LAND DEVELOPMENT - NR

2nd TOT

PRESENTATION OUTLINE

- Field Observations
- Water Management and Valley Expansion
- Bunds Maintenance and Repairs
- Canal Construction

FIELD OBSERVATIONS

PERIPHERAL AND INTERLOCKING BUNDS

- Most of the Bunds have been CONSTRUCTED.
- Most of the Bunds constructed are beginning to settle however we are yet to see if it will stand the test of time in terms of STABILITY
- Are the bunds constructed of the specified width and height

Fig. 1. Well compacted bunds (Savelugu district, 2018)

PLOUGHING, HARROWING AND LAND LEVELLING

- Most of the demo plots have been double ploughed or ploughed and harrow . However, some amount of levelling has been achieved using hoes.
- some fields or most are fairly levelled.
- Meaning we need to increase the height of bunds to enable us increase the depth of water in the demo plots for even distribution. However, the importance of micro bunds cannot be over emphasized.

Fig. 2. Fairly levelled field (Cheriponi district)

PLOUGHING, HARROWING AND LAND LEVELLING

However, the importance of micro bunds cannot be over emphasized.

Fig. 3 Central Gonja district, 2019

Fig. 2. Fairly levelled field (Cheriponi district 2018)

PLOUGHING, HARROWING AND LAND LEVELLING

Also, the importance of compaction of all bunds including micro bunds cannot be over stated.

Fig. 4 Central Gonja district, 2019

Fig. 5 Central Gonja district, 2019

WATER MANAGEMENT AND VALLEY EXPANSION

HARVESTING WATER

- Introduction of useful structures (Bunds, Intake structure, ponding of stream, seepage water collection ditch, so on and so forth)
- Maximization of rain resource and its use using the above
- Water Management at on-farm level
- Maintenance of structures (facilities)-dykes, ponds, canals, bunds etc

WATER MANAGEMENT (Under Rain-fed Area)

Aim

- ***To secure water for rice for continues 'no rain day' with a storing or water harvesting facility.***

On-a plot level

- Storing water in the field with bunds against continues 'no rain day'.

Off-plot level

- Maximization and utilization of water resources against continues no rain day.
- Sharing water with all water users with fields within the catchment area .

WATER MANAGEMENT
(Mending of bunds after rains under Rain-fed condition)

Fig. 6 Karaga district

Heap soil where bund is broken.

Fig. 7 Karaga district

Use sand bags to reinforce the bund.

WATER MANAGEMENT AT OFF-PLOT LEVEL

Objective

1. Supply of temporal irrigation water(supplementary) at the right time and in the right quantity based on water balance of each fields. Dependent on runoff from rainfall.

2. Reduction of water losses.

3. Reduction of drainage problems.

Integrated Process

Diversion	• The point from where the water is taken unto the area. Diversion weir, a valve or a gated structure
Conveyance	• The carrying of the water from the diversion through main or small earth canals and bunds and to the field with the associate d losses.
Regulation and measurements	•The amount of water released should be regulated and measured to meet that which is required by the crop on the field through measuring & regulatory devices such as weirs, parshall flumes and gates.
Distribution	• The right amount of water distributed to each block on demand whilst endeavoring to avoid distribution losses and improve on efficiency.
Drainage	• Excess water from the field needs to be properly carried away through the drainage system.

DIRECTING WATER INTO THE FIELD

Mend all cut bunds

To prevent water from flowing out of the plot

DIRECTING WATER INTO THE FIELD

ADVANTAGES OF PONDING FOR RICE CULTIVATION

1. Supply necessary water and nutrition

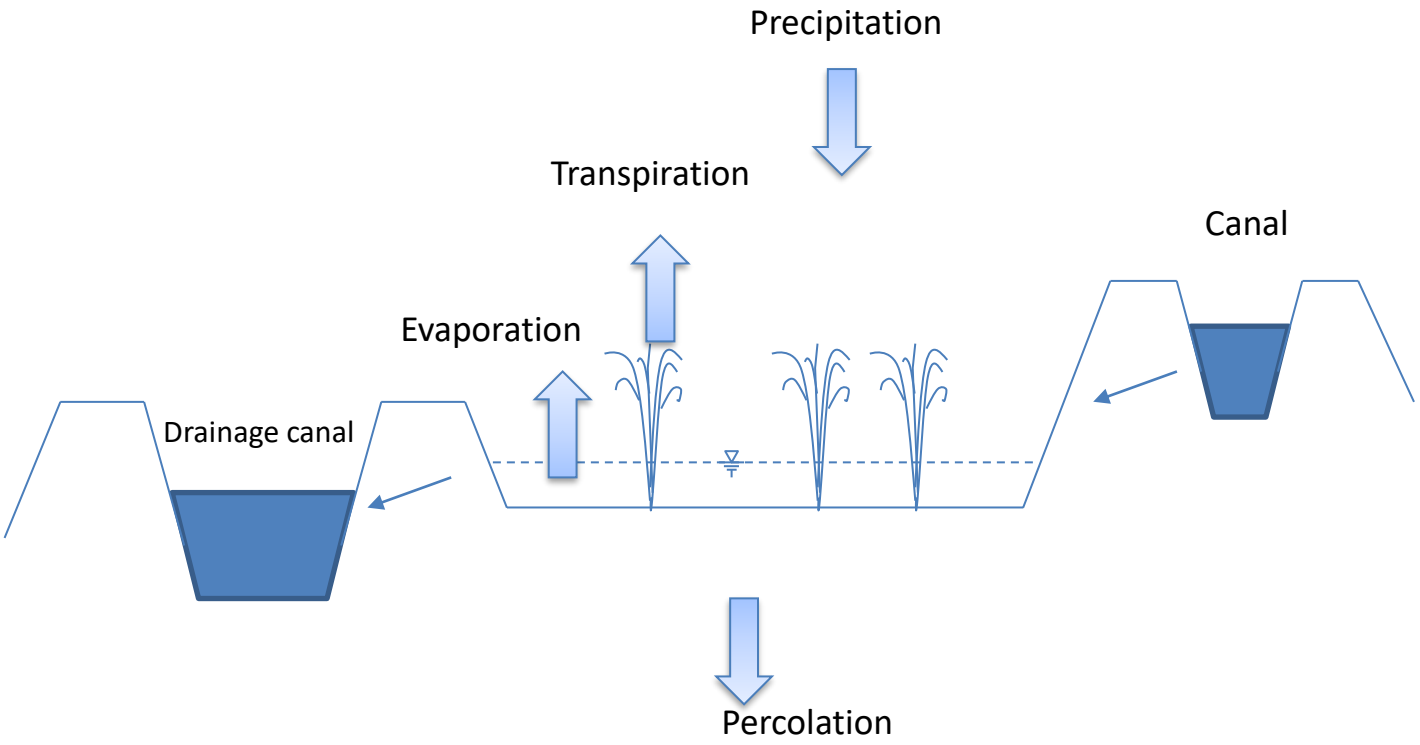
2. Helps rice growth and effectiveness of fertilizer uptake through control of soil surface temperature

3. *Reduction of weed*

4. Protection of rice plant against actions of wind

MOVEMENT OF WATER

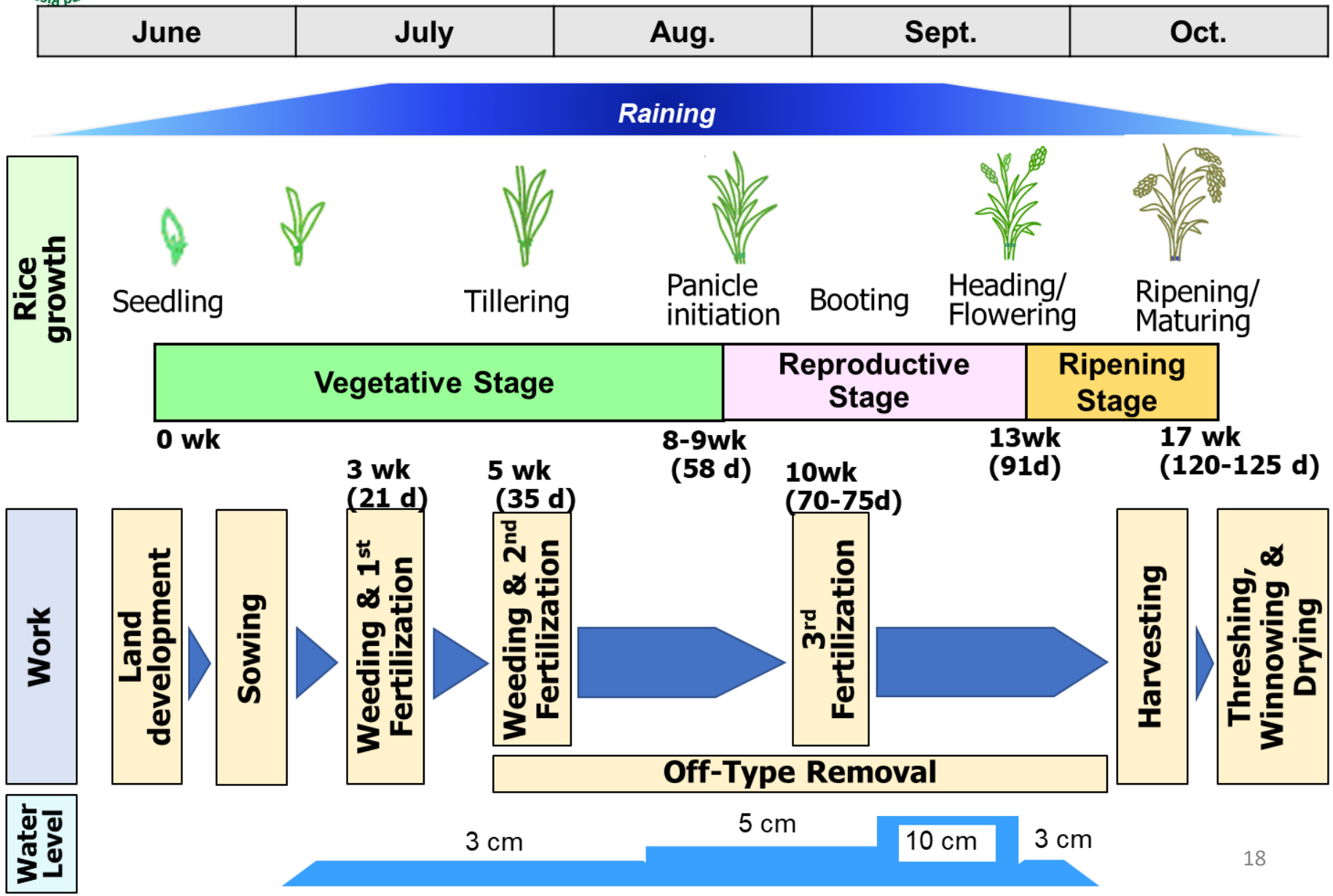
Optimum water requirement rate for paddy = 20 to 25 mm/day



KNOWING WHAT TO DO

- Know when water is needed and not needed in your rice field
- Check the off farm level for water availability
- Use well the on farm(in-field and immediate environment) water resources available with bunds and canals
- Construct canals to allow in water or drain
- Always use bunds to help in your water control
- In emergency cases use sand bags to manage floods

RICE GROWING STAGE, CULTURAL REQUIREMENT AND DEPTH OF WATER IN A PLOT



WATER MANAGEMENT TECHNIQUES

- Use of interlocking bunds
- Use of diverging and drainage canal
- Use dug outs, weirs
- Use of sand bags

SIMPLE WEIR WITH SAND BAGS

Wooden weir

Control water discharge with sand bags

WATER DIVERSION AND CONTROL

Elevation at canal bottom
Mpasatia, Atwima Mponua

Water Intake
Frenchman, Katabo

Bund protection
With sand bags
Savelugu

TO EXPAND VALLEYS CULTIVATION FOR RICE;

Agric Officers should;

- Alert farmers on the availability of water in the valley for expansion
- Assist farmers to expand land area in order to utilize the available water resources
- Identify all off farm water resources that can be harness by the farmers for rice production
- Alert the farmers to avoid continues cultivation/production of rice all year round on the same field

Bund Maintenance and Repairs

Why do we construct Bunds?

BUNDS

- Helps in conserving water in the field for the rice plants
- Direct water in and out of the field for water management
- Controls floods
- Walk ways and boundaries

WITHOUT BUNDS

- Lack of water in the field
- Frequent floods or over flows
- Poor drainage problems
- Difficulty in applying fertilizer

DETERMINATION OF HEIGHT OF BUNDS

Purpose

To prevent spilling of water over bunds

How to determine?

Height = (Maximum water level from last few years) + (Freeboard 20 cm)

Other factor to be considered

Land slope (inclination)

Spilled water over bunds

TEMPORARY BUNDS CONSTRUCTION

Don’t wait for a time like this to construct bunds

BUNDING MATERIALS

<table>
<tr><th>material</th><th colspan="2">Earth</th><th colspan="2">Stone</th><th colspan="2">Concrete</th></tr>
<tr><td></td><td>Advantage</td><td>Disadv.</td><td>Advantage</td><td>Disadv.</td><td>Advantage</td><td>Disadv.</td></tr>
<tr><td>Contour Bunds</td><td rowspan="4">➢Easy construction
➢Low cost</td><td rowspan="4">➢Weak to erosion</td><td rowspan="2">•Strong against heavy water flow
•Resistant to erosion</td><td rowspan="2">•Expensive
•Might be scattered on field</td><td>•Strong against heavy water flow
•High durability</td><td>•Expensive</td></tr>
<tr><td>Bunds across H_2O</td><td colspan="2" rowspan="3">Not appropriate</td></tr>
<tr><td>Bunds along H_2O</td><td colspan="2">Not appropriate
(ploughing with tractor)</td></tr>
<tr><td>Interlocking bunds</td></tr>
</table>

MAINTENANCE OF BUNDS

During cropping season

- Minor repairs such as hilling up the soil, reshaping and cutting grasses should be done to maintain the function of bunds.

Using Sand bags/ stones for bund maintenance (Cheriponi district)

Using Sand bags/ stones for bund maintenance (Savelugu district)

MAINTENANCE OF BUNDS

During off-cropping season

- Re-compaction of bunds and reshaping of bunds should be done
- Reinforcement of bunds where weak should also be done
- Especially at the end of the wet season when there's residual moisture for optimum compaction of soil.
- At this point, the dry season had set in and harvesting is almost over.

CANAL CONSTRUCTION

HOW TO CONSTRUCT AN EARTH CANAL

- Check the elevation level of the field and the water source
- Maintain the slope of a canal as constant as possible.
- Take into account the plot level and the invert of the water channel which will help to determine level in the canal
- Avoid digging too deep to avoid gully erosions
- Firm the banks after excavating

CANAL EFFICIENCY

To increase efficiency of constructed canal,

- Increase the maximum allowed water depth, either by raising the banks or by deepening the bed depending on the difference in field level and that of the water source.

- Use sand bags if the water levels are to be raised

THANK YOU

RICE CULTIVATION

2nd Training of Trainers

Edited 2019

Contents

1. Standard Cropping Calendar
2. Fertilizer Management
3. Young Panicle Observation
4. Disease & Pest Control
5. Chemical Control (General)
6. Quality Seed Production
7. Estimate of Harvesting Time

Standard Cropping Calendar in Northern Region (Direct Sowing - Agra)

June	July	Aug.	Sept.	Oct.

Raining

Rice growth

Seedling | Tillering | Panicle initiation | Booting | Heading/ Flowering | Ripening/ Maturing

Vegetative Stage	Reproductive Stage	Ripening Stage

0 wk | 8-9wk (58 d) | 13wk (91d) | 17 wk (120-125 d)

3 wk (21 d) | 5 wk (35 d) | 10wk (70-75d)

Work

Land development → Sowing → Weeding & 1st Fertilization → Weeding & 2nd Fertilization → 3rd Fertilization → Harvesting → Threshing, Winnowing & Drying

Off-Type Removal

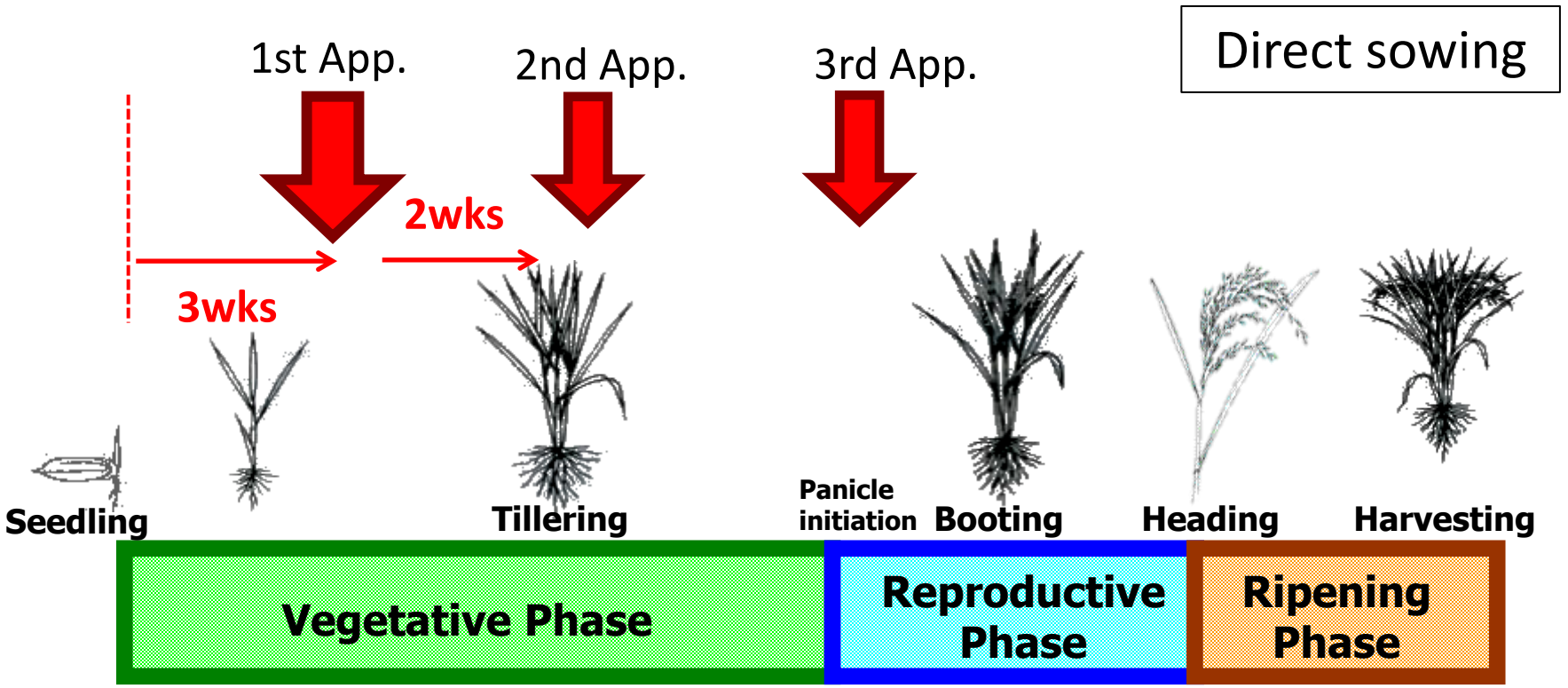
Water Level

3 cm | 5 cm | 10 cm | 3 cm

Fertilizer management

For 2nd In-House Training
2019

Apply fertilizer at correct growth stage



Application	Growth stage	Yield Component
1st Application	Tillering Stage	Panicle Number
2nd Application	Tillering Stage	Panicle Number
3rd Application	Panicle formation Stage	Number of Grain per Panicle

When 3rd fertilizer is applied ?

- 3rd fertilizer is applied at 18 – 20 days before heading.(in general)
- Decide the exact timing of 3rd fertilizer application by observing young panicles (concrete procedures for panicle observation will be explained later) .

- In case of “Agra”
  - Expected heading time is around 90-95 days after sowing.
  - 3rd fertilizer is applied around 80 days after sowing. (approximately 3 weeks after 2nd application in transplanting method and 5 weeks after 2nd application in direct sowing method.)

Approximate dates of 3rd fertilizer application

20 days before heading

Expected heading time

District	Date of sowing	Start panicle observation	70 days (10 weeks) after sowing	91 days (13 weeks) after sowing
Central Gonja	13 June	15 August	22 August	12 September
Karaga	6 June	8 August	15 August	5 September
Tolon	14 June	16 August	23 August	13 September
Zabzugu	11 June	13 August	20 August	10 September

Observation of Young Panicles

For 2nd In-House Training

2019

Why do we need to observe young panicles ?

- Objective 1

To determine the right timing of 3rd fertilizer application by the length of young panicles.

- Objective 2

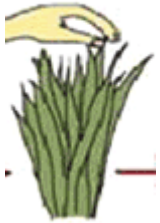
To anticipate approximate date of heading. By knowing the heading date, maturity date could be anticipated to start preparation for harvesting.

How panicles developed?

- Approximately 33 days before heading, panicle initiation begins in the uppermost node of the stem.
- Initially, the young panicle is so small and not visible to bare eye.
- A week later, the panicle is developed to 1 mm in length.

Let’s observe young panicles !

Observation of a young panicle

① 

Pull out the tallest stem in a hill.

② 

Peal the leaf sheaths one by one carefully.

③ 

Remove the flag leaf.

④ 

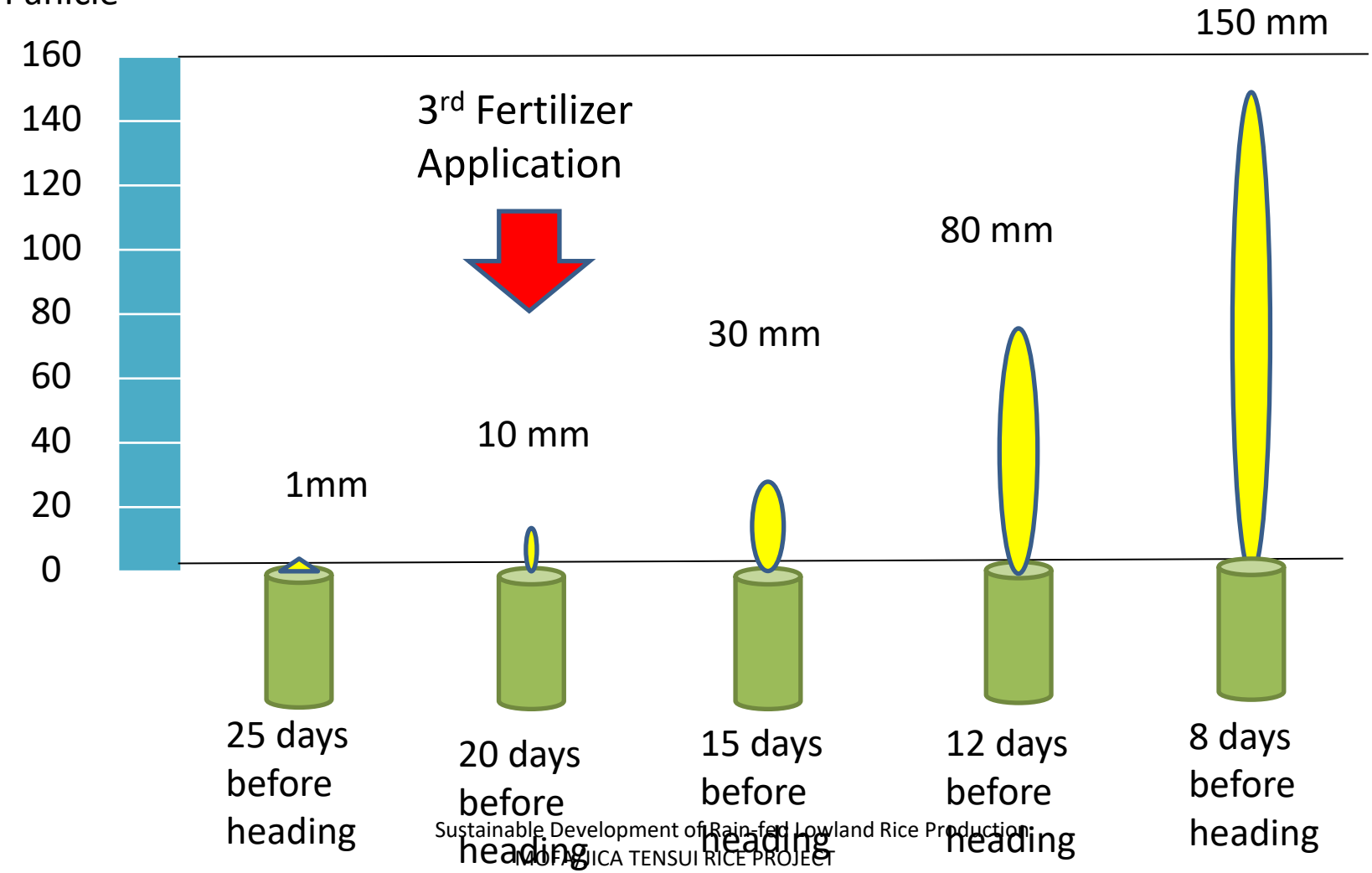
Find out a young panicle and observe.

How to check young panicles

Alternatively, you can cut leaf sheaths by knife to find out young panicles.


Young Panicles
09/07/2012

How to estimate Heading Date



Disease & Pest Control

For 2nd In-House Training

2019


Leaf Blast


Panicle Blast


Blast spread in the field

Primary Options for Rice Blast Control
- IPM Practices -

- Plant resistant varieties
  - ✓ Agra is said to be resistant to rice blast, but not perfectly resistant in our experience.
- Use Hot Water Seed Treatment
- Destruct infected residue, including extra seedlings
- Secure good ventilation, including cutting grass around rice fields.
- Provide enough water to rice plants to avoid extremely dry conditions.
- Eliminate rice blast at community level.
- Reduce N level and planting density.

Cut grasses around paddy fields for better ventilation

BEFORE

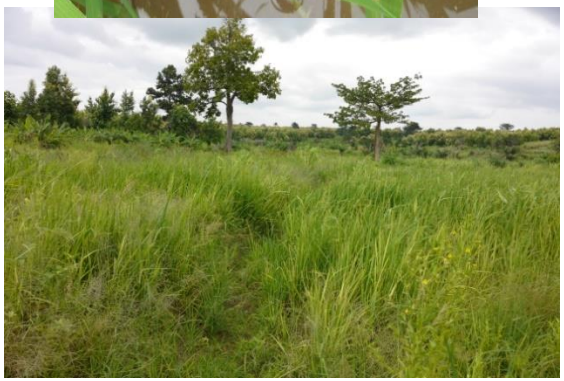
AFTER

Control of Rice Blast at Community Level

Demo Plot

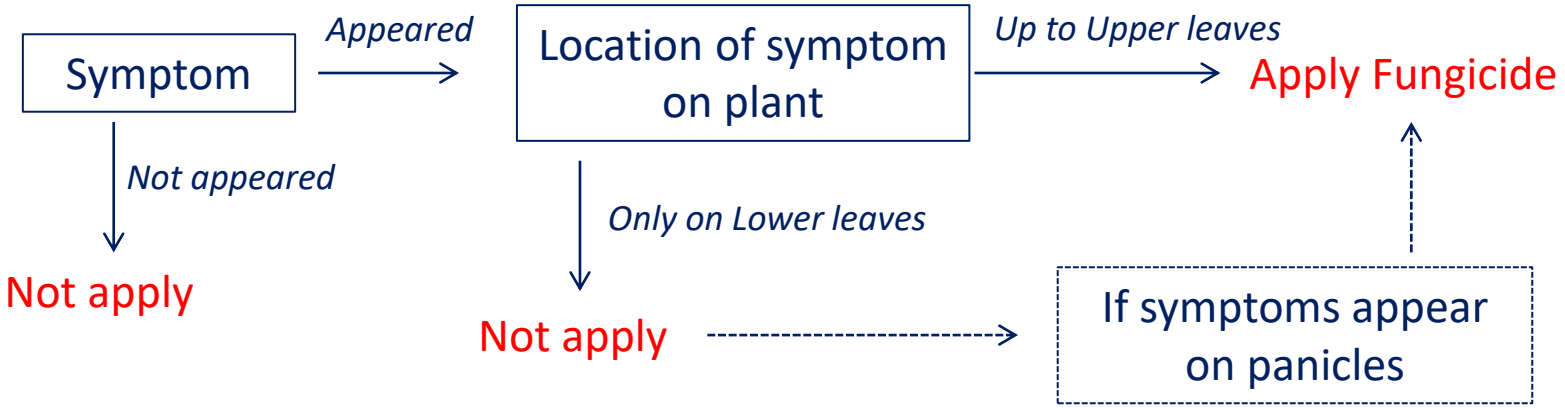
- Rice blast could be transmitted from neighboring rice fields.
- That is why rice blast control is necessary at community level.

Neighboring Rice Field



The Decision process of Chemical Control for Blast

- Foliage application



 # Even if symptoms is appeared only on lower leaves, sometimes panicle blast is developed.

Timing of foliage application for Blast

TOPS-M 70% WP 1,000-fold, 100L / ¼ acre
(THIOPSIN 70% WP)

or

BENDAZIM 50WP 1,500-fold, 75L / ¼ acre

Just before heading time

Full heading time

Chemical Control for Blast

- Foliage application *if symptoms appear*

TOPS-M 70% WP 1,000-fold, 100L / ¼ acre
(THIOPSIN 70% WP)

or

BENDAZIM 50WP 1,500-fold, 75L / ¼ acre

 # apply fungicide twice

1st application : Just before heading time

2nd application: Full heading time

Do not use fungicides repeatedly, because frequent application of fungicides could make fungi resistant to them.

Chemical Control (Foliage application) for Blast

- TOPS-M 70% WP 1,000-fold, 100L / ¼ acre (THIOPSIN 70% WP)

  Active ingredients*: Thiophanete methyl*

x 7 rounds
for ¼ acre

Chemical Control (Foliage application) for Blast

- BENDAZIM 50WP　1,500-fold,　75L / ¼ acre

  Active ingredients ; *Carbendazim*

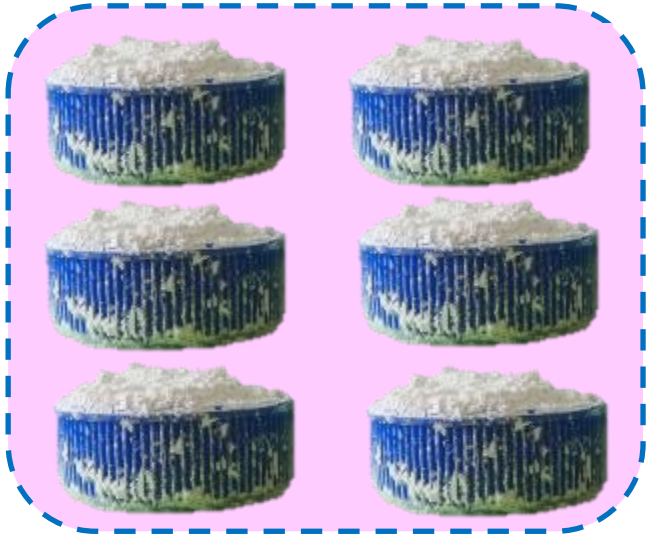
x 5rounds
for ¼ acre

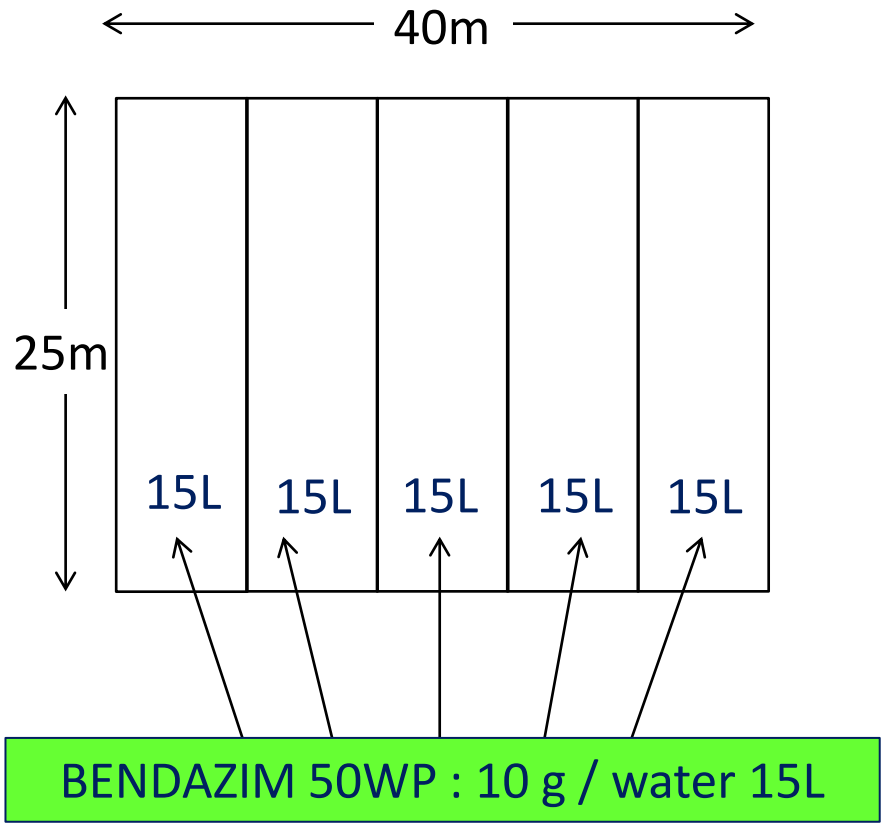
Face

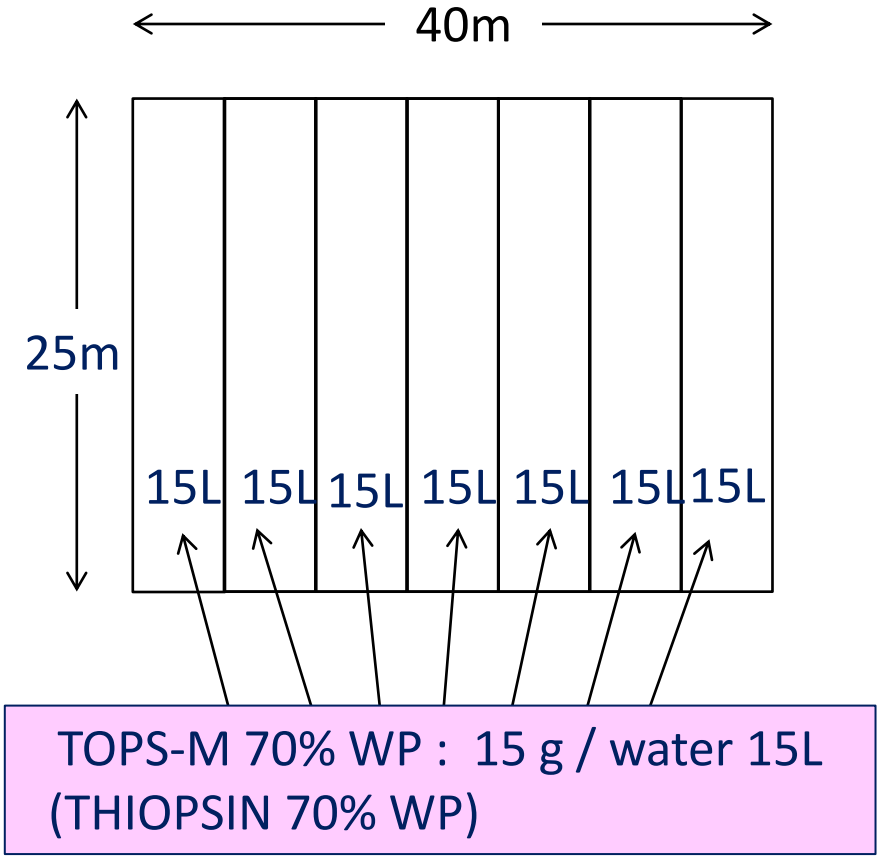
Method of weighing chemicals

BENDAZIM 50WP
10 g

TOPS-M 70% WP
(THIOPSIN 70% WP)
15 g




40m
25m
15L
15L
15L
15L
15L
BENDAZIM 50WP : 10 g / water 15L


40m
25m
15L
15L
15L
15L
15L
15L
15L
TOPS-M 70% WP : 15 g / water 15L
(THIOPSIN 70% WP)

Effective Active Ingredients for Foliage Application for BLAST

- Azoxystrobin
- Fenoxanil
- Ferimzone
- Fthalide
- Isoprothiolane
- Kasugamycin
- Metomiostrobin
- Orysastrobin
- Probenazole
- Pyroquilone
- Thiophanete methyl
- Tiadinil
- Tricyclazole


Virus Disease
by insect transmitted virus

Virus Disease

by insect transmitted virus

- The yellowing of leaves starts from the tip of lower leaves.
- Plants become stunted and the number of tillers is reduced.
- The disease is transmitted by *hoppers or beetles*.
- If symptoms appear, apply insecticide, depending on the situation.

