPM is the selection, integration, and implementation of pest management based on economic, ecological, and sociological consequences. IPM is not a packaged technology for pest control.

Objectives of IPM

- Improves decision-making in pest management (AESA is used as a decision tool).
- Helps farmers save unnecessary insecticide inputs, prevent exposure to health hazards due to pesticides, and reduce environmental pollution.

Concepts of IPM

- Not all insects are pests.
- The ecosystem is the management unit.
- Natural control must be maximized.
- Control procedures must not produce unexpected and undesirable effects.

Principles of IPM

- Grow a healthy crop
- Conserve predators and parasitoids
- Determine management actions necessary to produce a profitable crop
- Train farmers to be able to make a sound decision using AESA as a making tool

Practical Ways of Applying IPM

1. Conduct AESA
2. Be sure of the cause of the damage by checking the characteristic damages, symptoms, and growth phase affected.
3. Check the distinguishing characteristics and stage of the pest causing the damage.
4. Combine all possible methods of pest management.
5. Conserve biological control agents or friendly organisms.

6. Use chemical control only when no alternative methods or a combination of measures are applicable or available.

Lesson 3. Insect Pests and Its Natural Enemies

Key Learning Points:

- Not all insects that feed on the rice plants are pests.
- An organism is considered a pest when it reduces the yield of the rice plant. Pests feed on, attack, and destroy the plant.

Major Pests of Rice Plants

1. Insects such as black bugs, rice bugs, brown planthoppers, white backed planthoppers, green planthoppers, and stem borers
2. Pathogens that cause tungro, sheath blight, and bacterial blight
3. Weeds
4. Snails
5. Rodents
6. Birds

Table 3. Insect pests attack at each growth phase of the rice plant

Plant Growth Phase	Insect Pests
Vegetative/Tillering Phase	Whorl maggots, caseworms, leaf folders, green horned caterpillar, green semi-looper, cutworms, armyworms, green leafhoppers (GLH), brown planthoppers (BPH), white backed planthoppers (WBPH), and larvae of stem borers
Reproductive Phase	Leaf folders, stem borers, GLH, and BPH
Ripening Phase	Rice bugs that feed on the grains especially at the milking stage

Natural Enemies

- Known as beneficial organisms or friends of the rice plant
- Help control pest populations in rice fields by attacking insect pests
- Can be naturally occurring or introduced in the area
- Include lady beetles, damselflies, dragonflies, spiders, wasps, grasshoppers, and some pathogens that infect the eggs and larvae of insect pests

ACTIVITY

Title: Pest or Not a Pest

Methodology: Interactive Activity

Procedure:

1. Have the participants form groups of 5? Provide each group with one sheet of manila paper and marker pen where they will draw a table labeled:

Organism	Pest	Not a Pest
Example Rodents (rats)	inside houses	in the woods

2. Let the participants write down names of organisms they think might be a pest in the left-hand column. Then, they will indicate when or where it is a pest. If they can think of a situation where or when that SAME organism is NOT a pest, write it in the assigned column.
3. After each group has finished writing down their answers, have them compare them with other groups. Let the other groups agree or disagree.

Processing:

Debrief by highlighting their responses, including how many times the same species is mentioned. These are likely to be species harmful to people.

Point out also the column containing all the situations wherein the organisms were listed as a "Pest". What do these situations have in common? Most likely they are all human endeavors of some sort or situations that spoil something that humans value.

Finally, point out all the situations where they are considered not a pest.

Most likely these are the roles played by the species in the natural environment and/or their use as food, pleasure, or research purposes for humans.

Explain that in this lesson they will learn that potential pests cannot be treated the same wherever (or whenever) they occur.

Key Concept:

Not all insects that feed on the rice plants are pests. An organism is considered a pest when it reduces the yield of the rice plant. Pests feed on, attack, and destroy the plant.

Lesson 4. Conducting AESA

Key Learning Points:

AESA

- An ecological system partly modified by man to produce food, fiber, or other agricultural products.

- A way of understanding the interactions of the different factors in the field, which are directly and indirectly affecting the growth and development of the rice plant. It is an essential decision tool to identify changes and interactions in rice and its surroundings to help in applying the best and appropriate crop management practice.

Basic Components of a Rice Agroecosystem

- The sun is the primary energy source.
- The media is modified by prevailing weather: air, soil, and water.
- Plants and the environment.
- Herbivores or phytophagous forms. Plant-eating organisms such as insect pests and rats.
- Carnivores or animal-eating organisms such as parasites, predators, pathogens prey upon the phytophagous forms.
- Non-pest organisms (pollinators, decomposers, etc.)
- Agronomic practices of a farmer.

Procedures in Conducting AESA

1. Divide the training participants into four learning teams with one facilitator for each team. These learning teams are permanent throughout the training. Each team is assigned to a specific field plot for the weekly AESA.
2. Conduct AESA 14 DAT and weekly thereafter up to two weeks before harvest.
3. Randomly pick a hill and record the observations and data gathered. Get a minimum of 5 sample hills.
4. The following will be observed and recorded in sequence:
   a. Cautiously observe, identify, count, and classify highly mobile insects first, according to pests and natural enemies without disturbing the sample plants at the canopy.
   b. Observe and count other insects at the middle and lower portion of the plants by looking closer between tillers.
   c. Identify and count adult and nymphs of the brown planthoppers (BPH), whitebacked planthoppers (WBPH), and other insects at the base of the plant. Observe also the presence of the natural enemies of these pests such as mired bugs, dwarf spiders, and wolf spiders.
   d. Tap the plants after examining the hill. It will help dislodge other insects that are not counted or identified.
   e. Be aware that there are plenty of helpful aquatic predators such as water striders, Mesovelia, and Microvelia, which are effective against hopper adults and nymphs. These two are to be counted or estimated and included as other observations.
   f. Observe the sample hill for plant health, diseases, nutrient

deficiency, and leaf damages. Determine Nitrogen deficiency by using the Leaf Color Chart (LCC) or the LCC App.

g. Measure water level using an improvised bamboo stick or meter stick.
h. Determine weed status by rating weed density as abundant, frequent, and rare.
   Weed rating can be done while conducting field sampling and can generally be observed while standing at the edge of the field.
i. Take at least 10 LCC readings at random if PTD is LCC based. If 6 or more of the LCC readings are lower than 4, apply the recommended fertilizer.

5. Stake 5 representative hills per treatment for plant development data. Take the average number of tillers, plant height, and the number of leaves of the highest tiller.

Processing of Data

- Consolidate the data gathered such as the insect pests and their natural enemies and other field observations in a Manila paper.

- Include general observations such as
  - variety planted
  - date sown
  - date transplanted
  - fertilizer applied
  - average number of tillers
  - average plant height
  - number of leaves
  - age and stage of the plant

- Look out for other AESA data needed like weather conditions, water depth, weed status, plant health, pest, and other damages will be indicated as observations.

- Recommendations will be indicated opposite the observations.

Presentation of Report

- A representative from each group shall present/report their AESA outputs.
- A representative of the team will present their output in the big group.
- Questions and clarifications will be raised and opinions/answers/ recommendations and discussion will follow.
- The facilitators can clarify matters/issues with contrasting ideas and supply additional information when necessary.
- This activity will be undertaken once a week, up to 2 weeks, before harvesting.

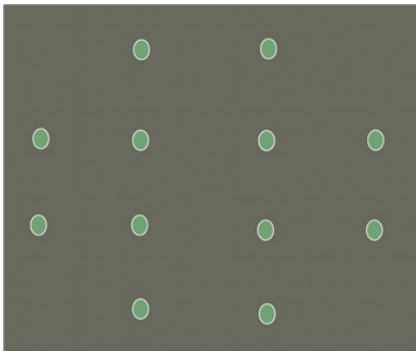
ACTIVITY

Title: Connect the dots

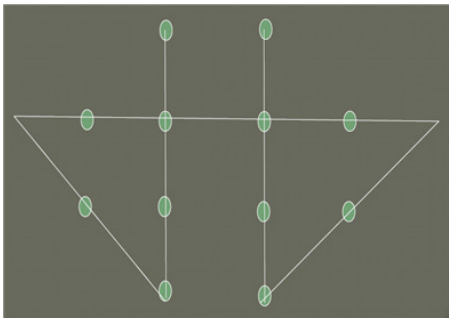
Methodology: Interactive Activity

Procedure:

1. Before discussing this topic, start with a brain teaser activity that has a relationship with the concept of AESA.
2. Show to the participants these 12 dots arranged in this manner.



3. Ask the participants to connect the 12 dots with five straight lines without lifting their pen.
4. After giving them the required time to do it, give recognition to those who can get the correct answer. Then show them the correct answer using the PowerPoint with animation. Observe the different reactions of the participants.



Processing:

While doing, the participants might be having a hard time connecting the dots with only five straight lines, and even without lifting their pens. This is because the participants are just confined with the 12 dots. They might not be looking beyond those dots, which is exactly the concept of AESA that one must not only look at where the rice plants are planted but look beyond, because everything is part of the ecosystem (biotic and abiotic factors).

Key Concept:

In conducting AESA, the participants will learn how to observe the crop, how to analyze the field situation, and how to make the proper decisions for their crop management.

Reference/s:

Joel V. Pascual, Glenn Y. Ilar, Genaro S. Rillon, Dindo King M. Donayre, Leonardo V. Marquez, Gilely D. Santiago, and Evelyn M. Valdez

Session 5: Roguing and Methods of Crop Establishment

Learning Objectives

At the end of the session, the participants will be able to:

a. Explain the importance ofroguing; and
b. Apply the methods of crop establishment.

Duration

5 hours

LESSON	METHODS	TOOLS
1. Rouging	Lecture and Presentation Fieldwork	Visual presentation
2. Methods of Crop Establishment	Lecture and Presentation Fieldwork	Visual presentation Manual seeder Knapsack sprayer Shovel Scraper Hammer Hand saw Rice plant Pre-germinated inbred rice seeds Seedling tray Garden soil Organic soil Carbonized rice hull Growth hormone Coco lumber Nails Mulching film Presentation material

Note to Facilitator

- This session focuses on the importance of roguing and the various methods of crop establishments.
- Prepare the necessary tools and materials to be used for the activity.
- Start the session by conducting AESA #1 and roguing activity.
- Process and present the AESA observations.
- Focus on the results and recommendations that the participants will present.

- Encourage farmers to discuss their practices freely during the AESA presentation and instill the importance of proper diagnosis and applying appropriate management practice.

- During discussion and activity, encourage the exchange of ideas and participative interactions among participants.

- Emphasize good management and how to improve the weakness, and the benefits of observing, measuring, and recording.

- Ensure the proper conduct of AESA and roguing early in the morning in the PTD and focus on the results and recommendations that the participants will present.

- Emphasize the importance of conducting AESA and timely roguing.

- Encourage farmers to discuss their practices freely during the AESA presentation and instill the importance of proper diagnosis and applying appropriate management practice.

- Encourage discussions on the observations on the treatments employed in the PTD.

- Regularly monitor the attainment of Key Checks and changes in farmers' current management practices with the use of Key Check monitoring board, and ensure that this is filled-up.

- Encourage farmers to participate in online webinars, courses and other virtual learning activities where available. Share to farmers links to relevant online activities if possible.

- Supplementary reference: Module on Training of Trainers on the Production of Hig-Quality Inbred Rice and Seeds, and Farm Mechanization.

Lesson1: Roguing

Key Learning Points:

- Roguing is the removal of off-types or mixtures in the field. This is one of the most important operations in seed production.
- Off-types are plants that differ from true-to-type plants. Undesirable plants are volunteer plants from an earlier crop, diseased plants, and weeds.
- To ensure the production of own quality seed for the next cropping season, the farmer must conduct roguing in the area where he will get his seeds.

Importance of Thorough and Proper Roguing

- Ensures physical purity of seeds produced because weeds & other rice varieties are removed
- Ensures genetic purity because off-types are prevented from cross-pollinating with true-to-type plants
- Timely roguing makes the process easier

Steps to Attain Proper Roguing

1. Use high-quality seeds.
2. Field plot must be free from volunteer plants & weeds.
3. Plant varieties that are recommended & suitable to the locality.
4. Remove off-types before the maximum tillering stage by uprooting the entire hill. After maximum tillering, cut the entire hill with off-types at ground level to prevent root damage to the adjoining plants.
5. Collect rogued plants & pile them outside the field.

Know the characteristics of the variety planted. Regularly inspect the field & rogue as early as the vegetative stage. At the very least, rogue during the following critical growth stages:

Table 11. Features to observe at the critical growth stages of rice

Stage of crop growth	Features to observe
I. Vegetative (15-20 DAT)	• Plants that are out of line
II. Maximum tillering	• Plant height (taller or shorter) • Canopy orientation • Base & stem color • Leaf color
III. Onset of flowering	• Flag leaf orientation • Panicle emergence (early heading or late heading)
IV. 20 days before harvesting	• Grain shape & width • Presence/absence of awn • Tip color

Lesson 2: Methods of Crop Establishment

Key Learning Points:

- In conventional manual transplanting practice, 8-12 laborers are required to transplant one hectare. However, if a self-propelled rice transplanter is used, 3 people can transplant up to 4 hectares in a day.
- Crop or plant establishment is a sequence of events that includes seeding, seed germination, seedling emergence, and development to the stage where the seedlings could be expected to grow to maturity.
- While rice can be transplanted or direct seeded the yield potential is the same. Transplanted crops will mature faster in the production field, however, they will take 5-10% longer after establishing the nursery to harvest.

Factors Affecting Plant Establishment and Yield

- Quality of seed
- Soil type or conditions
- Water supply

Methods of Crop Establishment

1. **Direct Seeding**

- Transplanted crops can be established manually, either in rows or randomly, or by machine. Direct seeded crops tend to mature faster than transplanted crops but often face more competition from weeds.
- Tools:
  - Broadcast
  - Mechanical seeder
  - Drum seeder
  - Precision Seeder

2. **Mechanical Transplanting of Rice**

- The process of transplanting young rice seedlings, which have been grown in seedling trays or mat nursery, using a rice transplanter.
- A transplanter is an agricultural machine used for transplanting seedlings to the field.
- Types:
  - Walk-behind rice transplanter
  - Riding-type

Reference/s:

Joel V. Pascual, Glenn Y. Ilar, Genaro S. Rillon, Dindo King M. Donayre, Leonardo V. Marquez, Gilely D. Santiago, and Evelyn M. Valdez

Table 4. Comparison of methods of using directly seeded and transplanted

Particulars	Direct Seeded (Broadcast by hand)	Transplanted (Planting by hand)
Farm system	Rainfed/ upland	Irrigated/ lowland
Suitable season	Dry season	Dry & Wet season
Planting preparation	0	30-40 days nursery
Seed rate	80 to 150 kgs / ha	40 to 60 kgs / ha
Soil moisture at planting	No standing water	Up to 5 cm water
Labor to planting	2 person/ha	20 persons/ha
Weed Control/Management	Difficult	Slight
Plant Stability	High lodging potentials	Low lodging potentials
Maturity	7 to 10 days early	Normal

ACTIVITY

Title: AESA #1 (14 days after transplanting)

Methodology: Interactive Activity and hands-on activity

Procedure:

1. Group the participants into 3-4 groups.
2. Go and walk across the field. Observe the whole agro-ecosystem. Let the participants record their general observations on the field.
3. Allow each group to randomly pick a minimum of 5 sample hills.
4. Let them observe keenly each of these hills and record their observations:
   a. Plant: observe the plant height, number of tillers, crop stage, deficiency symptoms, etc.
   b. Pests: observe and count pests at different places on the plant.
   c. Defenders (natural enemies): observe and count parasitoids and predators.
   d. Diseases: observe leaves and stems and identify any visible disease symptoms.
   e. Rats: count numbers of plants affected by rats.
   f. Weeds: observe weeds in the field and determine weed density as abundant, frequent or rare;
      Abundant - when the field is almost covered by weeds;
      Frequent - when weeds occur in spots; and
      Rare - when the weeds are almost absent.
   g. Water: observe the water situation of the field.
   h. Weather: observe the weather condition.
5. Consolidate the data gathered in a Manila paper. Indicate the general information about the crops such as the variety planted, date sown, date transplanted, and other important data.
6. Allow each group to analyze the field situation in detail and present their observations and analysis (in a drawing/preferred tool/way).
7. Ask each group to keep their presentation/output for comparison in the following weeks.