Although damaged plants do no recover again, further spreading of diseases can be prevented.

Virus Disease

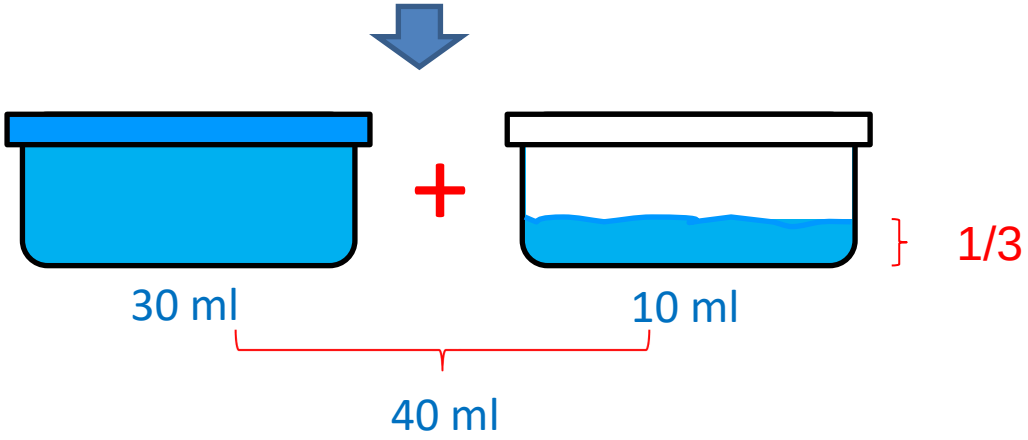
by insect transmitted virus

- Chemical Control
  - Application of Insecticide for *hoppers*

x 2 rounds
for ¼ acre

Method of measuring chemicals

Volume of lid is 30 ml



Note:
Volume of lid is differ from product to product

False smut

Bakanae disease

Brown spot

Damaged panicle by Stem borer

Major Insects observed in 2018/19 (1)

Rice Whorl Maggot

Adults of Rice Whorl Maggot was observed in the Training Plot in Asante Akim South this year.

However, spraying of insecticide is not recommended at the moment, because rice plants could compensate damage caused by the maggots later.

Rice Whorl Maggot was also observed in Asante Akim North in 2017. No serious damage by the maggots was reported.

An Adult of Rice Whorl Maggot in Asante Akim South this year

Major Insects observed in 2018/19 (2)

Rice Leaf Beetle

Rice Leaf Beetle was observed in Sekyere Central in 2018.

Spraying of insecticide is recommended if severe damage to rice plants is observed.

Water Weevil was also observed in Ahafo Ano North in 2017. They damaged rice plants and reduced paddy yield.

Rice Leaf Beetle in Ahafo Ano North in 2017

Chemical Control (General) 2019

Chemical Control

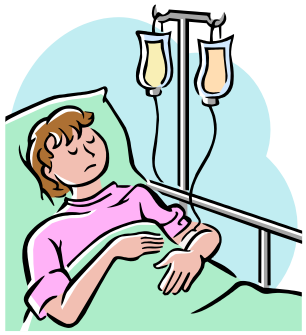
- Agro Chemicals (Herbicide, Insecticide, Fungicide, etc.) are POISONUS.

Chemical Control

- Improper and incorrect usage of these chemicals cause serious problem on people's health.

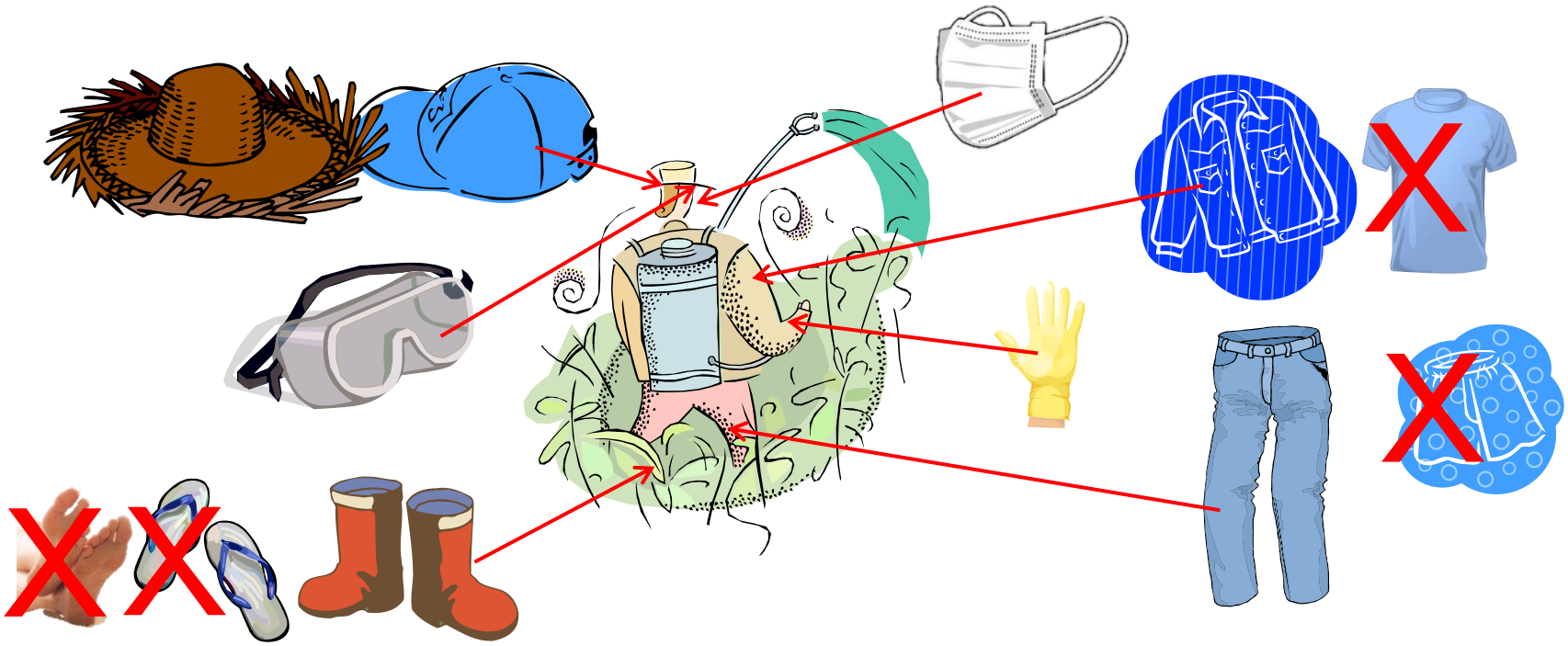
  [Death, Serious illness in internal organ,

  Physical or Mental impairments, etc.]



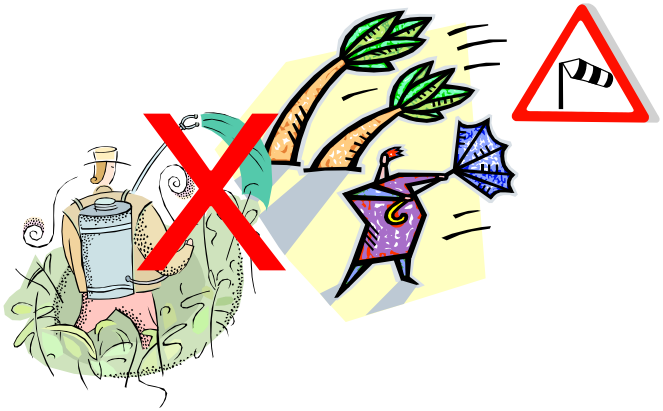
Operating precautions

- Operators must wear long-sleeved clothes, trousers, boots, gloves, mask, cap or hat and goggles to protect their body.

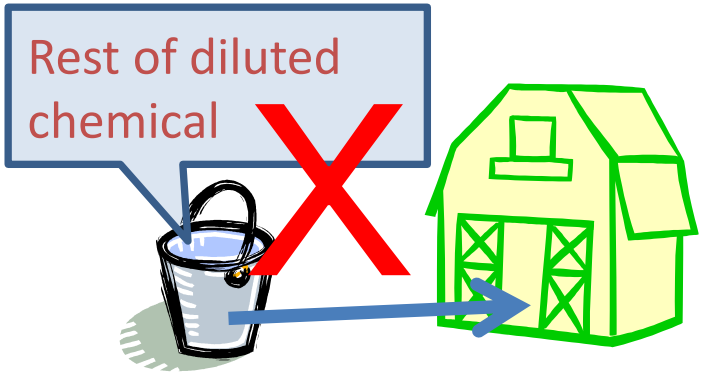


Instructions and directions for use

- When the wind is strong, chemicals application should be avoided.

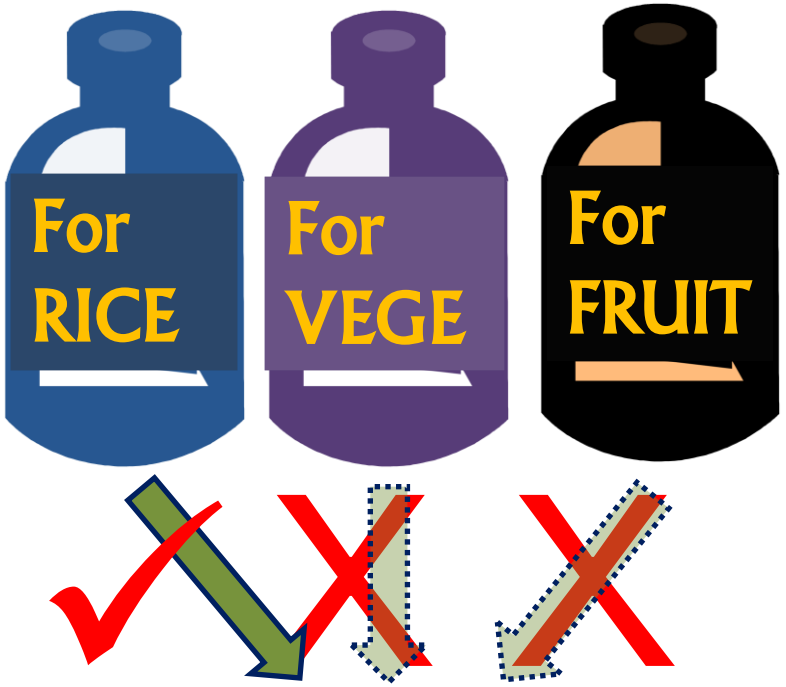


- Diluted chemicals should be applied all in same day.



Instructions and directions for use

- When agro chemicals are applied on rice, select chemicals for rice only.



RICE

Instructions and directions for use

- Inadequate or inappropriate application of Agro Chemicals are ineffective in preventing diseases, pests and weeds.

  - *Selection of chemicals*
  - *Timing of application*
  - *Dosage of chemicals*
  - *Dilution ratio*
  - *etc.*

Instructions and directions for use

- If Agro-chemicals with same materials continue to be used over longer period, its efficiency will be reduced.

- Agro-chemicals must not be applied just before harvesting. (see label of each chemical for details)

Quality Seed Production

For 2nd Training

2019

Purpose of quality seed production

- Seed is one of the most important component to achieve higher yield and higher quality in rice cultivation

- Very few farmers have access to the certified seeds in Ghana, therefore the farmers have to produce necessary seed by themselves

- Seed quality have to be maintained in order to preserve the purity of a variety

Why quality seed ?

Many broken grains are mixed

Discoloured grains and coloured grains are mixed

Good quality

Transplanting
Sowing

Heading

Maturing
Harvesting

Quality seed
(Single variety)

Mixed seed
(Assorted varieties)

Early Variety

Late Variety

Broken rice

Immature grain

Seed Quality Standards by Seed Unit (MOFA)

- Germination 80% (minimum)
- Purity 99.7% (minimum)
- Moisture content 10 ~ 12%
- Diseased seed free
- Stone and dirt free
- Admixture of other crops or weeds seed free
- Broken pieces and chaff free

Conditions for Quality Seed

1. Purity
   - Genetically-pure
   - Not mixed with other varieties
   - Not mixed with other crops and/or weeds
2. Healthy
   - Not infected pests and/or diseases
   - High germination ratio
   - Not mixed with damaged grains
3. Good Quality
   - Fulfilling grains
   - Uniformly fine

Important cultivation know-how

- Intense seed selection to secure healthy seeds and uniform germination
- Careful nursery management to avoid variety mixture and to raise healthier seedlings
- Intense land preparation to reduce the mixture of variety from left over seeds
- Intense weeding to avoid weed seed mixture
- Periodical uprooting of off-types and damaged plants from the field to avoid variety mixture and diseased seeds

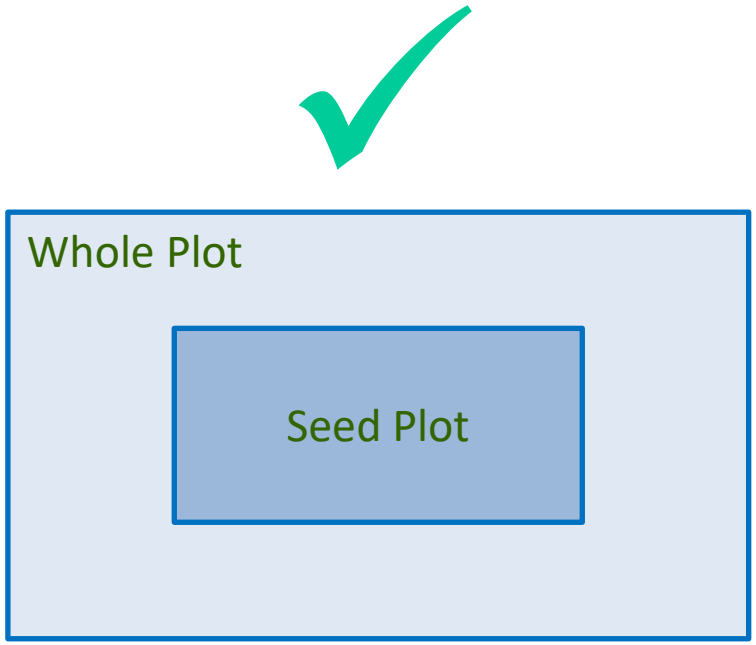
Main considerations

- Seed source for the quality seed production must be approved institutions or certified seed growers
- Implementers have to follow the cultivation guidelines prepared by the Project
- Most important technical points in quality rice seed production is centered on how to avoid mixture of other varieties or off-types in each process.

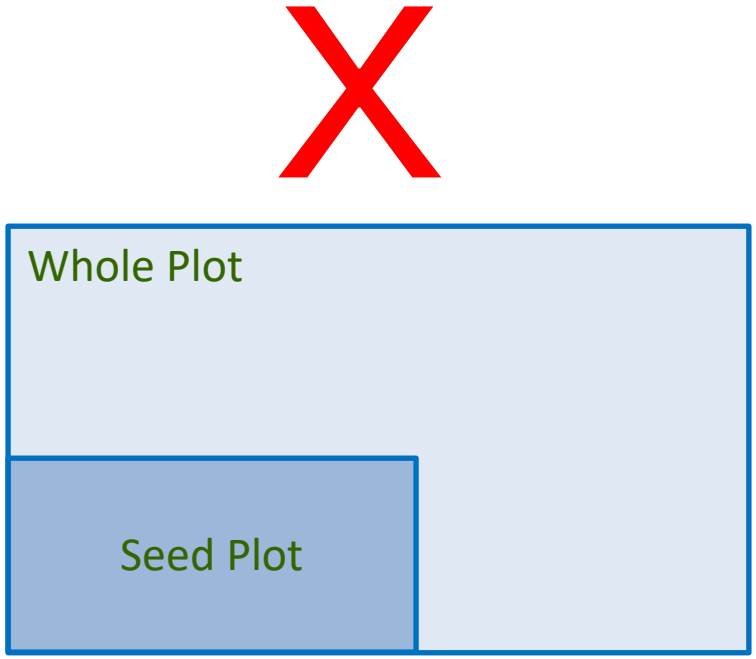
Important Concern

- Off-types and damaged plants are uprooted from the field once a week from just before/after heading to harvesting.
- Repeated winnowing to remove unfilled grains has to be carried out after drying
- Moisture content should be 12% - 10% during storing.
- Variety name, harvested date and year, produced plot, producer's name are attached to the bag.

Demarcation of the seed plot



Good



Not Good


Off-types

Off-type Removal (Rogueing)

Transplanting/
Direct sowing

Heading

Maturing
Harvesting

Day 0

90–100

125 days

Rogueing
Any time
As necessary

1 week

1 week

1 week

1st Rogueing

2nd Rogueing

3rd Rogueing

4th Rogueing

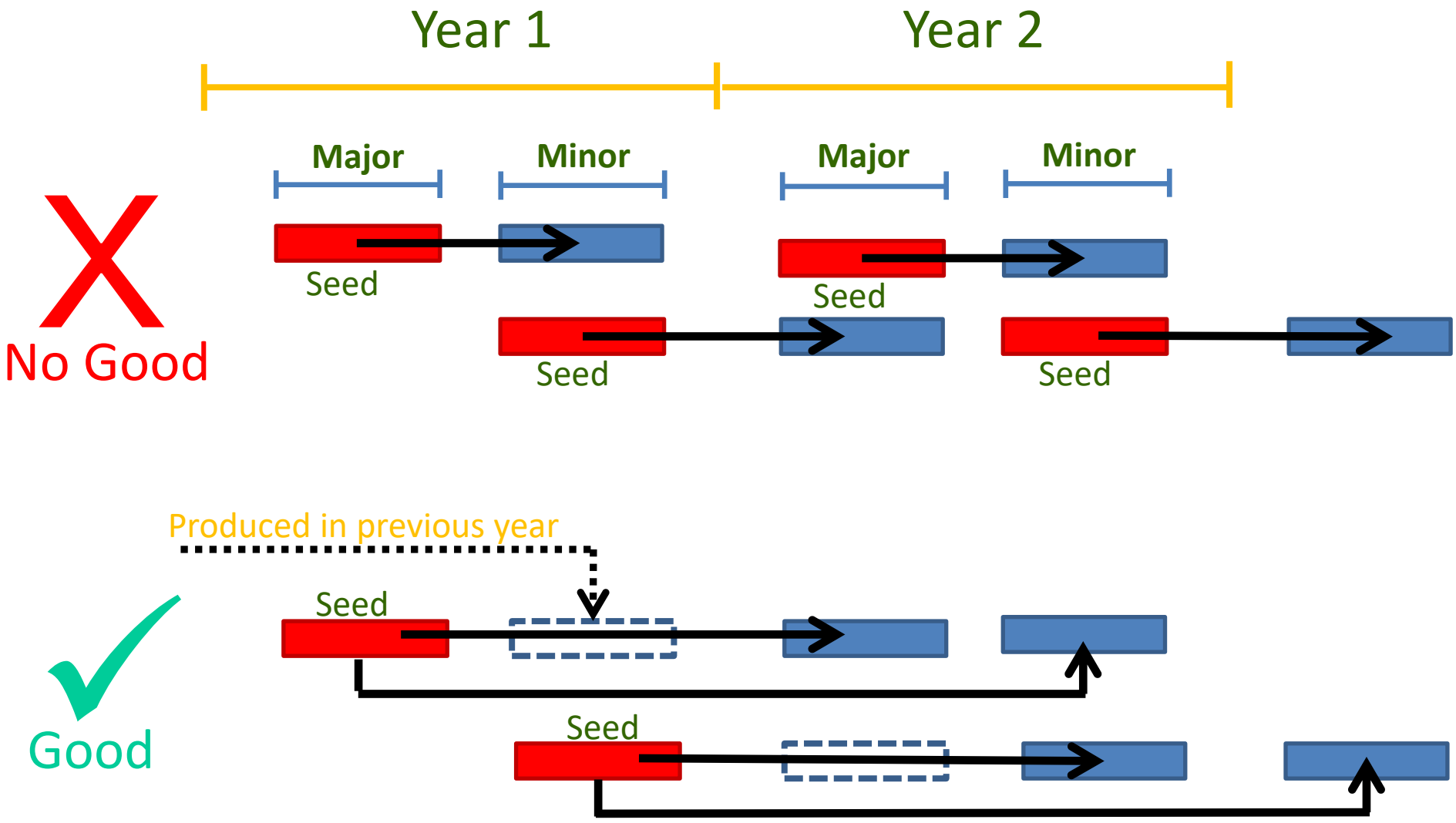

Paddy field in which pure seed is not used


Paddy field in which pure seed is used

Storage

Variety :
Producer :
Date :
Year :
Place :

Dormancy


Year 1
Year 2
Major
Minor
Major
Minor
Seed
Seed
Seed
Seed
No Good
Produced in previous year
Seed
Seed
Good

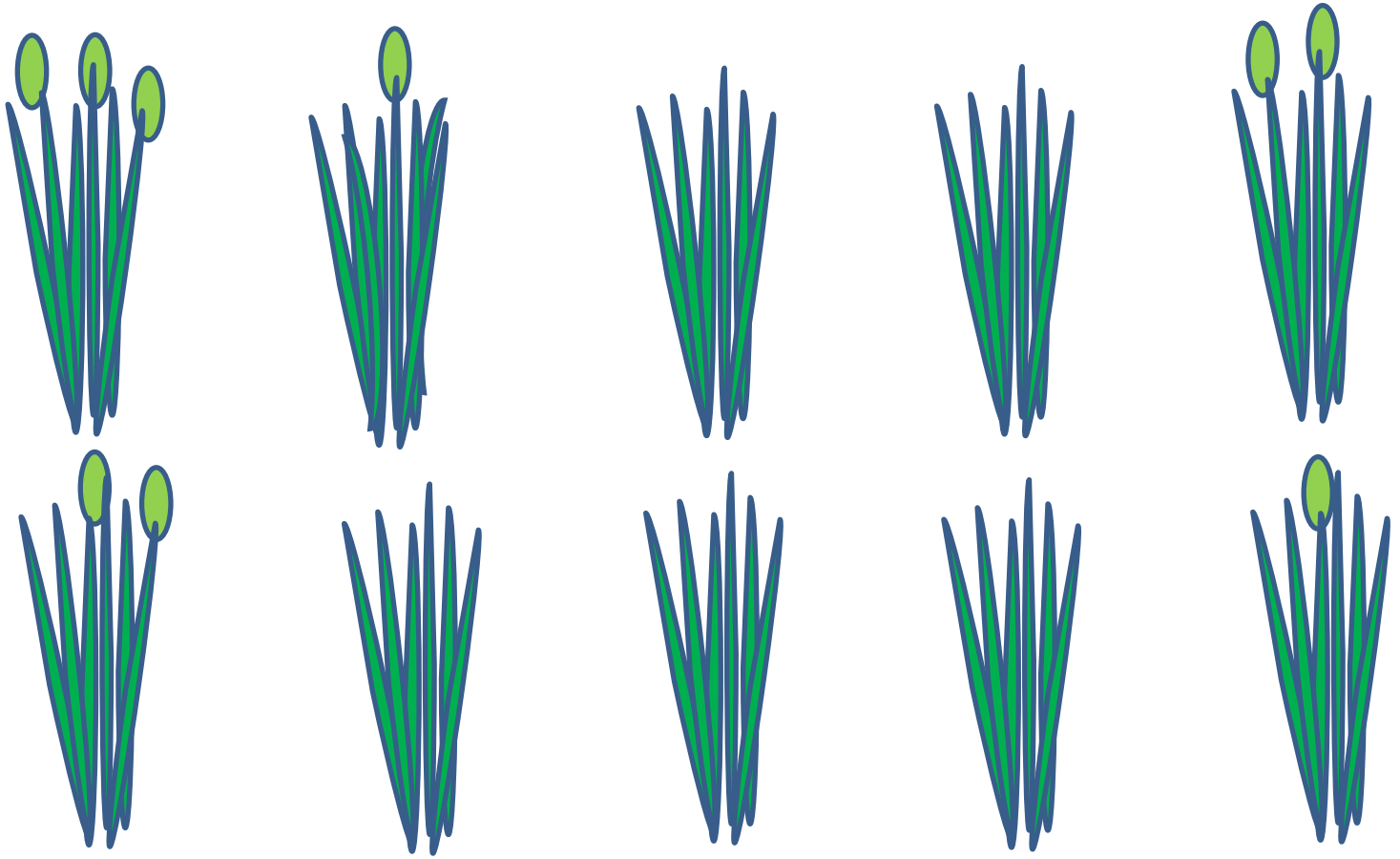
Estimation of Harvesting Time

For 2nd In-House Training

2019

How to decide Heading Date

Heading date is defined when growing out of panicles is observed in 50% of hills.



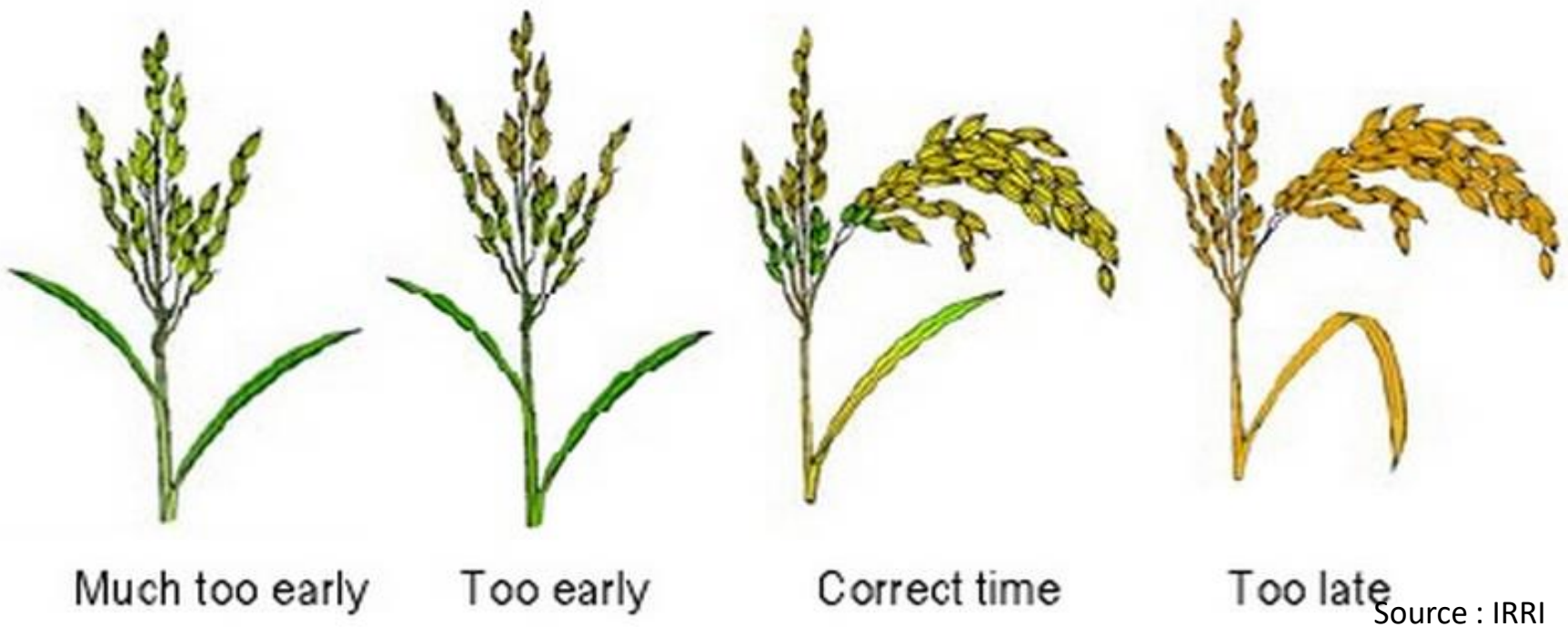
How to decide harvesting date

- Harvesting date should be approximately when accumulated average temperature reached 950 ℃ after heading date.

  ⇒ An exact figure of accumulated temperature will be determined by observation.

- Actual harvesting date should be decided by observing panicles.

How to Judge Harvesting Time by Panicle Observation



Source : IRRI

At maturity,

① 80 – 85 % of spikelets turn out yellow (straw colored).
② Paddy moisture content should be about 20 %.
③ Days after transplanting could be 120-125 days for Agra.
④ Days after heading could be 28 – 35 days.

An example of accumulated temperature

Days	1	2	3	4	5	6	7	8	9	10	11	12
Max	30	32	31	33	32	33	32	32	32	32	32	32
Min	24	23	23	24	24	23	23	24	24	23	23	23
Av.	27.0	27.5	27.0	28.5	28.0	28.0	28.5	29.0	28.5	27.5	27.5	28.5
Acc.	27.0	54.5	81.5	110.0	138.0	166.0	194.5	223.5	252.0	279.5	307.0	335.5

Days	13	14	15	16	17	18	19	20	21	22	23	24
Max	32	31	31	30	31	31	32	33	33	33	32	32
Min	24	23	23	24	24	23	23	24	24	23	23	24
Av.	28.0	27.0	27.0	27.0	27.5	27.0	27.5	28.5	28.5	28.0	27.5	28.0
Acc.	363.5	390.5	417.5	444.5	472.0	499.0	526.5	555.0	583.5	611.5	639.0	667.0

An example of accumulated temperature (cont.)

Days	25	26	27	28	29	30	31	32	33	34	35
Max	32	31	30	30	30	29	30	32	32	33	33
Min	24	23	23	24	24	23	23	24	24	23	23
Av.	28.0	27.0	26.5	27.0	27.0	26.0	26.5	28.0	28.0	28.0	28.0
Acc.	695.0	722.0	748.5	775.5	802.5	828.5	855.0	883.0	911.0	939.0	967.0

950 ℃

FARM MANAGEMENT AND SUPPORT SYSTEM

2nd TOT

-Northern Region 2019-

Contents

1. What is Marketing? Why important?
2. How do you use materials for 2nd TOT, Joint training and On-site training?
3. Connecting farmers to buyers for higher profit
4. Value Chain of Local Rice (for On-site training)

1. What is Marketing? Why important?

1. What is Marketing?
Why important?

- Marketing is the delivery of

"Customer satisfaction" at a profit!

- The aim of Marketing is

to know and understand the

"Customer's Needs and Wants"

so well that the product sells itself!

Tamale consumers' perception on the major problems with Local rice

Tamale consumers recognized the **presence of stones**, **selling without packaging**, and **cleanliness** as the major problems of local rice.
With these three factors, 65% of the total points were shared.

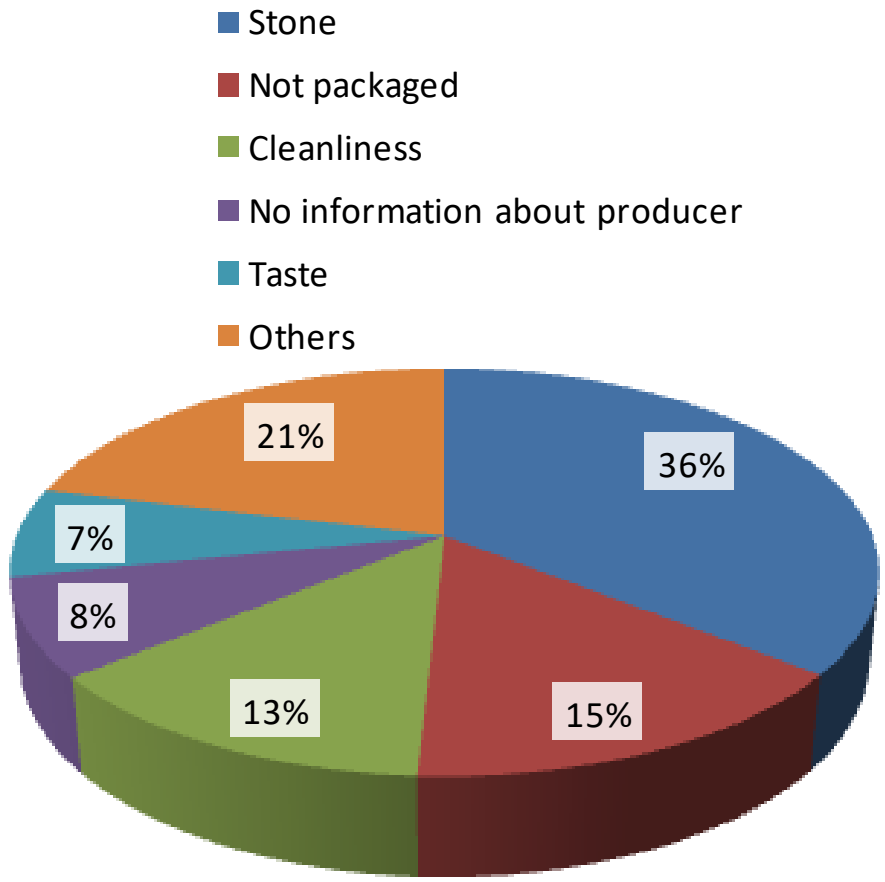


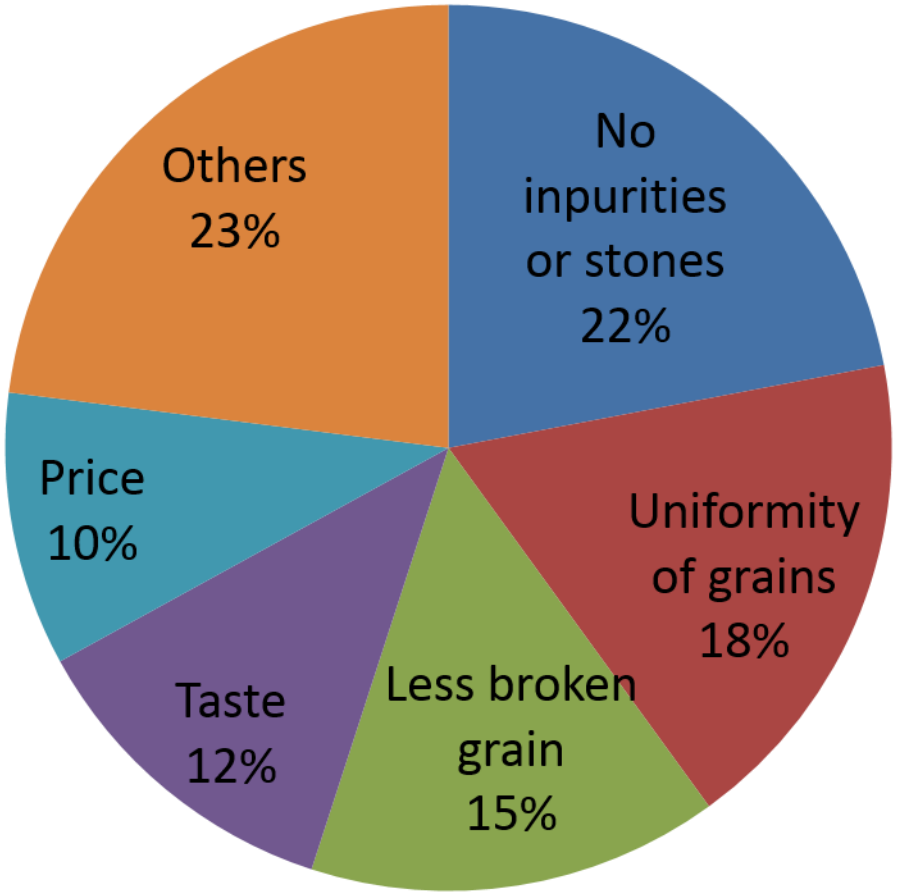
Fig.7 Northern Consumers Perception on the Major Problems with Local Rice

Source: SUEMITSU, Kenji JICA Expert on Marketing Accomplishment Report, The Project for Sustainable Development of Rain-Fed Lowland Rice Production in the Republic of Ghana, 10. Mar. 2011

Important Criteria when Urban consumers buy rice

WANT

For the Urban consumers, the most important criterion was **“No Impurities or Stones”** (22%), followed by **“Uniformity of grains”** (18%), **“Less broken grains”** (15%), **“Taste”** (12%), **“Price)”** (12%), and so on.



Source: SUEMITSU, Kenji JICA Expert on Marketing Accomplishment Report, The Project for Sustainable Development of Rain-Fed Lowland Rice Production in the Republic of Ghana, 10. Mar. 2011

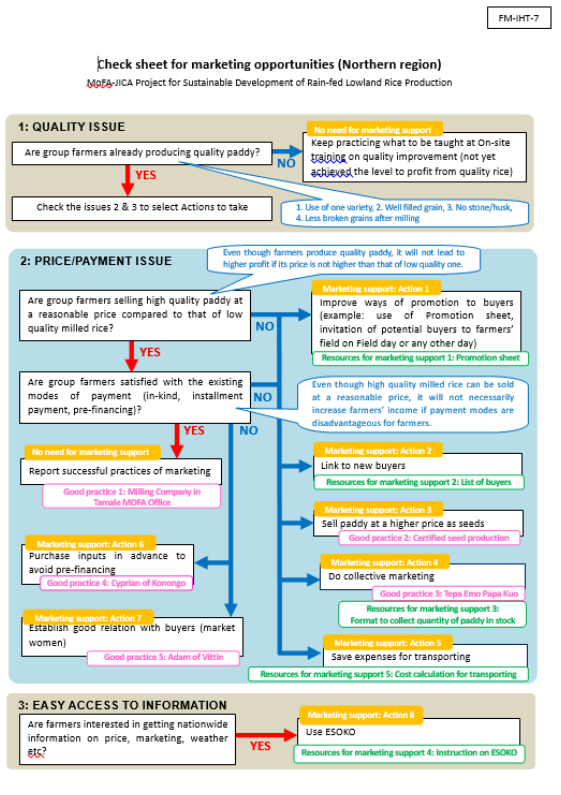
2. How do you use materials for 2nd TOT, Joint training and On-site training?

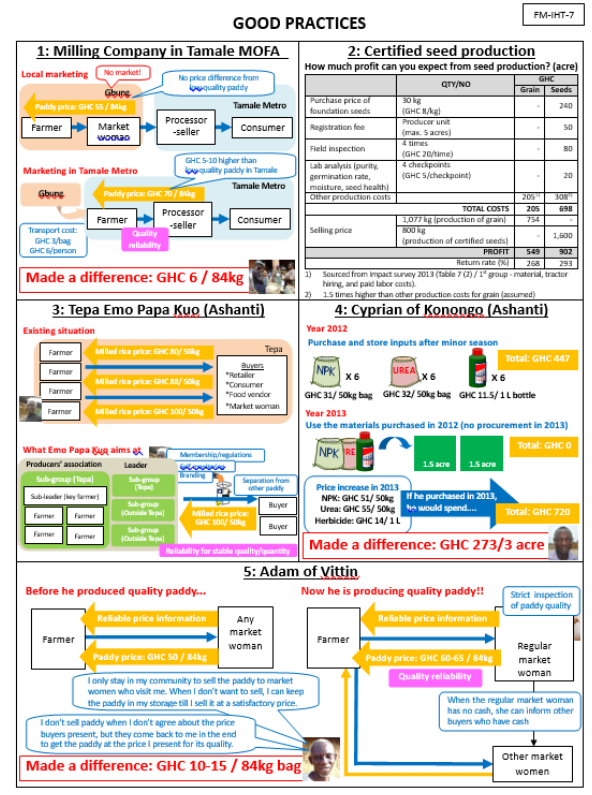
2-1. Materials for 2nd TOT/Joint training

Marketing support

1. *Check sheet for marketing opportunities & Good practices*
2. *Resources for marketing support*

These materials can be referred to by AEAs at On-site training





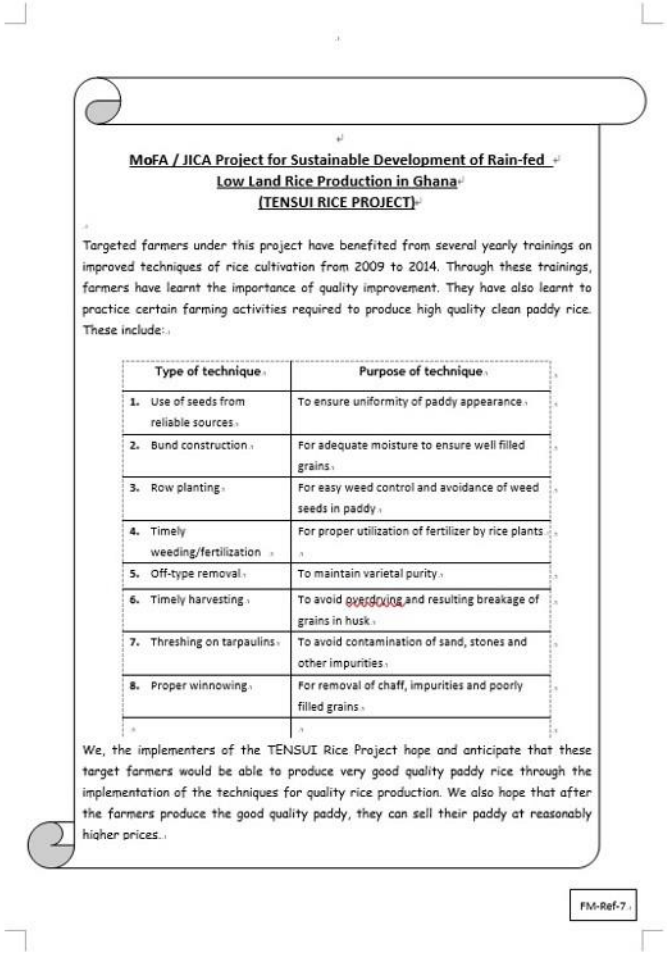
-To learn how to facilitate the possible enlargement of marketing opportunities in different environments and situations

2-2. Materials for 2nd On-site training

Marketing support

- *Promotion sheet*
  - To Use to explain farmers' effort for quality improvement at the time of negotiation with potential buyers.

Front



MoFA / JICA Project for Sustainable Development of Rain-fed Low Land Rice Production in Ghana
(TENSUI RICE PROJECT)

Targeted farmers under this project have benefited from several yearly trainings on improved techniques of rice cultivation from 2009 to 2014. Through these trainings, farmers have learnt the importance of quality improvement. They have also learnt to practice certain farming activities required to produce high quality clean paddy rice. These include:

Type of technique	Purpose of technique
1. Use of seeds from reliable sources	To ensure uniformity of paddy appearance
2. Bund construction	For adequate moisture to ensure well filled grains
3. Row planting	For easy weed control and avoidance of weed seeds in paddy
4. Timely weeding/fertilization	For proper utilization of fertilizer by rice plants
5. Off-type removal	To maintain varietal purity
6. Timely harvesting	To avoid overdrying and resulting breakage of grains in husk
7. Threshing on tarpaulins	To avoid contamination of sand, stones and other impurities
8. Proper winnowing	For removal of chaff, impurities and poorly filled grains

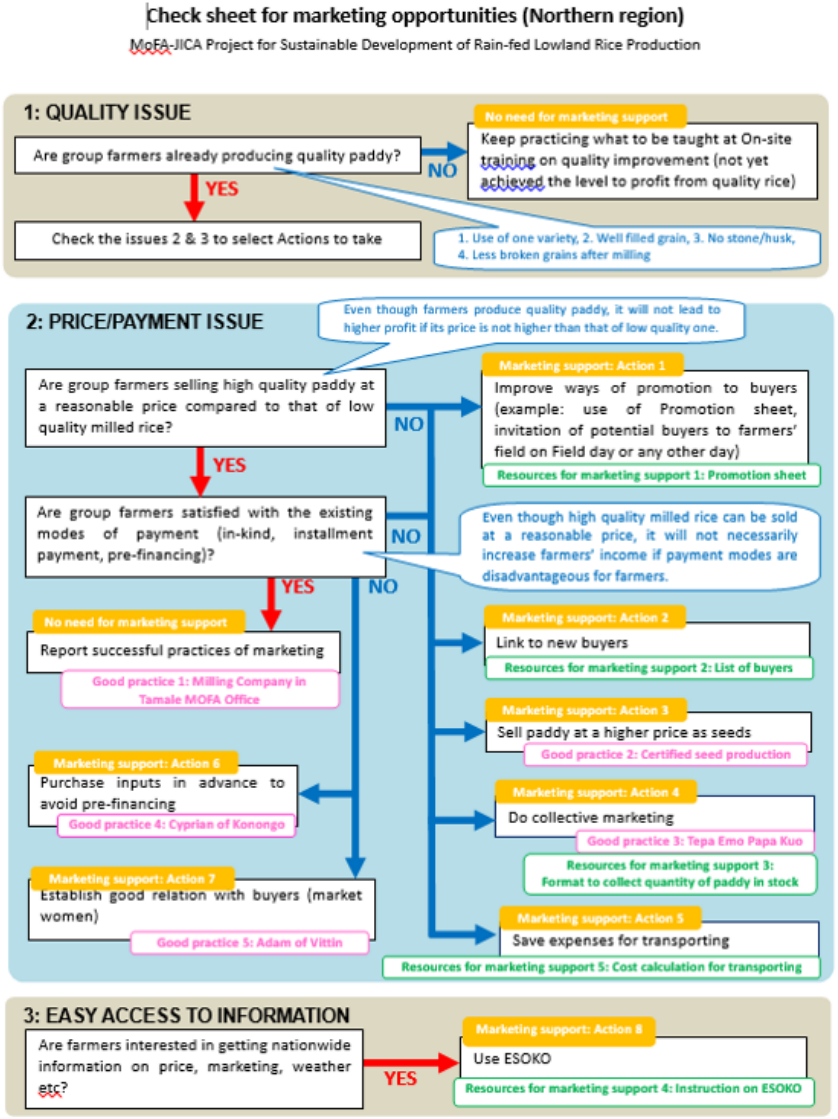
We, the implementers of the TENSUI Rice Project hope and anticipate that these target farmers would be able to produce very good quality paddy rice through the implementation of the techniques for quality rice production. We also hope that after the farmers produce the good quality paddy, they can sell their paddy at reasonably higher prices.

FM-Ref-7

Back

2-3. Check sheet for marketing opportunities & Good practices

1. Quality Issue
2. Price / Payment Issue
3. Easy Access to Information



1) Quality Issue

1. Use of one variety, 2. Well filled grain, 3. No stone/husk, 4. Less broken grains after milling

Are group farmers already producing **quality paddy**?

YES

heck the issues 2 & 3 to select Actions to take

NO

No need for marketing support

Keep practicing what to be taught at On-site training on quality improvement (not yet achieved the level to profit from quality rice)

What is Good Quality Paddy / Rice?

What is Good Quality Rice?

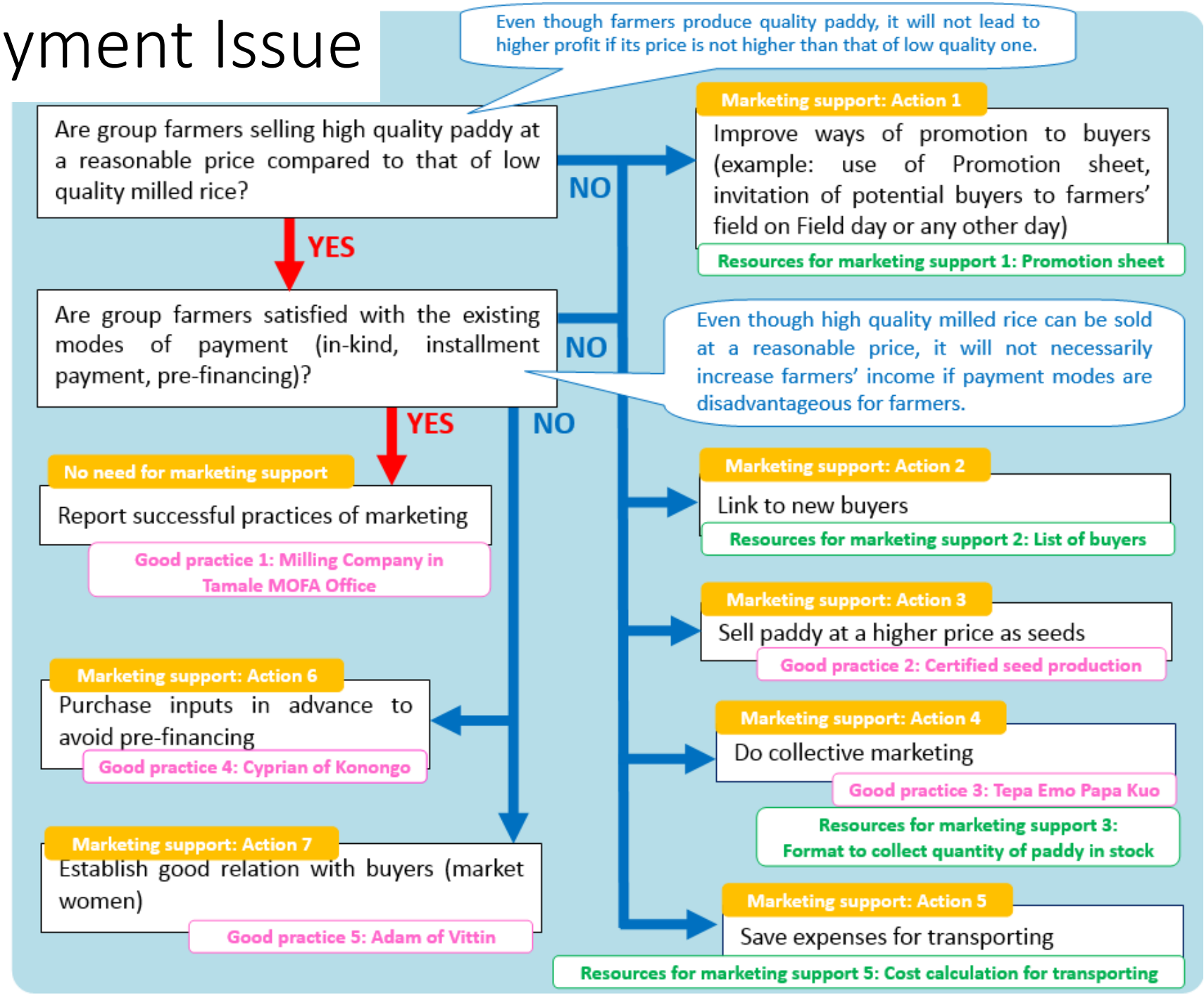
Many broken grains are mixed

Discoloured grains and coloured grains are mixed

Good quality

✓High quality can be achieved by whole activities from field to shop!

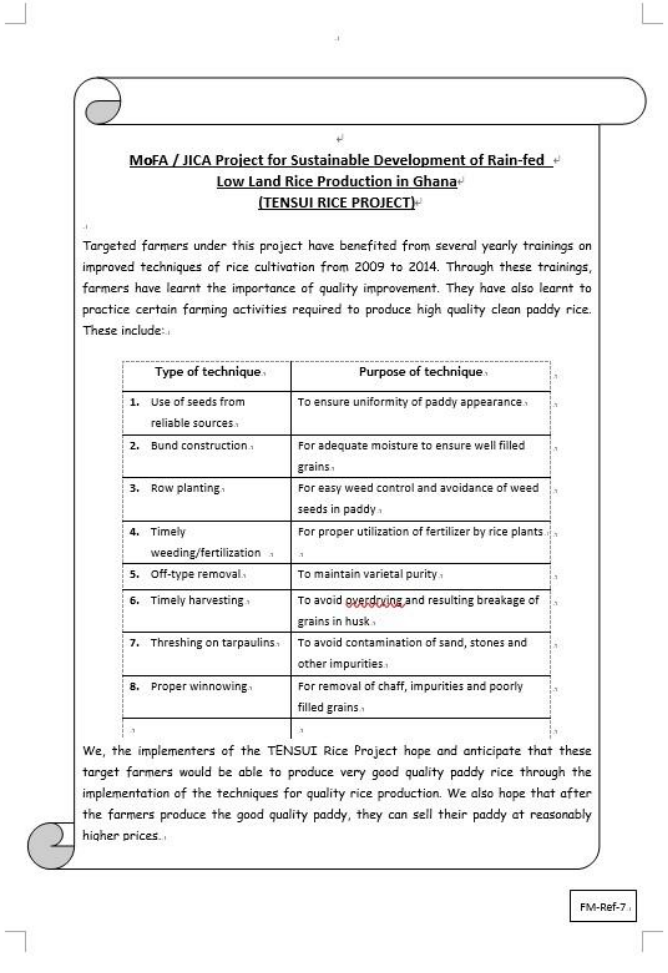
2) Price / Payment Issue



Resources for marketing support 1: Promotion sheet

- To be used by farmers, Processor-seller and AEAs to explain to potential buyers about effort for quality improvement at the time of negotiation
- This Promotion sheet is given to Key farmer and Processor-seller in the community.

Front



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FM-Ref-7

Back

Marketing support: Action 2

Resources for marketing support 2: List of buyers

- Target users: AEAs
- Purpose: To introduce farmers buyers interested in purchasing quality paddy/milled rice in bulk

No.	Position	Name	Phone no.	Location
1	Bulk paddy buyer	Yakubu Loharili	024-645-7460	Shishegu, Sagnerigu District
2	Bulk paddy buyer (Forum member)	Iddrish Sayibu	024-171-0563	Sagnerigu, Sagnerigu District
3	Bulk paddy buyer (Forum member)	Alhassan Zakaria	024-524-0491	Choggu, Sagnerigu District
4				

Good practice 2: Certified seed production

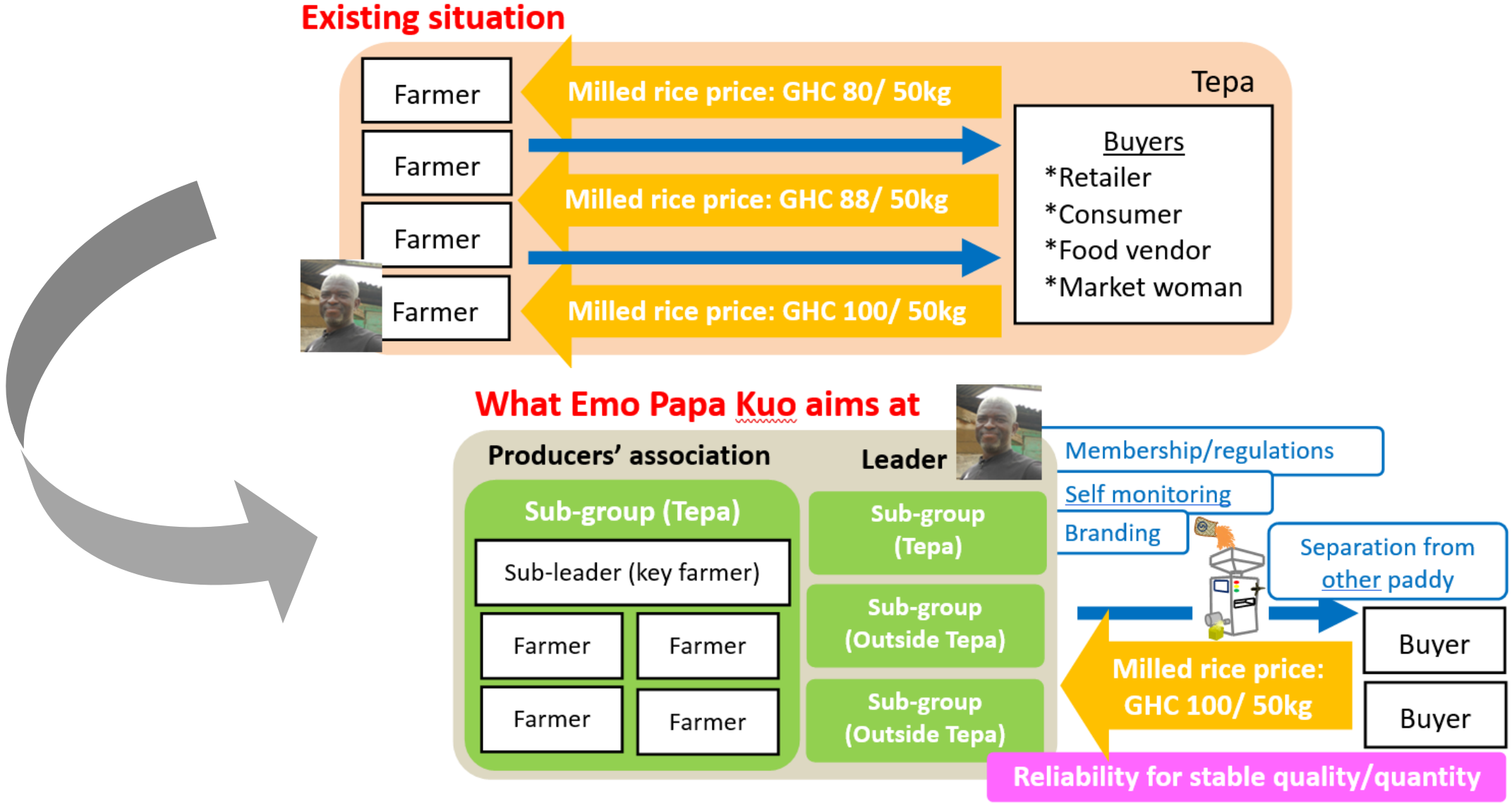
How much profit can you expect from seed production? (acre)

	QTY/NO	GHC	
		Grain	Seeds
Purchase price of foundation seeds	30 kg (GHC 8/kg)	-	240
Registration fee	Producer unit (max. 5 acres)	-	50
Field inspection	4 times (GHC 20/time)	-	80
Lab analysis (purity, germination rate, moisture, seed health)	4 checkpoints (GHC 5/checkpoint)	-	20
Other production costs		205[1)]	308[2)]
	TOTAL COSTS	**205**	**698**
Selling price	1,077 kg (production of grain)	754	-
	800 kg (production of certified seeds)	-	1,600
	PROFIT	**549**	**902**
	Return rate (%)	268	293

1) Sourced from Impact survey 2013 (Table 7 (2) / 1st group - material, tractor hiring, and paid labor costs).

2) 1.5 times higher than other production costs for grain (assumed)

Good practice 3: Tepa Emo Papa Kuo



Resources for marketing support 3: Format to collect quantity of paddy in stock

- Target users: AEAs
- Purpose: To compile paddy of individual farmers in stock

No.	Farmers' name	Community	Phone no.	Variety cultivated	Quantity of paddy in stock (no. of bags)		Quantity of paddy to be sold		Proposed time of selling (month)
					84 kg bag (Cocoa sack)	Size 5 bag	84 kg bag (Cocoa sack)	Size 5 bag	
1									
2									
3									
4									
5									

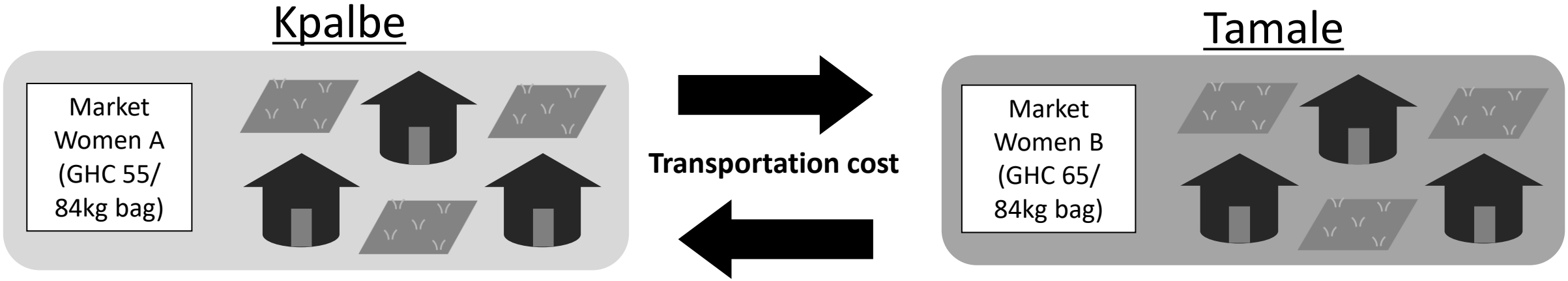
Resources for marketing support 5: Cost calculation for transporting

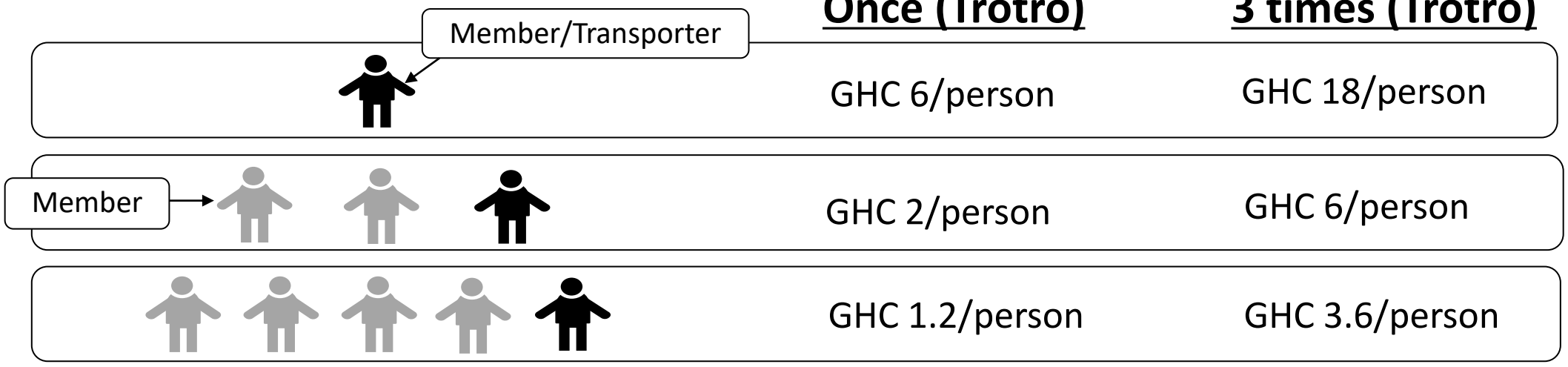
- Target users: AEAs
- Purpose: To get the idea that farmers can save costs through group transporting.

Conditions for group transporting:

Resources for marketing support 5: Cost calculation for transporting

Transportation cost: EXAMPLE (when farmers of Kpalbe go to Tamale)

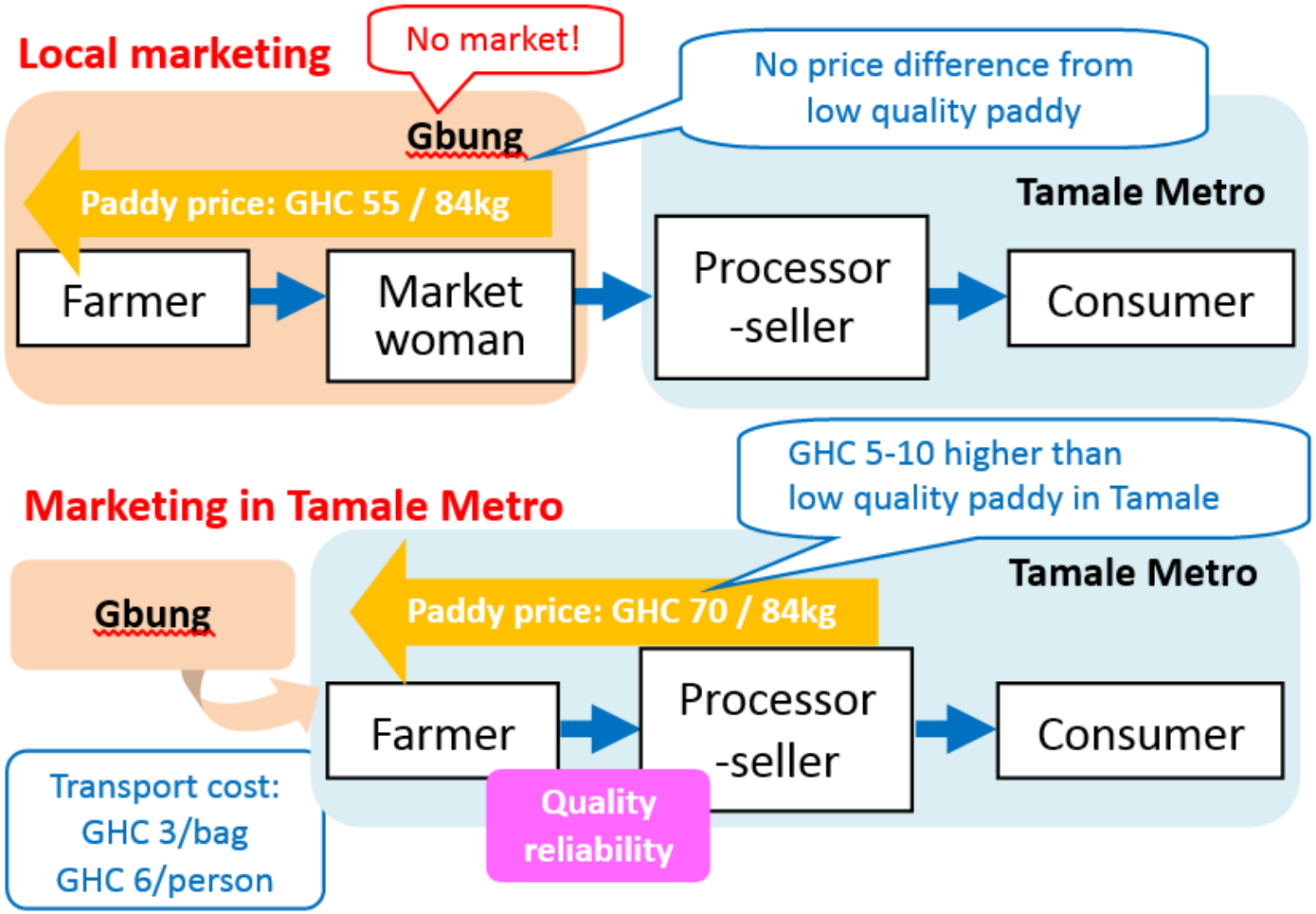




DIFFERENCE (1 person vs. 5 persons) **GHC 4.8/person** **GHC 14.4/person**

No need for Marketing support

Good practice 1: Milling Company in Tamale MOFA Office



Made a difference: GHC 6 / 84kg

Good practice 4: Cyprian of Konongo

Purchase and store inputs after the minor season!

Year 2012

X 6

X 6

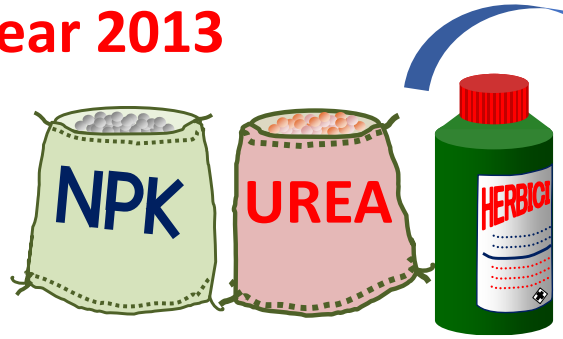
X 6

Total: GHC 447

GHC 31/50kg bag **GHC 32/50kg bag** **GHC 11.5/1 L bottle**

Made a difference: GHC 273/3 Acre

Year 2013



Use the inputs purchased in 2012 (no procurement in 2013)

1.5 acre **1.5 acre**

Total: GHC 0

Price increase in 2013:
NPK: GHC 51/ 50kg
Urea: GHC 55/ 50kg
Herbicide: GHC 14/ 1L

If he purchased in 2013, he would spend...

Total: GHC 724

Good practice 5: Adam of Vittin

Before he produced quality paddy...

Farmer

Reliable price information

Paddy price: GHC 50 / 84kg

Any market woman

I only stay in my community to sell the paddy to market women who visit me. When I don't want to sell, I can keep the paddy in my storage till I sell it at a satisfactory price.

I don't sell paddy when I don't agree about the price buyers present, but they come back to me in the end to get the paddy at the price I present for its quality.

Made a difference: GHC 10-15 / 84kg bag

Now he is producing quality paddy!!

Farmer

Reliable price information

Paddy price: GHC 60-65 / 84kg

Quality reliability

Strict inspection of paddy quality

Regular market woman

When the regular market woman has no cash, she can inform other buyers who have cash

Other market women

3) Easy Access to Information

Are farmers interested in getting nationwide information on price, marketing, weather etc?