Processing:

- Summarize the present situation of the field
- What aspect is most important at this moment?
- Is there any serious pest or disease outbreak?
- Is there a balance in the field between pests and defenders?
- Do you think the crop is healthy?
- What management practices are needed at this moment?
- When will it be done? Who will do it? Make sure that responsibilities for all activities are being discussed.
- Are you expecting any problems to emerge during the coming week? What problems? How can we avoid it? How can we be prepared?
- Summarize the actions to be taken.

Reference/s:

Marvin J. Manalang, Rowena A. Pineda, Glenn Y. Ilar, Joel V. Pascual, Susan R. Brena

Session 6: Farm Machinery Operation

Learning Objectives

At the end of the session, the participants will be able to:

a. Perform operation and maintenance of mechanical rice transplanter; and
b. Demonstrate farm machinery operation and safety.

Duration

5 hours

Lessons	Methods	Tools
1. Mechanical Transplanting	Lecture and discussion Fieldwork	Visual presentation Mechanical Transplanter Diesel/gasoline Rice seedlings (mat-type nursery)
2. Farm Machinery Operation and Safety	Lecture and discussion Fieldwork	Visual presentation

Note to Facilitator

- Prepare the necessary tools and machinery ready for display and operation. Start the session by conducting AESA #2 and roguing activity. followed by giving a brief introduction about mechanical rice transplanting and its advantages and disadvantages, highlighting the point that will need to learn how to use the machine correctly and efficiently.
- Process and present the AESA observations.
- Focus on the results and recommendations that the participants will present.
- Encourage farmers to discuss their practices freely during the AESA presentation and instill the importance of proper diagnosis and applying appropriate management practice.
- If machine is available, demonstrate its operation and allow the participants to operate.
- During discussion and activity, encourage the exchange of ideas and participative interactions among participants.
- Emphasize good management and how to improve the weakness, and the benefits of observing, measuring, and recording.
- Make sure to discuss the what,why,and how of successful results and problems.

- After the discussion, take the participants to the field selected for hands-on training including AESA #2 and roguing.

- Ensure the proper conduct of AESA in the PTD and focus on the results and recommendations that the participants will present.

- Encourage farmers to discuss their practices freely during the AESA presentation and instill the importance of proper diagnosis and applying appropriate management practice.

- Regularly monitor the attainment of Key Checks and changes in farmers' current management practices with the use of Key Check monitoring board, and ensure that this is filled-up.

- Encourage farmers to participate in online webinars, courses and other virtual learning activities where available. Share to farmers links to relevant online activities if possible.

- Supplementary reference: Module on Training of Trainers on the Production of High-Quality Inbred Rice and Seeds, and Farm Mechanization.

Key Learning Points:

- A mechanical rice transplanter is a machine designed for transplanting rice seedlings into a puddled and leveled field.
- Type of self-propelled rice transplanter and its parts

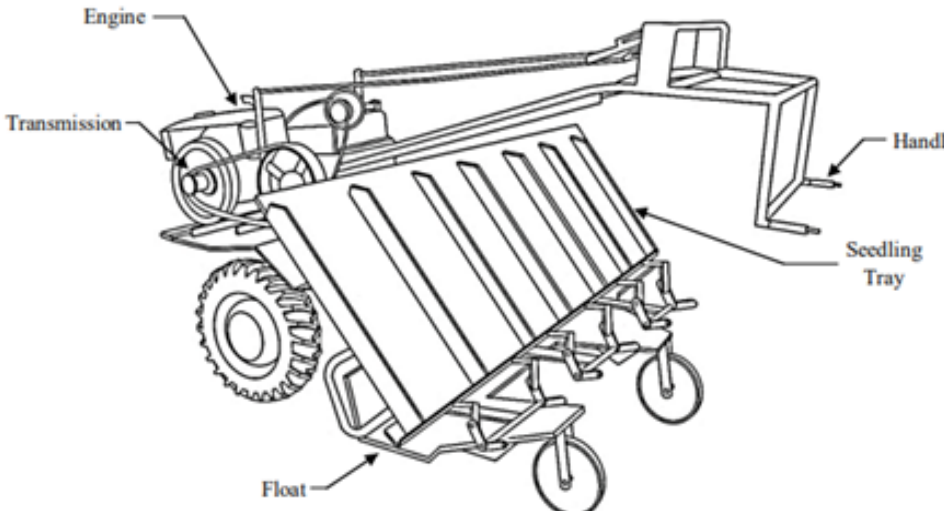


Figure 1. Walk-behind type transplanter

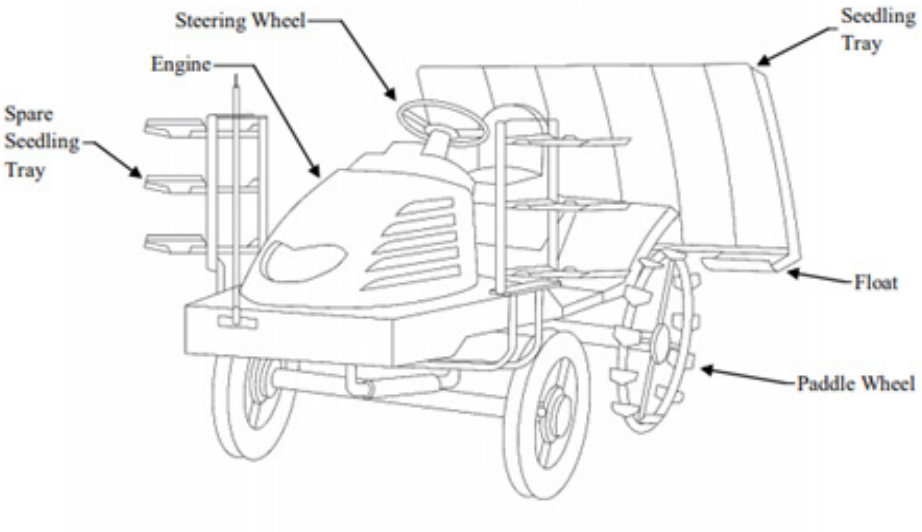


Figure 2. Riding type transplanter

Advantages of Mechanical Transplanting

- Transplanting of seedlings at the optimal age (14-18 days).
- Uniform spacing and optimum plant density (26-28 hills/m with 2-3 seedlings per hill).
- Higher productivity (0.5-0.7 t/ha) compared to traditional methods where plant spacing and density may not always be consistent.
- Less transplanting shock, early seedling vigor, and uniform crop stand.
- Lowers stress, drudgery, and health risks for farm laborers.
- Better employment opportunities for rural youth through the development of custom service businesses.
- Addresses the problem of labor scarcity.
- Increases farmers' net income.

ACTIVITY

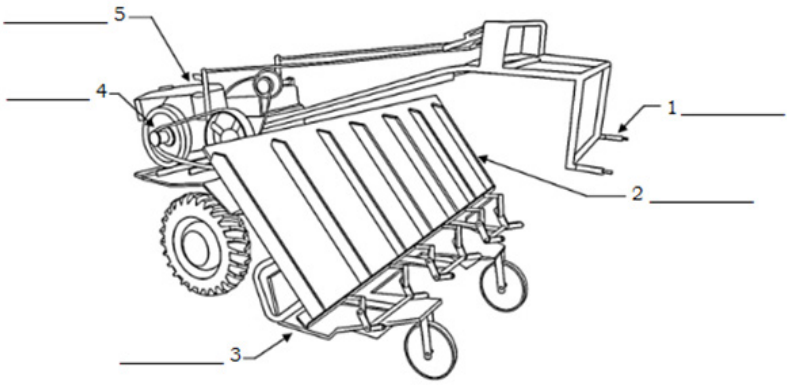
Title: Identification of the Parts of Mechanical Rice Transplanter

Methodology: Interactive Activity

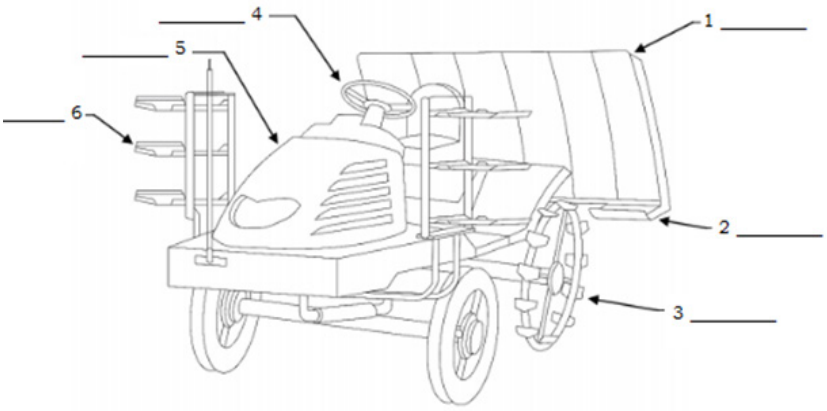
Procedure:

1. Ready the transplanter. Mark or put a number on the parts to be identified (see sample below).

   a. Walk-behind type transplanter



   b. Riding type transplanter



2. Divide the participants into three (3) to five (5) groups. Each group should have one member who will take down notes and a reporter who will present the group's output.
3. Let the participants list the parts they can identify, as many as they can.
4. Then, let each group present their output by pointing the parts and discussing their functions. While one group is presenting, let the other groups or participants listen, so that they will be more familiar with the transplanter, its parts, and functions.

Processing:

Why is knowing the parts and functions of a transplanter (or a machine) important?

Key Concepts:

Knowing the basic parts of the transplanter and their functions enable participants to properly operate and provide safety operation in the farm.

Principle of Operation

- The rice planter consists mainly of three parts, the motor, and the running gear, and the transplanter device.
- The transplanter includes the seedling tray, the seedling tray shifter, plural pickup forks.
- The seedling tray is like a shed roof where mat-type rice nursery is set.
- When the rice transplanter is brought into the field, the seedlings are fed on the seedling trays. Then the tray shifts seedlings like a carriage of typewriters as pickup forks get seedlings from the tray and put them into the ground.
- The pickup forks act like human figures by taking seedlings from the tray and pushing them into the earth.

Maintenance

- Clean the transplanter after transplanting. This will protect the metal parts from corrosion and increase machine life.
- Check the condition of the fingers. If the fingers are damaged, replace them.
- Replace the engine oil and gear oil regularly as per instructions given by manufacturers in the operation manual of the transplanter.
- Check whether all the components are in good condition.
- Store the machine in a shaded place and keep it covered when not in use.

Table 6. Frequently observed problems in transplanting

PROBLEM	CAUSE	TROUBLESHOOTING
Missing hills or uneven plant spacing	- Poor or uneven growth of seedlings in mats - Seedling mat is thin - Wear and tear of transplanting fingers	- Use mat nurseries grown with recommended practices - Use recommended seed rates to maintain optimum seedling density in nursery - Slow the cross-feed time (time of picking the seedlings by fingers) of transplanter - Check the transplanting fingers and replace if required
Seedling mats collapse on the seedling platform	- Mat is thin - High moisture content in the mat - Wider gap between seedlings - Rolling and drying of seedlings during transportation	- Ensure minimum mat thickness of 0.5 to 0.75 inches - Dry the nursery to firm it up - Use recommended seed rate to maintain optimum seedling density in nursery - Allow the cakes to straighten and moisten them before transplanting
Poor sliding and congestion on seedling platform	- Non- uniform cakes and mismatch of cake size Cakes are dry	- Maintain prescribed cake size - Replace uneven cakes - Sprinkle water on cakes before planting to improve sliding
Seedlings not released from planting finger especially in clay soils	- Mud gets stuck to the claws when the water level is low in the field - The seedling is stuck in the planting fingers resulting in the poor pickup - Mats are too wet	- Apply irrigation and maintain 2-3 cm water in the field - Set the seedling depth to deep planting (2-3 cm) - Dry the mats to the right moisture before transplanting
Floating and moving seedlings	- More water depth - High speed of the transplanter - Less planting depth - Improper field preparation	- Remove excess water and maintain it at 2-3 cm height - Reduce the speed of the transplanter - Increase planting depth - Ensure field is well prepared and leveled before transplanting
Transplanter floats, sinks, or presses soil against adjoining row	- Poor root development - Dry nursery is being used - High speed of the transplanter - Foreign materials in the seedbed	- Improve seedling root development by following recommended practices for seedbeds - Wet the nursery slightly - Reduce speed of the transplanter - Remove foreign materials before initiating nursery seedbed preparation

PROBLEM	CAUSE	TROUBLESHOOTING
Seedlings unable to get transplanted in soil	- Excess water in the field - Slippage of transmission wheel	- Drain out excess water from field - Lower the wheel to avoid wheel slippage
Hill spacing becomes smaller, especially in soft soil and deep water	- Transmission wheel is attached in reverse direction - Improper field preparation	- Attach the transmission wheel in the correct direction. If problem persists, remove the washer from the 3-point hubs present in the larger pulley - Check the soil condition. Use transplanter with optimum water level
Transmission wheel clogs; restricts forward movement	- Transmission wheel is attached in reverse direction - Improper field preparation	- Attach the transmission wheel in the correct direction. If problem persists, remove the washer from the 3-point hubs present in the larger pulley - Check the soil condition. Use transplanter with optimum water level

ACTIVITY

Title: Operation and troubleshooting of a Mechanical Rice Transplanter

Methodology: Interactive and hands-on activity

Procedure:

1. Prepare or ready the land before the activity as discussed from the past sessions and ensure the availability of seedlings, in the nursery mat.
2. Divide the participants into 3 to 5 groups. Each group should have one member who will take down notes and a reporter who will present the group's output.
3. Give each participant 10-15 minutes to experience or demonstrate mechanical rice transplanting operations on the field following these steps.
   - Put seedling mats at the two opposite bunds of the field in the direction of transplanting for easy loading.
   - Feed the seedling mats onto the seedling platform.
   - Start transplanting at the mark running parallel to one of the bunds.
   - Take a U-turn at the end of the field. Each return pass should be parallel to the last row, maintaining the desired row spacing.
4. While each participant will take turns, others will observe and list down the common problems they encountered while using the transplanter, its causes, and the possible solution to the problem using the table below. This should be done by the group.
5. Then, allow 5-10 minutes for each group to present their output.
6. Summarize the presentation of the groups.

Frequently Observed Problems in Transplanting

PROBLEM	CAUSE	TROUBLESHOOTING
Example: Missing hills or uneven plant spacing	- Poor or uneven growth of seedlings in mats - Seedling mat is thin - Wear and tear of transplanting fingers	- Slow the cross-feed time of transplanter - Check the transplanting fingers and replace if required

Processing:

1. How does a mechanical rice transplanter work?
2. What are the advantages and disadvantages of using rice mechanical transplanters?
3. What are the common problems you encountered when using a mechanical transplanter? What are the possible causes and how to troubleshoot those problems?