YES

Use ESOKO

Resources for marketing support 4: Instruction on ESOKO

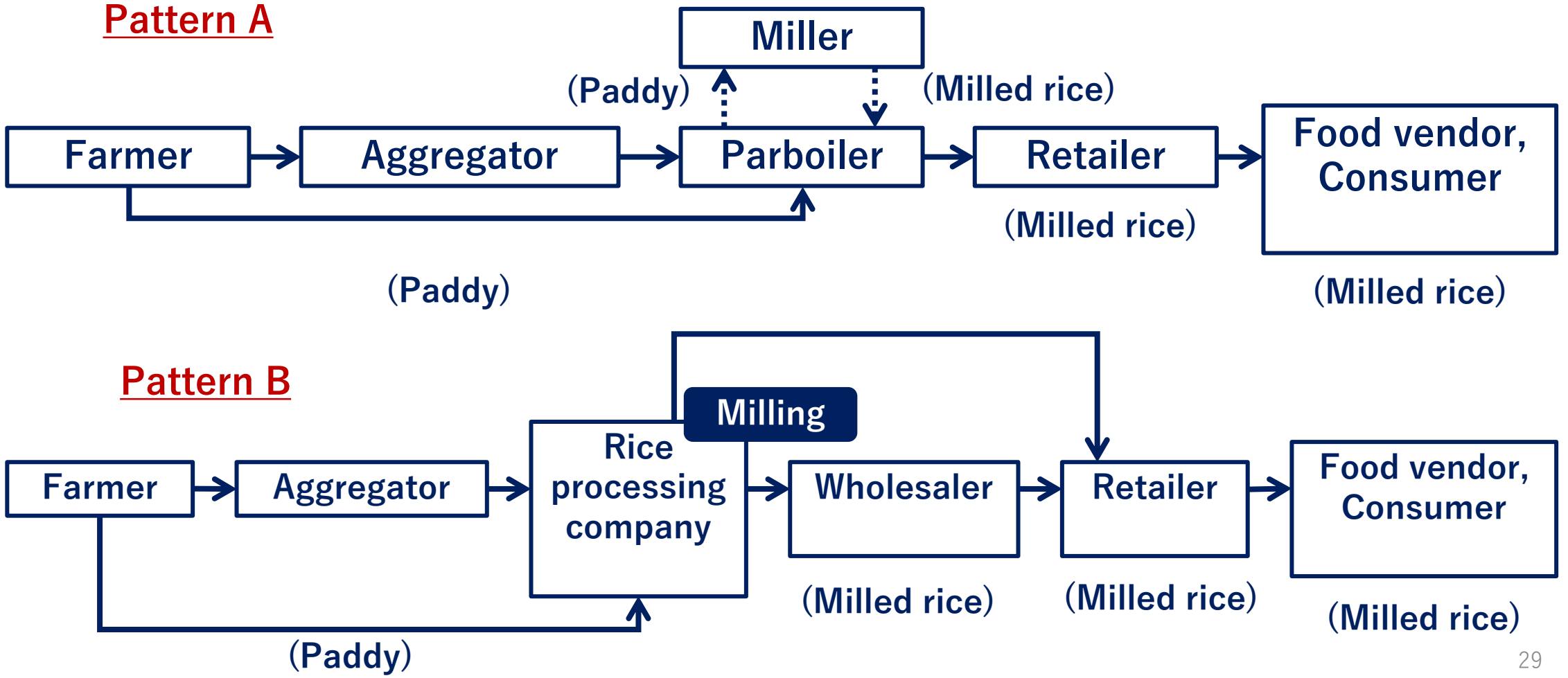
Resources for marketing support 5: Instruction on ESOKO

- Target users: AEAs
- Purpose: To introduce farmers to using ESOKO, the mobile price information system

- **Service 1:** Send "Rice" to 1900 => Get weekly price information of local rice price of 46 major markets in Ghana (GHC 0.06)
- **Service 2:** 1900 (phone call) = > Daily weather information (GHC 0.2765/min. by MTN)
- **Service 3:** Bids & offers (GHC 0.2765/min. by MTN)
  1. Inform ESOKO quantity of products you have
  2. Package the products nicely
  3. Submit information (location, phone no., farmers' name, to ESOKO
  4. ESOKO distribute the information to all the subscribers on the platform
  5. Any subscribers can directly call to the farmers for negotiation

3. Connecting Farmers to Buyers for Higher Profit

Let's Learn Rice Supply Chains in Northern Region (Examples)



Let's Learn Rice Supply Chains in Northern Region (Cont'd)

Pattern A

Farmers sell paddy to aggregators who visit them or parboilers. Farmers are not given chances to negotiate and only have to accept price given by the buyers.

Pattern B

Farmers sell paddy to rice processors such as Avnash which sell local rice with an original brand. They have their own quality standards to differentiate paddy price.

What is "Rice Value Chain"?

The farmer's profit changes according to quality of paddy and seller!

Actor	Breakdown of consumer price on Parboiled rice (GHC/unit)	Unit	Pattern A			Pattern B		
			Cost	Share (%)	Selling price	Cost	Share (%)	Selling price
Farmer	Production cost	84kg paddy	16	12.4	-	35	12.5	-
	Farmer's profit	**84kg paddy**	**36.1**	**28.0**	**52.1**	**45**	**11**	**80**
Aggregator	Transportation from farm-gate to market	84kg paddy	5	3.8	-	5	-	-
	Aggregator's profit	84kg paddy	5.1	4.0	62.2	5	1.8	-
Parboiler/ Rice Processing Company	Transportation from market to home	84kg paddy	1.5	1.2	-	-	-	-
	Fire wood	84kg paddy	5	3.9	-	-	-	-
	Transportation from home to milling station	84kg paddy	1.5	1.2	-	-	-	-
	Milling charge (Rice miller's profit)	84kg paddy	10.5	8.1	-	-	-	-
	Parboiler's /	50kg milled rice	17.3	32	98	-	-	-
	Rice processing company's profit		-	-		35	12.5	115
Consumer	Transportation from milling station to market	50kg milled rice	1.6	1.2		3	1.1	-
	Wholesaler / Distributor		12.4	9.6	112	82	29.3	200
	Transportation from market to market		1.6	1.2		2	0.7	-
	Retailer / Super market		15.4	11.9	**129**	78	27.9	**280**
	Consumer							

* All the prices are recalculated data of value chain survey in 2017.

Price Differentiation based on Quality Standards (Example of Avnash)

avnash

AVNASH INDUDTRIES GHANA LIMITED

Grading System for Paddy Purchase

Specification	Rejected	Deductible	STRAIGHT MILLING Standard Grade "A"	STRAIGHT MILLING Deductible Grade "B"	PARBOILED Deductible Grade "C"	PARBOILED Deductible Grade "D"	Rejected	
Moisture	above 18%	14.1 - 18%	12-14%	11.1-11.9%	10-10.9%	9-9.9%	below 8%	Qualities of Critical Consideration
Crackness			Max 20%	20.1 - 40%	40.1 - 60 %	60.1 - 80%	80% above	
Admisture			Max 3%	3.1 -7%	7.1 -10%	10.1 - 15%	15% above	
Red Grain			Max 3%	3.1 - 10%	10.1 - 20%	20.1 - 30%	30% above	
Discolor Grain			Max 1%	Max 3%	3.1 - 5%	5.1 - 7%	7% above	
Combine Rice			Max 1%	Max 3%	3.1 - 4%	4.1 - 5%	5% above	
Immature Grain			Max 0.5%	Max 1%	Max 1.5%	Max 2%	2% above	
Aromatic (kg)			1.25pws	1.10pws	0.95pws	0.85pws		
Non-Aromatic (kg)			1.10pws	1.05pws	0.95pws	0.85pws		

84kg bag = 105GHC

84kg bag = 92.4GHC

84kg bag = 79.8GHC

84kg bag = 71.4GHC

LEGEND / KEY

A	B	C
Excellent	Pass	

Points would be plotted on the grading scale as per quality results released. The concentration of the points under a grade determines the grade of paddy.

Supplier Name:		**Prepared By:**	
Address/Contact:		**Verified By:**	
Grade		**Authorized By:**	
Quantity:			
Price:			
Total:			

Good Practices in the Field

Price giving by a farmer: Maria of Kpalbe, East Gonja

AVNASH agents came to Kpalbe with their car and most farmers did not have any rice in stock anymore. At first they offered to buy my rice (Jasmin 85) at GH¢ 70 but I did not agree to their price. I actually told them that I was not interested to sell to them so they should go away and not come back again. Later they came back to me and offered to buy my rice at GH¢ 80 per bag. I still rejected this price and eventually they agreed to pay **GH¢ 82 per bag**. At this point I **sold 10 bags** to them. I only sold to them in the year 2017 (August).

The price I sold to AVNASH was better than the price at which the market women were buying.

Also most of the market women did not have cash to pay outright.

Contract was by way of cash and carry.

This price is higher than Grade "C" paddy.

She made a deal with the bulk quantity of 10 bags.

Let's Collect Information on the Actors of Local Rice Value Chain!

The situation of VC is different for each district or commune. If you want to raise the target farmer's profit, you will need to better grasp all the actors of local rice value chain and strengthen the weak part where the value chain is not functioning.

Let’s collect information on the actors of local rice value chain at your project site and connecting farmers to buyers for higher profit!

Questionnaire sheets (1)&(2)

Basic Info

Production

Processing/ Sales

Expenses / Profit

Access to customers

Marketing /Promotion

Issues/ Challenges

Interview to Farmers

Questionnaire on Value Chain of Local Rice (1)

Region: ☐Ashanti / ☐Northern	Date: / / 2018
District:	Community:
Name of interviewer:	Sex: ☐Male / ☐Female
Name of interviewee:	Position: ☐AEA / ☐DAO / ☐PCU

1. Trade of Local Rice (Please fill in the rough estimate of the last year)

1) Amount of production	bags	2) Area of rice field	/Acre
3) Size of bag	kg	4) Production volume (=1)x3))	kg
5) Quantity of seeds	bags	6) Quantity for home consumption	bags

	7) Quantity of sales	8) Price	9) Sales (=7)x8))
i. Paddy	bags	GHC/bags	GHC
ii. Milled rice	G		
iii. Milled rice			
iv. Parboiled paddy			
v. Parboiled rice			

Calculation should be accurate!

2. Total Expenses for Rice Productio

Materials	GHC/year
Labors	GHC/year
Transportation	GHC/year
Land cost	GHC/year
Total	**GHC/year**

Profit (= Total of 1. – Total of 2.) **GHC/Year**

3. Distribution of Local Rice (Please select in ascending order of quantity from the **Box 1** below)

Paddy	1)	2)	3)	4)	5)
Milled rice	1)	2)	3)	4)	5)
Parboiled rice	1)	2)	3)	4)	5)

<Box 1> 1. Rice miller in community, 2. Milling station in district, 3. Milling company in other district or region, 4.Parboiler, 5. Brokers / Aggregators, 6. Wholesalers, 7. Retailers, 8. Food vendors, 9. Neighbors, 10. Relatives, 11. Others (Please specify)

4. Availability of the Market Information (Please select 3 choices from the **Box 2** below)

* Market information: such as price, quality, quantity and packaging of rice that required for commercial market.

1)	2)	3)

<Box 2> 1. TV, 2. Radio, 3. Mobile phone, 4. AEA, 5. Broker / Aggregators, 6. Parboiler, 7.Wholesaler, 8. Other farmers, 9. Others (Please specify) _____.

5. Three Major Issues of Local Rice Production (Please specify)

1)
2)
3)

Interview to Rice miller

Questionnaire on Value Chain of Local Rice (2)

Region: ☐Ashanti / ☐Northern	Date: / / 2018
District:	Community:
Name of interviewer:	Sex: ☐Male / ☐Female
Name of interviewee:	Position: ☐AEA / ☐DAO / ☐PCU

1. Trade of Local Rice (Monthly)

	1) Quantity of sales	2) Purchase	3) Revenue (Milling cost)	4) Expense (=1)x2))	5) Sales (=1)x3))
i. Paddy (84kg)	bag	GHC/bag		GHC	GHC
ii. Paddy (120kg)	bag	GHC/bag	GHC/bag		
iii. Paddy	kg	GHC/kg	GHC/kg	GHC	
iv. Milled rice	kg	GHC/kg	GHC/kg	GHC	
	Grawaa	GHC/Grawaa	GHC/ Grawaa	GHC	
rice	kg	GHC/kg	GHC/kg	GHC	GHC
ag)	bag	GHC/bag	GHC/bag	GHC	GHC
i bag)	bag	GHC/bag	GHC/bag	GHC	GHC
			Total	**GHC**	**GHC**

Select only applicable items!

2. Total Expenses for the business (Please fill in the rough estimate of the last month)

Purchasing expense				GHC/month
Labors				GHC/month
Transportation cost	1)	GHC/bag	2)	GHC/month
Other expense				GHC/month
Total				**GHC/month**

Profit (= Total of 1. – Total of 2.) **GHC/Month**

3. Supplier of Local Rice (Please select in ascending order of quantity from the **Box 1** below)

Paddy	1)	2)	3)	4)
Milled rice	1)	2)	3)	4)
Parboiled rice	1)	2)	3)	4) 5)

Fill in the corresponding number.!

4. How to find suppliers:

5. Main Customer of Local Rice (Please select in ascending order of quantity from the **Box 1**)

Paddy	1)	2)	3)	4)	5)
Milled rice	1)	2)	3)	4)	5)
Parboiled rice	1)	2)	3)	4)	5)

<Box 1> 1. Farmer in community, 2. Farmer in other district or region, 3. Parboiler, 4. Brokers / Aggregators, 5. Wholesalers, 6. Retailers, 7. Food vendors, 8. Neighbors, 9. Relatives, 10. Others (Please specify) _____

6. How to find customers:

7. The three major issues of your business (Please specify below)

1)
2)
3)

Basic Info

Processing/ Sales

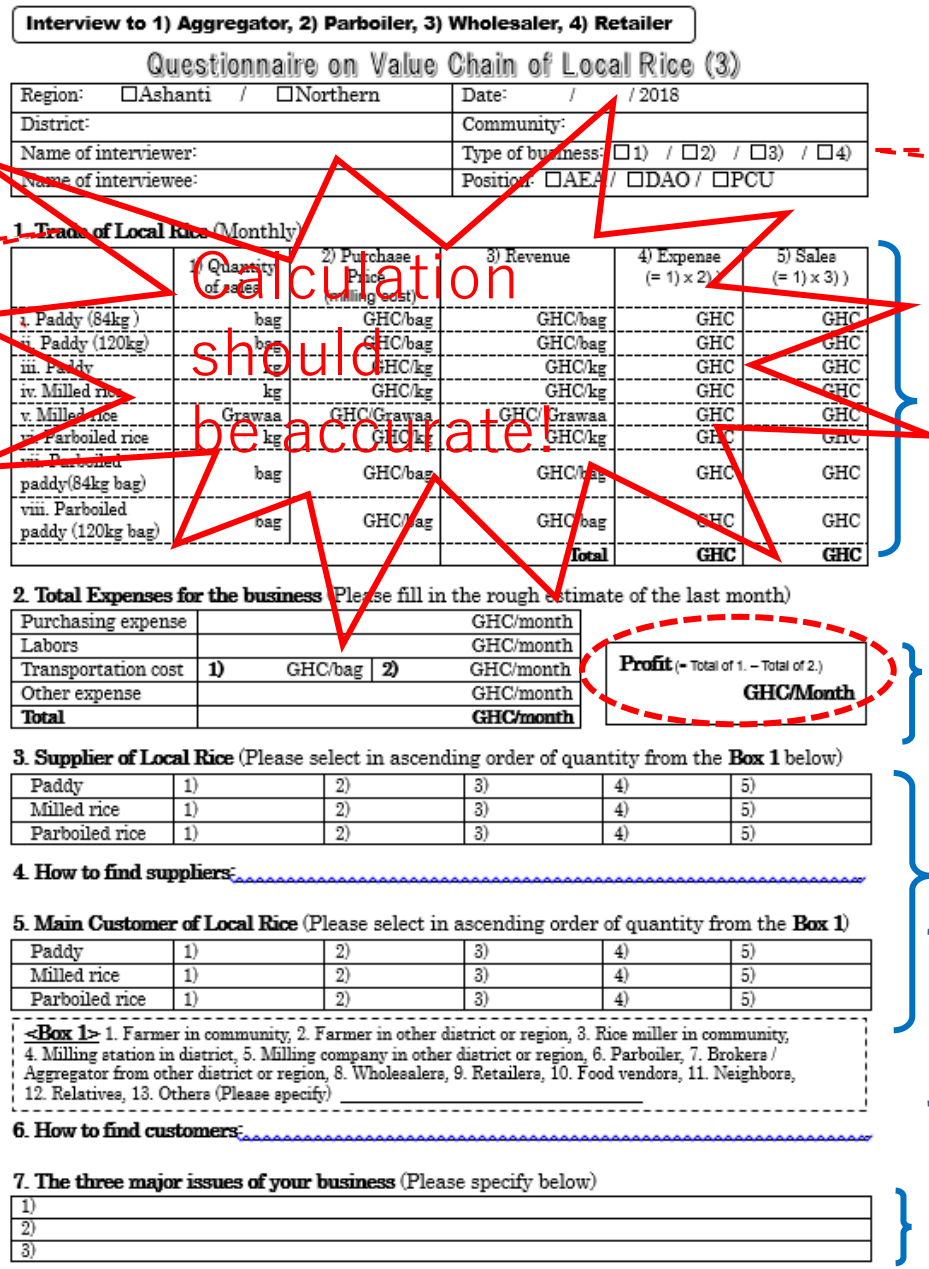
Expenses / Profit

Supply of local rice

Access to customers

Issues/ Challenges

Questionnaire sheets (3)



Interview to 1) Aggregator, 2) Parboiler, 3) Wholesaler, 4) Retailer

Questionnaire on Value Chain of Local Rice (3)

Region: ☐Ashanti / ☐Northern	Date: / / 2018
District:	Community:
Name of interviewer:	Type of business: ☐1) / ☐2) / ☐3) / ☐4)
Name of interviewee:	Position: ☐AEA / ☐DAO / ☐PCU

1. Trade of Local Rice (Monthly)

	1) Quantity of sales	2) Purchase Price (+Milling cost)	3) Revenue	4) Expense (= 1) × 2)	5) Sales (= 1) × 3))
i. Paddy (84kg)	bag	GHC/bag	GHC/bag	GHC	GHC
ii. Paddy (120kg)	bag	GHC/bag	GHC/bag	GHC	GHC
iii. Paddy	kg	GHC/kg	GHC/kg	GHC	GHC
iv. Milled rice	kg	GHC/kg	GHC/kg	GHC	GHC
v. Milled rice	Grawaa	GHC/Grawaa	GHC/Grawaa	GHC	GHC
vi. Parboiled rice	kg	GHC/kg	GHC/kg	GHC	GHC
vii. Parboiled paddy(84kg bag)	bag	GHC/bag	GHC/bag	GHC	GHC
viii. Parboiled paddy (120kg bag)	bag	GHC/bag	GHC/bag	GHC	GHC
			Total	**GHC**	**GHC**

2. Total Expenses for the business (Please fill in the rough estimate of the last month)

Purchasing expense				GHC/month
Labors				GHC/month
Transportation cost	**1)**	GHC/bag	**2)**	GHC/month
Other expense				GHC/month
Total				**GHC/month**

Profit (= Total of 1. – Total of 2.) **GHC/Month**

3. Supplier of Local Rice (Please select in ascending order of quantity from the **Box 1** below)

Paddy	1)	2)	3)	4)	5)
Milled rice	1)	2)	3)	4)	5)
Parboiled rice	1)	2)	3)	4)	5)

4. How to find suppliers:

5. Main Customer of Local Rice (Please select in ascending order of quantity from the **Box 1**)

Paddy	1)	2)	3)	4)	5)
Milled rice	1)	2)	3)	4)	5)
Parboiled rice	1)	2)	3)	4)	5)

<Box 1> 1. Farmer in community, 2. Farmer in other district or region, 3. Rice miller in community, 4. Milling station in district, 5. Milling company in other district or region, 6. Parboiler, 7. Brokers / Aggregator from other district or region, 8. Wholesalers, 9. Retailers, 10. Food vendors, 11. Neighbors, 12. Relatives, 13. Others (Please specify) _____

6. How to find customers:

7. The three major issues of your business (Please specify below)

1)
2)
3)

Basic Info

VC Actors

Select only applicable items!

Calculation should be accurate!

Processing/ Sales

Expenses / Profit

Fill in the corresponding number!

Supply of local rice

Access to customers

Issues/ Challenges

Issues / Challenges

Assignment to AEAs/DAOs

< Before the next OST, >

1. Collect data from target farmers, rice miller, broker, wholesaler, retailer by using this questionnaire.
2. Submit filled-in questionnaire to DAO.
3. DAO type data into soft copy of questionnaire.
4. Send data to PCU.

Let's Discuss How You can Encourage Target Farmers!

Major challenges facing farmers (Examples from East Mampursi)

1. Difficulty of Tractor access:
2. Erratic rainfall:
3. Diminishing farm land:
4. Low price of paddy:
5. Lack of income / capital:
6. Delayed payment by aggregator or processor:

Please refer to Good practices as well.

Let's Discuss How You can Encourage Target Farmers!

Major challenges facing farmers – Sample of countermeasures

1. Difficulty of Tractor access:

2. Erratic rainfall:

3. Diminishing farm land:

4. Low price of paddy:

5. Lack of income / capital:

6. Delayed payment by aggregator or processor:

Let's Encourage Target Farmers Step by Step!

- ✓ It is important that DAO and AEA to practice these ideas to support farmers!
- ✓ Your positive action for target farmers will lead to connecting buyers for higher profit in the future.
- ✓ Good practices on farmers' support, please share the information to PCU at any time.

4. Value Chain of Local Rice

Good quality of Local Rice makes everybody happy!!

For On-Site Training

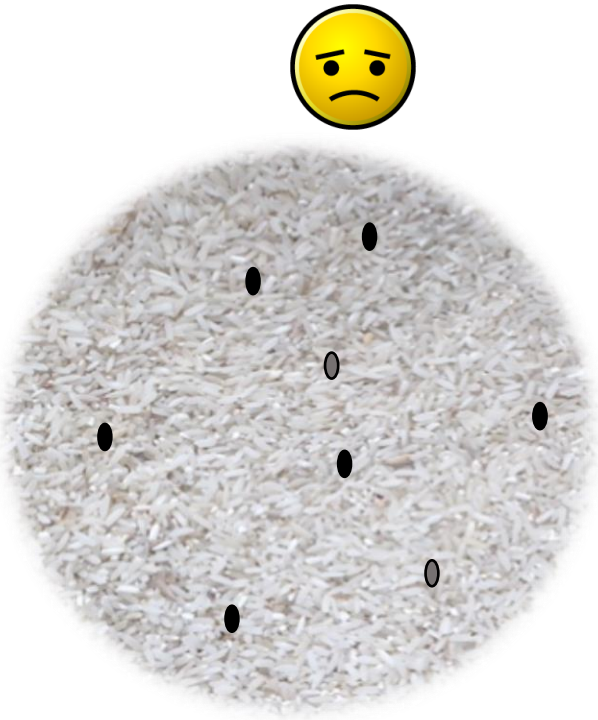
Prepared October 2018

Sustainable Development of Rain-fed Lowland Rice Production
MoFA/JICA TENSUI RICE PROJECT

Value Chain of Local Rice

- Let's explain target farmers the local rice value chain and reasons why they need to apply new techniques for rice production!
- Farmers are in the most important position among value chain actors!

Why metropolitan consumers do not purchase local rice?



1) Presence of stones

2) Selling without packaging

3) Cleanliness

Why metropolitan consumers do not purchase local rice?

1) Presence of stones

It is tedious for busy metropolitan consumers to remove stones by themselves and they prefer to purchase imported rice without stones.

2) Selling without packaging

Packaged rice in small size is preferred by metropolitan consumers because it is less likely to be affected by rats, insects, moisture, etc. and can be easily kept at home.

3) Cleanliness

It is tedious for busy metropolitan consumers to remove contaminants such as husks and dust.

Which types of rice metropolitan consumers want to buy?

Local rice has higher potential!!

1) Good taste

2) Good smell (Aroma)

3) Stone free

4) Cleanliness

5) Whiteness

6) Package appearance

Which types type of rice do metropolitan consumers want to buy?

Local rice has a high potential!!

1) Good taste! → **The freshly harvested rice is delicious!**

2) Good smell (Aroma) → **The rice which is just milled has aroma, especially, aromatic varieties!**

3) Stone free
4) Cleanliness
5) Whiteness
6) Package appearance

→ **These can be achieved by not putting rice directly on the rice field after harvesting, using tarpaulin when drying paddy and using rice mills equipped with de-stoners.**

→ **The number of domestic companies that sell local rice by making original packages is gradually increasing. They are constantly looking for good quality paddy as the demand for local rice is becoming higher.**

Quality of your paddy affect an entire value chain

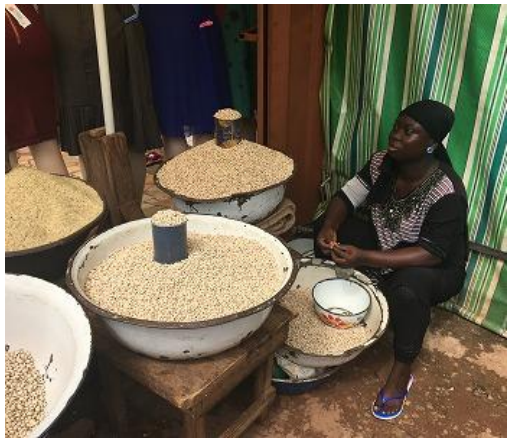
Farmers

High quality

Parboiler

Wholesaler

Retailer



Customer

Quality of your paddy affect an entire value chain

- When farmers sell good quality of paddy to aggregators or miller-sellers, they will like to buy it. It's because their customers such as wholesalers and retailers will definitely purchase good quality paddy and price negotiation will be easier.
- Final consumers will be able to eat delicious and healthy local rice which is comparable to imported rice.
- All the actors of local rice value chain such as farmers, aggregators, parboilers, wholesalers, retailers and customers will make better profit, if farmers produce good quality of paddy.

Quality of your paddy negatively affect the entire value chain

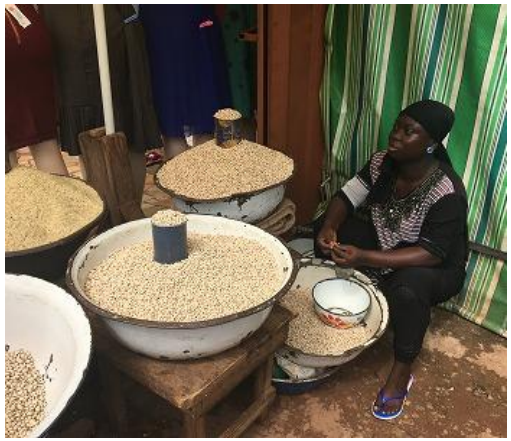
Farmers

Low quality paddy

Parboiler

Wholesaler

Retailer



Customer

Low quality of paddy can negatively affect the entire local rice value chain

- If farmers produce poor quality paddy, the entire local rice business may become stagnant.
- When farmers sell low quality paddy to aggregators or parboilers, they will refuse to buy it or purchase only at low price. It's because their customers such as wholesalers and retailers will not purchase it at good price and price negotiation will be very difficult, too..
- Wholesalers, retailers and final consumers in urban areas will purchase imported rice instead of low quality local rice.
- All the actors in the local rice value chain will have high risk of keeping paddy which can not be sold anywhere for long.

Do you want to sell rice to make increase income?

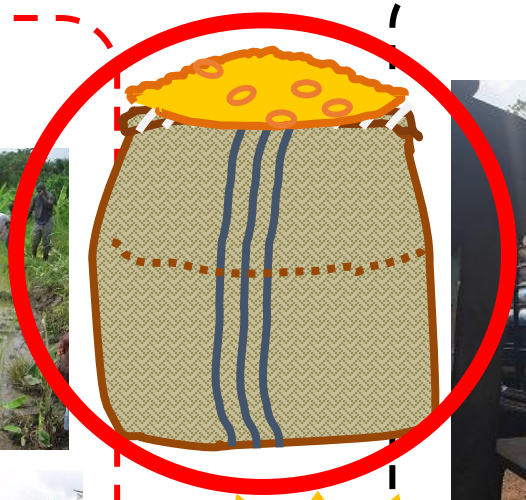
Do you want to sell rice to increase income?
If yes, we recommend you to apply all the technics of TENSUI 2 !!
Because…..,

Apply all the technics!!

Farmers





Aggregators

Buy at higher price!

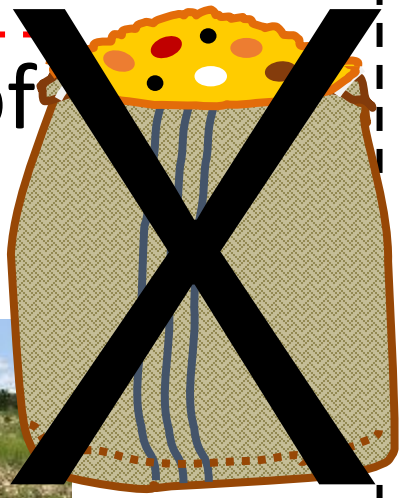
Parboiler

Apply all the technics!!

Application of all the TENSUI2 techniques can increase yield and sales volume of rice per acre.
Quality of rice will become high enough to match the needs and wants of metropolitan consumers, price negotiation will be easier and rice can be sold at a higher price.
Farmers will be able to prepare good quality seeds and inputs for following seasons.
It is then expected that a positive spiral can be caused.

If not apply the technics…

Poor condition of Paddy field



Refused to Buy…

Aggregator

Parboiler

If not apply the technics…

It will reduce yield and sales volume of rice per acre.
The quality of rice will become lower, price negotiation will be difficult and rice can not be sold at a higher price.
Farmers will not be able to prepare good quality seeds and inputs for next-season.
Then, a negative spiral can be caused.

FM-Ref-5

Check sheet for marketing opportunities (Northern region)

MoFA-JICA Project for Sustainable Development of Rain-fed Lowland Rice Production

1: QUALITY ISSUE

Are group farmers already producing quality paddy?

NO → **No need for marketing support**: Keep practicing what to be taught at On-site training on quality improvement (not yet achieved the level to profit from quality rice)

YES ↓

Check the issues 2 & 3 to select Actions to take

1. Use of one variety, 2. Well filled grain, 3. No stone/husk, 4. Less broken grains after milling

2: PRICE/PAYMENT ISSUE

Even though farmers produce quality paddy, it will not lead to higher profit if its price is not higher than that of low quality one.

Are group farmers selling high quality paddy at a reasonable price compared to that of low quality milled rice?

NO → **Marketing support: Action 1**: Improve ways of promotion to buyers (example: use of Promotion sheet, invitation of potential buyers to farmers' field on Field day or any other day)

Resources for marketing support 1: Promotion sheet

YES ↓

Are group farmers satisfied with the existing modes of payment (in-kind, installment payment, pre-financing)?

NO → Even though high quality milled rice can be sold at a reasonable price, it will not necessarily increase farmers' income if payment modes are disadvantageous for farmers.

YES ↓ **No need for marketing support**: Report successful practices of marketing

Good practice 1: Milling Company in Tamale MOFA Office

NO ↓

Marketing support: Action 2: Link to new buyers

Resources for marketing support 2: List of buyers

Marketing support: Action 3: Sell paddy at a higher price as seeds

Good practice 2: Certified seed production

Marketing support: Action 4: Do collective marketing

Good practice 3: Tepa Emo Papa Kuo

Resources for marketing support 3: Format to collect quantity of paddy in stock

Marketing support: Action 5: Save expenses for transporting

Resources for marketing support 5: Cost calculation for transporting

Marketing support: Action 6: Purchase inputs in advance to avoid pre-financing

Good practice 4: Cyprian of Konongo

Marketing support: Action 7: Establish good relation with buyers (market women)

Good practice 5: Adam of Vittin

3: EASY ACCESS TO INFORMATION

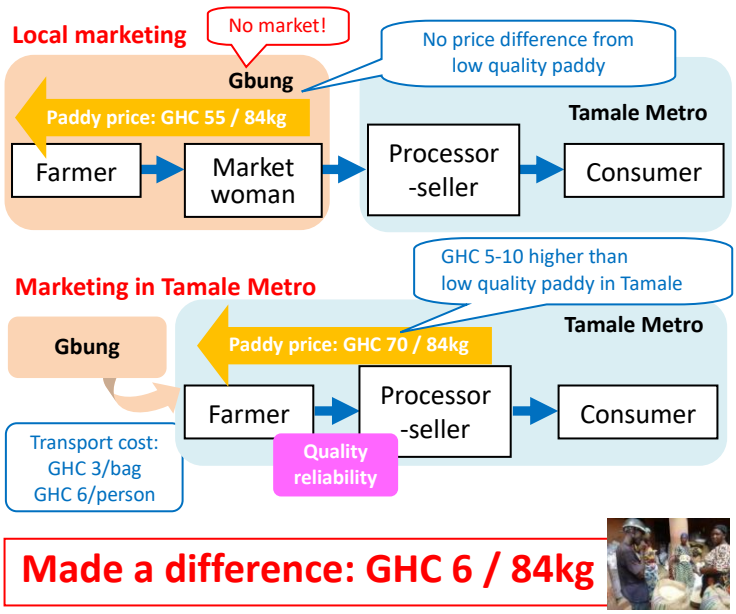
Are farmers interested in getting nationwide information on price, marketing, weather etc?

YES → **Marketing support: Action 8**: Use ESOKO

Resources for marketing support 4: Instruction on ESOKO

GOOD PRACTICES

1: Milling Company in Tamale MOFA



Made a difference: GHC 6 / 84kg

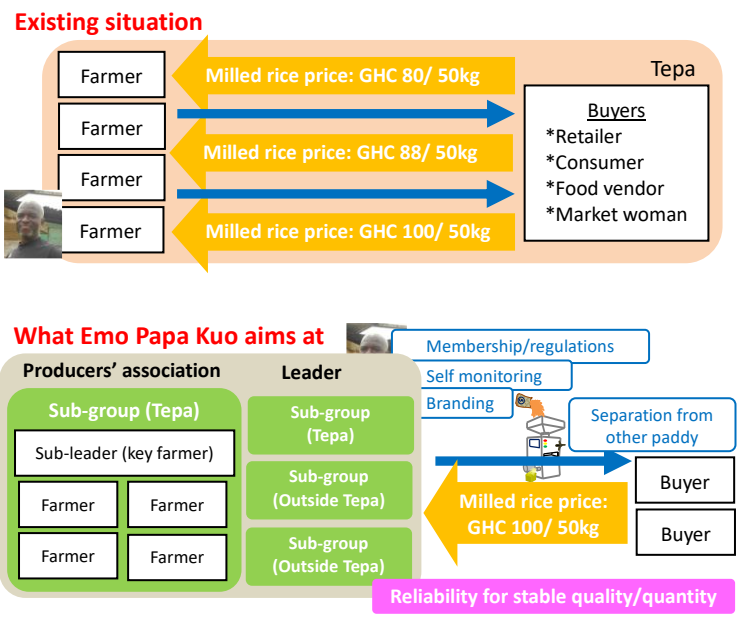
2: Certified seed production

How much profit can you expect from seed production? (acre)

	QTY/NO	GHC	
		Grain	Seeds
Purchase price of foundation seeds	30 kg (GHC 8/kg)	-	240
Registration fee	Producer unit (max. 5 acres)	-	50
Field inspection	4 times (GHC 20/time)	-	80
Lab analysis (purity, germination rate, moisture, seed health)	4 checkpoints (GHC 5/checkpoint)	-	20
Other production costs		205[1)]	308[2)]
TOTAL COSTS		**205**	**698**
Selling price	1,077 kg (production of grain)	754	-
	800 kg (production of certified seeds)	-	1,600
PROFIT		**549**	**902**
Return rate (%)		268	293

1) Sourced from Impact survey 2013 (Table 7 (2) / 1st group - material, tractor hiring, and paid labor costs).
2) 1.5 times higher than other production costs for grain (assumed)

3: Tepa Emo Papa Kuo (Ashanti)



4: Cyprian of Konongo (Ashanti)

Year 2012

Purchase and store inputs after minor season

GHC 31/ 50kg bag | **GHC 32/ 50kg bag** | **GHC 11.5/ 1 L bottle**

Year 2013

Use the materials purchased in 2012 (no procurement in 2013)

Price increase in 2013
NPK: GHC 51/ 50kg
Urea: GHC 55/ 50kg
Herbicide: GHC 14/ 1 L

If he purchased in 2013, he would spend....

Total: GHC 720

Made a difference: GHC 273/3 acre

5: Adam of Vittin

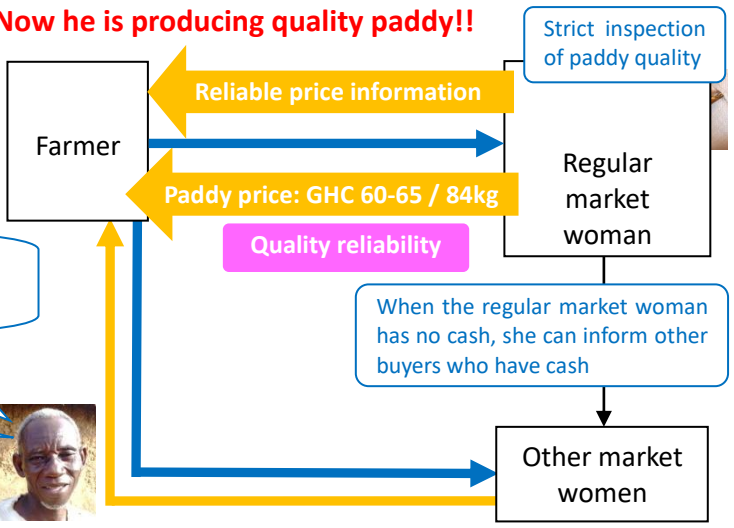
Before he produced quality paddy...

I only stay in my community to sell the paddy to market women who visit me. When I don't want to sell, I can keep the paddy in my storage till I sell it at a satisfactory price.

I don't sell paddy when I don't agree about the price buyers present, but they come back to me in the end to get the paddy at the price I present for its quality.

Made a difference: GHC 10-15 / 84kg bag

Now he is producing quality paddy!!



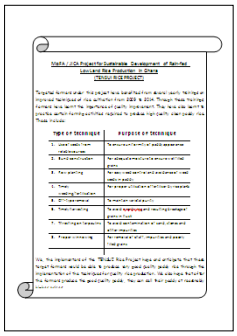
FM-Ref-6

Resources for marketing support (Northern region)

1: Promotion sheet

- Target users: Individual farmers
- Purpose: To explain to buyers farmers' effort for quality rice production

Front


Back

2: List of buyers

- Target users: AEAs
- Purpose: To introduce farmers buyers interested in purchasing quality paddy/milled rice in bulk

No.	Position	Name	Phone no.	Location
1	Bulk paddy buyer	Yakubu Loharili	024-645-7460	Shishegu, Sagnerigu District
2	Bulk paddy buyer (Forum member)	Iddrish Sayibu	024-171-0563	Sagnerigu, Sagnerigu District
3	Bulk paddy buyer (Forum member)	Alhassan Zakaria	024-524-0491	Choggu, Sagnerigu District
4				

Remark: This list is supposed to be further developed by AEAs themselves.

3: Format to collect quantity of paddy in stock (attached in Page 3)

- Target users: AEAs
- Purpose: To compile paddy of individual farmers in stock

4: Instruction on ESOKO

- Target users: AEAs
- Purpose: To introduce farmers to using ESOKO, the mobile price information system

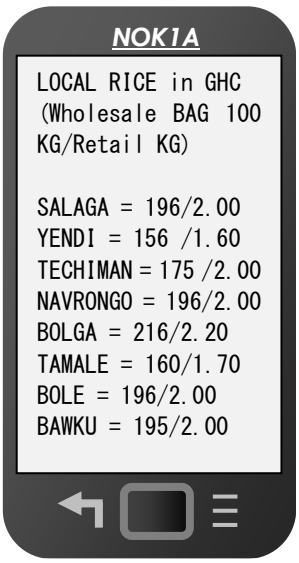
Service 1: Send "Rice" to 1900 => Get weekly price information of local rice price of 46 major markets in Ghana (GHC 0.06)

Service 2: 1900 (phone call) = > Daily weather information (GHC 0.2765/min. by MTN)

Service 3: Bids & offers (GHC 0.2765/min. by MTN)

1. Inform ESOKO quantity of products you have
2. Package the products nicely
3. Submit information (location, phone no., farmers' name, to ESOKO
4. ESOKO distribute the information to all the subscribers on the platform
5. Any subscribers can directly call to the farmers for negotiation

April 28, 2014



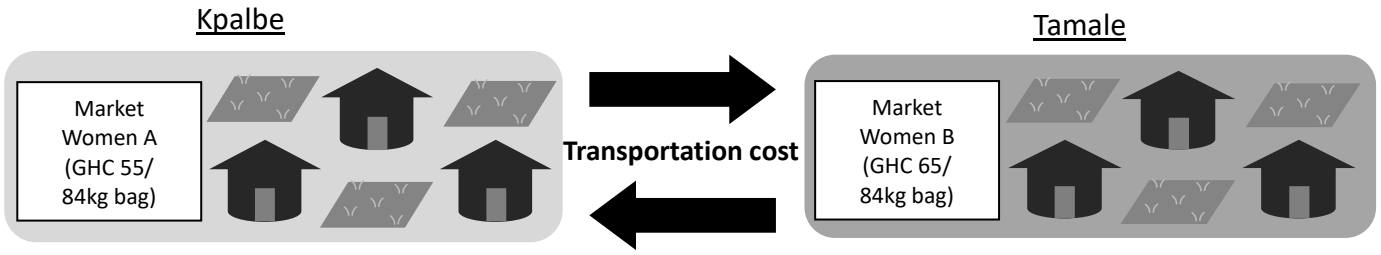
5: Cost calculation for transporting

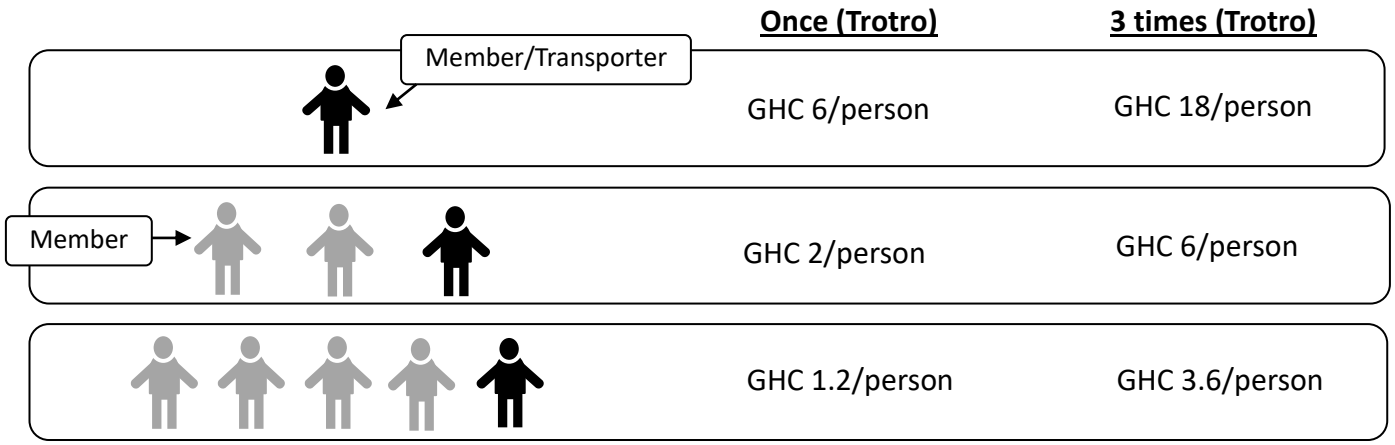
- Target users: AEAs
- Purpose: To get the idea that farmers can save costs through group transporting

Conditions for group transporting:

Transportation cost:

EXAMPLE (when farmers of Kpalbe go to Tamale)





DIFFERENCE (1 person vs. 5 persons)	**GHC 4.8/person**	**GHC 14.4/person**

Format to collect quantity of paddy in stock

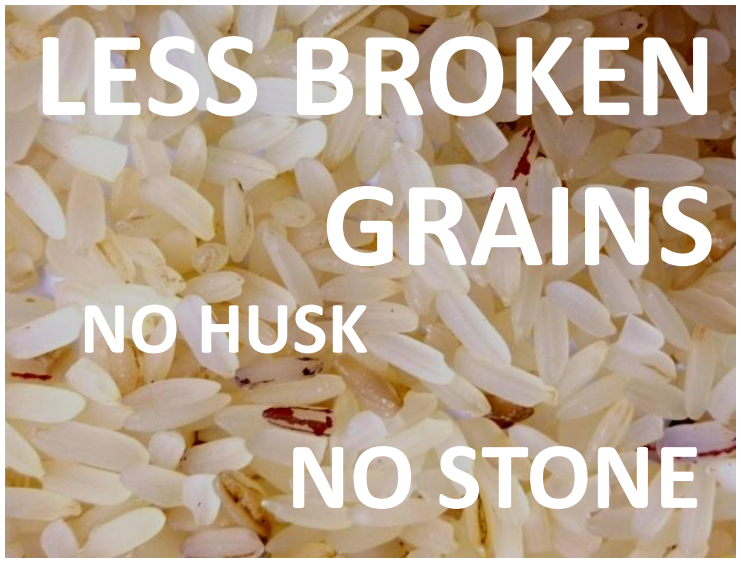
MOFA-JICA Project on Sustainable Development of Rain-fed Lowland Rice Production

District:_____

Community:_____

AEA's name:_____

No.	Farmers' name	Community	Phone no.	Variety cultivated	Quantity of paddy in stock (no. of bags)		Quantity of paddy to be sold		Proposed time of selling (month)
					84 kg bag (Cocoa sack)	Size 5 bag	84 kg bag (Cocoa sack)	Size 5 bag	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									



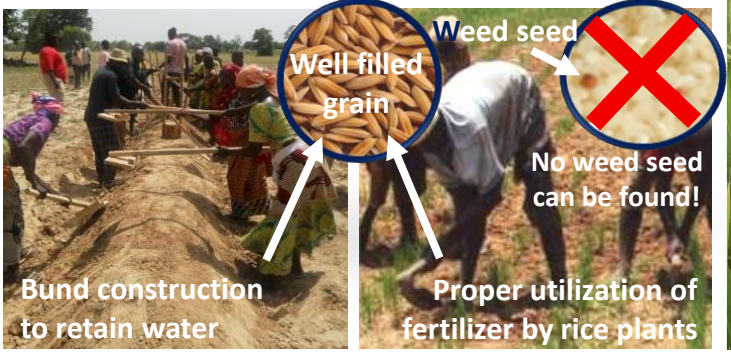
MY RICE IS QUALITY ONE!!

How I achieved this quality in the field?

1. Use of seeds from reliable sources

Research institute → MoFA -JICA → Farmer

2. Bund construction, timely weeding/fertilization



3. Off-type removal

4. Timely harvesting

5. Eliminating soil and stone during and after harvest

6. Proper winnowing

This promotion sheet is made for the smallholder farmers who received training by the MoFA-JICA project to enhance the quality rice production and marketing. For any query, please contact MoFA Northern Regional Office (037-202-7749).

MoFA / JICA Project for Sustainable Development of Rain-fed Low Land Rice Production in Ghana (TENSUI RICE PROJECT)

Targeted farmers under this project have benefited from several yearly trainings on improved techniques of rice cultivation from 2009 to 2014. Through these trainings, farmers have learnt the importance of quality improvement. They have also learnt to practice certain farming activities required to produce high quality clean paddy rice. These include:

Type of technique	Purpose of technique
1. Use of seeds from reliable sources	To ensure uniformity of paddy appearance
2. Bund construction	For adequate moisture to ensure well filled grains
3. Row planting	For easy weed control and avoidance of weed seeds in paddy
4. Timely weeding/fertilization	For proper utilization of fertilizer by rice plants
5. Off-type removal	To maintain varietal purity
6. Timely harvesting	To avoid overdrying and resulting breakage of grains in husk
7. Threshing on tarpaulins	To avoid contamination of sand, stones and other impurities
8. Proper winnowing	For removal of chaff, impurities and poorly filled grains

We, the implementers of the TENSUI Rice Project hope and anticipate that these target farmers would be able to produce very good quality paddy rice through the implementation of the techniques for quality rice production. We also hope that after the farmers produce the good quality paddy, they can sell their paddy at reasonably higher prices.

Interview to Farmers

Questionnaire on Value Chain of Local Rice (1)

Region: ☐Ashanti / ☐Northern	Date: / / 2018
District:	Community:
Name of interviewer:	Sex: ☐Male / ☐Female
Name of interviewee:	Position: ☐AEA / ☐DAO / ☐PCU

1. Trade of Local Rice (Please fill in the rough estimate of the last year)

1) Amount of production	bags	2) Area of rice field	/Acre
3) Size of bag	kg	4) Production volume (= 1) x 3))	kg
5) Quantity of seeds	bags	6) Quantity for home consumption	bags

	7) Quantity of sales	8) Price	9) Sales (= 7) x 8))
i. Paddy	bags	GHC/bags	GHC
ii. Milled rice	Grawaa	GHC/Grawaa	GHC
iii. Milled rice	bags	GHC/bags	GHC
iv. Parboiled paddy	bags	GHC/bags	GHC
v. Parboiled rice	bags	GHC/bags	GHC
		Total	**GHC**

2. Total Expenses for Rice Production (Please fill in the rough estimate of the last year)

Materials	GHC/year
Labors	GHC/year
Transportation	GHC/year
Land cost	GHC/year
Total	**GHC/year**

Profit (= Total of 1. – Total of 2.)
GHC/Year

3. Distribution of Local Rice (Please select in ascending order of quantity from the **Box 1** below)

Paddy	1)	2)	3)	4)	5)
Milled rice	1)	2)	3)	4)	5)
Parboiled rice	1)	2)	3)	4)	5)

<Box 1> 1. Rice miller in community, 2. Milling station in district, 3. Milling company in other district or region, 4.Parboiler, 5. Brokers / Aggregators, 6. Wholesalers, 7. Retailers, 8. Food vendors, 9. Neighbors, 10. Relatives, 11. Others (Please specify)

4. Availability of the Market Information (Please select 3 choices from the **Box 2** below)

* Market information: such as price, quality, quantity and packaging of rice that required for commercial market.

1)	2)	3)

<Box 2> 1. TV, 2. Radio, 3. Mobile phone, 4. AEA, 5. Broker / Aggregators, 6. Parboiler, 7.Wholesaler, 8. Other farmers, 9. Others (Please specify) _____.

5. Three Major Issues of Local Rice Production (Please specify)

1)
2)
3)

Interview to Rice miller

Questionnaire on Value Chain of Local Rice (2)

Region: ☐Ashanti / ☐Northern	Date: / / 2018
District:	Community:
Name of interviewer:	Sex: ☐Male / ☐Female
Name of interviewee:	Position: ☐AEA / ☐DAO / ☐PCU

1. Trade of Local Rice (Monthly)

	1) Quantity of sales	2) Purchase price	3) Revenue (Milling cost)	4) Expense (= 1) x 2))	5) Sales (= 1) x 3))
i. Paddy (84kg)	bag	GHC/bag	GHC/bag	GHC	GHC
ii. Paddy (120kg)	bag	GHC/bag	GHC/bag	GHC	GHC
iii. Paddy	kg	GHC/kg	GHC/kg	GHC	GHC
iv. Milled rice	kg	GHC/kg	GHC/kg	GHC	GHC
v. Milled rice	Grawaa	GHC/Grawaa	GHC/ Grawaa	GHC	GHC
vi. Parboiled rice	kg	GHC/kg	GHC/kg	GHC	GHC
vii. Parboiled paddy(84kg bag)	bag	GHC/bag	GHC/bag	GHC	GHC
viii. Parboiled paddy (120kg bag)	bag	GHC/bag	GHC/bag	GHC	GHC
			Total	**GHC**	**GHC**

2. Total Expenses for the business (Please fill in the rough estimate of the last month)

Purchasing expense			GHC/month
Labors			GHC/month
Transportation cost	**1)** GHC/bag	**2)**	GHC/month
Other expense			GHC/month
Total			**GHC/month**

Profit (= Total of 1. – Total of 2.)
GHC/Month

3. Supplier of Local Rice (Please select in ascending order of quantity from the **Box 1** below)

Paddy	1)	2)	3)	4)	5)
Milled rice	1)	2)	3)	4)	5)
Parboiled rice	1)	2)	3)	4)	5)

4. How to find suppliers: _____.

5. Main Customer of Local Rice (Please select in ascending order of quantity from the **Box 1**)

Paddy	1)	2)	3)	4)	5)
Milled rice	1)	2)	3)	4)	5)
Parboiled rice	1)	2)	3)	4)	5)

<Box 1> 1. Farmer in community, 2. Farmer in other district or region, 3. Parboiler, 4. Brokers / Aggregators, 5. Wholesalers, 6. Retailers, 7. Food vendors, 8. Neighbors, 9. Relatives,
10. Others (Please specify) _____

6. How to find customers: _____.

7. The three major issues of your business (Please specify below)

1)
2)
3)

Interview to 1) Aggregator, 2) Parboiler, 3) Wholesaler, 4) Retailer

Questionnaire on Value Chain of Local Rice (3)

Region: ☐Ashanti / ☐Northern	Date: / / 2018
District:	Community:
Name of interviewer:	Type of business: ☐1) / ☐2) / ☐3) / ☐4)
Name of interviewee:	Position: ☐AEA / ☐DAO / ☐PCU

1. Trade of Local Rice (Monthly)

	1) Quantity of sales	2) Purchase Price (milling cost)	3) Revenue (price per unit)	4) Expense (= 1) x 2))	5) Sales (= 1) x 3))
i. Paddy (84kg)	bag	GHC/bag	GHC/bag	GHC	GHC
ii. Paddy (120kg)	bag	GHC/bag	GHC/bag	GHC	GHC
iii. Paddy	kg	GHC/kg	GHC/kg	GHC	GHC
iv. Milled rice	kg	GHC/kg	GHC/kg	GHC	GHC
v. Milled rice	Grawaa	GHC/Grawaa	GHC/ Grawaa	GHC	GHC
vi. Parboiled rice	kg	GHC/kg	GHC/kg	GHC	GHC
vii. Parboiled paddy(84kg bag)	bag	GHC/bag	GHC/bag	GHC	GHC
viii. Parboiled paddy (120kg bag)	bag	GHC/bag	GHC/bag	GHC	GHC
			Total	**GHC**	**GHC**

2. Total Expenses for the business (Please fill in the rough estimate of the last month)

Purchasing expense			GHC/month
Labors			GHC/month
Transportation cost	**1)** GHC/bag	**2)**	GHC/month
Other expense			GHC/month
Total			**GHC/month**

Profit (= Total of 1. – Total of 2.)
GHC/Month

3. Supplier of Local Rice (Please select in ascending order of quantity from the **Box 1** below)

Paddy	1)	2)	3)	4)	5)
Milled rice	1)	2)	3)	4)	5)
Parboiled rice	1)	2)	3)	4)	5)

4. How to find suppliers: _____.

5. Main Customer of Local Rice (Please select in ascending order of quantity from the **Box 1**)

Paddy	1)	2)	3)	4)	5)
Milled rice	1)	2)	3)	4)	5)
Parboiled rice	1)	2)	3)	4)	5)

<Box 1> 1. Farmer in community, 2. Farmer in other district or region, 3. Rice miller in community, 4. Milling station in district, 5. Milling company in other district or region, 6. Parboiler, 7. Brokers / Aggregator from other district or region, 8. Wholesalers, 9. Retailers, 10. Food vendors, 11. Neighbors, 12. Relatives, 13. Others (Please specify) _____

6. How to find customers: _____.

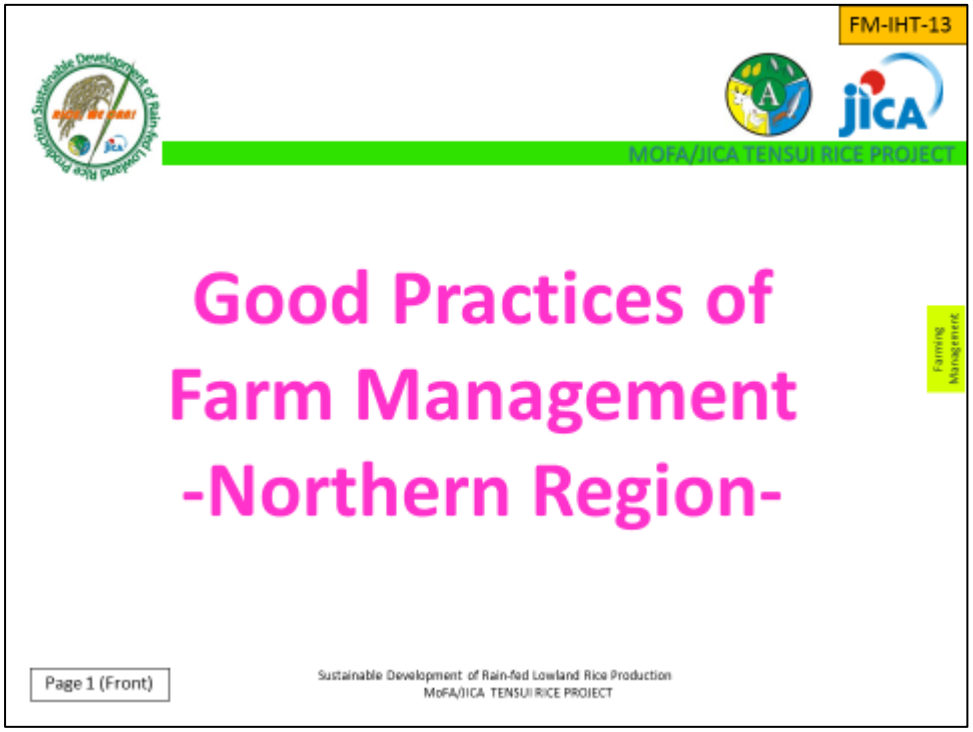
7. The three major issues of your business (Please specify below)

1)
2)
3)

Good Practices of Farm Management -in Northern Region-

Good Practices of Farm Management

- We have several good practices of farm management found among TENSUI Project farmers. Today, let's learn about their stories! Then, you will be the ones who can be "good examples"!!



Page 1 (Back)

Case 1:

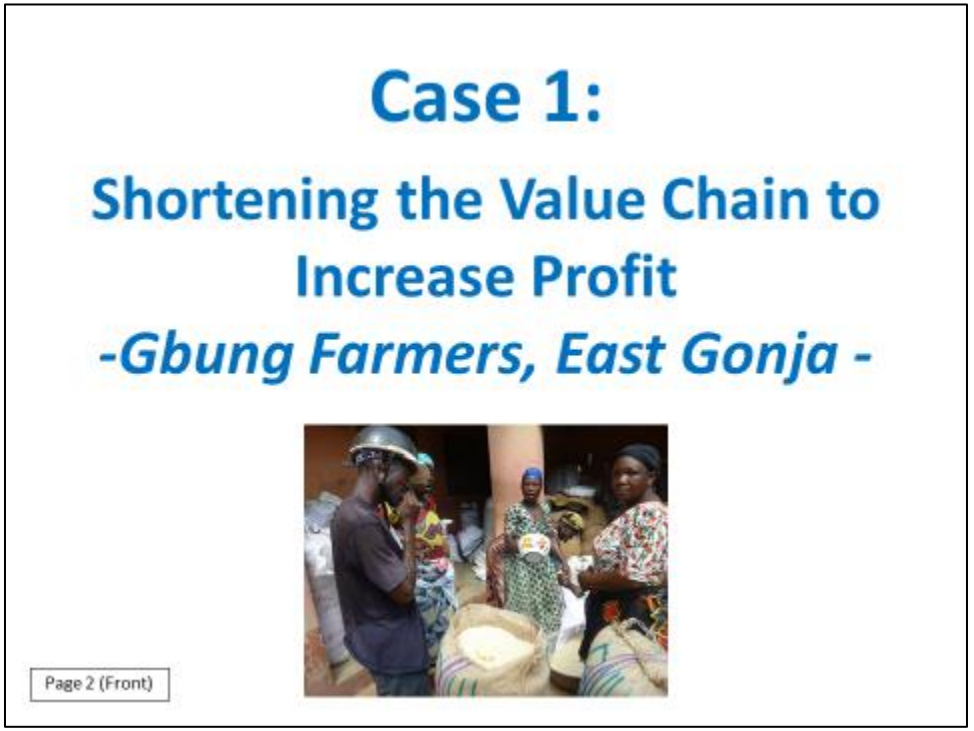
Shortening the Value Chain to Increase Profit

-Gbung Farmers, East Gonja -

Case 1:

- Let's learn about a good practice of farmers in Gbung, East Gonja!

(shared in August 2014)



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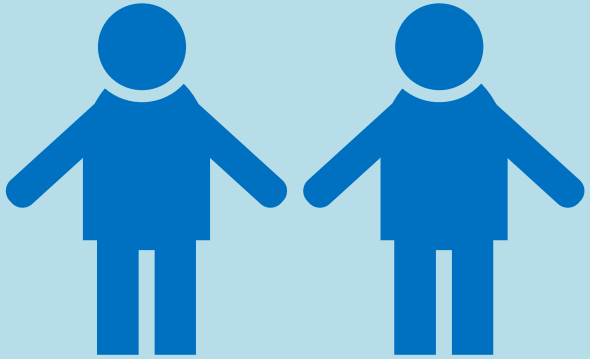
Before…

Gbung

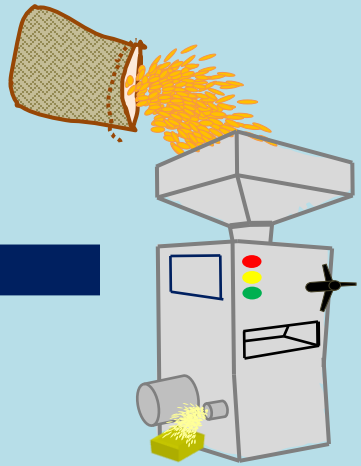
Farmer

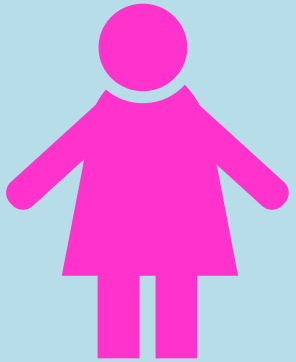
Aggregator

Tamale Metro



Vendor, Consumer

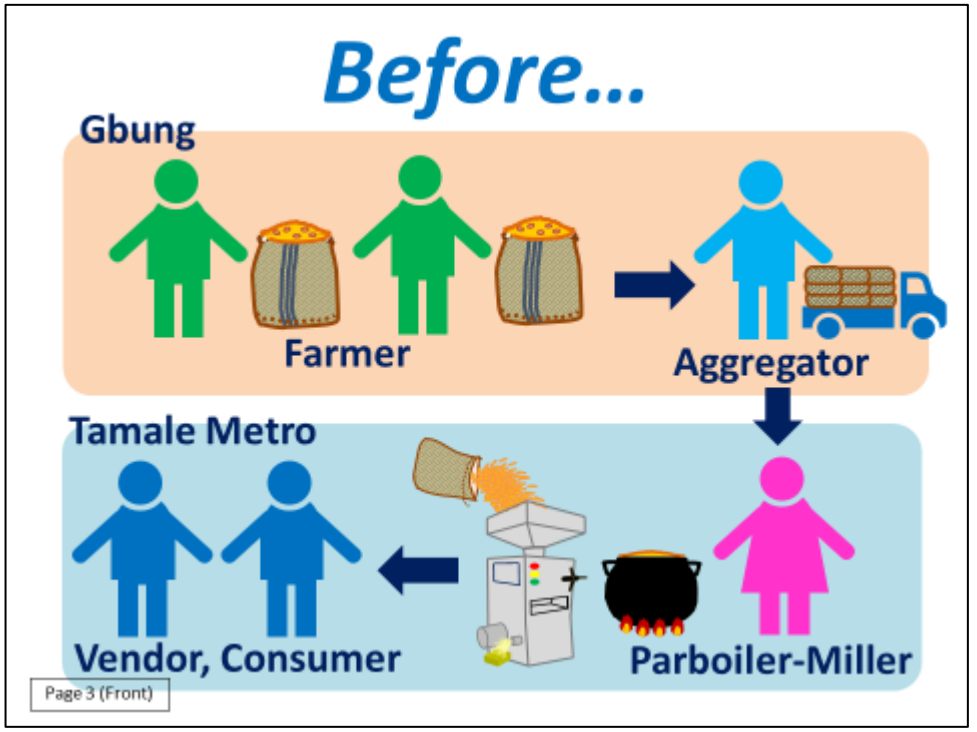




Parboiler-Miller

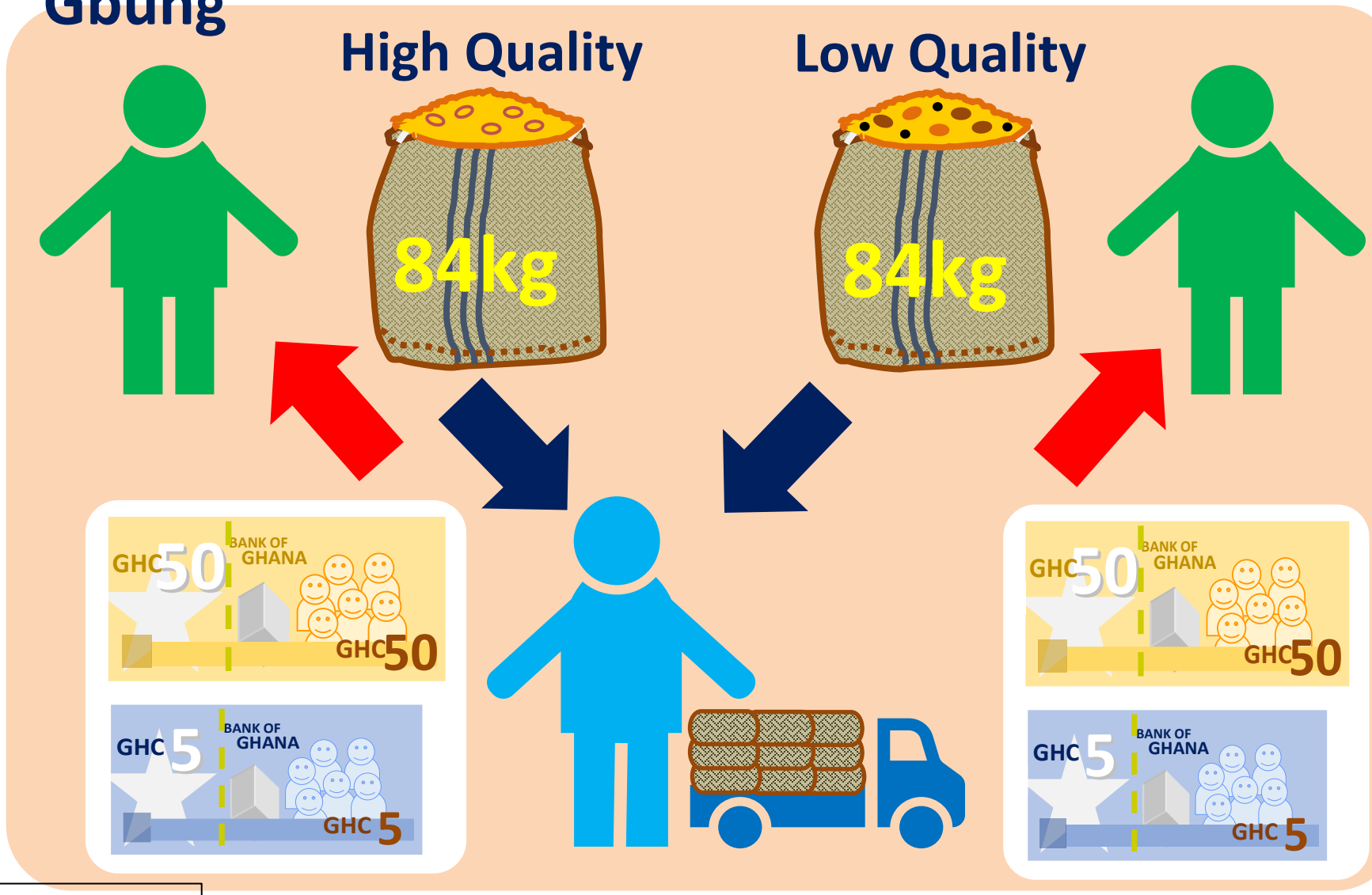
Before…

- The farmer and his colleagues used to sell high quality paddy to an aggregator visiting Gbung.
- After purchasing the paddy in Gbung, the aggregator sold it to parboiler-millers working on parboiling and milling in Tamale Metro. After processing, they sold the milled rice to vendors and/or consumers coming to the milling station.



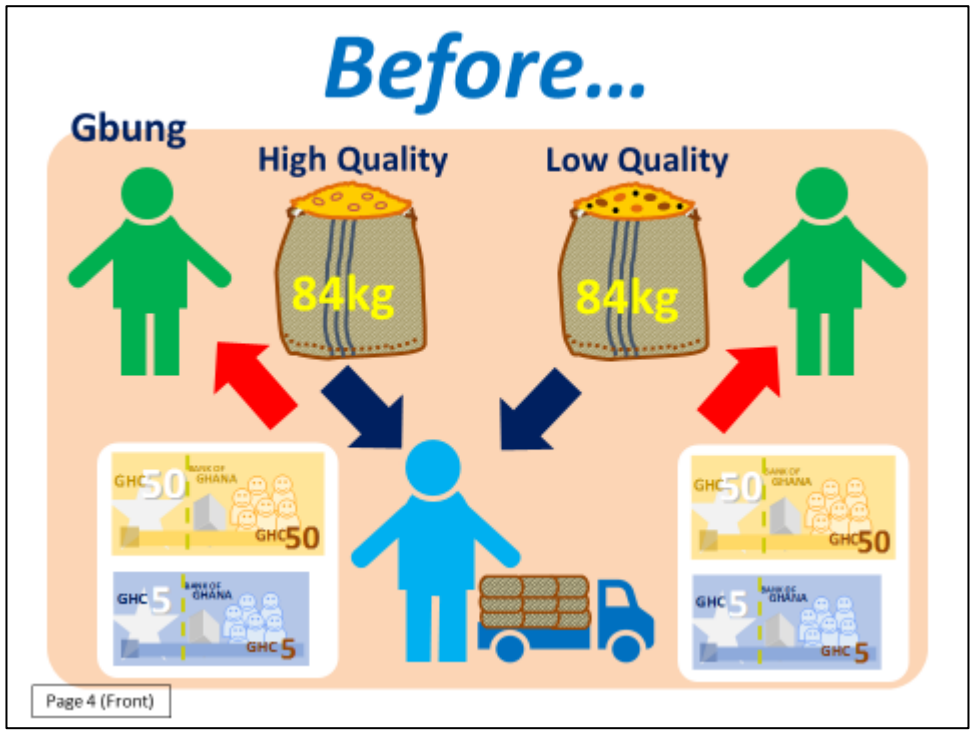
Before...

Gbung



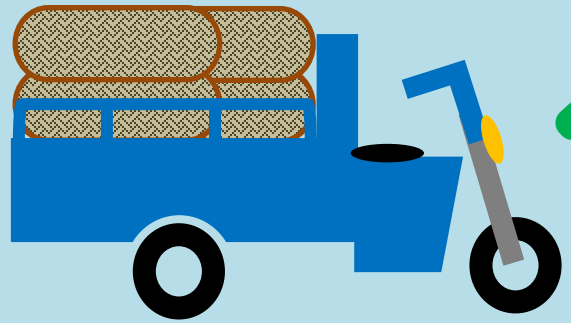
Before…

- In Gbung, he gained GHC55/84kg paddy for his high quality paddy, which was the same price as low quality paddy produced by other farmers.
- He had no other choice than selling at GHC55/84kg paddy as there was no market place in Gbung.
- Ask farmers: How would you solve this kind of problem?