Lesson 2: Farm Machinery Operation and Safety

Key Learning Points:

- Farm machinery corresponds to all machines and tools that are used in the production, harvesting, and care of farm products, and includes trailers that are used to transport agricultural produce or agricultural production materials between a local place of storage or supply and the farm.
- Occupational Safety and Health deals with all aspects of safety and health in the workplace and has a strong focus on primary prevention of hazards.
- A hazard is defined as a condition or changing set of circumstances that presents potential injury, illness, or property damage.
- Farm machinery creates many possible hazards for both operators and bystanders. Even though manufacturers take many steps to make machinery safe, all hazards cannot be removed.
- The most agricultural hazards are associated with tractor operation (overturns, runovers and PTO entanglement) and machine operations (commonly occurred when two moving parts and unguarded/exposed parts).
- Minor and serious injuries can occur when workers are not paying close attention, taking shortcuts, ignoring warnings or failing to follow safety rules.

Maintenance of Farm Machinery

a. During the repair of any machinery, appropriate protective clothing should be worn.
b. All machinery should be maintained regularly.
c. When repairs are made, any guard removed during repair must be replaced before the equipment is used.
d. Whenever preparing to work on a piece of equipment, wheels need to be blocked to prevent movement and any jacks used should be stable and in good condition.
e. Tire inflation needs to be checked periodically to prevent flats and blowouts.
f. Whenever preparing to work on a piece of equipment, wheels need to be blocked to prevent movement and any jacks used should be stable and in good condition.
g. Brakes, hitches, safety chains, springs and shackles, should be inspected regularly for wear, broken or missing parts and cracks in the welds.
h. Hydraulic and air lines should be inspected for wear and cracks. Any indication of damage to these lines should be immediate grounds for replacement of the line.

Safety Reminders

a. Ensure that everyone working on the farm is thoroughly familiar with operating procedures and safety requirements for any machinery they use.
b. Operating and maintaining the machine should be carried out in accordance with the manufacturer's instructions.
c. Any machine part, function, or process which may cause injury must be safeguarded.
d. Safety = Good Working Equipment + Capable and Attentive Operators

ACTIVITY

Title: AESA #2 (21 days after transplanting)

Methodology: Interactive and hands-on activity

Procedure:

Follow same procedure on conducting AESA #1.

Session 7: Nutrient and Fertilizer Management

Learning Objectives

At the end of the session, the participants will be able to:

a. Enumerate and discuss the different diagnostic tools used to assess nutrient deficiencies; and
b. Compute the exact amount of fertilizer materials needed and suited for their farming.

Duration

5 hours

Lesson	Method	Tools
1. Tools Used to Assess Nutrient Deficiencies	Lecture and presentation Fieldwork	Visual presentation Rice plant Seedlings MOET Containers Meter stick Sweep net LCC Record book Pen Markers Manila paper Crayons Adhesive tape Masking tape Glue Alcohol
2. Fertilizer and Its Computation	Lecture and presentation Fieldwork	Visual presentation

Note to Facilitator

- Prepare the necessary tools and machinery ready for display and operation.
- Start the session by conducting AESA #3 and roguing activity.
- Process and present the AESA observations.
- Focus on the results and recommendations that the participants will present.
- Encourage farmers to discuss their practices freely during the AESA presentation and instill the importance of proper diagnosis and applying appropriate management practice.

- Provide a brief introduction on how to assess nutrient deficiencies using various tools. During discussion and activity, encourage the exchange of ideas and participative interactions among participants.

- Preferably, the participants should experience using the tool.

- Encourage download of the necessary mobile applications to be used.

- During discussion and activity, encourage the exchange of ideas and participative interactions among participants.

- Emphasize that there are different diagnostic tools available that they can choose from.

- Emphasize good management and how to improve the weakness, and the benefits of observing, measuring, and recording.

- Make sure to discuss the what, why, and how of successful results and problems.

- Ensure the proper conduct of AESA in the PTD and focus on the results and recommendations that the participants will present.

- Encourage farmers to discuss their practices freely during the AESA presentation and instill the importance of proper diagnosis and applying appropriate management practice.

- Regularly monitor the attainment of Key Checks and changes in farmers' current management practices with the use of Key Check monitoring board, and ensure that this is filled-up.

Lesson 1. Tools Used to Assess Nutrient Deficiencies

Key Learning Points:

Different tools used to assess nutrient deficiencies

A. **Minus One Element Technique Kit (MOET Kit)** offers a reliable, low-cost, and easy alternative technique for diagnosing nutrient limitation. The method simulates actual field condition and the basis of the recommendation is the actual performance of the rice plants and determines limiting nutrients that are not diagnosed in the soil chemical test.

ACTIVITY

Title: Assessing nutrient deficiencies using MOET Kit

Methodology: Interactive and hands-on activity

Procedure:

1. Divide the participants into 3-4 groups.
2. Explain the instructions of the activity as follows:

A. Collection of Soil Samples

a. Collect soil samples randomly at a depth of 20cm from at least 35 points per hectare using a PVC pipe or trowel.

Reminder: Avoid taking samples at or near carabao ponds, animal manure or near piles of decomposing matters like rice straws or crop residues.

B. Establishing the MOET Setup

a. Mix the soil samples thoroughly and remove plant roots and other organic debris.
b. Transfer approximately 4kg of wet soil into each plastic pot. Keep the soil wet during the entire plant growth.
c. Mix the fertilizer formulations separately with the soil in each pot.
d. After mixing, wash your hands before mixing the next pot to avoid contamination. Label the pots with corresponding formulations applied in each pot such as Complete, -N, -P, -K, -S, - Cu, and Zn.
e. Transplant at least five 12-day old seedlings per plastic pot or sow at least six pre-germinated seeds.
f. After 10 days, retain only the two best growing plants per pot. Ensure that the pots are watered and leave with at least 2 cm deep standing water. Never allow the soil to dry up.
g. Grow the plants up to 45 DAT. At 30 DAT, nutrient deficiencies are already apparent.

Processing:

- Do you find the MOET kit useful in diagnosing nutrient deficiency in crops? How does it help you?

- What is the importance of knowing or conducting this technique?

Key Concept:

Once the participants know which element is deficient, they can then apply the missing nutrient using the recommended rates. They do not need to apply elements found to be sufficient in the soil. The MOET kit provides all the information, and a good solution to their fertilizer problems.

B. MOET App is an application specifically developed to complement the MOET Kit. It has the capability to compute field fertilizer requirements, set target yield and schedule the right timing of fertilizer application of the given Philippine lowland rice cultivar.

ACTIVITY

Title: Generating Fertilizer Recommendation using MOET App

Methodology: Interactive and hands-on activity

Procedure:

1. Divide the participants into 3-4 groups.
2. Explain the instructions of the activity as follows:

A. Collection of Input Data for the MOET App

a. Count and record the number of tillers with its corresponding label.
b. If a weighing scale is available, cut the plants at the base close to the surface of the soils from each pot. Weigh and record the biomass data with its corresponding label.

B. Using the MOET App

a. Tap the MOET App Icon on your tablet or smartphone.
b. Select your Language ("English"). Tap "I agree to the terms and conditions" and "Start".
c. Select the Fertilizer Requirement Calculator from the main menu.
d. Input the correct data such as the previous and the variety to plant, the average yield and fresh weight, mode of crop establishment and schedule of planting. Input also the farmer's profile and take a picture of the farm. Tap "Next".
e. Input the fertilizer available in the local market and its price.
f. Input the recorded tiller count or weight of biomass from the MOET setup. Press "Compute Nutrient."
g. Send the information to PhilRice via SMS.
h. Select from the four options of the fertilization plan you want to follow and send the selected plan to the farmer through SMS or save as image format.

Processing:

- How does the MOET App work? How does it complement the MOET kit?
- Using this App, what are the data needed to generate fertilizer recommendations?
- What other data does the App can generate?

C. Leaf Color Chart (LCC) is used to determine the N fertilizer needs of rice crops. LCC has four green strips, with color ranging from yellow green to dark green. It determines the greenness of the rice leaf, which indicates its N content.

ACTIVITY

Title: Nitrogen management in rice using LCC

Methodology: Interactive and hands-on activity

Procedure:

1. Divide the participants into 3-4 groups.
2. Explain the instructions of the activity as follows:

A. Select plants for testing.

a. Randomly select at least 10 disease-free rice plants or hills in a field, where plant population is uniform.

B. Match the leaf to the chart.

a. Select the topmost, youngest, fully expanded leaf from each hill or plant. This part best reflects the N status of the plants.

b. Place the middle part of the leaf on the LCC and compare its color with the color panels. Do not detach or destroy the leaf.

C. Measure the leaf color

a. Measure the leaf color under the shade of your body. Direct sunlight affects leaf color readings.

b. If possible, the same person should read the LCC at the same time of the day, every time.

c. If the color of a rice leaf is in between two shades, take the average of the two values as the reading. For example, if the color is in between 3 and 4, the reading should be 3.5.

D. Determine the Average LCC

Take the reading of the 10 leaves, and determine the average. If the color is more or less than 3, N fertilizer top dressing is needed.

Note: Use the LCC once every 7–10 days starting from the beginning of tillering (14 DAT). Continue this process up to 5–10 days after panicle initiation.

Processing:

Do you find the LCC useful in determining the N fertilizer needs of the crops?

D. Soil Test Kit (STK) is a simple, low-cost, and portable testing kit developed by the soil scientists of the Bureau of Soils and Water Management (BSWM).

The STK is expected to provide more direct information about the adequacy and deficiency levels of both the major and minor soil nutrients. The information will lead to a more precise fertilizer recommendation.

E. Rice Crop Manager (RCM) is a web-based platform for field-specific information on crop and nutrient management to increase yields and income of rice farmers in the Philippines. It uses the results of research and existing knowledge to provide farmers in irrigated and rainfed lowlands with 'precise' field- and farmer-specific recommendations.

Lesson 2. Fertilizer and Its Computation

Key Learning Points:

- Fertilizer is any substance that is added to the soil or applied to the plant to supply the elements essential for plant nutrition.
- Fertilizers are classified according to form (natural/ organic and chemical/inorganic) and according to fertilizer elements present (single, incomplete, complete, and mixed fertilizers).
- Fertilizer grade is the guaranteed percentage of total nitrogen (N), available phosphorus (P_2O_5), and water soluble potassium (K_2O), in that order, in a fertilizer material.
- Fertilizer recommendation is the amount (kg) of N, P_2O_5, and K_2O recommended per hectare.
- Four "Finds" in Fertilizer Calculation
  - Find the area
  - Find the rate (per area)
  - Find the amount of nutrient (area * rate)
  - Find the amount of fertilizer (nutrient/ concentration)
- Fertilizing the rice plants with the right amount will lead to higher productivity as well as reducing the cost of production. This is a win-win situation for both the rice farmers and rice plants.

ACTIVITY

Title: AESA #3 (28 days after transplanting)

Methodology: Interactive and hands-on activity

Procedure:

Follow same procedure on conducting AESA #1.

Session 8: Nutrients and its Deficiency Symptoms

Learning Objectives

At the end of the session, the participants will be able to:

a. Determine nutrients needed by plants and its deficiency symptoms.

Duration

5 hours

LESSON	METHOD/S	TOOL/S
Nutrients and Its Deficiency Symptoms	Lecture and presentation Fieldwork	Visual Presentation Rice plant Seedlings Containers Meter stick Sweep net LCC Record book Pen Markers Manila paper Crayons Adhesive tape Glue Alcohol

Note to Facilitator

- This session focuses on the nutrients that rice needs and its corresponding deficiencies.
- Prepare the necessary tools and materials to be used.
- Start the session by conducting AESA #4 and roguing activity.
- Process and present the AESA observations.
- Focus on the results and recommendations that the participants will present.
- Encourage farmers to discuss their practices freely during the AESA presentation and instill the importance of proper diagnosis and applying appropriate management practice.
- During discussion and activity, encourage the exchange of ideas and participative interactions among participants.
- Emphasize good management and how to improve the weakness, and the benefits of observing, measuring, and recording.
- Make sure to discuss the what, why, and how of successful results and problems.

- After the discussion, take the participants to the field selected for hands-on training including AESA #4 and roguing.

- Ensure the proper conduct of AESA in the PTD and focus on the results and recommendations that the participants will present.

- Encourage farmers to discuss their practices freely during the AESA presentation and instill the importance of proper diagnosis and applying appropriate management practice.

- Regularly monitor the attainment of Key Checks and changes in farmers' current management practices with the use of Key Check monitoring board, and ensure that this is filled-up.

- Encourage farmers to participate in online webinars, courses and other virtual learning activities where available. Share to farmers links to relevant online activities if possible.

- Supplementary references: PalayCheck System for Irrigated Lowland Rice booklet by PhilRice, and Module on Training of Trainers on the Production of High-Quality Inbred Rice and Seeds, and Farm Mechanization.

Lesson:

Key Learning Points:

- Nutrients are what plants need to grow and become productive. Proper nutrient management improves crop growth and yield.
- The following are the major nutrients needed by rice plants:
    1. Nitrogen (N)
    2. Phosphorus (P)
    3. Potassium (K)
    4. Zinc (Zn)
    5. Sulfur (S)

- When symptoms of nutrient deficiency manifest in older leaves (lower leaves), it is usually caused by deficiencies in N, P, K, and Magnesium (Mg). On the other hand, if symptoms are seen in the younger leaves (upper leaves), it is usually Zn, Calcium (Ca), Copper (Cu), Iron (Fe), Boron (B), Sulfur (S), and Manganese (Mn).

ACTIVITY

Title: AESA #4 (35 days after transplanting)

Methodology: Interactive and hands-on activity

Procedure:

Follow same procedure on conducting AESA #1.

Session 9: Water-saving Technology

Learning Objectives

At the end of the session, the participants will be able to:

1. Apply water-saving technology and techniques.

Duration

5 hours

LESSON	METHODS	TOOLS
Water-saving Technology	Lecture and presentation	Visual Presentation

Note to Facilitator

- This session focuses on water-saving technology.
- Prepare the necessary tools and materials to be used.
- Start the session by conducting AESA #5 and roguing activity.
- Process and present the AESA observations.
- Focus on the results and recommendations that the participants will present.
- Encourage farmers to discuss their practices freely during the AESA presentation and instill the importance of proper diagnosis and applying appropriate management practice.
- During discussion and activity, encourage the exchange of ideas and participative interactions among participants.
- Emphasize good management and how to improve the weakness, and the benefits of observing, measuring, and recording.
- Make sure to discuss the what, why, and how of successful results and problems.
- Ensure the proper conduct of AESA in the PTD and focus on the results and recommendations that the participants will present.
- Encourage farmers to discuss their practices freely during the AESA presentation and instill the importance of proper diagnosis and applying appropriate management practice.
- Regularly monitor the attainment of Key Checks and changes in farmers' current management practices with the use of Key Check monitoring board, and ensure that this is filled-up.
- Encourage farmers to participate in online webinars, courses and other virtual

learning activities where available. Share to farmers links to relevant online activities if possible.

- Supplementary reference: Module on Training of Trainers on the Production of High-Quality Inbred Rice and Seeds, and Farm Mechanization.

Lesson: Water-saving Technology

Key Learning Points:

Importance of Water

Water transports nutrients from the soil to the plant. An adequate water supply ensures good crop establishment, seedling vigor, and normal crop growth and development and yield.

Role of Water in Rice Growth
1. Helps the plant to use soil nutrients efficiently
2. Aids in weed control
3. Influences farm operations and farming systems
4. Dissolve soil nutrients
5. Regulates temperature
6. Facilitates field operation
7. Facilitates soil biological processes

Water Management Issues on Rice
1. Seasonal and geographic rainfall distribution is biased
2. Unstable Climate (extremes)
3. Mostly experiencing economic water scarcity
4. High cost for irrigation development
5. Rice requires more water than other crops

Wasteful Practices
1. Rice paddies are kept open during fallow period
2. Farmers have no definite guidelines during irrigation
3. Paddy to paddy irrigation (no farm ditches)

ACTIVITY

Title: AESA #5 (42 days after transplanting)

Methodology: Interactive and hands-on activity

Procedure:

Follow same procedure on conducting AESA #1.

Reference/s:

Session 10: Postharvest

Learning Objectives

At the end of the session, the participants will be able to:

1. Practice corrects postharvest operations; and
2. Enumerate different machines used in postharvest operations.

Duration

5 hours

LESSON	METHODS	TOOLS
Postharvest	Lecture and presentation Fieldwork	Visual Presentation Moisture meter Mechanical dryer

Note to Facilitator

- This session focuses on the postharvest practices which include drying and milling.
- Prepare the necessary tools and equipment to be used.
- Start the session by conducting AESA #6 and roguing activity.
- Process and present the AESA observations.
- Focus on the results and recommendations that the participants will present.
- Encourage farmers to discuss their practices freely during the AESA presentation and instill the importance of proper diagnosis and applying appropriate management practice.
- During discussion and activity, encourage the exchange of ideas and participative interactions among participants.
- Emphasize good management and how to improve the weakness, and the benefits of observing, measuring, and recording.
- Make sure to discuss the what, why, and how of successful results and problems.
- Ensure the proper conduct of AESA in the PTD and focus on the results and recommendations that the participants will present.
- Encourage farmers to discuss their practices freely during the AESA presentation and instill the importance of proper diagnosis and applying appropriate management practice.

- Regularly monitor the attainment of Key Checks and changes in farmers' current management practices with the use of Key Check monitoring board, and ensure that this is filled-up.

- Encourage farmers to participate in online webinars, courses and other virtual learning activities where available. Share to farmers links to relevant online activities if possible.

- Supplementary reference: Module on Training of Trainers on the Production of High-Quality Inbred Rice and Seeds, and Farm Mechanization.

Lesson: Postharvest

Key Learning Points:

Drying is one of the most important operations towards the preservation of grain quality. Delays in drying, incomplete drying, or uneven drying will result in qualitative and quantitative losses.

Purpose of Drying
- Drying reduces the moisture content of grains to a level safe for storage. Thus, rice grain must be dried as soon as possible after harvest (ideally within 12 hours).
- Storage of incompletely dried grain with a higher than acceptable moisture content will lead to failure regardless of what storage facility is used. In addition, the longer the desired grain storage period, the lower the required grain moisture content must be.
- Drying temperature also affects the milling quality of rice. Higher temperatures result in lower head rice yield and increased fissure formation.

Benefits from Drying
- Drying is one way of increasing farmers' income by reducing quantity and quality losses.
- Drying expands farmer's opportunities enabling them to temporarily store and seek better markets without quality deterioration.
- Timely and proper drying of grain could avert potential losses in quality and quantity.

Forms of Losses due to Delay or Improper Drying
- Discoloration
- Loss of seed viability
- Reduced milling recovery
- Altered texture and taste
- Spillage
- Price reduction

Different Types of Dryers
- Fixed bed batch dryer
- Re-circulation batch dryer
- Continuous flow dryer

Milling

- Milling is a crucial step in post-production of rice.
- The basic objective is to remove the husk and the bran layers, and produce an edible, white rice kernel that is sufficiently milled and free of impurities with minimum breakage kernels.
- Most rice varieties are composed of roughly 23% rice hull, 8% bran layers, and 68% starchy endosperm, and germ or embryo at 1 %. Total milled rice contains whole grains or head rice, and broken.
- The by-products in rice milling are rice hull, rice germ and bran layers, and fine broken.

Products of Rice Milling

- Rice hull
- Bran
- Germ (Embryo)
- Endosperm (White Rice)

Types of Rice Mill

- Single Pass Rice Mill
- Multi-Pass Rice Mill

ACTIVITY

Title: AESA #6 (49 days after transplanting)

Methodology: Interactive and hands-on activity

Procedure:

Follow same procedure on conducting AESA #1.

Reference/s:

Susan R. Brena, Ricardo F. Orge, and Manuel Jose C. Regalado

Session 11: Basic Financial Management

Learning Objectives

At the end of the session, the participants will be able to:

- Utilize the farm business cycle in farm planning and implementation;
- Apply/practice the competencies for business success;
- Apply the concepts of 5 C's of credits;
- Utilize credit/loan management practices; and
- Apply farm record-keeping practices.

Duration

5 hours

Lessons	Method	Tools
Farm Business Cycle and Components	Reflection activity Case study	Copies of case studies Meta cards Markers Masking tape
Competencies for Business Success	Lecture and presentation Interactive activity	Handout Exercise worksheet
Five Cs of Credit	Lecture and presentation	Visual Presentation
Credit/Loan Management	Lecture and presentation Interactive activity	Visual Presentation
Farm Record Keeping	Lecture and presentation Role play Hands-on activities	Work sheets

Note to Facilitator

- This session focuses on the basic financial management highlighting the farm business cycle and components, competencies for business success, five C's of credits, credit/loan management, and farm record keeping.
- Prepare the necessary tools and materials to be used.
- During discussion and activity, encourage the exchange of ideas and participative interactions among participants.
- Emphasize good management and how to improve the weakness, and the benefits of observing, measuring, and recording.

- Make sure to discuss the what, why, and how of successful results and problems.

- Regularly monitor the attainment of Key Checks and changes in farmers' current management practices with the use of Key Check monitoring board, and ensure that this is filled-up.

- Encourage farmers to participate in online webinars, courses and other virtual learning activities where available. Share to farmers links to relevant online activities if possible.

- Supplementary reference: Module on Training of Trainers on the Production of High- Quality Inbred Rice and Seeds, and Farm Mechanization.

Lesson 1: Farm Business Cycle and Components

Key Learning Points:

The Commercial Farming Environment

- Shows that farm practices have changed over the years.
- Nowadays, farming is more specialized where farmers produce for the market.
- Life requires more cash today than in the past, therefore, instead of using farms for growing food to consume at home, there is more pressure to use the farms to generate the required cash.
- It is imperative to begin to look at the farm/farming more as an income-generating business, rather than just a source of food

ACTIVITY

Title: Commercial Farming Environment

Methodology: Interactive and hands-on activity

Procedure:

1. Pair up the participants and have them discuss/reflect on the following:

   Why are you a farmer? Is it to produce food for yourself and your family? Is it to generate cash? Or is it both food production and cash?

   Possible responses: Some farmers may be producing equally for food and cash, while others may be producing more for cash, and yet others may be producing more for food and less for cash.

2. Once the participants have finished discussing, show The Commercial Farming Environment where changes in the importance of farming for food and farming for cash are depicted over a 10-year period. Ask the participants to think and share what the visual means.

The commercial farming environment

How do you explain the following changes in farming practices?

	Farming for food	Farming for cash	WHY THIS CHANGES? List down your answers
10 YEARS AGO			
5 YEARS AGO			
TODAY			

Components of a Farm/Business

A farm is a production unit where something is made, grown, or manufactured.

Like any other business, a farmer needs to understand what is happening within the farm, and what internal and external elements may affect farm profitability.

ACTIVITY

Title: Components of a Farm/Business

Methodology: Interactive and hands-on activity

Procedure:

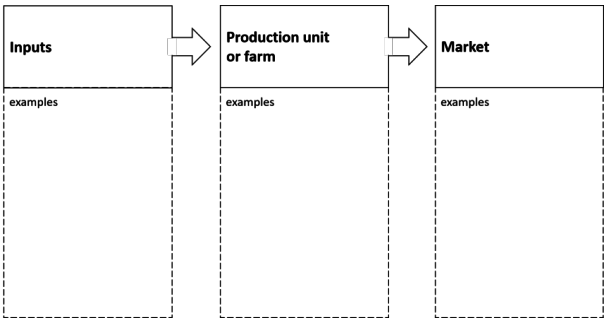
1. Ask the participants to think of the similarity between a farm and a business. Provide metacards and have them write their ideas. Cluster or group answers when possible.

2. Ask the participants to fill up the Components of a Farm or Business. First, have the participants think of examples of things which are grown in a farm, eg. rice, corn, vegetables, eggs, etc, and write these in the center column under "Production Unit or Farm."

Next, have the participants identify what would be needed to produce the things listed on the Production Unit or Farm column. Answers will be listed under the "Input" column.

Lastly, ask the participants what happens to the products made in the production unit or farm. Elicit the answer that these are sent and sold in the market, and indicate under the market column. The participants may also identify different processing practices which the products may have to go through before being sold in the market.

Components of a Farm or business



Farm Business Cycle

The farm business cycle is a useful way to develop a business orientation or thinking. Refer to the diagram of the farm business cycle below and explain each component of the cycle as follows:

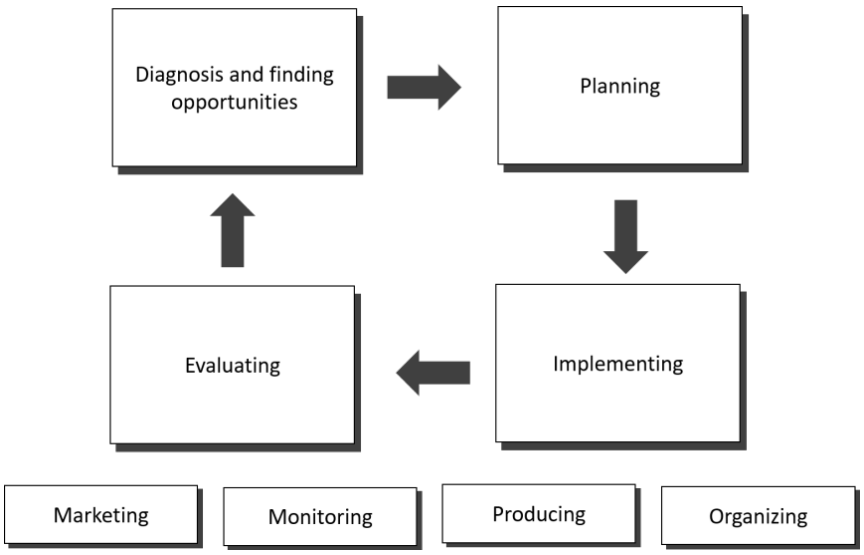


Figure 3. The farm business cycle

Step 1: Diagnosis and finding opportunities - a study of the business that identifies problems that are limiting the farm's performance (finding out what is wrong), and opportunities that can improve performance (finding out what more can be done).
Step 2: Planning - exploring options and making decisions about the steps to follow to achieve an objective or goal. It is about looking into the future.
Step 3: Implementing - ensuring that the plan can be realized. This

involves organizing, producing, monitoring and marketing. Organizing involves arranging the resources and people needed to carry out the plan. Monitoring involves keeping track of progress being made on tasks and activities of the plan and checking to see if things are going as planned.

Step 4: Evaluating- deciding whether or not the plan worked and whether or not the goals were achieved. It involves taking a longer look at what you have done and measuring it against your expectations.

ACTIVITY

Title: Farm Business Cycle

Methodology: Interactive activity

Procedure:

Divide the participants into four groups, and tell them that they will have the opportunity to study Mang Juan's journey through the farm business cycle.

Mang Juan's case study will be presented in five parts - each part corresponding/showcasing the four steps of the farm business cycle.

Have the participants read the stories out loud, in a dramatic and funny way. After each part, the groups will discuss amongst themselves the guide questions provided.

After 10 minutes, raise each question in the plenary and generate a quick discussion to ensure that participants understand what it means to critically diagnose or examine the situation of the business.

Mang Juan's Story

Part I: Diagnosis/Finding opportunities

After completing his primary education, Mang Juan had left his barangay to seek a job in the city. While the city life had been exciting, and he had found several work opportunities, it had also been a hard living. Mang Juan's father was now too old to be managing the 1 hectare family farmland by himself, and Mang Juan now is happy to return home. However, he wanted to make sure that he would be earning enough to support his family on a long-term basis. For this, he needed to know the current farming practices and see what could be done to raise the income generated by the land.

Upon return, Mang Juan started talking to the farmers in his own barangay, so that he could find out what crops were being grown in the area. Based on his interview they grow the same crops: beans, onions and corn. When asked why, they said because everyone else did; it was that they had always grown. He also learnt that these farmers were selling their produce to the first buyer who came to the farm.

As a next step, Mang Juan decided to find out other products could be produced in the area. He went to the nearest town where he talked to buyers and found out that there was a high demand for garlic. Mang Juan knew that growing garlic was like growing onions, so it would not be difficult to produce. He also found three buyers who said that they would buy garlic from him, provided it was of good quality. They said they normally paid PhP 75.00 per kg.

Before investing in garlic production, Mang Juan realized that he needed to know that he could make a profit by growing and selling garlic at the market rate. He visited a neighboring barangay, where farmers helped him calculate how profitable garlic was.

As a final step, Mang Juan approached an extension worker from the local community organization who advised him to start garlic production by planting 1/4 a hectare with the new crop. The extension worker told him he should be able to harvest about 3,200 kg per hectare so on 1/4 hectare, he should be able to produce 800kg of garlic.

After completing his investigations, Mang Juan decided to grow garlic on ¼ hectare of his land and plant beans, onions and corn on the rest of the land.

Guide Questions:

- What did Mang Juan realize about the farmers in his barangay?
- What did he decide to do? How did he do it? Why is this important?
- What did he learn from his visit to the market?
- What did Mang Juan decide to do? Why could he be confident about this?

Processing:

In this case study, Mang Juan identified a problem. He realized that everyone was growing the same crops and not actively looking for markets. He also realized that the existing practice was to sell to the first buyer that came to their farms. Realizing that he should grow something different, Mang Juan undertook research and identified a more profitable opportunity for himself i.e. growing and selling garlic. In order to make a final decision, Mang Juan found out the costs and the technical inputs needed for a successful business.

Mang Juan's Story

Part 2: Planning

Based on what he had learned from the market, the other farmers and from the extension worker, Mang Juan set himself a goal of growing MI hectare of garlic and marketing it to the three nearby buyers. He figured out that if he sold 800 kg of garlic, he would obtain a total sales income of PhP 60,000. But in order to calculate the profit he could make, he first needed to know the cost of the inputs that would be used to grow and sell the crop.

Mang Juan listed the primary inputs he would need to grow the garlic, i.e. seed, fertilizer, pesticides, labor, among others. As the garlic was sold at a farm there was no transport. He calculated that all expenses incurred which amounted to PhP 34,590.00, meaning that he could expect a total profit of PhP 25,410.00 from garlic production.

Of course, Mang Juan now needed to implement his plan, i.e. buy the immediate inputs, organize labor, prepare his land and plant the crop.

Guide Question:

What was Mang Juan's plan? Describe it.

Processing:

Highlight that Mang Juan carefully identified what inputs he would need for his business, what he would produce, how he would sell the garlic, and the profit he could expect. These are some important steps towards assessing business feasibility.

Mang Juan's Story

Part 3: Implementing: Organizing, Producing and Monitoring

When Mang Juan had organized all the inputs, he prepared his land and planted the garlic seeds. Within a month, however, Mang Juan realized that the germination was poor and the growth of the garlic was not as expected. He went to the extension worker for advice, who told him to replant using a different variety of seed. Even though this was an extra cost for Mang Juan, he obtained new seeds for planting, knowing that he made a promise to several buyers in the market to supply good garlic. He did quick calculations and knew that he would still make a profit.

Knowing that the crop would now be delayed by at least a month, he made new arrangements for transport. This did not cost him anything extra. The second time, the germination was much better. A few weeks later, Mang Juan garlic was almost ready and it was looking good.

Close to harvest time, Mang Juan purchased the packaging he needed to market his garlic to the three shops. Very shortly thereafter, Mang Juan harvested his garlic. He was a month later than expected, but it was worth it.