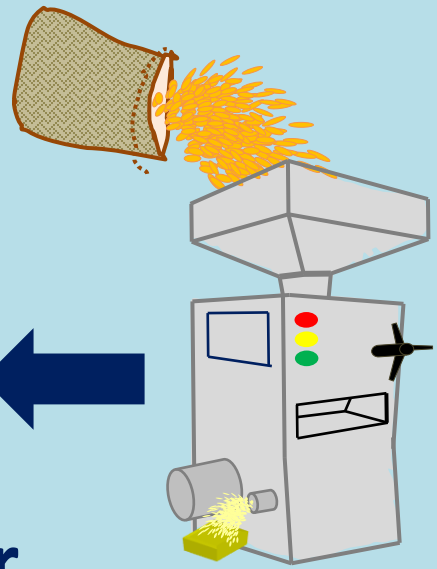
Then…

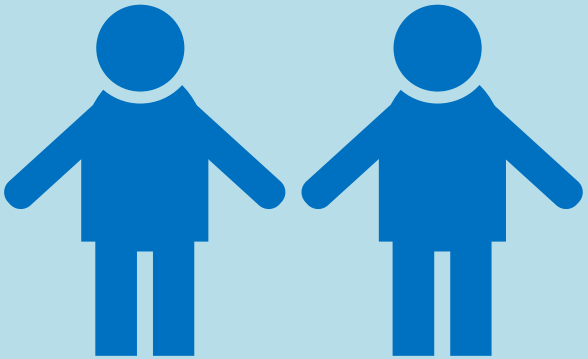
Gbung



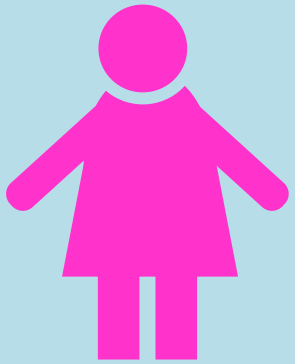
Farmer

Tamale Metro





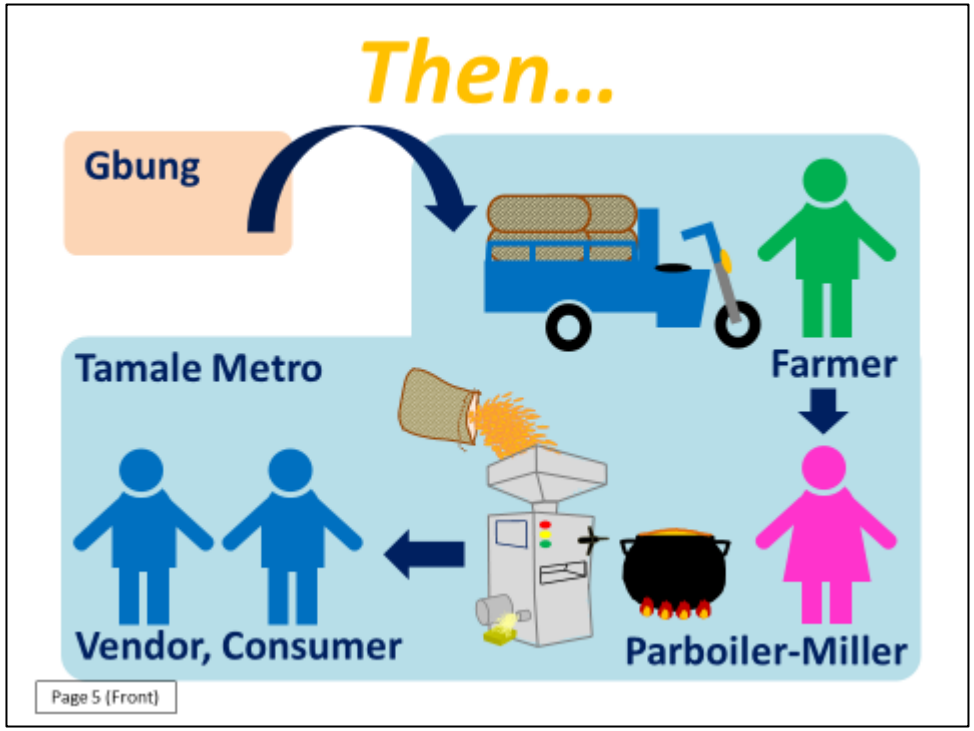
Vendor, Consumer



Parboiler-Miller

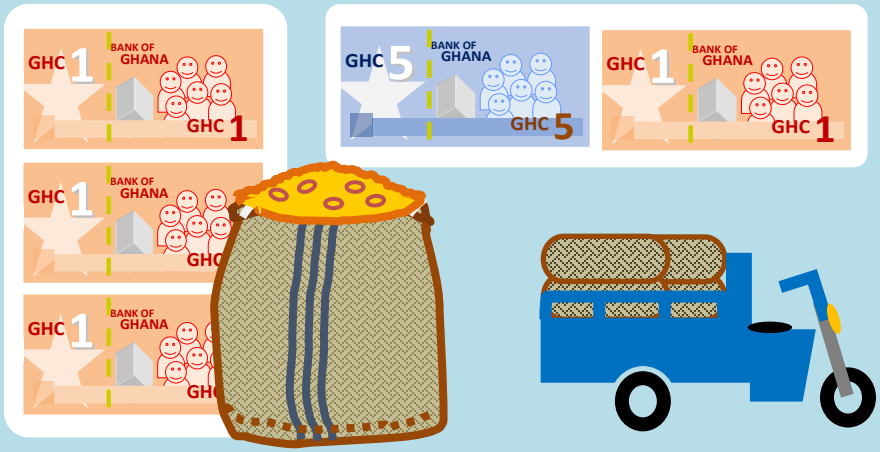
Then…

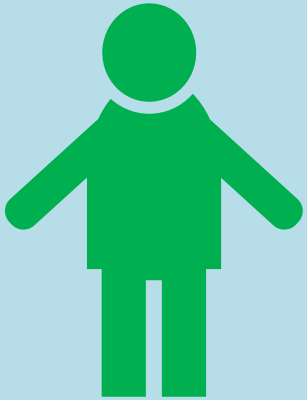
- He started to transport his high quality paddy to Tamale Metro by himself and directly sell to the parboiler-millers there. There was no intervention by the aggregator between them anymore.



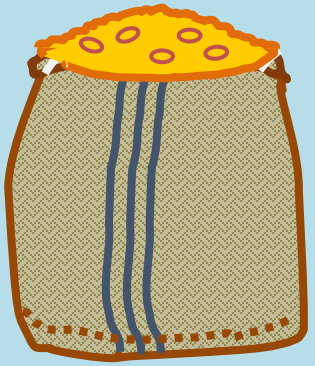
After!

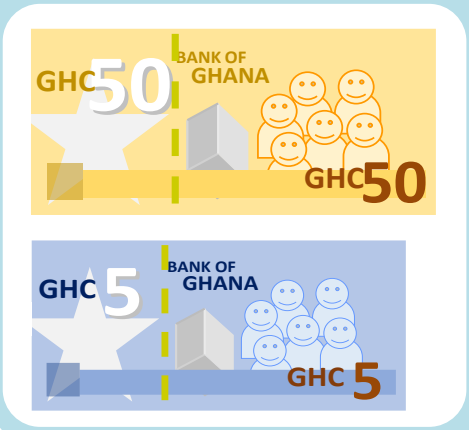
Tamale Metro

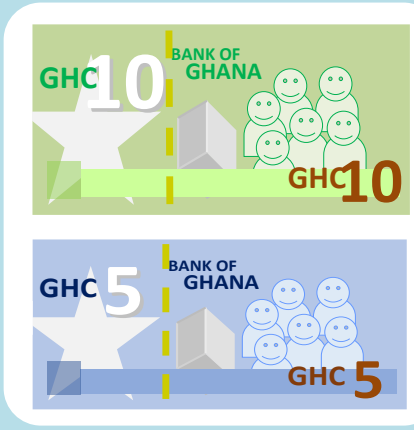


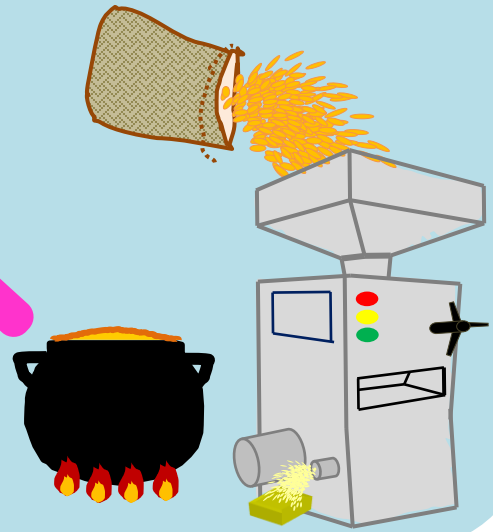


High Quality



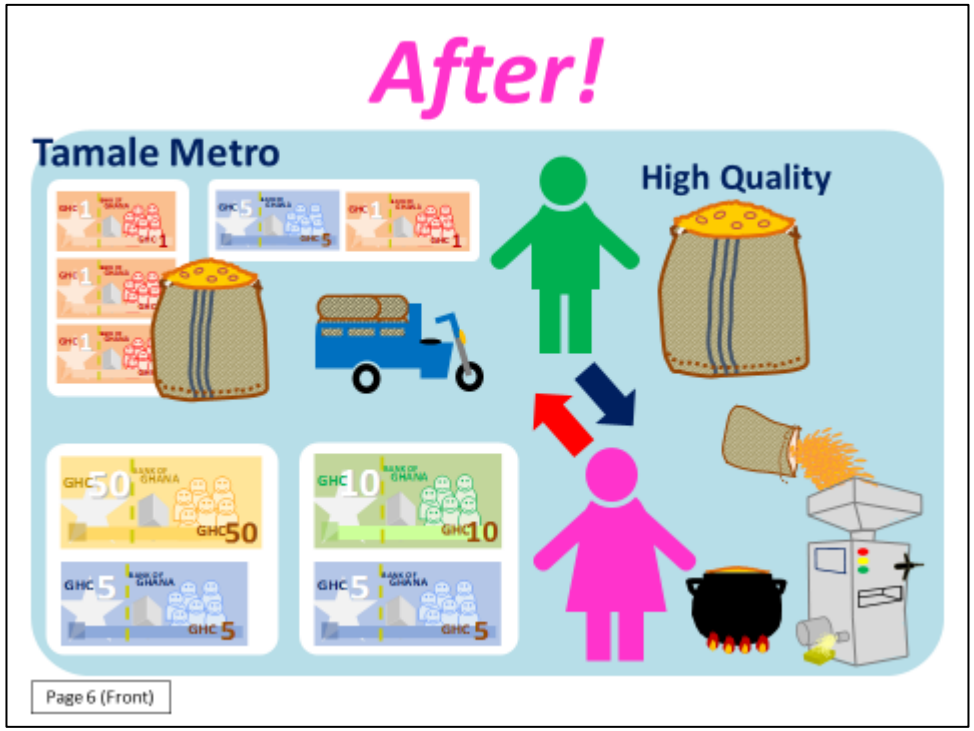






After!

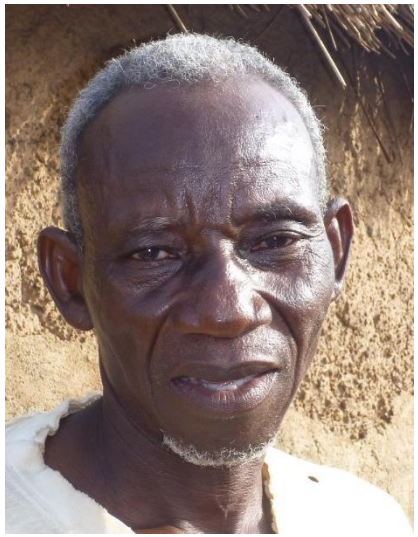
- Then, he gained GHC70/84 kg paddy from the parboiler-millers. This price is about GHC5-10/84kg paddy higher than that for low quality rice in Tamale Metro.
- Even after deducting transportation fee GHC3/84kg paddy bag and GHC6/person (driver), his profit increased by GHC6/84kg paddy.



Case 2:

Selecting Buyers Who Value the Quality

-Adam of Vittin, Tamale Metro-



Case 2:

- Let’s learn about a good practice of Mr. Adam of Vittin Community in Tamale Metro.

Case 2:

Selecting Buyers Who Value the Quality

-Adam of Vittin, Tamale Metro-

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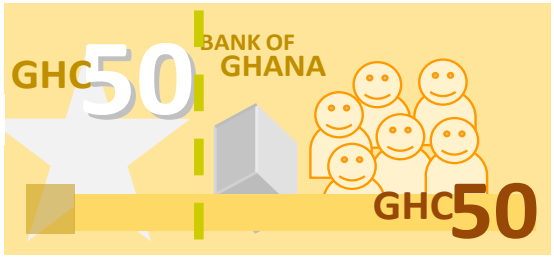
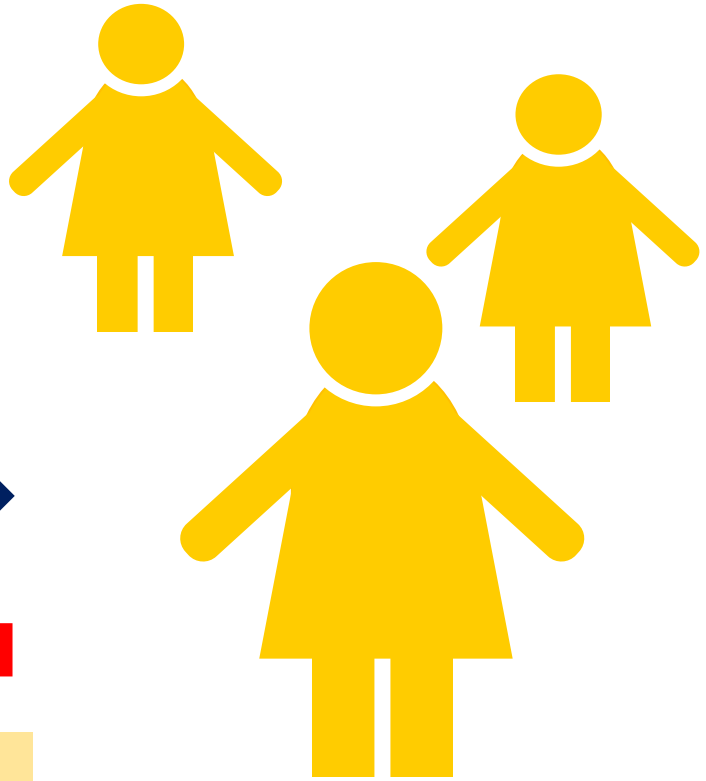
Before…

Low Quality

Farmer

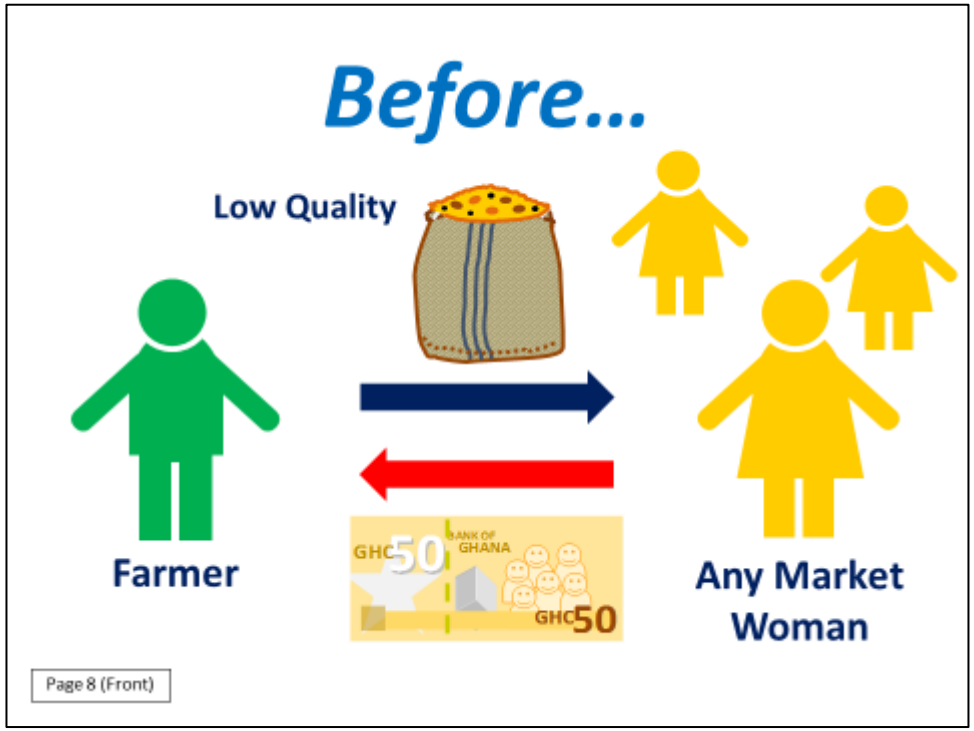




Any Market Woman

Before…

- Before he learnt to produce quality paddy at the TENSUI Project, Mr. Adam used to sell his paddy to any market woman visiting Vittin Community at GHC50/84kg paddy.



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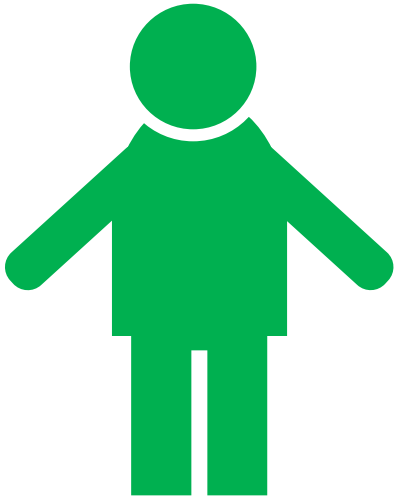
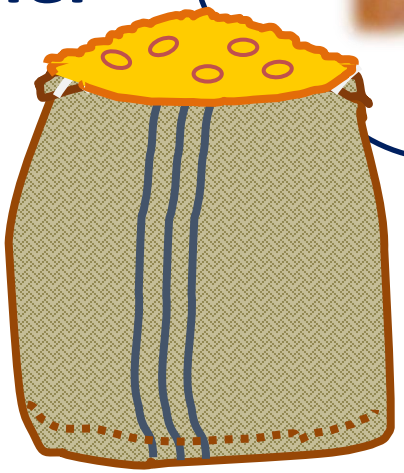
Then…



Farmer

Quality Inspection



High Quality!

Market Woman

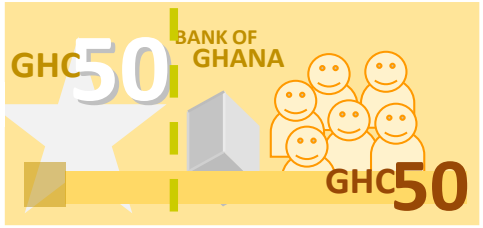
Then…

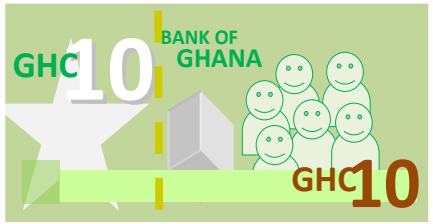
- After producing high quality paddy at the TENSUI Project, Mr. Adam actively worked on market women who do strict inspection to distinguish quality paddy.
- The market woman recognized that the quality of Mr. Adam's paddy is high enough to produce high quality milled rice for higher price.

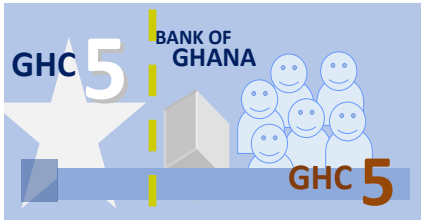
After!

High Quality!

Farmer



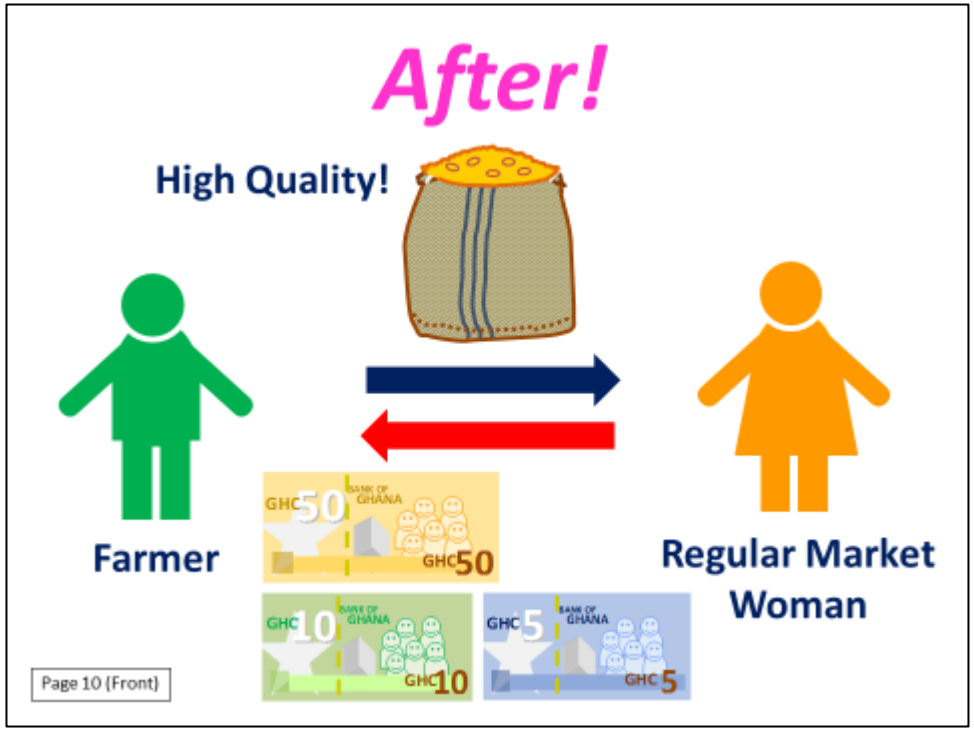




Regular Market Woman

After!

- Eventually, he managed to establish a reliable relation with the market woman, who paid GHC65/84kg paddy to him.
- She became a regular market woman.



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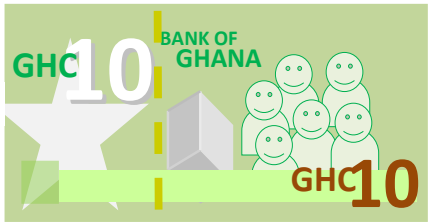
After!

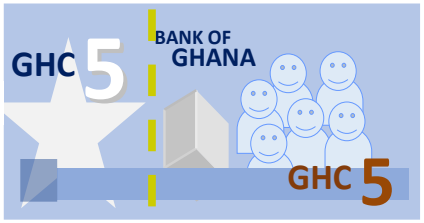
High Quality!

I have no cash today

Farmer

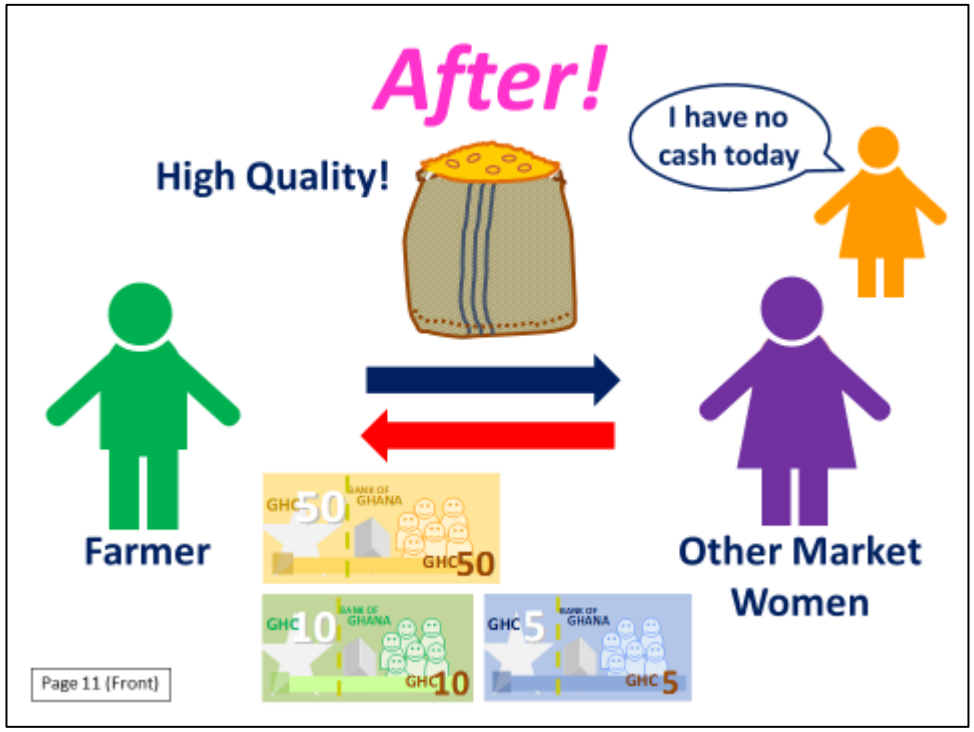
Other Market Women





After!

- Even when the regular market woman has no cash, Mr. Adam could be connected with other market women who were able to buy his paddy still at GHC65/84kg paddy.
- Mr. Adam says, “I only stay in my community to sell the paddy to market women who visit me. When I don’t want to sell, I can keep the paddy in my storage till I am able to sell it at satisfactory price. Although I don’t sell my paddy when I don’t agree about the price which buyers present, they come back to me in the end to purchase the paddy at the price I present due to its quality.”



Case 3:

Let’s Produce Seeds for Profit!

Let's Produce Seeds for Profit!

- Do you know activities required for seed production?
- Do you know cost for seed production?
- Do you know how much you can earn through seed production?

➔Let's learn about a good practice of seed production today!

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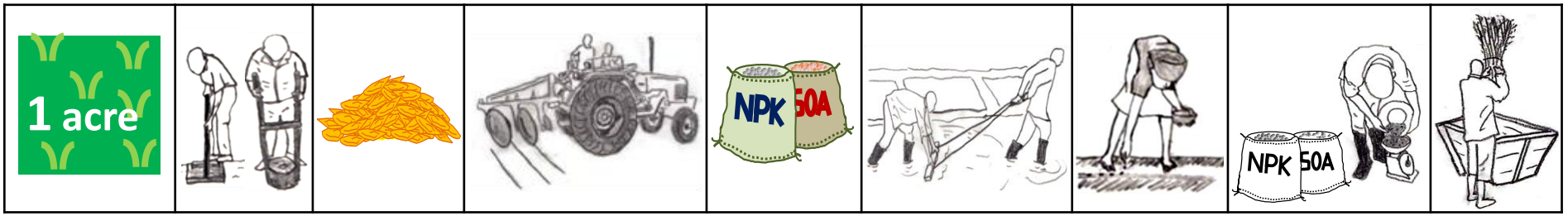
Production Cost per Acre

Grain Farmers

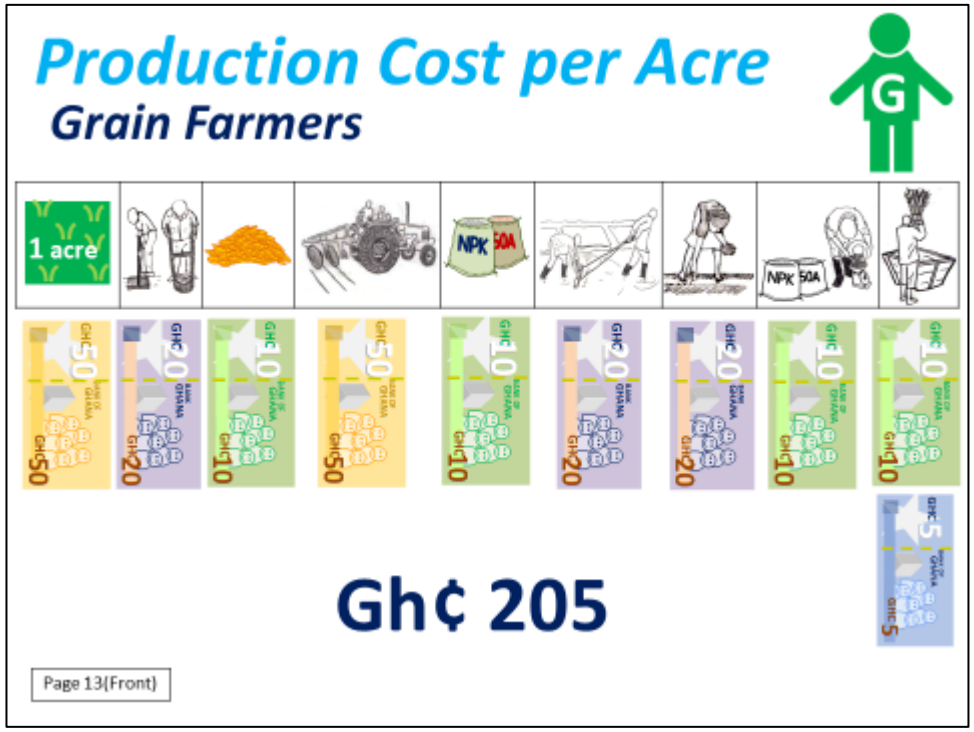


Gh¢ 205

Production Cost per Acre

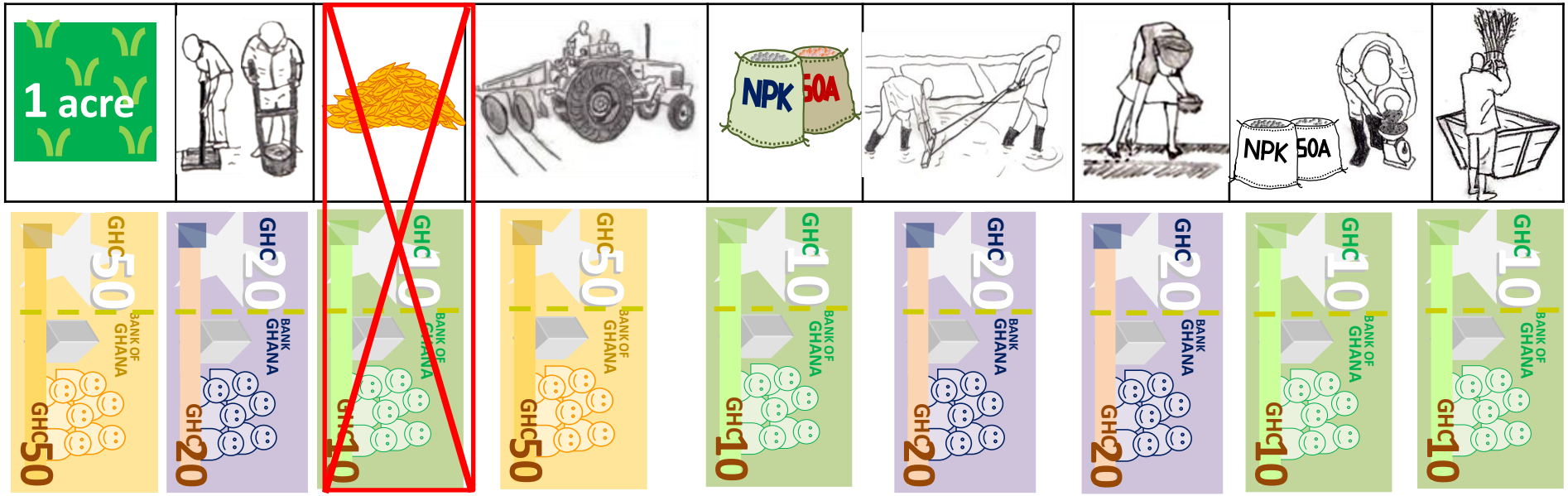
Grain Farmers

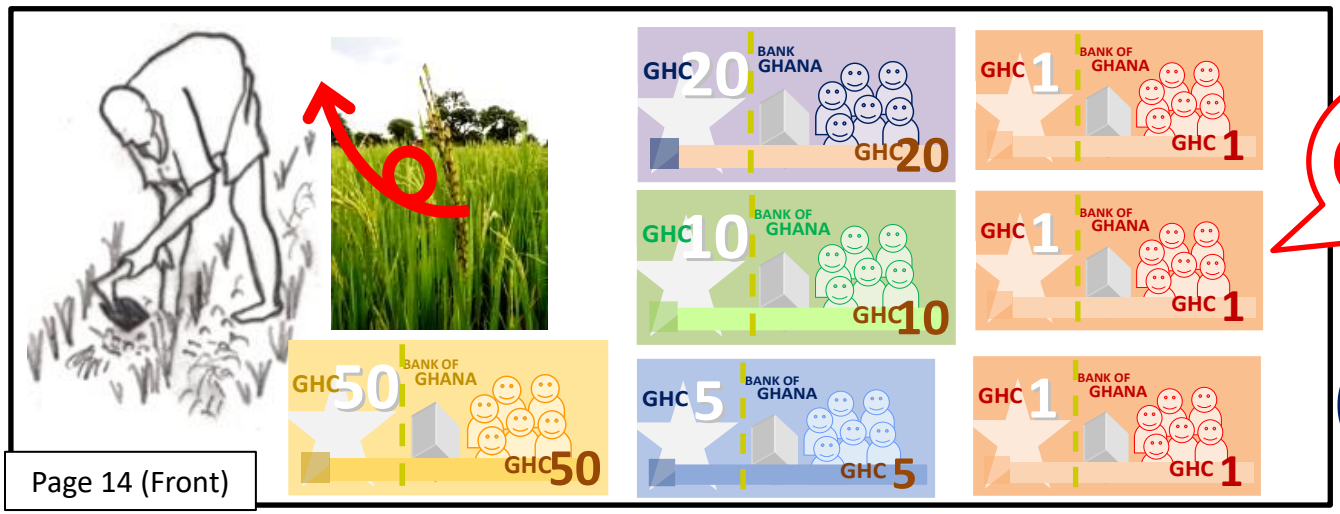
- Grain farmers need around GHC205 for grain production. For example, they spend money for land rent, land development, seed, tractor, fertilizer, etc.



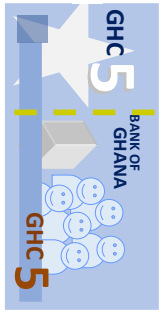
Production Cost per Acre

Seed Farmers





GH¢ 88

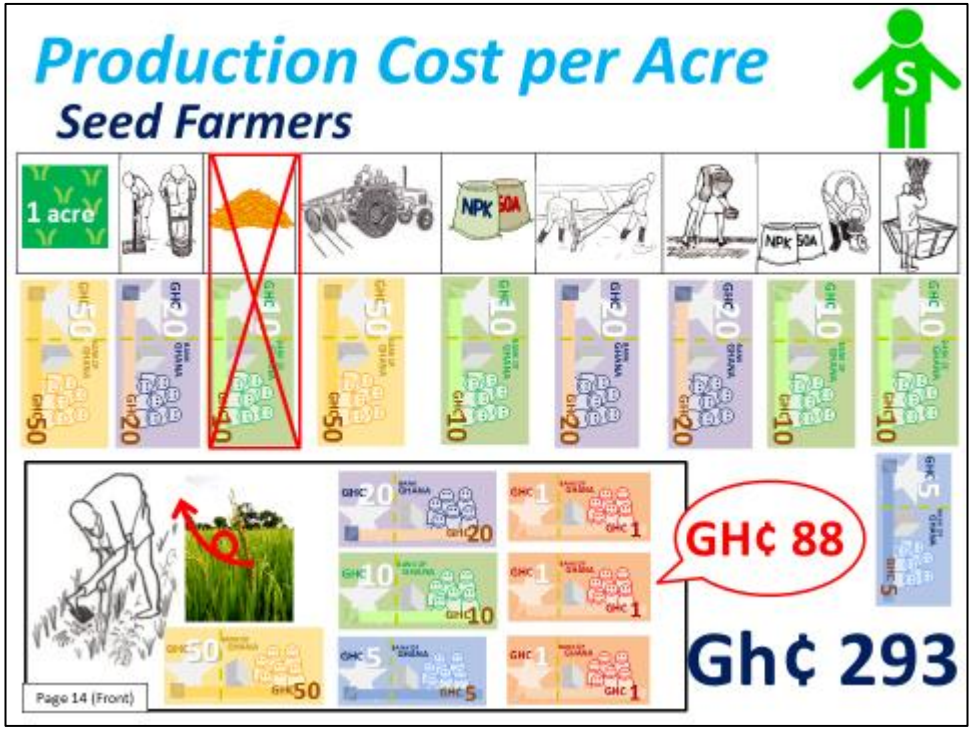


Gh¢ 293

Production Cost per Acre

Seed Farmers

- Seed farmers need around GHC293 for seed production, which is around 1.5 times than grain producers' cost, excluding cost for grain seed.
- For example, they may spend extra money for weeding and off-type removal, which are important to keep purity of the product as seed.