Guide Questions:

- What happened after Mang Juan planted his garlic? What did he do about it? Why?
- When it got Close to harvesting time, What did he do?

Processing:

Explain to the participants that the whole purpose of making a plan is to implement it, which involves three key activities, i.e.:

- Organizing, i.e. to get in order everything you need for producing. In a farm business, it mostly refers to buying inputs, organizing labor and draft power.
- Producing, i.e. growing the crop or raising the animals. It includes all the things a farmer does to produce his crop or product such as ploughing, planting, harvesting, feeding and watering animals.
- Monitoring, i.e. checking that everything is going according to plan. It also means making small changes to the plan. In Mang Juan's story, he had to replant because he did not have the right seed.

Mang Juan's Story

Part 4: Implementing: Marketing

As the garlic was harvested from the field, it was checked and cleaned. The bad cloves were thrown away, while the rest was packed into the net bags and put into boxes. When everything was weighed, Mang Juan discovered that he had 750 kgs. It was a little less than expected, but based on his calculation, Mang Juan knew that he would still make a profit.

The transport arrived as planned. The boxes were loaded onto the vehicle and Mang Juan took his garlic to the three retailers. Initially, the first shop refused to take his garlic since Mang Juan was one month late. However, Mang Juan showed the storekeeper the quality of his produce and convinced him to buy it.

The second buyer agreed to take the product, but wanted to pay Mang Juan after sixty days. Mang Juan explained that this was his first crop and he wanted to keep selling to this buyer, but couldn't if they could not make a better deal on payment. In this way, Mang Juan persuaded the storekeeper to pay 50% immediately and 50% after 60 days.

The third buyer refused to pay the agreed price. He said that he was able to get cheaper garlic from another farmer. Again, Mang Juan showed the storekeeper the quality of the product. He also told him that his competitors had bought the garlic at the agreed price. In this way, Mang Juan convinced the storekeeper to pay the agreed price—in cash.

Guide Questions:

- The harvesting and packaging went well. What happened when Mang Juan took the garlic to the three buyers?
- And what did he do about it? Why?

Processing:

Explain how marketing is a very important part of the farm business. It includes preparing, packaging, transporting, and selling the product.

Lesson 2: Competencies for Business Success

Key Learning Points:

- The Competencies for Business Success handout describes the set of skills that entrepreneurs must possess to take control of challenges in Business.

- If the participants know their strengths and the areas they need to improve on, they will be able to adjust accordingly. Learning is a lifetime task and as long as they are ready to learn, they will be able to achieve anything they set their minds into.

ACTIVITY

Title: Successful Entrepreneurs

Methodology: Interactive activity

Procedure:

Ask the participants to close their eyes, and think of the most successful entrepreneur or business person they know.

After 3-4 minutes, ask everyone to open their eyes, and share with others why they think a particular person is a successful entrepreneur, i.e. what in their views are the key abilities or competencies that make the person a successful businessperson. Note the participants' responses on the board.

Refer them to the Competencies for Business Success handout (refer below), and discuss the contents.

Table 7. Competencies for Business Success*

ACHIEVEMENT CLUSTER	1. **Opportunity seeking initiatives**	• Pays attention to the needs and demands of people • Never procrastinates. Acts immediately on marketable Ideas. • Understands that the more common businesses have enough competition in their common markets while unique ones offer lower competition resulting to higher revenues and profit.
	2. **Risk taking**	• Calculates risks by identifying the most beneficial alternative courses of action to minimize effect of risks in the net profit. • Proactive. Anticipates a loss and counters it with feasible alternatives. • Understands that in business realities, seasoned entrepreneurs sometimes take on a riskier business to get higher profits.
	3. **Demand for efficiency and quality**	• Performs business tasks better, faster, cheaper without putting aside safety and quality. • Accomplishes tasks by meeting or exceeding standards of excellence.
	4. **Persistence**	• Faces a significant obstacle with a good plan of action. • Identifies a good alternative to every decision to meet a challenge or overcome an obstacle. • Acts as the prime mover of resources in the achievement of goals and objectives.
	5. **Commitment to the work contract**	• Offers personal sacrifices or gives extraordinary efforts in completing tasks. • Accomplishes targets on time, as agreed and to the satisfaction of customers.
PLANNING CLUSTER	6. **Information seeking**	• Gathers data, information or feedbacks from clients, suppliers and competitors to use for the improvement of products or services • Studies the market personally for innovations of new product development • Talks with experts for technical advice
	7. **Goal setting**	• Sets goals and objectives which are specific and that guarantees customer satisfaction • Sets calculated goals and objectives
	8. **Systematic planning and monitoring**	• Makes a well-organized plan with clearly defined methods. • Logically flexible for the emergent constraints, challenges and needs. • Conducts scheduled gap-proof monitoring and response activities to determine emergent constraints, challenges and needs.
POWER	9. **Persuasion and networking**	• Always ready to give facts and benefits to convince customers to patronize products and services offered. • Accomplishes the business objectives; taps key people who can be used as agents or channels to hasten product and service delivery to customers.

CLUSTER	**10. Independence and self-confidence**	• Develops self-trust in the attainment of goals and objectives. • Does not need external approval before acting on constraints and challenges. Being, consultative does not purely mean dependence on others advice. An entrepreneur must be brave enough to use one's ability to choose which alternative course of action is the appropriate decision

*Adapted from "Module 1: Personal entrepreneurial Competencies (PECs) Across market and Environment" in AFA-HORTICULTURE (Pasig: Department of Education, 2014), pp. 9-10

ACTIVITY

Title: Successful Entrepreneurs

Methodology: Interactive activity

Procedure:

Lead the participants to **Exercise 2: Competencies for Business Success.** Ask them to recall Mang Juan's story from the previous meeting. In pairs, the participants should revisit Mang Juan's story (all five parts) and mark on the page which of the 10 competencies they think Mang Juan has. Inform the participants that they must justify their marking with an example. After 15 minutes, lead a quick plenary discussion, by calling out a competency, asking if Mang Juan had that competency, and if yes, requesting an example.

Competencies for Business Success

Mark in the given space which of the competencies Mang Juan had, and you have.

ACHIEVEMENT CLUSTER	PLANNING CLUSTER	POWER CLUSTER
1. Opportunity seeking initiatives ☐ *Mang Juan* ☐ You	**6. Information seeking** ☐ *Mang Juan* ☐ You	**9. Persuasion and networking** ☐ *Mang Juan* ☐ You
2. Risk taking ☐ *Mang Juan* ☐ You	**7. Goal Setting** ☐ *Mang Juan* ☐ You	**10. Independence and self-confidence** ☐ *Mang Juan* ☐ You
3. Demand for efficiency and quality ☐ *Mang Juan* ☐ You	**8. Systematic planning and monitoring** ☐ *Mang Juan* ☐ You	
4. Persistence ☐ *Mang Juan* ☐ You		
5. Commitment to the work contract ☐ *Mang Juan* ☐ You		

Once the participants understand individual competencies, ask them to mark, on the same exercise sheet, those competencies that they think they are strong in. Then facilitate a quick discussion to identify which of the competencies participants would like to improve. Ask participants how a person can improve his/her competencies? Some ideas are as follows:

- Meet successful business persons – observe them, talk to them, and learn from them.
- Identify the cluster that you need to improve, and seek training for the same.
- Take deliberate steps during the various parts of this training to over come identified limitations.
- Discuss with the facilitator how to overcome specific limitations and inhibitions.

Lesson 3: Five C's of Credit

Key Learning Points:

The following are the five C's of Credit

1. **Capacity** –Ability to repay the loan
2. **Capital/Cash** – Personal money that you have or have invested in the business
3. **Collateral** – Assets you are willing to use as repayment in case you cannot repay the loan
4. **Conditions (loan)** – Intended use for the borrowed money in consideration of the overall economic conditions
5. **Character** – The general impression you make on the lender

Be mindful on the requirements for applying for loans, which may vary depending on the lending institution.

Lesson 4: Credit/Loan Management

Key Learning Points:

Interest Rates

- The amount a lender charges for the use of assets expressed as a percentage of the principal.
- Typically noted on an annual basis known as the annual percentage rate (APR).
- The assets borrowed could include cash, consumer goods, or large assets such as a vehicle or building.
- Components
  Time
  Inflation
  Risk

- **Interest = Principal (P) * Interest Rate (R) * Time (T)**
  P: Amount of the loan
  R: Percent of interest charged or earned
  T: The length of time for which the interest will be charged; expressed in years.

Maturity Date

The maturity date is the date in which a loan must be repaid.

ACTIVITY

Methodology: Interactive activity

Procedure:

Lead the participant to answer the following:

Mang Juan loaned an amount of PhP 20,000 with a 3% interest rate to be repaid for 5 years.

Given	**Formula**
Principal: PhP 20,000 Interest Rate: 3% Time: 5 years	Interest: P*R*T

Solution

Interest: 20,000 * 0.03 * 5
Interest: PhP 3,000

Answer: PhP 3,000 is the interest for the loan of PhP 20,000 with a 3% interest rate to be repaid for 5 years.

Processing:

- What is interest, principal, interest rate, and time?
- What is the maturity date of the loan?

Key Concepts:

- Higher interest rate means borrowing will cost you more and you will have to work more hours to pay for it.
- Smaller credit payments will take an individual longer to pay the balance off and will end up paying more.

Lesson 5: Farm Record Keeping

ACTIVITY

Methodology: Interactive activity

Procedure:

Ask the participants the following question:

If you meet a vegetable farmer who says that he or she has had a good harvest last season, what information are you most likely to want?

Give each person time to think about the question and write down the answers on board.

Proceed to ask each person individually what his or her key questions are. Name the participant with the closest right questions. Point out to the participants the inadequacy of other questions.

Explain that there are a lot of things to be asked but the answers depend on the farmer keeping records. Records are important to analyze the performance of the farm business.

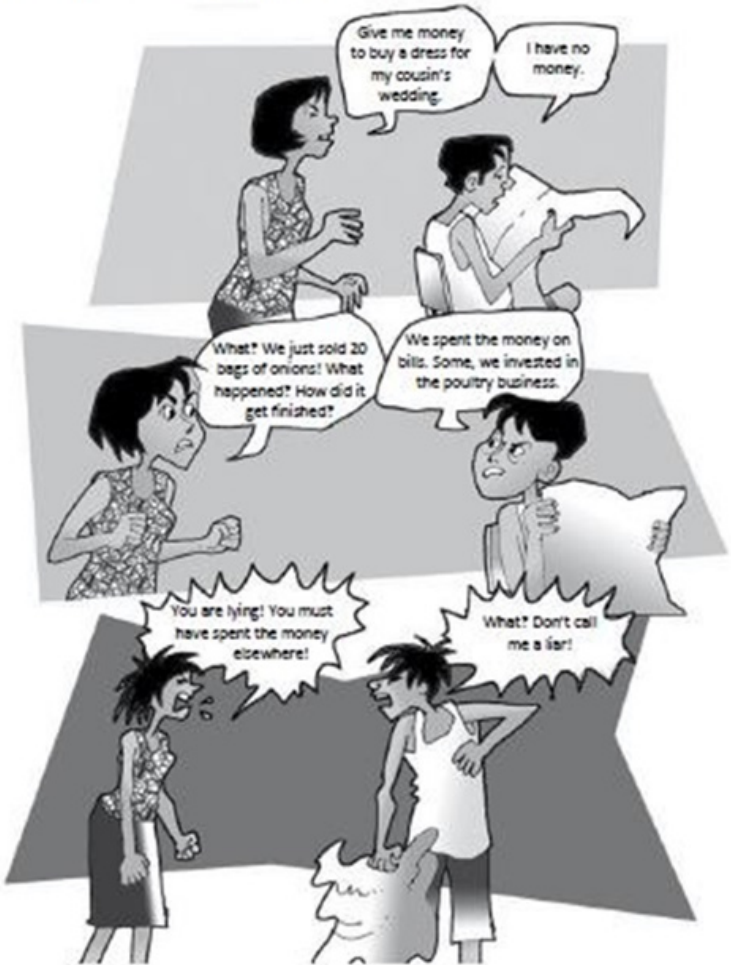
ACTIVITY

Methodology: Interactive activity

Procedure:

Ask for two volunteers to perform in a skit. The skit is a role play given in Role Play about Record Keeping. Give the volunteers time to review the skit, then let them act out the skit before the other participants.

Argument between Juan and his wife Marsha



After the performance, ask the following:

- What happened in the role play?
- Why did Marsha not believe that her husband used all the money properly?
- What could have been done to avoid the confusion on how the money was spent? Link the answers to the need to keep proper records.

Key Learning Points:

- A record is written proof of what happened, what is happening, or what is anticipated to happen. A record can also be a written proof of what was said, and who said it.
- Record keeping entails writing down all the money that comes into the business, and all the money that goes out of it, including the production activities.

ACTIVITY

Methodology: Interactive activity

Procedure:

Discuss with the participants why it is important to keep records. What is the purpose of records? How can records help farmers? What can happen if records are not kept? Start a discussion on their experience in using records. Brainstorm on why some businesses or farms do not keep records. The following explanations may be given:

- Some farmers do not give importance to records.
- Some don't know how to prepare them.
- Some find it complex.
- Some don't have enough time available.

Record keeping is important because a person cannot keep everything in his head. People are forgetful by nature. The advantages of record keeping are:

- Keeps track of how much money is received, spent and how it was spent
- Monitors the amount of raw materials used to grow the enterprise
- Monitors the price of produce sold and cost of inputs
- Allows to calculate possible profits or losses
- Enables better decision making on what to buy and sell
- Keep records of buying and selling on credit
- Shows how much volume is produced

ACTIVITY

Methodology: Interactive activity

Procedure:

Divide the participants into four groups and ask them to list the types of records they are familiar with. What types of records do you think are needed? Write these on the board. On the basis of these findings identify the most important farm records. Refer to the list below.

Describe the 7 examples of farm records and initiate a discussion. Tell the participants that we will now look at these records. Together they will help you make a profit and loss statement for your farm and individual enterprises.

There are several types of farm records, depending on their use:

- Production Record
- Labor Record
- Inputs and Materials Record
- Cash Inflow Record
- Cash Outflow Record
- Fixed Asset Record
- Home Consumption Record
- Profit and Loss Record

ACTIVITY

Methodology: Interactive activity

Procedure:

Start working through the records mentioned. Essentially this lesson reinforces the need for record keeping by putting together in one place your previous computations regarding the farm business.

Organize the participants into groups of 3-5. Group them based on common enterprises.

The participants will be provided with different record templates to practice on.

A. Production Record
Explain that the entries here provide information on production output. This record helps the farmer to understand how well his production program is performing. It can be used to compare the performance of one farm with another. A production record is necessary for assessing the farm business plans prepared previously.

Ask the participants to discuss the production records and start filling in the table, for example:

Table 8. Sample Production Record

Enterprise	Land size	Expected yield/hectare	Total yield (tons/kgs/bags)
Rice	1 ha	1600/ha	1600 kg

Production Record

Enterprise	Land size	Expected yield/hectare	Total yield (tons/kgs/bags)

B. Labor Record

Explain the following while pointing out the different headings in the labor record:

- Entries under these headings provide information on the number of people required for each activity and the number of hours they will take each day. Such information will assist the farmer in understanding the labor requirements for each activity.
- Under the heading "Number of people working", record the actual number of people who worked on that particular activity for a particular day.
- Under the next heading "Number of hours taken", record the actual hours spent doing the particular activity. The total number of hours is calculated by multiplying the number of people and the number of hours spent on each activity.
- Explain that it is important to record the information as soon as the activity is done. The information should be recorded each day that the activity takes place. If not, it will be difficult to remember the number of hours taken to complete the activity.
- Refer and explain how in the following example, the farmer is able to know exactly how many workers are required to carry out a task, and to know how much time it will take. Let the participants know that it is important to keep labor records.

Table 9. Sample Labor Record

Date	Activity	Number of people working	Number of days taken	Total number of days taken
20/2/12	Land preparation	2	2	4
20/3/12	Planting	2	6	12
6/10/12	Harvesting	1	8	8

Labor Record

Date	Activity	Number of people working	Number of days taken	Total number of days taken

C. Inputs and Materials Record

Explain to the participants that agriculturalproduction inputs and materials vary widely because of the different productions systems. They can be categorized as seed inputs, fertilizer or plant nutrient materials, plant protection materials.

Refer and explain how in the following example, the farmer is able to know exactly how much inputs and materials have already been purchased and used. Emphasize the importance and practicality of these records.

Table 10. Sample Inputs and Materials Record

Inputs/materials	Date Purchased	Quantity of Inputs/ materials	Unit	Unit price (₱/bag)	Total amount (₱)
1. Seeds	15/3/12	3	Bags	1,200	3,600
2. fertilizer – urea	16/3/12	4	Bags	1,300	5,200
3. fertilizer – ammonium nitrate	16/3/12	4	bags	1,200	4,800

Inputs and Materials Record

Inputs/materials	Date Purchased	Quantity of Inputs/materials	Unit	Unit price (₱/bag)	Total amount (₱)

D. Cash Inflow Record

Start a discussion about the use of cash inflow records. Ask them if they understand the value of the record. Mention that farmers should keep cash inflow records for each of their farm enterprises. This will help farmers to prepare enterprise budgets for the next round of planning. The record also helps farmers to construct cash flows for the farm.

Ask the participants to go over the Cash Inflow Record worksheet. Explain the following while pointing out the different headings in the cash inflow record:

- Entries here provide information on the activities that require the farmer to receive money particularly from the sales of the products of the enterprise. The first heading, "Date", gives the date of the product sold.
- The type of product is given under the second heading "Produce sold".
- Under "Quantity" enter the amount of produce sold. Remember to include the unit for example: number, kg, litre, bag, etc.
- The unit price (the price the buyer paid for one unit of produce) is recorded in the fourth heading "Unit price".
- The fifth heading is for "Total income". We learned in earlier sessions that the "Total income" is calculated by multiplying the market price by the quantity sold. Because money from sales is coming into the farm business, it is called "cash inflow". The amount of money coming in will depend on the level of productivity, the amount sold in the market and the market prices.
- The last heading is given to enter "Comments" about things you observed when marketing the produce that could affect the performance of the enterprise. For example, it could include a note that prices were better in the morning than in the afternoon. It could be a note that the bigger buyers were at the market very early.

Explain that the cash inflow record should be updated regularly. It is a good idea to record the information at the end of every day after returning from the market. At the end of the production cycle the farmer should total all the cash inflows.

Make sure the participants understand the nature of the record, see refer to the example below. Let the participants know that it is important to give details of the sales/outputs.

Cash Inflow Record

Date	Sales/output	Quantity (kg)	Unit price (₱/kg)	Total income (₱)	Comments

E. Cash Outflow Record

Start a discussion about the usefulness of the cash outflow record. Ask if the participants understand the value of the record? Explain that farmers should keep cash outflow records for all their enterprises. This will help farmers when they need to set up enterprise budgets for the next round of planning. This record will also help the farmer when he needs to calculate the cash flow for the whole farm.

Ask the participants to go over the Cash Outflow Record then explain it in detail. Notify them that it provides information of all the activities that require the farmer to spend money either to buy inputs or pay for services and operations.

Explain the format as follows:

- The date the activity is carried out or the inputs are purchased are recorded under the first heading, "Date".
- The operation, activity or input used is recorded under the second heading.
- Under the "Quantity" heading the amount of work conducted (operation) or the amount of input purchased is recorded. Again you will need to include the unit of measurement such as kg, number, ha, liter, bag, etc.
- The cost of the unit of input, or services or operation is recorded under the fourth heading "Unit cost".
- The "Total cost" for the activity or input is recorded under the fifth heading. In an earlier session we learned that the total cost is calculated by multiplying the quantity used by the unit price. Because money is always going out or being spent it is regarded as a cash outflow.
- The last column is provided for any comments or observations the farmer has that may affect the performance of the enterprise.

Explain that all of the columns need to be completed every time an activity is carried out. At the end of the production cycle, the farmer should aggregate all the money spent and seen as cash outflows.

Referring to the example below, explain that this captures the cash paid out to buy inputs and materials needed to grow corn. Each time money is used to make a purchase it should be recorded in this format. Like with the cash inflow record, at the end of the season, the cash outflow record will make it easy to know exactly how much cash was spent to produce and market corn.

The record also enables the farmers to see when and where he spent his money. This will help him when planning his production and marketing strategy for the enterprise.

Table 11. Sample Cash Outflow Record

Date	Particulars	Quantity	Unit price (₱/kg)	Total expenses (₱)	Comments
25/01/12	Purchased seed	50 kg	50	2500	
1/2/12	Purchased fertilizer	1 bag	700	700	
18/2/12	Purchased fertilizer	1 bag	3500	3500	
25/2/12	Labor	4 hrs	200	800	
25/2/12	Labor plowing	5 hrs	500	2,500	
5/03/12	Labor	12 hrs	300	3,600	
5/03/12	Pesticides	1 L	1,000	1,000	
5/10/12	Transportation	1	1,000	1,000	
5/10/12	Bags	40	50	2,000	
6/10/12	Harvesting	80 hrs	250	2,000	
Total				19,600	

Ensure that the participants recognize the importance of record keeping.

Cash Outflow Record

Date	Particulars	Quantity	Unit price (₱/kg)	Total expenses (₱)	Comments

F. Home Consumption Record

Start a discussion about the importance of the home consumption record. Lead the discussion to an understanding that the home consumption record assists farmers to know where some of the income from the farm enterprises is going.

It helps him make a business decision whether to sell all of his food crops to generate cash or to consume food as an alternative. When the farmer knows the value of the produce that is consumed by the family he will recognize the impact on the profitability of the enterprise.

He can then decide whether or not to continue this way.

Ask the participants to turn to the Home Consumption Record work sheet. Explain the following while pointing out the different headings in the table.

The entries in the home consumption record logs produce that have been stored, consumed, or given as gifts to relatives, friends and family members. It can also log produce that is lost or spoiled after harvest. The main purpose of the record is to provide information on the amount and the value of what the family has consumed from the farm or has given away.

- The first heading includes the date that produce is consumed or stored for consuming later. Remember, if produce is not sold it does not attract income, but unsold products still cost money to produce.

- The second heading shows the "consumed items".

- Under the third heading you record the "Amount consumed", given away or stored for consuming later. Remember to include the unit of measurement such as number, li or kg.

- Under the "Unit price" heading you record the price of the produce you would have received if you had sold it in the market.

- The next heading is "Total value". We learnt in a previous session that the "Total value" is calculated by multiplying the unit price times the amount recorded under "Quantity consumed."

- The last heading is provided for "comments" on the amount of produce consumed or given as gifts. For example it may record that produce was used at a wedding or given to a neighbor who needed help.

Explain that this record should be updated regularly. It is best to record on the day that the produce is stored, consumed, given away or lost. At the end of the production cycle, a farmer should calculate the total value of this produce as part of the income from the enterprise. A member of the farm household should be encouraged to keep these records. Get feedback and make sure the participants understand the nature of the consumption record.

Referring to the example table below, explain that the farmer has

recorded the number of kilograms of corn consumed by the family or given away. The total value of the production consumed instead of sold is P2000. The amount is part of the enterprises profitability. But it is not part of the enterprise cash inflow.

Table 12. Sample Home Consumption Record

Date	Consumed Items	Quantity	Unit price (₱/kg)	Total value (₱)	Comments
5/03/12	Corn	50 kg	20	1,000	Family
5/03/12	corn	50 kg	20	1,000	Family
Total				**2,000**	

Home Consumption Record

Date	Consumed Items	Quantity	Unit price (₱/kg)	Total value (₱)	Comments

G. Profit and Loss Record

Explain that the cash inflow record and the cash outflow record (and the home consumption record if you used it), which we have just looked at, can be used to make a profit and loss statement for each enterprise.

Ask the participants to refer to the Profit and Loss Record worksheet and explain that the record should help keep track of profits and losses. At the top of the record they should enter the type of enterprise being measured. If it is onion, it becomes: "Measuring my onion enterprise".

Each profit and loss record covers a specific period of time. For crops, it is usually a cropping season. For vegetables the period may be a few months. For grain crops the period may be a year. For tree crops this could be many years. For livestock the period will be from the point of purchase to the point of sale.

When we calculated enterprise budgets, we used as an example a 1 ha land. Each farmer will have a unique size of land or a unique number of livestock. In order to calculate profitability of the actual farm, he will need to use the actual size of the enterprise.

So you need to write down the area (hectares) or size (number of livestock) of the enterprise and use this number when doing your calculations.

Ask the participants to write the appropriate information in their records. Next, ask each group to go through the cash inflow, cash outflow (and consumption records) for their enterprise and calculate the profit (or loss). They should write this down in their worksheets using an enterprise budget format.

Refer to the part with the headings. Explain the following:

- This sheet is used to arrange the records provided by the farmer into different categories: field operations, inputs and materials, labor, post production and value of sales. The items included in the cash outflow and cash inflow formats are entered under "Inputs/Operations" (second heading) and placed under the appropriate heading.
- The unit of measurement and the quantity used are provided under the second heading.
- The unit cost or price is given for each item and recorded under the heading "Unit price or cost". It is a cost if it is from the cash outflow record and it is included in the price if it is from the cash inflow record or home consumption record.
- To calculate the total income you multiply the quantity of the produce sold times the unit price. The amount is recorded under "Total income".
- To calculate the total cost you multiply the quantity of inputs or operation by the unit cost. The amount is recorded under "Total cost".

This record sheet can be difficult to do. So you may want to ask for help from an extension worker or other farmers. Or you might be able to help other farmers.

Use the Sample Profit and loss statement as a guide to complete a profit and loss record with the help of other records. Ask each group to maintain and share their results. Do one enterprise at a time. Did each group arrive at the same answer? If not, why? Which enterprises are profitable? Which enterprises are not profitable? Why? Ask if there are any questions about this. Encourage discussion.

Table 14. Sample Fixed Asset Record

Date	Items	Purchase price (₱)	Quantity	Life (years)	Comments
1/2/2008	Hand tools	800		2-3	Replace in 2011
3/4/2008	Knapsack prayer	1,000		5	Bought from Pedro
4/4/2008	Irrigation pipes	2,000		10	Bought from AgriCor

Get feedback. Make sure they understand the nature of the record.

Fixed Asset Record

Date	Items	Purchase price (₱)	Quantity	Life (years)	Comments

Session 12: Seed Certification Process and Seed Testing

Learning Objectives

At the end of the session, the participants will be able to:

- Explain the importance of seed certification; and
- Identify the parameters for seed testing.

Duration

5 hours

LESSON	METHODS	TOOLS
1. Seed Certification	Lecture and presentation	Visual Presentation
2. Seed Testing	Lecture and presentation	Visual Presentation

Note to Facilitator

- This session focuses on the process of seed certification and how to conduct seed testing.
- Prepare the necessary tools and materials to be used.
- During discussion and activity, encourage the exchange of ideas and participative interactions among participants.
- Emphasize good management and how to improve the weakness, and the benefits of observing, measuring, and recording.
- Make sure to discuss the what, why, and how of successful results and problems.
- Encourage farmers to participate in online webinars, courses and other virtual learning activities where available. Share to farmers links to relevant online activities if possible.
- Supplementary reference: Module on Training of Trainers on the Production of High-Quality Inbred Rice and Seeds, and Farm Mechanization; and Knowledge Bank of International Rice Research Institute (http://www.knowledgebank.irri.org/).

Lesson 1. Seed Certification Process

Key Learning Points:

Seed Quality

Describes potential performance of a seed lot considering four (4) parameters:

1. True to variety
2. High % physical purity
3. High germination percentage (high vigor)
4. Low Moisture content – suitable for storage

Importance of High-Quality Seed

- Lower seed rate – economical
- Less or minimal re-planting
- Vigorous seedlings – faster growth rate
- Uniform crop stand – ease in harvesting
- Yield can increase from 5% - 20%

Factors Affecting Seed Quality

- Genetic (Variety)
- Climatic Condition
- Crop Husbandry
- Sowing (Time)
- Management (Nutritional, Water, Pest)
- Harvesting (Time, Procedure)
- Threshing (Time, Procedure)
- Post Harvest (Drying, Packing, Transportation)

Seed Certification

- A system of seed production geared towards maintaining genetic identity, varietal purity and standards of quality seeds of superior crop varieties.
- Its purpose is to maintain the genetic identity and purity and make available to the farmers high quality seeds of superior varieties.
- Bureau of Plant Industry (BPI) through the NSQCS is the seed certifying agency in the country which implements quality control procedures in certification of seed stock production.

Mechanics in Seed Certification

1. Accreditation of Seed Growers
2. Determining eligibility of the crop variety
3. Verification of seed source
4. Application for Certification
5. Field Inspection
6. Field Standards
7. Seed Sampling
8. Seed Testing
9. Issuance of Results of analysis
10. Issuance of Certification Tags
11. Tagging

Lesson 2. Seed Testing

Key Learning Points:

Parameters to determine the quality of seeds:

A. Measuring Moisture Content (MC)

- MC is the weight of water contained in paddy or rice expressed in percent.
- It is usually referred to as the wet basis meaning the total weight of the grain including the water (MCwb).
- For research, MC referred to the dry matter of the grain is sometimes used (MCdb).

B. Germination Test

It gives an indication of vigor.

C. Seed Lot Purity

The impurities measured to test the purity of the seed batch are 1) weed and other crop seed, and 2) inert matter.

D. Varietal Purity

1. Grain dimensions
   Comparing the length-width ratio of the sample with the published ratio for the variety indicates the varietal purity of the grain sample.

2. 1000-grain weight
   Each variety has a published weight for 1000 grains. If the 1000-grain weight calculated from the sample departs from this, it may be an indication that the sample contains a mixture of varieties.

3. Red grains
   A grain is considered to be red if more than 25% of its surface area is red colored or streaked.

Table 15. Varietal purity measure, length

SCALE (Length in millimeter)		
1	Extra long	more than 7.5 mm
3	Long	6.6 - 7.5 mm
5	Medium	5.51 - 6.6 mm
7	Short	less than 5.5 mm

Table 16. Varietal purity measure, length-width ratio

Scale	Shape	Ratio
1	Slender	Over 3.0
3	Medium	2.1 to 3.0
5	Bold	1.1 to 2.0
9	Round	less than 1.1

E. Seed Health Tests

1. Fungal contaminants

The primary seedborne fungi causing yield loss are: Blast (*Pyricularia oryzae* CAV.), Brown spot (*Helminthosporium oryzae* Breda de Hann) and Bakanae (*Fusarium moniliforme* Shel).

2. Bacterial contaminants

Two species of bacteria – *Pseudomonas* and *Xanthomonas* are the primary bacteria of concern. Seed borne *Xanthomonas* can cause Bacterial leaf blight. Bacteria have to be extracted, purified, isolated and then identified.

3. Nematodes

Only one of the more than 100 nematode species (*Aphelenchoides besseyi*) is known to be seedborne. Nematodes are unsegmented roundworms. They are microscopic and transparent. They can live in the roots or in aerial plant tissue. For practical seed testing, the "modified Baermann funnel method" is considered suitable. Seeds are soaked and incubated before nematodes are counted in the water extract.