Additional Cost for Seed Production per Acre

Foundation Seed (30kg) : Gh¢ 240

Registration: Gh¢ 50

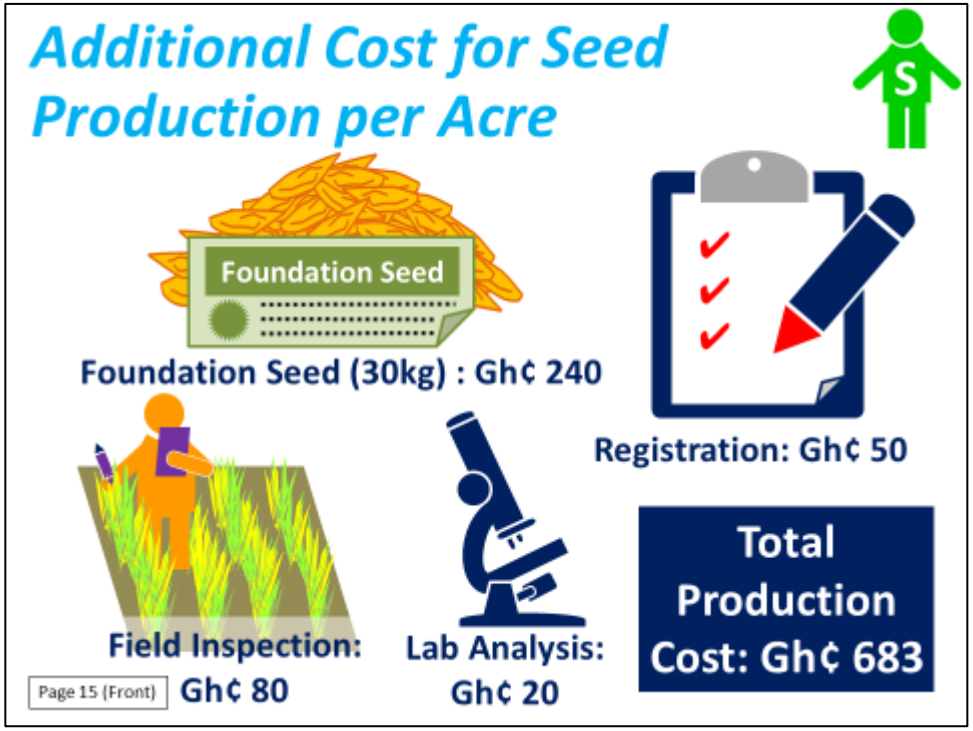
Field Inspection: Gh¢ 80

Lab Analysis: Gh¢ 20

Total Production Cost: Gh¢ 683

Additional Cost for Seed Production per Acre

- In addition, seed farmers need to pay to purchase foundation seed, registration, field inspection (GHC20 x 4 times = GHC80) and lab inspection.
- In total, their production cost will be GHC683 per acre, around 3.3 times than grain producers' cost.



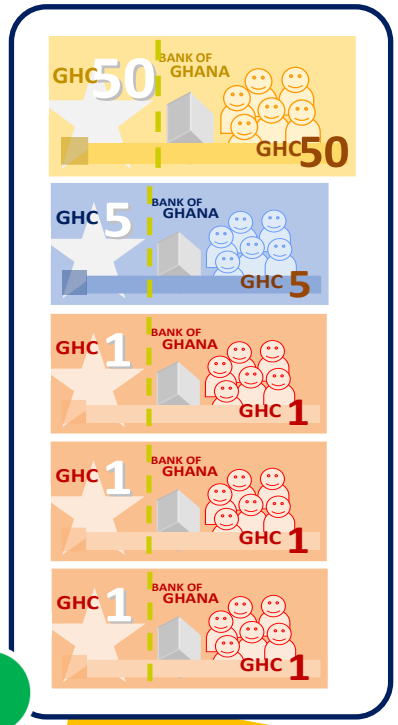
Production

Production

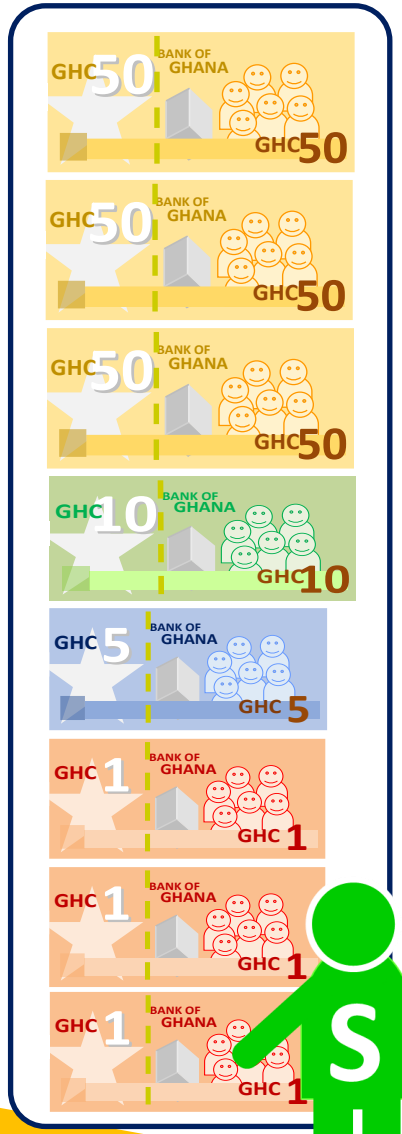
- Let's look at production of grain farmers and seed farmers! Grain farmers gained 12 bags (84kg bag) per acre whereas seed farmers gained 9 bags per acre.
- This is because the seed farmers apply 30cm x 15cm spacing for sowing to gain higher quality while grain farmers apply 30cm x 10cm as recommended by the TENSUI2 Project for higher yield.

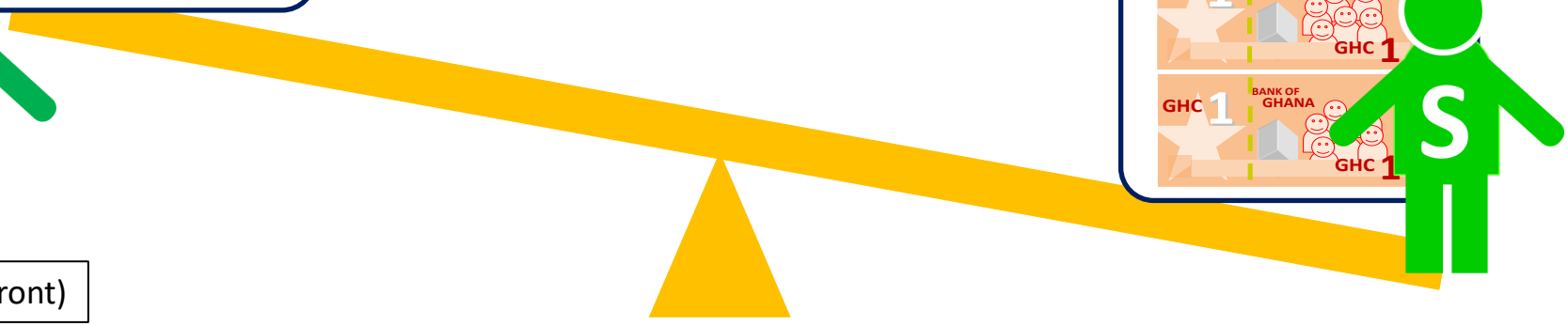
Unit Price

Gh¢58/bag



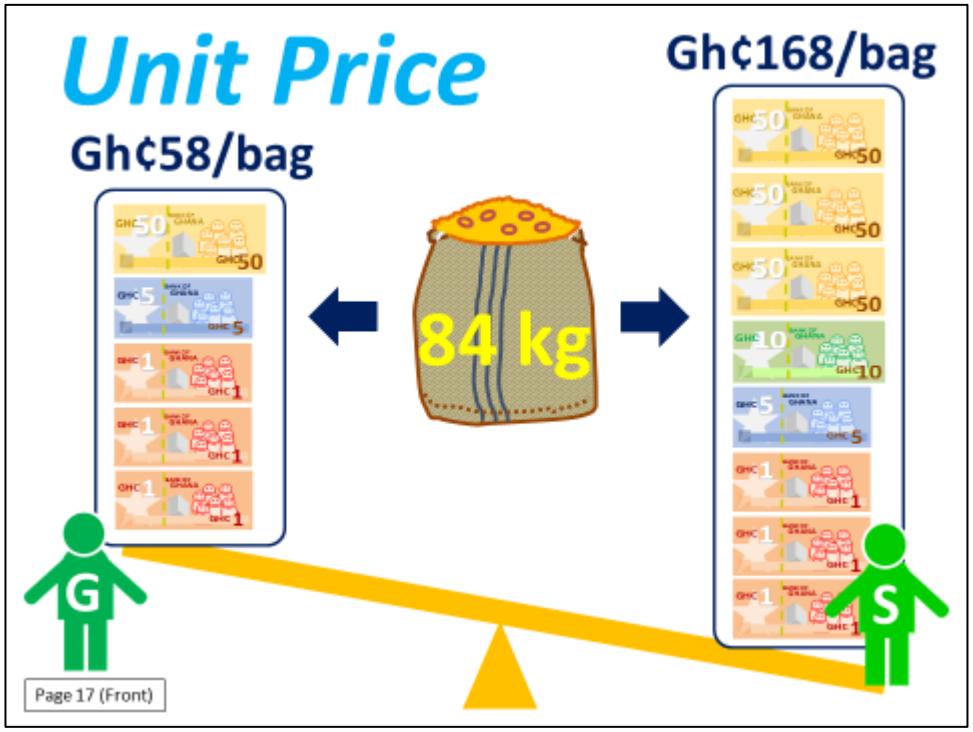
Gh¢168/bag





Unit Price

- Selling price of grain paddy was GHC58 per 84kg bag whereas selling price of seed paddy was…… GHC168 per 84kg bag!!



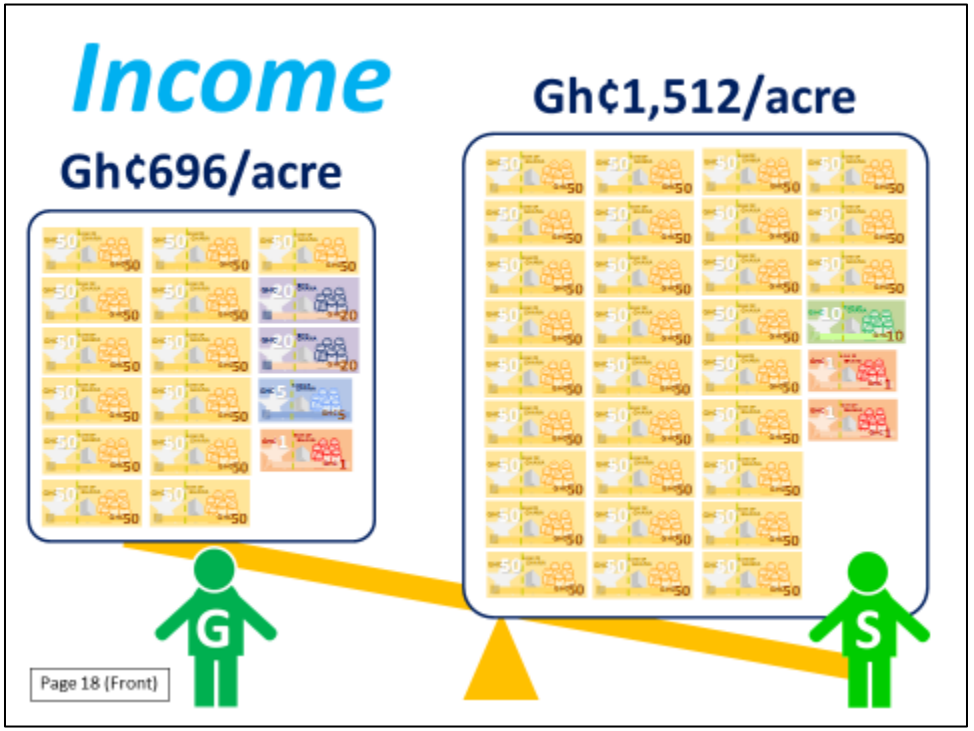
Income

Gh¢696/acre

Gh¢1,512/acre

Income

- Income through grain paddy was GHC696/acre whereas income through seed paddy was…… GHC1,512/acre!!



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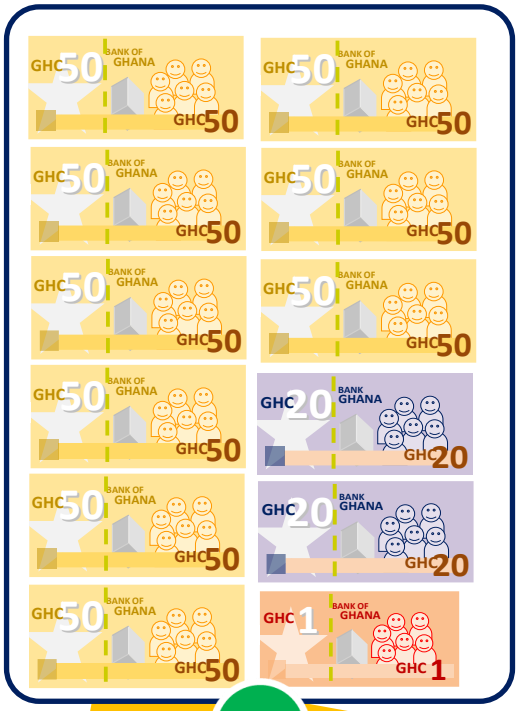
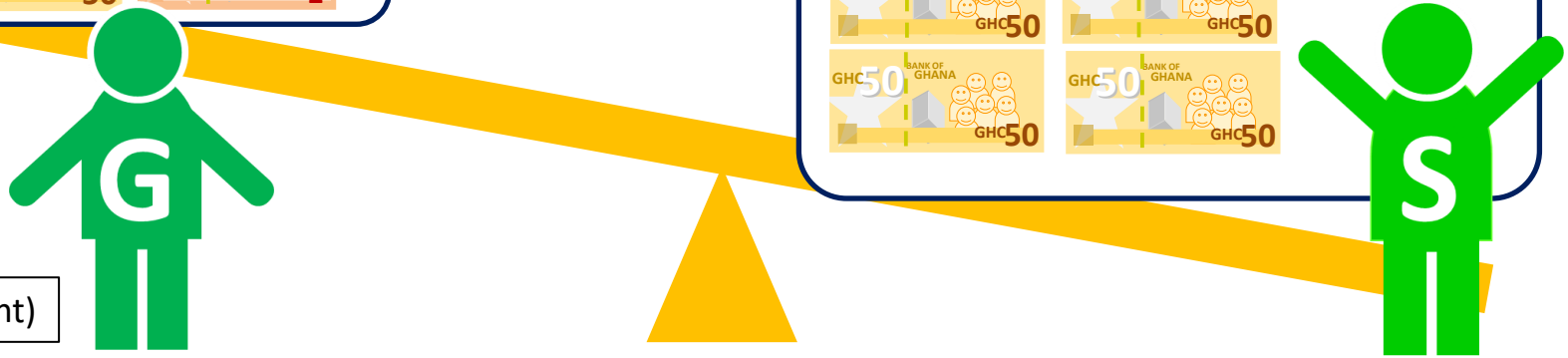
Profit!!

Gh¢491/acre

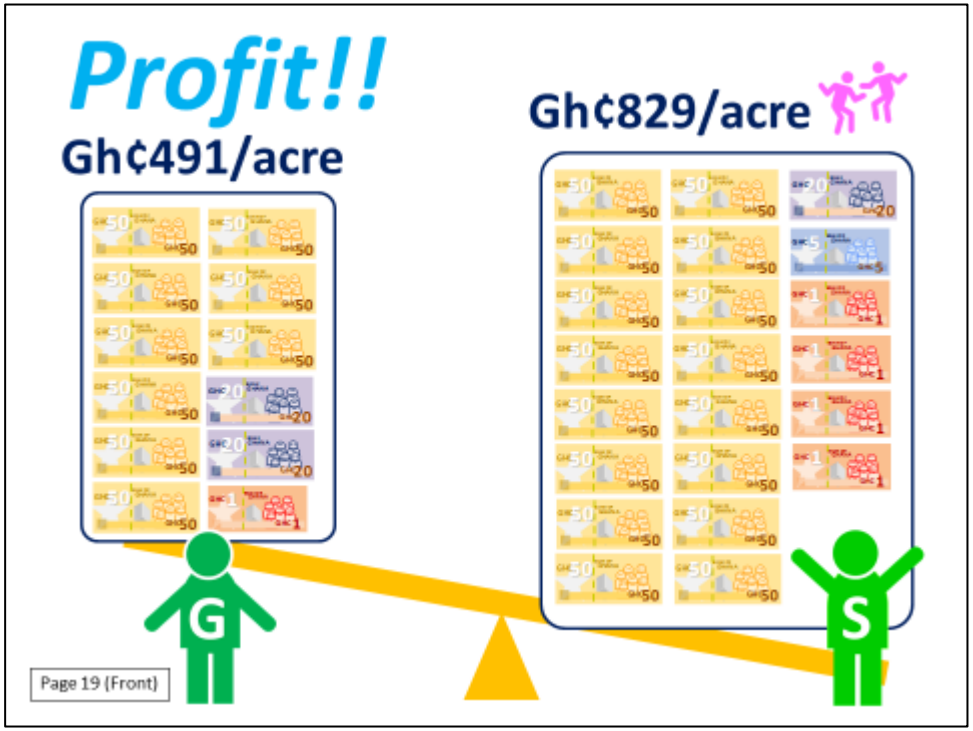


Gh¢829/acre



Profit!!

- Then… profit through grain paddy was GHC491/acre whereas profit through seed paddy was…… GHC829/acre!!



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Case 4:

Saving Input Cost for Profit

-Cyprian of Konongo, Ashanti-

Case 4:

- Let's learn about a good practice of Cyprian of Konongo Commynity in Asante Akyem Central District of Ashanti Region! (shared in August 2014)

Case 4:

Saving Input Cost for Profit

-Cyprian of Konongo, Ashanti-

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In 2012…

GHC 31/50kg bag

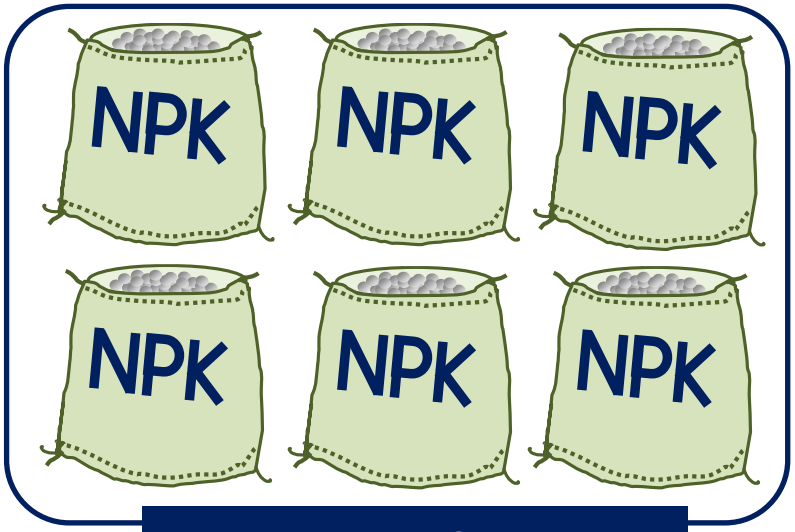
GHC 32/50kg bag

GHC 11.5/1 L bottle

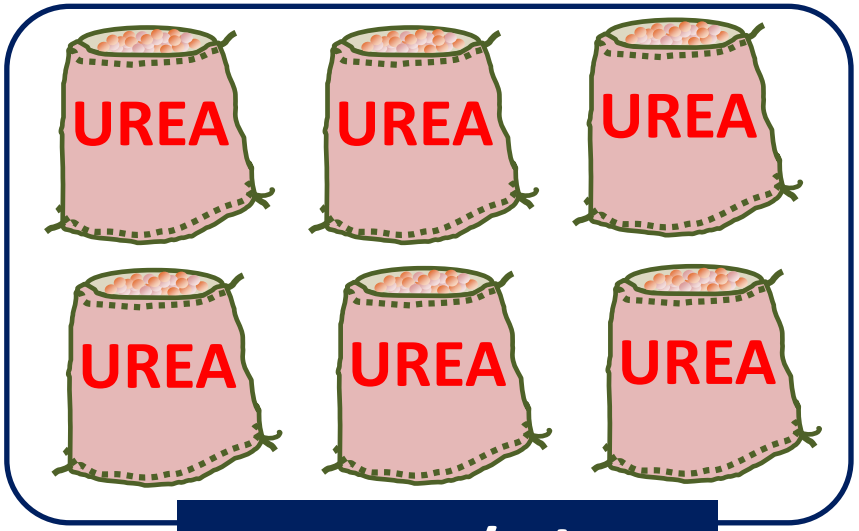
In 2012…

- In 2012, unit price for 50kg bag of NPK was GHc 31 and Urea cost GHc 32 per 50kg bag.
- A litre of herbicide was sold at GHc 11.5

At the End of the Cultivation Season in 2012…



GHC 186/6 bags



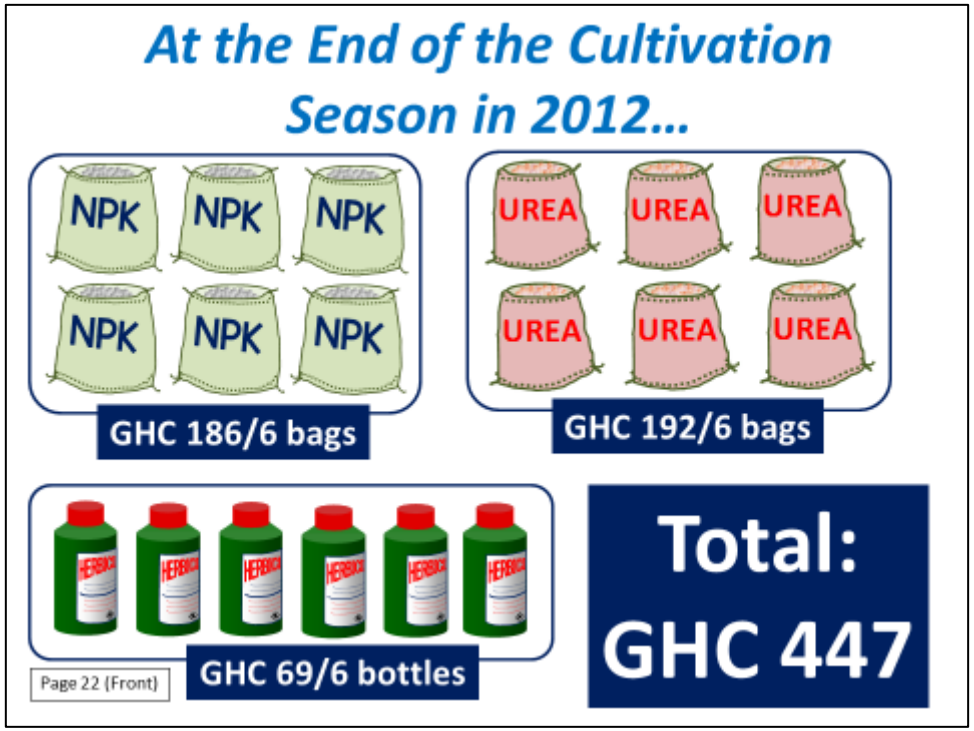
GHC 192/6 bags

GHC 69/6 bottles

Total: GHC 447

At the End of the Cultivation Season in 2012…

- At the end of cultivation season in 2012, Mr. Cyprian decided to buy 6 bags of NPK at the cost GHc 186. He also spent GHc 192 on 6 bags Urea. Again he purchased 6 litres of herbicide at cost of GHc 69.
- In total, he spent GHc 447 on the three inputs.



In 2013…

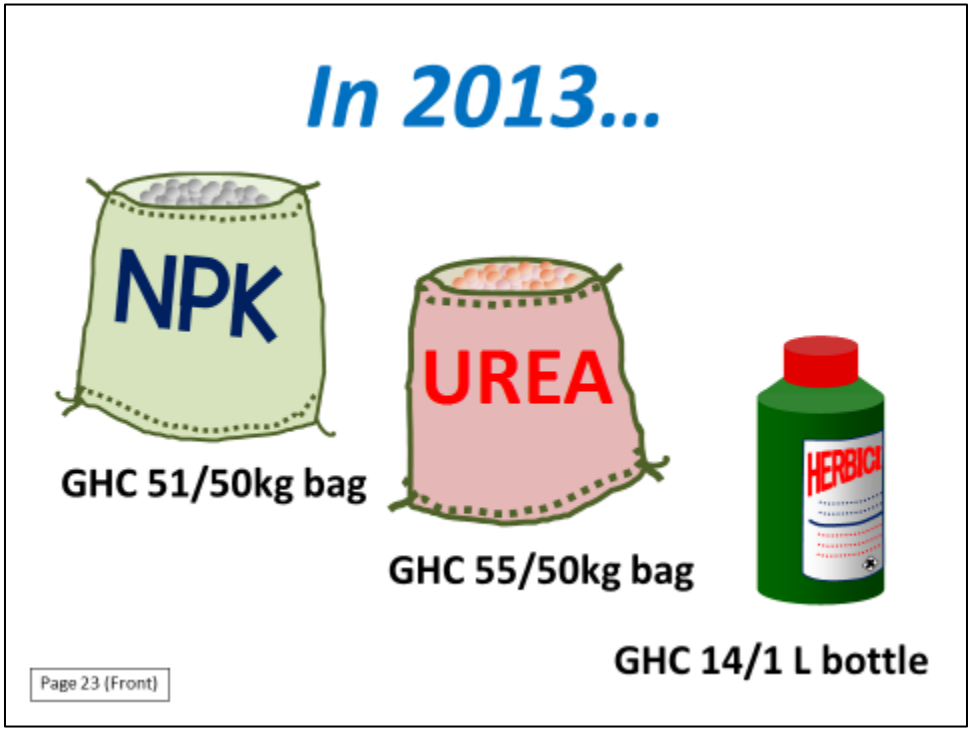
GHC 51/50kg bag

GHC 55/50kg bag

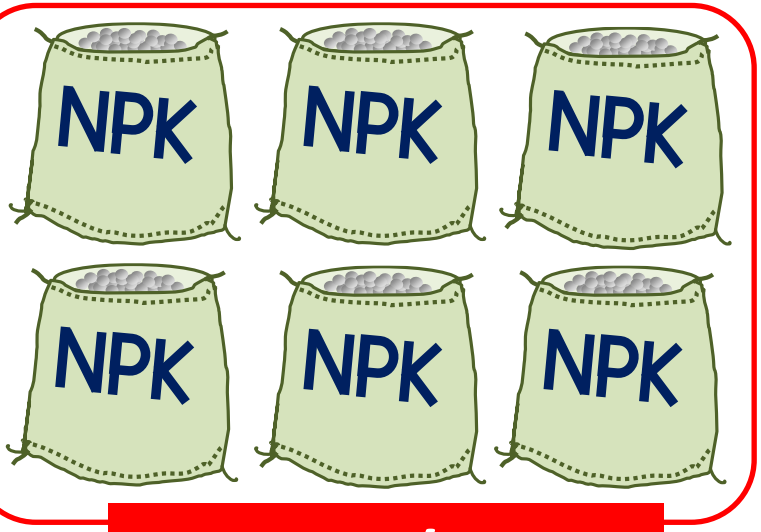
GHC 14/1 L bottle

In 2013…

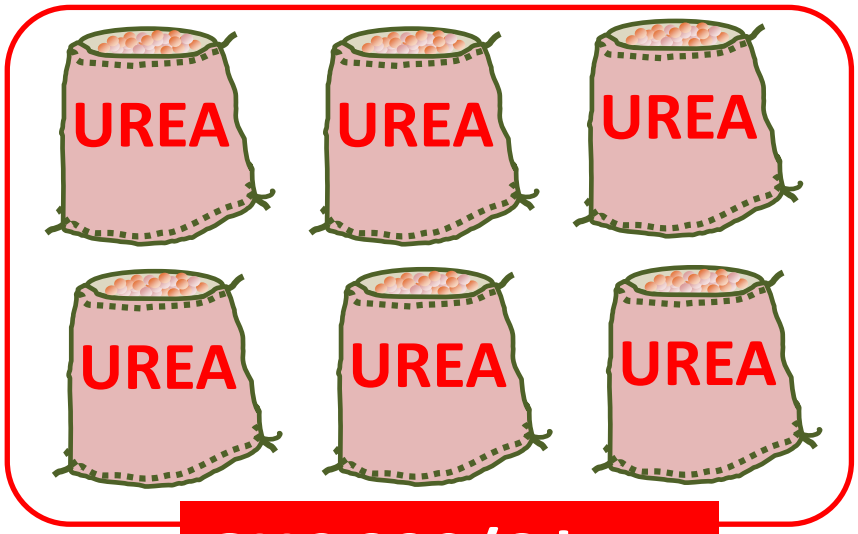
- In 2013, NPK price increased to GHc 51/ 50kg bag whilst Urea was selling at GHc 55/ 50kg bag. A litre bottle of Herbicide was also increased to GHc 14.



If He Purchased the Inputs in 2013, He Would Have Spent…



GHC 306/6 bags



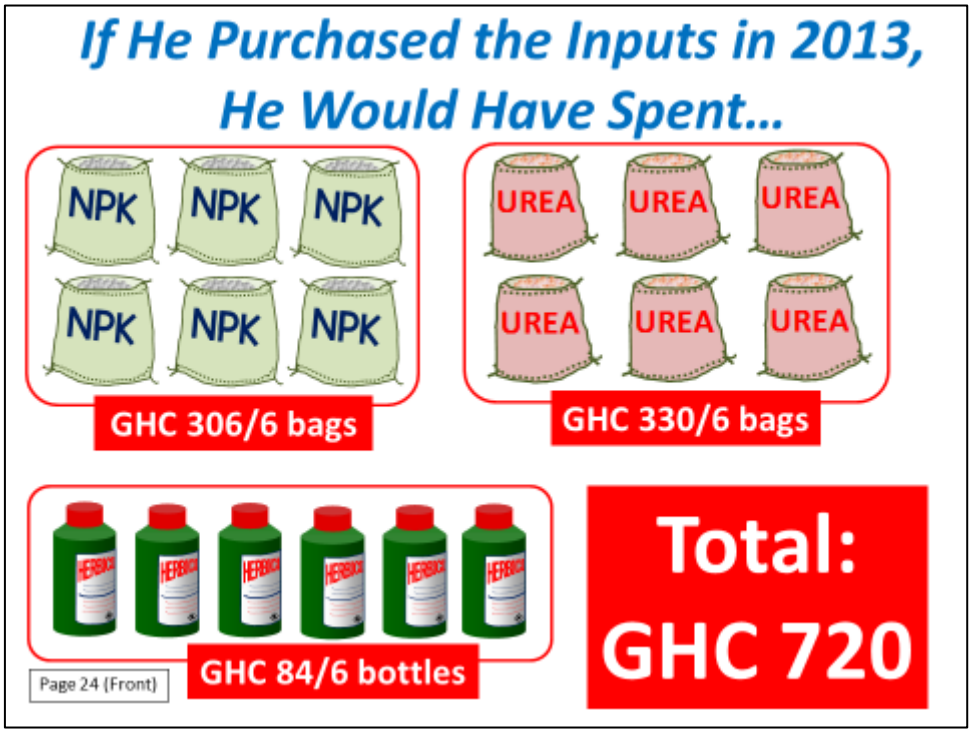
GHC 330/6 bags

GHC 84/6 bottles

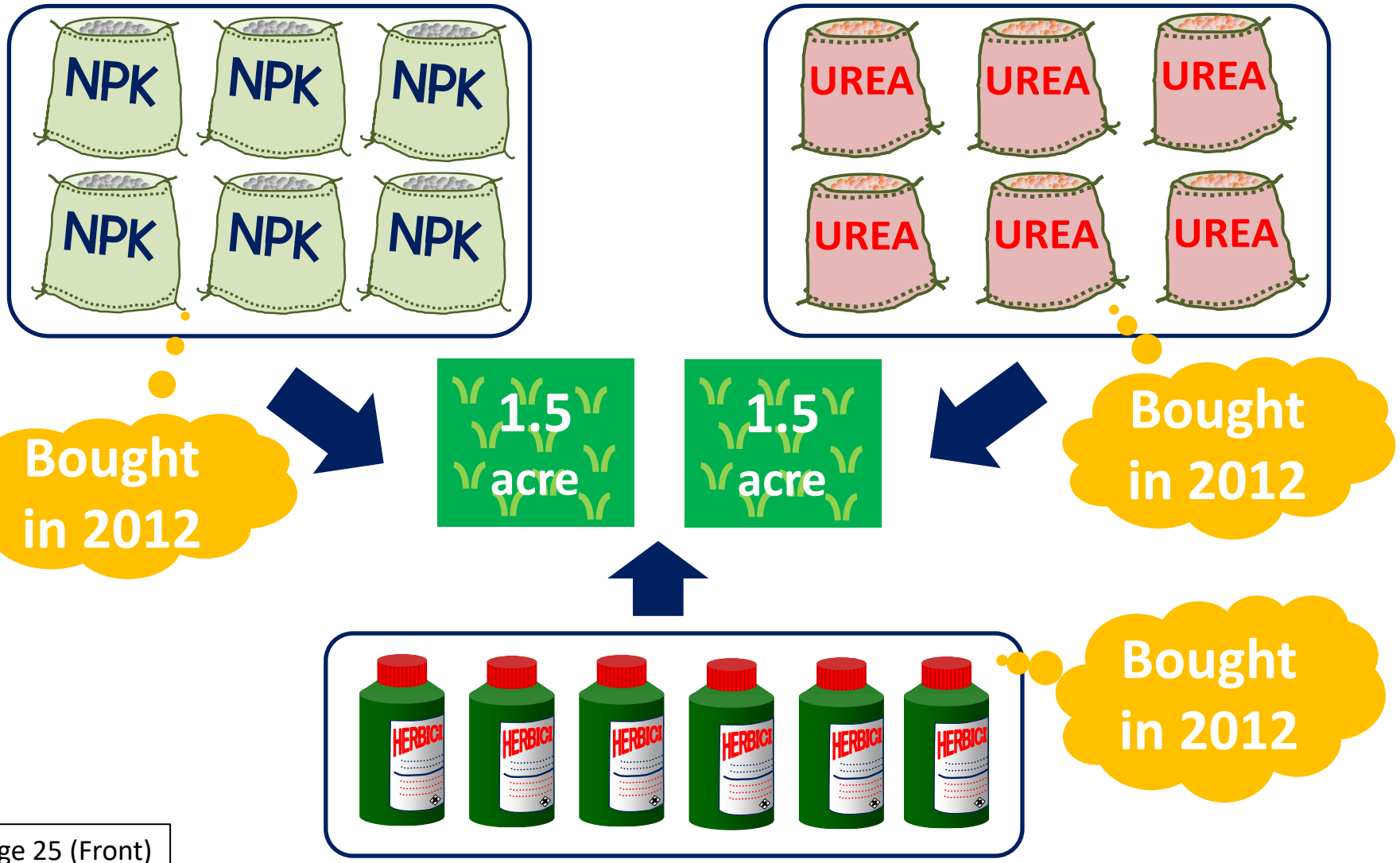
Total: GHC 720

If He Purchased the Inputs in 2013, He Would Have Spent…

- If Mr. Cyprian was to purchase same quantity of inputs in 2013, he would have spent GHc 720 in total.