4. Viruses and mycoplasma-like organisms

Of the 21 rice viruses and mycoplasma-like organisms, only two (wrinkled stunt virus and witches' broom virus) are confirmed as seed transmitted. They have only been confirmed in Surinam and seed health testing has not been established.

Session 13: Yield Estimation and Final Analysis

Learning Objectives

At the end of the session, the participants will be able to:

a. Calculate grain yield using yield components, crop cut, and actual production data;
b. Evaluate the farmer group activities during the postharvest review and evaluation; and
c. Discuss the guidelines in conducting the final analysis and in interpreting the results

Duration

5 hours

LESSONS	METHODS	TOOLS
Crop Cut, Yield and Yield Components	Lecture and presentation Field Visit	Visual Presentation Meter Stick Scythe Sacks Used tarpaulin Plastic straw Bamboo stick Brown paper Manila paper Markers Moisture meter Weighing scale
Final Analysis	Lecture and presentation Field Visit	Laptop Projector Manila paper Marker crayons Filled-up PalayCheck monitoring board Graph summary of grain yield and gross margin versus number of key checks achieved

Note to Facilitator

- This session focuses on how to calculate grain yield using yield components, crop cut, and actual production data and the conduct of final analysis.
- Prepare the necessary tools and materials to be used.
- Ensure the collection of information on farmers' yield and expenses prior to the final meeting.

- During discussion and activity, encourage the exchange of ideas and participative interactions among participants.

- Emphasize good management and how to improve the weakness, and the benefits of observing, measuring, and recording.

- Make sure to discuss the what, why, and how of successful results and problems.

- Encourage farmers to participate in online webinars, courses and other virtual learning activities where available. Share to farmers links to relevant online activities if possible.

- Supplementary reference: PalayCheck System for Irrigated Lowland Rice booklet by PhilRice; and Module on Training of Trainers on the Production of High-Quality Inbred Rice and Seeds, and Farm Mechanization.

Lesson 1. Crop Cut, Yield and Yield Components

Key Learning Points:

- Weather conditions, cultural management, and nutrient supply greatly influence the yield and yield components of a rice variety.
- Each yield component differs in the time when it is determined and its contribution to grain yield.
- Understanding their relationships is a key to yield improvement.
- Grain yield can be determined using yield components, crop cuts, or actual production.
- Proper plot sampling should be done to obtain accurate results.

Grain Yield
- The bottom line or aspect of rice production that finally counts.
- The final outcome of crop management practices.

Yield Components
- Can help in designing a strategy in reaching a target yield.
- Used to analyze what went wrong if a target is not reached.
- For examining yield performance or effect of a particular treatment.

Getting Crop Cuts
- At least 2 sampling areas within a plot. At least 1 m from levee or border.
- Area = 10 m2; separate each variety.
- Thresh, clean and dry.
- Weigh and get MC.
- Adjust MC to 14% and compute yield.

ACTIVITY

Title: Measurement of grain yield from a farm parcel or pinitak

Methodology: Hands-on Activity

Procedure:

1. Parcel yield will be obtained from the fields of farmer-partners (FPs) and farmer-cooperators (FCs). The site coordinator and/or agricultural technologist should supervise the measurement, harvesting, threshing, collecting and recording data.
2. If there are many missing hills due to pests (i.e. rats) and diseases in each parcel, estimate the area of missing hills in percent and record.
3. The following should be considered:

   a. Before harvesting/ reaping, measure the area (length and width in meters per parcel). Sample areas for 3 parcels are shown below.

   Note: A farmer may have one or more parcels.

   Ask the participants to discuss the production records and start filling in the table, for example:

   b. After threshing, count and record the number of sacks of threshed palay per parcel. From each parcel, randomly select parcel five bags. Get the weight (kg) of the grains from each bag and obtain the percent moisture content (MC) of sample grains using a Grain Moisture Meter. Follow the instructions in using the Meter.
   c. Sample data for Parcel 1:
      (1) Parcel 1 area = 1,250m2
      (2) Total number of sacks or bags of palay harvested from Parcel 1=13
      (3) Average weight of one sack (average of five sacks randomly sampled) = 51.80kg/sack
      (4) Estimated total fresh grain weight from Parcel 1 = 13 sacks x 51.8kg/ sack = 673.4kg
      (5) Average %MC (average grain MC from 5 sacks randomly sampled) = 22.3%
   d. Calculate the grain yield from fresh weight of grain sample from Parcel 1 and adjust to 14%MC using the formula below. Follow the same procedure for Parcels 2 and 3. Tabulate data and get the average of yields of Parcels 1 to 3.

Grain yield at 14% MC (kg/ha)	=	Fresh grain weight (kg)/Parcel 1 area (m^2) x 10,000 m^2/ha x (100% - MC) / 86
	=	673.4kg / 1,250m^2 x 10,000m^2/ha x (100 – 22.3%) / 86
	=	5,386.3kg/ha x 0.9034
	=	**4,866.79kg/ha or 4.9t/ha**

Table 17. Sample grain yield data of three parcels from each farmer-partner or farmer-cooperator

Parcel no.	Area (m^2)	% Area with missing hills (if many)	Fresh weight of grain samples per parcel (kg/m^2)	% Moisture Content	Grain yield adjusted to 14% MC	
					Kg/ha	t/ha = (kg/ha)/1,000
1	1,250		673.4	22.3	4,866.7	4.9
2	1,250		900.1	19.0	5,651.8	5.7
3	1,250		1,600.1	20.0	5,953.5	6.0
				Average	5,490.7	5.5

*Adapted from "PalayCheck System for Irrigated Lowland Rice booklet" by PhilRice, p. 85

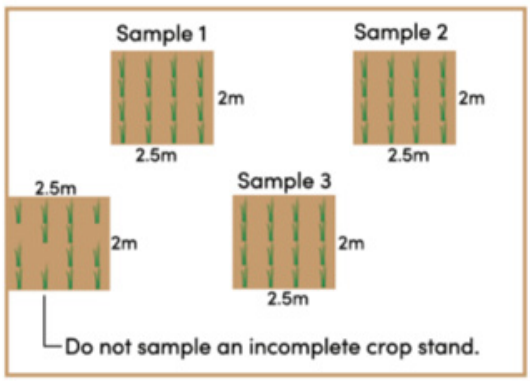
ACTIVITY

Title: Measurement of "crop-cut" grain yield from a selected parcel or pinitak

Methodology: Hands-on Activity

Procedure:

1. If FP or FC has two or more parcels, select a representative parcel. From the selected parcel, randomly measure three 5m^2 harvest areas (see figure below). Select areas with good crop stand, without missing hills, not damaged by pests and diseases, and without nutrient deficiency symptoms.



2. Harvest/reap all plants from each sample area measuring 5m^2 (=2mx 2.5m). Thresh, clean, dry, weigh, and obtain the grain %MC using a grain moisture meter. Drying samples may be done in the oven at 70°C for 49 hours, or sun-drying for 2-3 days. Follow instructions in using the meter.

3.Sample data for crop-cut sample 1 from a representative farm parcel:
(a) Crop-cut sample 1 area = 5m^2
(b) Grain weight for sample 1 = 2.03kg
(c) Grain moisture content = 14.1%

Calculate the grain yield from grain weight of crop-cut sample 1 and adjust to 14% MC using the formula below. Follow the same procedure for crop-cut samples 2 and 3. Tabulate and get the average yields of crop-cut samples 1 to 3.

Grain yield at 14% MC (kg/ha)	=	Grain weight (kg)/Crop-cut Sample 1 area (m^2) x 10,000m^2/ha x (100 - % MC) / 86
	=	2.03kg / 5m^2 x 10,000m^2/ha x (100 – 14.1%) / 86
	=	4.060kg/ha x 0.9988
	=	**4,055.13kg/ha or 4.1t/ha**

Table 18. Sample grain yield from 3 crop-cut samples obtained from a representative farm parcel

Sample no.	Grain weight (kg) / 5m^2	Moisture Content (%)	Grain yield adjusted to 14% MC	
			Kg/ha	t/ha = (kg/ha)/1,000
1	2.03	14.1	4,055.1	4.1
2	2.35	13.9	4,700.0	4.7
3	2.28	13.7	4,560.0	4.6
			Average	**4.5**

*Adapted from "PalayCheck System for Irrigated Lowland Rice booklet" by PhilRice, p. 85

ACTIVITY

Title: Measurement of yield components from 4-hill samples adjacent to crop-cut area.

Methodology: Hands-on Activity

Note: Do this only if resources (manpower, time, and payment) are adequate

Procedure:

1. Select three representative 4-hill (2x2 hills) samples adjacent to the "crop-cut" area or 5m^2 harvest area. At 20x20cm distance between hills, 4 hills will occupy an area of 0.16m^2.

2. For each representative sample, count the panicles from each hill and total them for four hills.
3. Thresh the grains from all hills sampled.
4. Separate and count the filled and unfilled spikelets.
5. From the filled spikelets, separate the 1,000 grains and dry in the oven at 70 degrees C for 49 hours.
6. After drying the grains and weight has stabilized, record and label the weight as the 1,000-grain weight.

Yield components:

- Panicle number/m^2 = (Panicle number for 4 hills at 20cm x 20 cm between hills) / 0.16m^2
- Number of spikelets / panicle = (Total no. of filled and unfilled spikelets / panicle)
- % Filled spikelets = (no. of filled spikelets /panicle) / (no. of filled + unfilled spikelets) x100
- 1,000-grain weight (g)
- Follow the same procedure for the other two 4-hill samples. Tabulate the data and get the average.

Table 19. Sample yield components from 4 hills (0.16m^2) / sample

Sample no.	Number of particles/m^2	No. of spikelets/panicle	% Filled spikelets	1,000 grain weight (g)
1	500	122	76.1	22.8
2	506	88	81.8	23.9
3	575	101	81.9	25.0
Average	**527**	**104**	**79.9**	**23.9**

Grain yield (kg/ha)	=	Panicle number / m^2 x spikelet number / panicle x % filled spikelets x 1000 grain weight (g)
	=	Spikelet number / m^2 x % filled spikelets x 1000 grain weight (g) x 10^2

*Adapted from "PalayCheck System for Irrigated Lowland Rice booklet" by PhilRice, p. 87

Notes:

- *Percent filled spikelets should be in decimal form.*
- *Compare the yield calculated from yield components (obtained from plant hills sampled adjacent the crop-cut area) to yield obtained from a 5m^2 "crop-cut" sample or yield from a farm parcel.*

Lesson 2. Final Analysis

Note to Facilitators

- Provide answers only if necessary and encourage farmers to participate in the discussion by asking why-questions.
- Make the participants feel comfortable and that they are not to be ridiculed with their answer and the practice they implemented.
- Discuss and share the knowledge and experience, and contribute information to help them move toward a conclusion or to summarize.

Key Learning Points

- Conducting a final analysis three to four weeks after harvest helps the farmers to realize what practices should be continued, adopted or modified in the next cropping season.
- The final outcomes identified from the various management practices is based on the difference of the yield and gross margin.

Information and Data Needed

- Yield
- Quality results
- Gross margin

Farmer group activities

- Review management and weather conditions during the season
- Review achievement of all Key Checks
- Relate Key Checks achieved to the yield and gross margin obtained
- Investigate reasons for differences in yield and gross margin
- Identify strengths and weaknesses of management
- Discuss results of participatory trials
- Discuss management for the next cropping season

ACTIVITY

Title: Final Analysis

Methodology: Group Discussion

Procedure:

1. Conduct a group activity to process the data on the monitoring board. This activity should be linked to the final analysis via the idea that "without conducting the final analysis, the conduct of the FFS feels like it did not have a good conclusion". Ask the participants what they felt during the activity and relate their answers/feelings to what it would feel if no final analysis was conducted.

2. Discuss and review the PalayCheck cycle, and the key checks' importance and assessments.

3. Compare the management practices and yield results of the participating farmers. Look for differences and determine what happened.

4. Discuss and explain the grain yield and gross margin data, together with the remarks in the PalayCheck monitoring board (sample below). It should be emphasized that the values were all converted to one hectare.

5. Conduct a group activity (see sample activity). This activity should be linked to the final analysis via the idea that "without conducting the final analysis, the conduct of the FFS feels like it did not have a good conclusion". Ask the participants what they felt during the activity and relate their answers/feelings to what it would feel if no final analysis was conducted.

6. Discuss and review the PalayCheck cycle, and the key checks' importance and assessments.

7. Compare the management practices and yield results of the participating farmers. Look for differences and determine what happened.

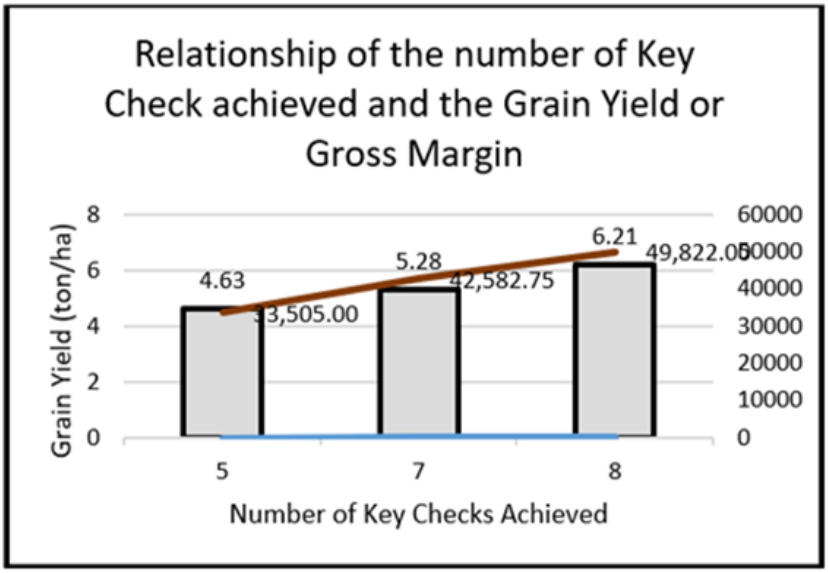
8. Discuss and explain the grain yield and gross margin data, together with the remarks in the PalayCheck monitoring board (sample below). It should be emphasized that the values were all converted to one hectare.

Table 20: Sample Monitoring Board:

NAME	KEY CHECKS									# of Key Checks Achieved	Grain Yield (t/ha)	Gross Margin (P/ha)	Remarks
	1	2	3	4	5	6	7	8	9				
1. Ronalyn	/	/	/	/	/	/	/	/		8	7.50	72,677	
2. Narlita	/	/	/	/	/	/	/	/		8	6.90	47,650	
3. Julieta	/	/	/	/	/	/	/	/		8	6.60	53,953	
4. Leonardo	/	/	/	/	/	/	/	/		8	6.00	56,125	
5. Angel	/	/	/	/	/	/	/	/		8	5.92	38,738	
6. Mary Ann	/	/	/	/	/	/	/	/		8	5.88	31,927	
7. Cecelia	/	/	/	/	/	/	/	/		8	5.77	58,732	
8. Evelyn	/	/	/	/	/	/	/	/		8	5.12	38,774	
9. Juanita	/	/	X	/	/	/	/	/		7	5.93	50,920	
10. Miriam	/	/	X	/	/	/	/	/		7	5.51	38,640	
11. Joel	/	/	X	/	/	/	/	/		7	5.40	47,200	
12. Jane	/	/	/	/	/	/	X	/		7	4.29	33,571	
13. Derick	/	X	/	X	/	/	X	/		5	4.63	33,505	
Key Check Achieved (%)	100	92	100	69	100	100	85	100					

9. Discuss the farmer group activities for the final analysis. Based on the results listed in the monitoring board, farmers will do the following:

1.1 Investigate reasons for the differences in yield and gross margin.
1.2 Identify the strengths and weaknesses of management.
1.3 Discuss management strategies for the next cropping season.



Processing:

1. Can the yield differences be explained by the number of key checks achieved? Or does the achievement of key checks explain the difference?

2. What other factors may have contributed to the difference?

3. What practices contributed most or least to the difference?

4. What practices should/could be changed for the next cropping?

Session 14: Graduation

Duration

5 hours

ACTIVITY	METHODS	TOOLS
Field Day and Graduation	Sharing of experiences Graduation Proper Participatory Evaluation	Presentation materials on learning results (Posters, AESA charts, results analysis, etc.) Folk Media/Dynamics; Graduation clothing (T shirts, caps - *optional*) Venue Tents Chairs

Note to Facilitator

- Print the certificates and carefully verify the names of graduates
- The FFS graduation is not just a ceremony but also an opportunity for experience sharing.
- Visitors should be guided by a host member to share the experiences as much as possible.
- Prepare a time table for the FFS graduation.
- Motivate the farmers to practice the knowledge they have acquired on their farms.
- Celebrate their achievements and acknowledge time and effort taken by themselves and their fellow farmers.

Table 21. Proposed Time table for FFS Graduation

Time	Activity
8:00	FFS Groups Assemble
8:15	Registration
9:00	Opening
9:00	Prayers
9:05	Visiting Host Farm
9:15	Presentations of Groups
10:00	Group Dynamics
10:15	Speech - Local leaders - Chief Guest - Project team representative - FFS representative
11:00	Awarding of Certificates
11:30	Vote of Thanks/Closing Message
11:45	Lunch
12:30	Departure

Annex A. Establishing a Demonstration Field

Table 22. Recommended PTD Set-up

PalayCheck Practice				**Farmer's Practice**
Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
Variety 1	Variety 2	Variety 3	Variety 4	Variety 5
400 m^2	400 m^2	400 m^2	400 m^2	400 m^2
*All management practices will be based on the PalayCheck system recommendations			*All management practices will be based on the PalayCheck system except the treatment or practice to be compared.	*All management practices are based on farmers' practice

Note:

- Variety 1 – nationally or regionally recommended variety
- Variety 2 – new or latest variety already tested in the area
- Variety 3 – commonly used or popular variety in the area

Table 23. Sample practices/treatment that can be applied for plots 4 and 5

PalayCheck recommendations	**Farmers' normal or traditional practice**
High-quality seeds	Low-quality seeds (did not undergo purification and germination testing)
Leveled field	Non-leveled field
21 days land preparation	Less than 1 week land preparation
Synchronous planting	Asynchronous planting
Use of 18-21days old seedling	30 days or older seedling
AWD using observation well	Continuous flooding
Use of diagnostic tools for fertilizer management	Application of 2-3 bags of urea or complete 10-14 DAT and 2-3 bags complete or urea 25-40 DAT
No spraying	Use of pesticides or Calendar spraying
Recommended harvest indicator	Too early or too late harvest
Other practices that can be compared	
Crop establishment methods – manual transplanting; or transplanting vs. direct seeding; or manual broadcast vs. use of drumseeder	

Annex B. Guide in Administering Pre- and Post-test

Conducting pre- and post-test is a necessary exercise to measure the knowledge gained by the participating farmers in the Farmers Field School (FFS). The pre-test also provides the areas of weaknesses of the participants which can serve as guide for the resource persons on topics and areas that needed emphasis during discussions. To make the exercise friendlier and easier for the farmers, the ballot box type of assessment is used in lieu of a written exam.

The Ballot Box

Materials:

- Manila Papers, bond paper or cardboard
- A whistle (or any sound producing instrument)
- Markers, paper bags, masking tape
- Plastic bags or vials
- Actual specimens
- 1.5meter pole or chair or wall where the questions/ballot box with questionnaire will be posted

Cut manila or bond papers and prepare the strings of ballots with the same number per participant (for example, the total number of participants are 25 people, prepare 25 ballot strings). There should be as many ballots as there are questions. For example, if there are 20 questions, each participant should have 20 ballots with the same number.

Preparation:

1. Prepare 20 to 25 questions focused on important knowledge and techniques in regard to the enterprises and curriculum (see guide questions).
2. Prepare enough pieces of cardboard or Manila papers around 40 cm x 30 cm and write question on each. Try to simplify and use the least possible letters/words. The questions should be in the most understandable language (preferably vernacular). Write the 3 answers down below the question. They should be of selection type where participant only choose the correct answers.
3. Make three windows at the lower part according to the answers and tie a paper bag behind or just tie paper bag under each answer as to collect the ballot ticketing according to the answer.
4. It is recommended to collect live, dried or preserved, actual specimens and mount the same on pieces of cardboard (depending on the question) to make the question clearer and easy to understand.
5. Put all prepared question boards around the host farm using poles or fixing trees.

Implementation:

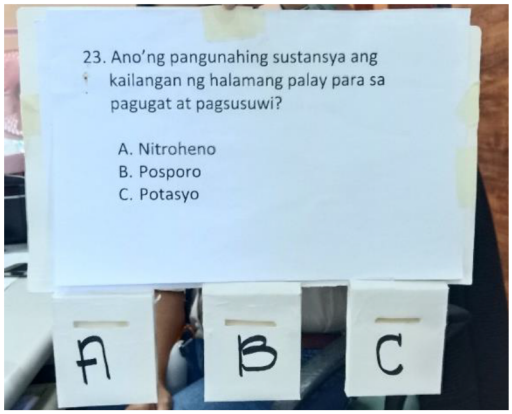
1. Assign each participant a number and give a string of paper ballots with their number. Record each participant's number and name separately for future use.
2. Explain to participants that each board has a question with three choices of answers but only one is correct. On each question board they have to put only one ticket in the answer box which they think is correct.
3. Invite participants to move to one station each. They put a ticket in the corresponding answer box. Blow the whistle and keep time to 1 or 2 minutes per

station. Continue the exercise until all the participants have answered every question.

4. There are several ways to help illiterate participants do the ballot box exercise. The easiest way is to invite a few literate non-FFS persons to help illiterate participants by reading the questions and answer choices to them.

Note to Facilitators:

1. The questions have to be formulated in the field based on the availability of the specimens and materials, though you can bring some pre formulated questions, which can fit according to the reality in the field.
2. The samples should be fresh, live, maintaining their colors, with evident symptoms and characteristics. Thus, conducting the activity in actual field is advantageous.
3. In case actual field is not available, the activity may still be done with actual or live specimens as applicable.
4. Explain procedure and objectives clearly and be ready for farmers' questions or to help those who cannot read.
5. It is recommended to ask for help from colleagues or farmer facilitator, not only in the preparation and placement of the questions in the field, but also in the development of the session itself.
6. Use resistant materials to cover displays with plastic for protection against rain.
7. Care has to be given in disclosing the results. Some members want to know the results but some may not feel comfortable. Therefore, facilitators and farmers should have an agreement of confidentiality, for the results, that can be used with discretion.



Sample question with ballot box

Sample string of ballot

Guide questions for the pre and post-test

Topic	**Guide in making a question** Make a question where the following will be highlighted.
Overview of Palay Check	History of Palay Check
	Principles of Palay Check System (HIKE)
Rice Morphology	Distinguishing characteristics between rice and weeds
	Plant parts and its function for growth and development
Growth stages of rice	The number of days per phase
	In the ten stages of rice, highlight critical stages and the corresponding management practices to be employed
*For Key Checks, make a question highlighting the importance, assessment, and recommendations. Also, the following is recommended/ sample;	
Key Check 1	Characteristics of high-quality seeds or difference between high-quality and low-quality seeds
	Color of tags per seed class
	Number of allowable other varieties per seed class
	Guaranteed yield increase when using a high-quality seed
	How to know that the variety is recommended
Key Check 2	Recommended number of days of land preparation, and why
	Importance of levelling the field
	Yield penalty of unlevelled field
Key Check 3	The number of days recommended for rest period
	How to achieve synchronous planting
	Benefits of rest period and synchronous planting
Key Check 4	Characteristics of healthy seedlings
	Recommended seeding rate
	Recommended days of replanting
	Recommendations for seed bed site selection
	Recommended size of seed bed
	Cons and pros of transplanted and direct seeded
Key Check 5	Major roles of NPK
	Diagnostic tools

	Number of panicles to achieve for Key Check 5
	The right EAT
	Fertilizer computation
	Identification: actual specimen of fertilizer e.g. urea, MOP, etc.
Key Check 6	Percentage of Water saved if irrigation water is well-managed
	Symptoms of excessive and water stress
	Most critical stage where water is needed
	Observation well
Key Check 7	Identification: live/actual specimen of insect pest, natural enemies, diseases, and weeds
	Sample computation of assessing insect pest damage like stemborer
Key Check 8	Yield penalty of too early and too late harvesting
	Indicator when to harvest rice using manual/thresher harvesting and combine harvester
	Recommendations when to drain the field
Key Check 9	Recommended MC for storage
	Pros and cons of sun drying and mechanical drying
	Recommended time for stirring grains in sun drying
	Importance of seed cleaning
Special topics	Give emphasis on the importance of topic, its recommendations, and the why's for its recommended practices.

Sample set of questions for the pre/post-test

1. Alin sa mga sumusunod ang tamang kapuruhan ng binhi (highest to the lowest)?
   A. foundation > registered > certified > breeder
   B. certified > breeder > foundation > registered
   C. breeder > foundation > registered > certified

2. Para sa lipat-tanim, ilan ang kilo ng inbred na binhi ang rekomendadong itanim sa isang ektarya na palayan?
   A. 80 – 100 kg/ha
   B. 60 – 75 kg/ha
   C. 20 – 40 kg/ha

3. Alin sa mga sumusunod ang pinakahuli o hindi mahalaga sa pagpili ng binhing itatanim?
   A. Mataas umani
   B. Angkop sa luagar
   C. Bagong labas na binhi

4. Ilang linggo ang rekomendado para sa paghahanda ng lupa?
   A. 1 – 2 linggo
   B. 5 – 6 linggo
   C. 3 – 4 linggo

5. Alin sa mga sumusunod ang epektibong pamamaraan upang mabawasan ang pag-atake ng pesteng daga?
   A. Sabayang pagtatanim
   B. Paglalagay ng pain/lason
   C. Lahat ng nabanggit

6. Alin sa sumusunod ang hindi epekto ng pagpapahinga ng lupa sa loob ng 1 buwan?
   A. Para maputol ang inog ng buhay ng mga pesteng insekto sa palay
   B. Para mabulok ang mga dayami at pinag-gapasan
   C. Para sa maayos na pagpapatubig.

7. Ilang araw ang tinatagal ng paglaki ng palay o vegetative stage?
   A. 30
   B. 35
   C. Depende sa variety

8. Kilalanin kung anong uri ng abono ito.
   A. Complete Fertilizer
   B. Urea
   C. Ammonium Sulfate

9. Bakit mahalagang patuyuan ang mga pinitak 1–2 linggo bago mag-ani?
   A. para makatipid sa tubig irigasyon
   B. para mas mapadali ang pag-aani
   C. lahat ng nabanggit

10. Ilan ang rekomendadong tundos ang dapat pumasok sa 1 metro kwadrado para sa mechanical na lipat-tanim?
   A. 15 tundos
   B. 21 tundos
   C. 30 tundos

11.Ilang kilo ng nitroheno mayroon sa isang sako ng Urea?
   A. 50 kg
   B. 46 kg
   C. 23 kg

12. Alin sa mga sumusunod na pangungusap tungkol sa kahalagahan ng pamamahala sa tubig ang hindi totoo?
   A. Ang pagpapatuyo ng tubig ay nakakaalis sa mga nakakalasong element.
   B. Ang pagpapatuyo ng tubig ay tumutulong sa pagbulok ng organikong bagay.
   C. Ang pagpapatuyo sa bukid ay isang maaksayang pamamaraan.

13. Ano ang pinakakritikal na buhay ng palay kung saan hindi ito dapat nakakaranas ng kakulangan sa tubig?
   A. Pagsusuwi
   B. Pamumulaklak

C. Paglalaman

14. Ano ang pangalan ng bahaging ito ng palay?
A. dahon
B. ligyul at orikel
C. ugat ng dahon

15. Ilang yugto ang buhay ng palay?
A. 3
B. 7
C. 10

16. Ano ang sapat na halumigmig (moisture content) ng palay para hindi ito madaling masira bago iimbak?
A. 12 – 14 %
B. 15 – 17%
C. 19 – 21%

17. Ang Leaf Color Chart (LCC) ay ginagamit sa
A. Para malaman kung may sakit ang palay ng tungro
B. Para malaman kung kulang sa Sulfur
C. Para malaman kung kulang sa Nitrogen

18. Ano ang tawag sa sakit na ito?
A. Bacterial Leaf Blight
B. Tungro
C. Rice Blast

19. Ilang porsyento ang mawawala sa ani kapag hindi napatag nang maayos ang lupa?
A. 5%
B. 10%
C. 15%

20. Ilang porsiyento ang nararapat na hinog na butil ng palay bago anihin gamit ang combine harvester?
A. 75–80 %
B. 80–85%
C. 90–95%

21. Ilan ang rekomendadong sukat ng kamang-punlaan para sa isang ektarya?
A. 400 m^2
B. 700 m^2
C. 600 m^2

22. Ano ang tawag sa sa sakit na ito?
A. Bacterial Leaf Blight
B. Tungro
C. Rice Blast

23. Ano'ng pangunahing sustansya ang kailangan ng halamang palay sa pagugat at pagsusuwi?
A. Nitroheno
B. Potasyo
C. Posporo

24. Alin sa mga sumusunod ang kaibigang insekto?

A. Rice Black Bug
B. Lady Beetle
C. Rice Bug

25. Ito ay paraan ng pagalam ng iba't-ibang factors gaya ng tubig, panahon at insekto sa palayan na nakakaapekto sa paglaki at ani ng palay.

A. IPM
B. AESA
C. FFS

Annex C. Key Checks Monitoring and Assessment

Timely monitoring and accurate key check assessment of farmers' field is important as this will be the basis in the final analysis. In the FFS sessions, key check assessment of the PTD trials is included in their AESA. With this, the farmers will be familiar with assessment procedures and may do the checking in their own field. The following is the recommended procedure in conducting the monitoring and key check assessment of farmers.

I. Prepare a monitoring chart using a manila paper to track the achievement of key checks by the farmers. This will be used for the entire season. The following information should be present:

Name of Farmer Cooperator	Key Check									Key Checks Achieved	Grain Yield	Gross Margin	Remarks
	1	2	3	4	5	6	7	8	9				
Achievement of Key Checks (%)										Range =	Mean=	Mean =	

II. At the end of every session, assess every applicable key check per farmer by interview. In the remarks section of the monitoring board, take note of key observations and details, especially for key checks with multiple assessment criteria. If properly filled-up, the remarks will help the facilitator explain issues that may be raised during the final analysis.

III. If the PalayCheck primer is available to the farmer, require the farmers to fill up the "Mga Gastos at Gawain sa Pagpapalayan" and the "Pagtataya ng Key Checks" found at the last page of the primer. Before the final analysis, summarize their data in the monitoring board. Compute for the grain yield and gross margin. For a clearer processing, use one hectare as conversion factor for all the data.

If PalayCheck primer or a crop monitoring form is not available, take note of the following information from each farmer:

- Variety
- Area (ha)
- Seeding Rate
- Method of Crop Establishment
- Date Sown (and Transplanted for TPR)
- Date/s of Harvest
- Harvest Quantity (cav)
- Average Weight per cavan (kg)
- Prevailing Price/kg (PHP)
- Total Production Cost (PHP) and breakdown of expenses

Masaganang ANI Mataas na KITA

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