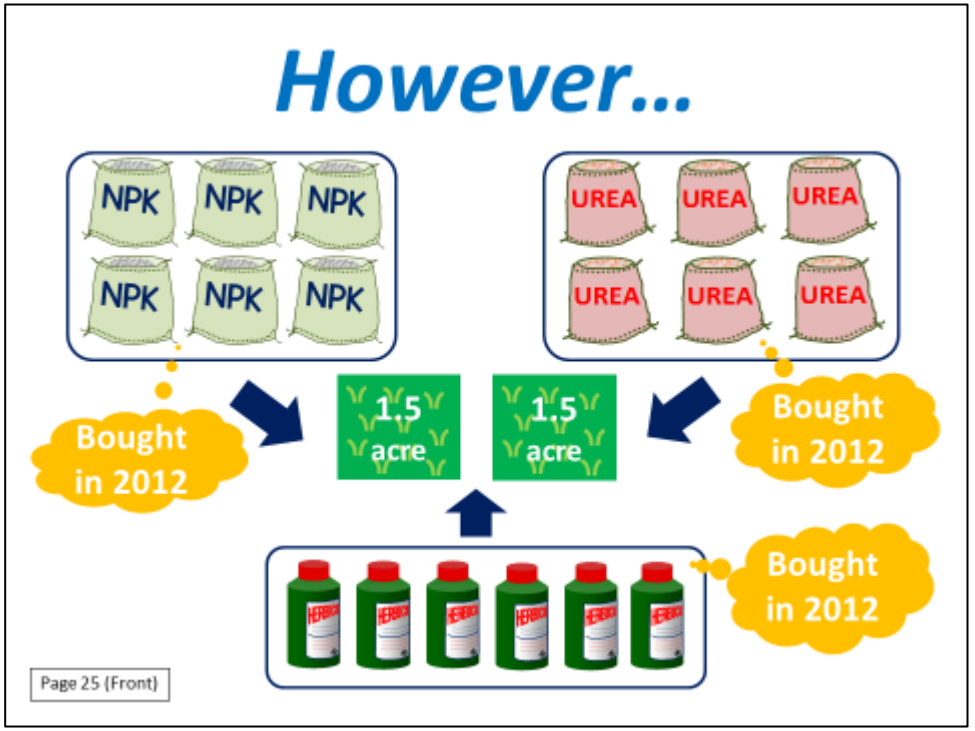


However…


NPK
NPK
NPK
NPK
NPK
NPK
UREA
UREA
UREA
UREA
UREA
UREA
Bought in 2012
1.5 acre
1.5 acre
Bought in 2012
HERBICI
Bought in 2012

However…

- However, he used the inputs acquired in the previous year (2012) for his 3 acres rice field in 2013.



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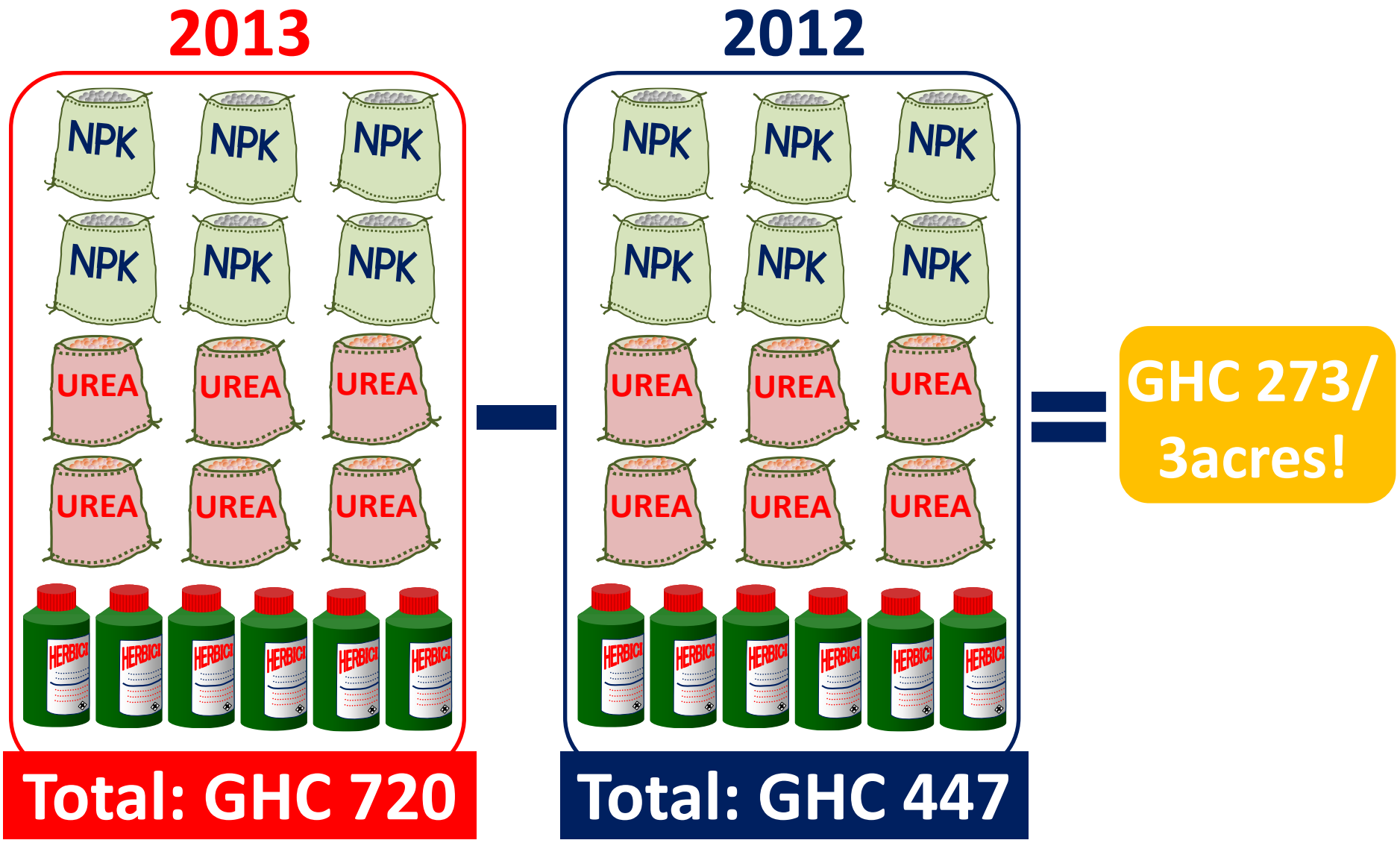
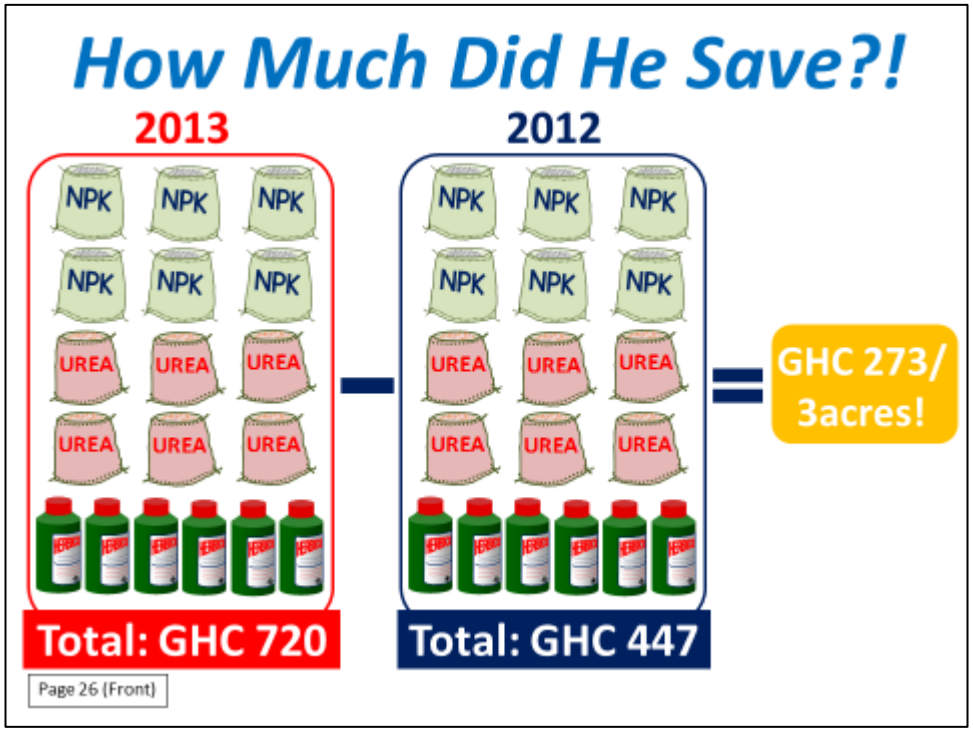
How Much Did He Save?!



How Much Did He Save?!

- How much did he save when he purchased Inputs in advance?
- In 2013 the inputs cost GHc 720. Meanwhile, he spent GHc 447 on same quantity of inputs in 2012.
- Since he bought in advance, he made saved GHc 273 on 3 acres!!!

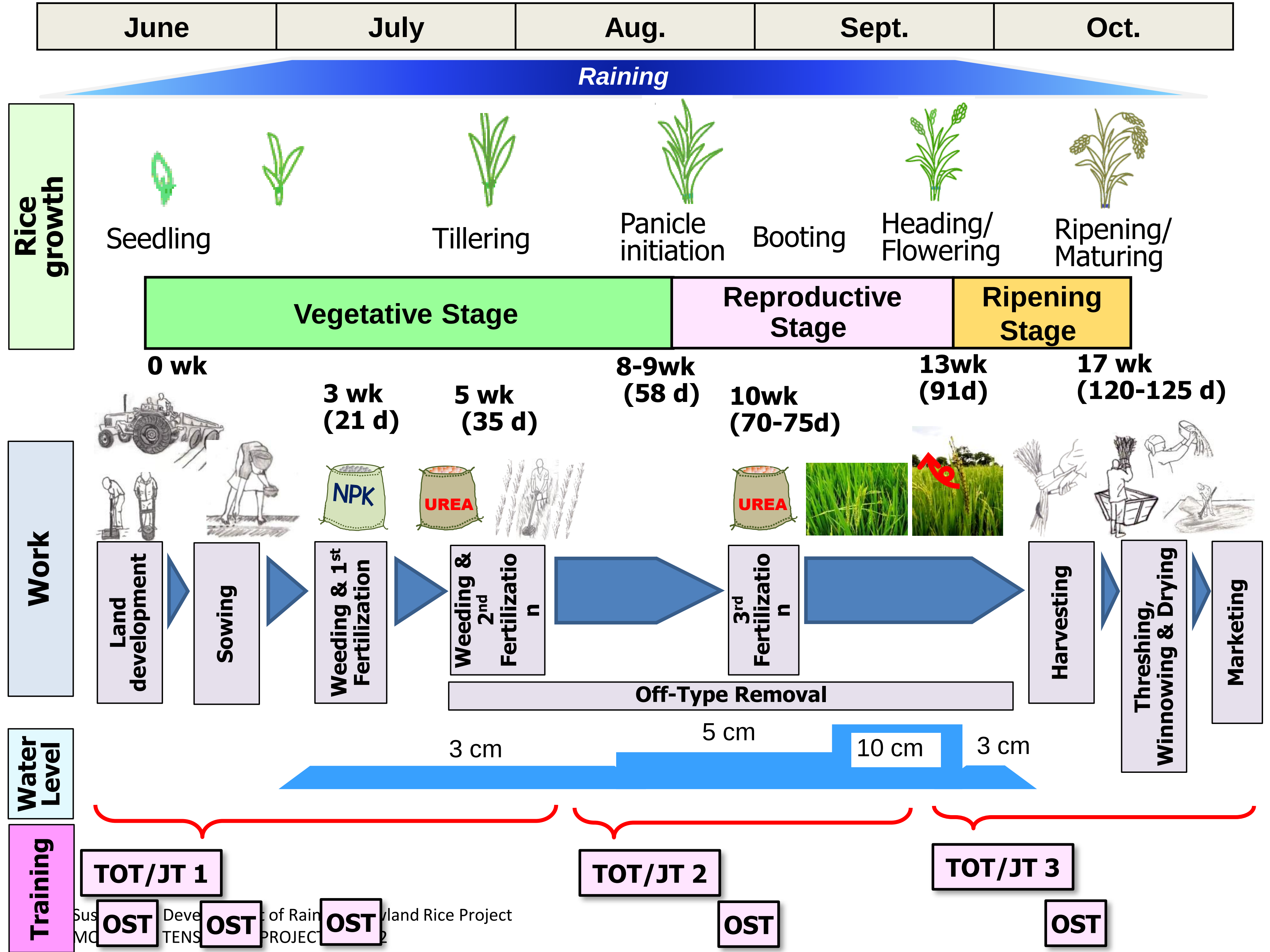


Extension

2nd TOT

Contents

1. Relationship between Standard Cropping Calendar & Training
2. Training Topics to be covered and Material to be used at On-Site Training (after sowing)
3. Points of Monitoring by AEAs
4. Group Formation
5. Sample Program for 2nd TOT at district


June
July
Aug.
Sept.
Oct.
Raining
Rice growth
Seedling
Tillering
Panicle initiation
Booting
Heading/ Flowering
Ripening/ Maturing
Vegetative Stage
Reproductive Stage
Ripening Stage
0 wk
3 wk (21 d)
5 wk (35 d)
8-9wk (58 d)
10wk (70-75d)
13wk (91d)
17 wk (120-125 d)
Work
NPK
UREA
UREA
Land development
Sowing
Weeding & 1st Fertilization
Weeding & 2nd Fertilization
3rd Fertilization
Off-Type Removal
Harvesting
Threshing, Winnowing & Drying
Marketing
Water Level
3 cm
5 cm
10 cm
3 cm
Training
TOT/JT 1
TOT/JT 2
TOT/JT 3
OST
OST
OST
OST
OST

TRAINING TOPICS TO BE COVERED AND MATERIAL TO BE USED AT ON-SITE TRAINING

For OST by district

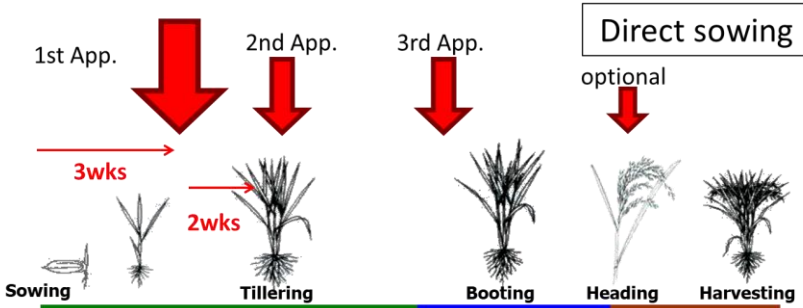
On-Site Training Materials

- **in the form of a Flipchart**

Face

RC OST 2-1

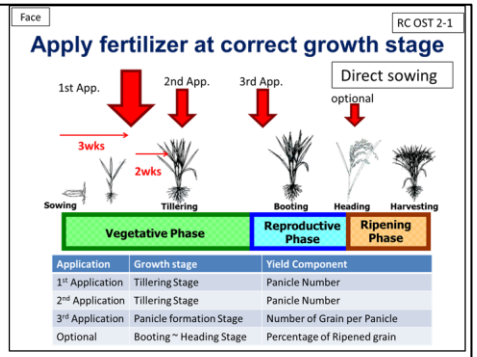
Apply fertilizer at correct growth stage



Application	Growth stage	Yield Component
1st Application	Tillering Stage	Panicle Number
2nd Application	Tillering Stage	Panicle Number
3rd Application	Panicle formation Stage	Number of Grain per Panicle
Optional	Booting ~ Heading Stage	Percentage of Ripened grain

Back side

Fertilizer is applied 3 times at particular times according to growth stage.



In Direct Sowing

- 1st application is done 3 weeks after sowing.
- 2nd application is done 2 weeks after 1st application.
- Note that the timing of 1st and 2nd fertilizer application is different in case of transplanting.

Show <u>front side</u> to farmers.

<u>Back side</u> is for AEA use.
AEA can explain in accordance with the instructions provided.

How to use On-Site Training Materials

Kente Training Plot,
Amansie Central District

Kyeremfaso Training Plot,
Mampong Municipal

OST	Work in a Training/Demo Plot	Training Topics to be covered and Material to be used		
		Rice Cultivation	Land Development	Farm Management
2nd	Fertilizer Application (1st), weeding	Fertilizer management, weed control, pest & disease control	*Monitor the condition of bund and repair it if necessary*	*Monitor whether farmers keep record and give them advice*
	Fertilizer Application (2nd), weeding	Same as above	*Same as above*	*Same as above*
	Young panicle observation, Fertilizer Application (3rd),	Same as above	*Same ad above*	Value chain establishment, Marketing questionnaire
	Heading (determine the heading date)	Off type removal, bird scaring, timing of harvest	*Same as above*	*Provide marketing advice based on the results obtained questionnaire*

OST	Work in a Training/Demo Plot	Training Topics to be covered and Material to be used		
		Rice Cultivation	Land Development	Farm Management
3rd	Harvesting, threshing, winnowing	Harvesting, Post-harvest		A tale of two farmers
	Drying, Storing, Milling, Selling			*Collect end-line data from group farmers*

Effective use of OST materials make farmers understand well.

- ✓ Explain theory, benefit and function of newly introduced technologies e.g. bund construction, leveling, seed selection, drilling, split fertilizer application etc. before the work.
- ✓ Explain the impact of adopting newly introduced technologies by showing result at demo plot e.g. good germination is the output from leveling and seed selection etc. after work.

Points of Monitoring by AEAs (1)

[After Sowing]

- Visit the demo plot within a week and check for;
  - **Germination**
  - Water level in the field
  - Bund condition
  - Effect of pre-emergent herbicide

⇨ Repair bund anytime.

Drain water if too much flood before germinate.

Replant seed or refill seedlings if necessary.

Keep optimum water level after germinate.

Points of Monitoring by AEAs (2)

[After 1st/2nd Fertilizer Application]

- Keep contact with key farmer to know the demo plot condition.
- Visit the demo plot and check for the following;
  - **Enough water level in the field**
  - Bund condition
  - Proper weed control
  - Pest and disease appearance/incidence

➡ Report to DAO-Crops immediately if rice is damaged by pest or disease.

Points of Monitoring by AEAs (3)

[After 3rd Fertilizer Application]

- Visit the demo plot for continuously checking;
  - **Enough water level in the field**
  - Bund condition
  - Proper weed control
  - Pest and disease appearance
  - **Heading date** (defined as 50% of hills produced panicles)
  - Remove off types (rougueing)

➡ When you decide the heading date, record it in the demo-plot action plan & monitoring sheet.

Points of monitoring by AEAs (4)

Form 2: AEA Report

Form 2-1a: Demo-Plot Action Plan & Monitoring Sheet (1) Transplanting

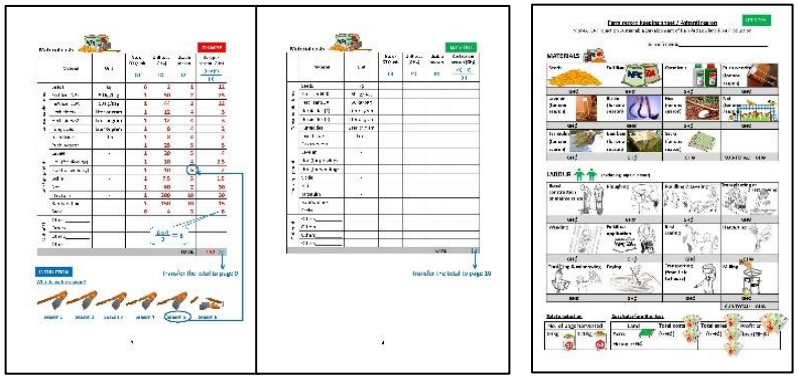
Name of AEA: Phone No. of AEA: Operational Area: District:	Number of Group Farmers: M: F: (Youth: Aged: PLWDs:) Name of Key Farmer: Phone No. of Key Farmer:	Community: Size of Demo Plot: acre Rice Variety:

No.	Field work	Action Plan			Monitoring			
		Week-based Time frame	Date-based Time frame (from ... to)	Recommended tool & inputs	Date implemented	No. of farmers participated	- Describe each activity in detail, - Evaluate each work whether it is implemented along with the guideline	Remarks on the field and crop condition, if any
1	Seed preparation	1 week before sowing		Rice seeds, salt, egg, bucket, sieve, firewood, pot, seed net		M: F:		
2	Nursery preparation	1 day before sowing		Hoe, cutlass, garden line		M: F:		
3	Nursery management	from 1 day before sowing to the day for transplanting		Hoe		M: F:		
4	**Sowing**	**Week 0**		String, stick, hoe		M: F:	Quantity of seeds: kg	
5	Land clearing	3 weeks (or more) before transplanting		Cutlass		M: F:		
6	Bund construction	1 - 2 weeks before transplanting		Hoe, spade, garden line		M: F:		
7	Ploughing	1 week before transplanting		Hoe		M: F:		
8	Puddling and or Leveling	1 day before transplanting		Hoe, spade, leveller		M: F:		
9	Uprooting and seedlings preparation	1 day before transplanting		Strings		M: F:		
10	**Transplanting**	**3 weeks after sowing**		String, stick, garden line		M: F:	Row transplanting: cm x cm	
11	1st Weeding	5 weeks after sowing		Push weeder		M: F:		
12	1st Fertilizer application	5 weeks after sowing		Fertilizer, weighing scale, containers		M: F:	Type of fertilizer applied: Quantity applied: kg	
13	Off-type removal	From 5 weeks after sowing to the day for harvesting		No tool (hand removal)		M: F:		

[Monitoring of Action Plan]

- Are farmers following their Action plan?
- Do farmers understand the timing of 3rd fertilizer application?
- Have they already cleared weed (3rd weeding) by the time of 3rd fertilizer application?
- Are they aware of the timing of off-type removal after 3rd fertilizer application?

Points of monitoring by AEAs (5)



[Monitoring of Farm Record Keeping Book/Sheet]

- Do farmers understand how to use the materials?
- Are farmers recording cost in farm record keeping sheet/book or their own notebooks?
- Are calculations accurate?
- Was there any difficulty for farmers to use the materials?
  - ➢ The materials were too difficult to use (if so, which part?)
  - ➢ Any other personal reason (too busy to fill, used other materials, record keeping was not necessary)

GROUP FORMATION

For 2nd Joint Training

GROUP FORMATION & RICE EXTENSION ACTIVITIES

- A **group** is a collection of individuals who coordinate their individual efforts .
- Farmers in many communities have a long tradition of performing certain agricultural productive activities as a group rather than as individuals
- Group approach facilitates the transfer of knowledge, information and technologies as

The Role of AEAs in Group activities

- Facilitation role
- Helps in preparation of rice action plan and cropping calendar
- Input arrangement and technical information for demonstration plot establishment.
- Practical training for farmers from valley selection through to rice marketing.

The Role of AEAs in Group activities cont.

- AEAs ensure a cohesive group activity (Group bylaws, operation of bank account ,meetings etc).
- AEAs organized field events such as Field days, Field trips, etc.
- Monitoring and other roles

Some Key Criteria for selection of group members

- Group membership should be voluntary and optional by farmers.
- Farmers in same community and preferably in same valley or whose fields are near.
- Farmers who already have experience in rice cultivation
- Membership constitution should be by individual farmer‘s willingness (grouping) e.g. same social,religion,scale of production e.tc.
- 10 members in a group (1 Key farmer, 9 members)

The role of Key farmers and group members

- The Key farmer plays leadership roles and serves as a contact person
- He could also lead discussions during field days
- Should be able to teach and explain necessary rice techniques to other group members upon request.
- Group members transfer rice technology to colleague group farmers and other non-group rice farmers.

SAMPLE PROGRAM AND DETAILED TIMEFRAME/ POINTS TO BE EMPHASIZED

For 2nd Training of Trainers by district

Sample Programme for 2nd JT

Time	Topic
8:00-8:30 (0.5 hour)	Registration, Purpose of training
8:30-9:30 (1 hour)	Land Development
9:30- 11:30 (2 hours)	Rice Cultivation
11:30-13:30 (2 hours)	FMSS
13:30-14:30 (1 hour)	Lunch
14:30-15:30 (1 hour)	Extension, M&E
15:30-16:00 (0.5 hour)	Way forward Closing remarks

Detailed Time Allocation and Points to be Emphasized (1)

Purpose of the Training

Contents (Material names)	Mode of Training	Points to be Emphasized	Time Allocation
Purpose of the Training	Explanation by an Instructor	- Purpose of the training is - Participants should fully understand and be ready to train AEA/farmers on the following major topics; ➢ Water management and bund maintenance ➢ Timing of 3rd fertilizer application ➢ Value chain establishment and marketing support	5 min.

Detailed Time Allocation and Points to be Emphasized (2)

Land Development

Contents (Material names)	Mode of Training	Points to be Emphasized	Time Allocation
Water Management and Valley Expansion	Presentation and explanation by Trainer	- Water harvesting - Water management under rain-fed conditions [On-plot & off-plot water management] - Water management techniques [Diversion & Control techniques] - Valley expansion	25 mins
Bund Maintenance and Repairs	Presentation and explanation by Trainer	- Maintenance and repair of constructed bunds	10
Canal Construction	Presentation and explanation by Trainer	- Points to note when constructing a canal	5 mins

Detailed Time Allocation and Points to be Emphasized(3)

Rice Cultivation (1)

Contents (Material names)	Mode of Training	Points to be Emphasized	Time Allocation
Fertilizer Management	Presentation by Crop Officer	- Apply fertilizer at correct growth stage - Timing of third fertilizer application should be 18 – 20 days before heading. - Don't apply fertilizer around 30 days before heading; this could result in lodging. - Observe young panicles to judge number of days before heading	20 minutes
Observation of Young Panicle	Presentation by Crop Officer, Hands-on Practice	- Panicle initiation starts about 33 days before heading. - Observe young panicles by pealing leaf sheaths. - Apply fertilizer when young panicles reached 1-3 cm long.	30 minutes
Disease and Pest Control	Presentation by Crop Officer	- Features of Rice Blast - Primary options of rice blast control - Chemical control of rice blast - Virus disease	30 minutes

Detailed Time Allocation and Points to be Emphasized (4)

Rice Cultivation (2)

Contents (Material names)	Mode of Training	Points to be Emphasized	Time Allocation
Chemical Control	Presentation by Crop Officer	- Points for attention (in general)	10 minutes
Quality Seed Production		- Purpose of quality seed production - Seed Quality Standards - Important cultivation know-how	10 minutes
Estimation of Harvesting Time		- How to decide heading date - How to Judge harvesting time by panicle observation - Use of accumulated temperature	20 minutes

Detailed Time Allocation and Points to be Emphasized (5)

FMSS

Contents (Material names)	Mode of Training	Points to be Emphasized	Time Allocation
Introduction (What is marketing)	Explanation by an Instructor	• How to achieve high quality Rice from field activities to shop. • Check sheet for marketing opportunities • Resources for marketing support	35 min. 15 min. 10 min.
Connecting farmers to Buyers for high Profit	Explanation by an Instructor	• Rice Value Chain Actors • Collect information • Lets discuss how to support rice farmers	10 min. 15 min. 25 min.

Detailed Time Allocation and Points to be Emphasized (6)

Extension (1)

Contents (Material names)	Mode of Training	Points to be Emphasized	Time Allocation
Relationship between Standard Cropping Calendar & Training	Presentation by extension officer	- Explain about topics covered and timing of training according to the standard cropping calendar. ✓ 1st TOT/JT covered from nursery preparation to 2nd fertilization & weeding. ✓ 2nd TOT/JT covers from 3rd fertilization to off-type removal. ✓ 3rd TOT/JT will cover from harvesting to milling.	5 minutes
Training Topics to be covered and Material to be used at On-Site Training		- Show OST materials to AEAs and explain how to use.	15 minutes

Detailed Time Allocation and Points to be Emphasized (6)

Extension (2)

Contents (Material names)	Mode of Training	Points to be Emphasized	Time Allocation
Points of Monitoring by AEA	Presentation by extension officer	- Every after OST, AEA in charge should make close visit to the plot and monitor the field condition. Check points are as shown in the slides.	10 minutes
Group formation			5 minutes

Detailed Time Allocation and Points to be Emphasized (6)

M&E

Contents (Material names)	Mode of Training	Points to be Emphasized	Time Allocation
2nd quarter progress report	Presentation by desk officer	- Share the progress and achievement of rice extension during the 2nd quarter, compare to the annual target. ✓ Number of demo plots established, ✓ Activities done at demo plots, ✓ How many trainings conducted, ✓ Number of farmers trained	15 minutes
		- Challenges observed during the 2nd quarter rice extension activities. - Show countermeasures.	5 minutes

Detailed Time Allocation and Points to be Emphasized (7)

Way forward

Contents (Material names)	Mode of Training	Points to be Emphasized	Time Allocation
Way Forward		- Remind AEAs for submission of; ☐ Baseline data of target farmers (Form 2-2) ☐ Monitoring sheet (Form 2-1)	1 minute


Sustainable Development of Rain-fed Lowland Rice Production
RICE WE CAN!
JICA

END

Planning & Budgeting

2nd TOT

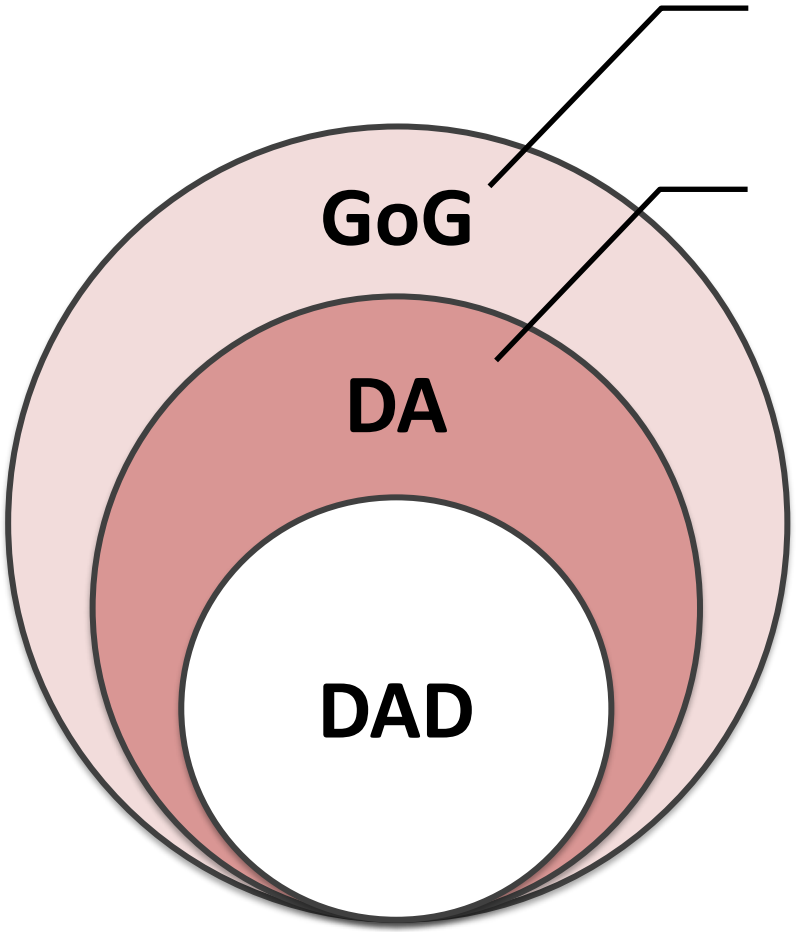
Securing Fund for Rice Extension
Characteristics by Sources of Fund

01 MAG	02 GoG/DACF/ IGF & PFJ	03 Input Dealers Farmers
Easy access Big amount Time limited	Communication Required No Time bound (budgeted annually)	Communication Required In-kind No time bound
No activity once MAG finishes.	**Sustainable once obtained.**	**Sustainable once obtained.**

- ✓ Don't rely on MAG only (Delay like this year would be encountered)
- ✓ Try GoG/DACF/ IGF in addition to MAG
- ✓ Involve Input Dealers (Through PFJ or Invite Input Dealers to the most successful demo just before Harvest.)

This Year's Budget TOO!!!

What is the challenge? : Recognition of DAD



- **Late Disbursement: 1 district**

- **There are problems in DA: 5 districts**
  - ✓ GoG is allocated, but no allocation of DACF & IGF
  - ✓ Taking Time in releasing funds (“Bureaucracy”)
  - ✓ Technical problem occurred in DA to release fund
- **No Problem to access: 2 districts**

How can we overcome the challenges for funds from DA?

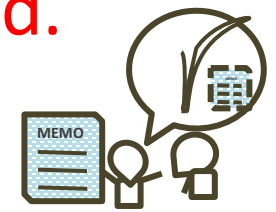
Figure: Recognition of DAD in candidate cycle districts

Source: Action Plans to Secure Funding submitted for selection of Cycle districts.

THEN, HOW CAN WE INVOLVE DA?

How can we involve DA? (For Budget Negotiation with DA)

- Be proactive with budget request from Assembly. (Two weeks before the activity at least)
- Be ready to attract DA
  - ✓ Have an idea about cost for rice extension.
  - ✓ Success story
  - ✓ Good Picture Album
  - ✓ Actual Results of Rice Extension Activity
  - ✓ Invite them to Field Day/Trip and let DCE discuss with farmers to know needs on the ground.



How to involve DA.

ADVICE FROM A CYCLE 2 DISTRICT NORTHERN REGION.

Case 1: Gushegu in 2018

- Gushegu is a Cycle 2 MMDA in Northern Region.
- Situation in Northern region is severer than Ashanti Region.
- However, Gushegu could access to several sources such as DACF, PFJ and MAG for 4 demonstration plots.
- Coming two slides are advice from him.

Advice to Cycle 3 Districts on how Assemblies can support them (Gushegu District, NR)

- First and foremost, try as much as possible to be part of the Assembly.
- Brief them on the importance of the project and show case what previous districts have done.
- Demonstrate that YES you can perform.
- Anytime the Assembly needs your services respond quickly.
- Inform and discuss with the administrators of the Assembly and input dealers as early as possible the intended demonstration to enable you access funds and inputs early.

3. Advice to Cycle 3 Districts –cont.

- Involve Assembly staff especially Co-ordinating Director and the Planning Officer during some of the training sessions, field days and monitoring so that they can see what you are doing.
- Do not visit the Assembly during their busy hours. Sometimes if possible, go their residence and discuss issues with them.

PARTICIPATION OF PLANNING OFFICER ATFIELD DAY AT MATURITY STAGE AT KPATILI

MUNICIPAL PLANNING OFFICER ADMIRING THE FIELD

RICE CULTIVATION ACTIVITIES, TOOLS & INPUTS

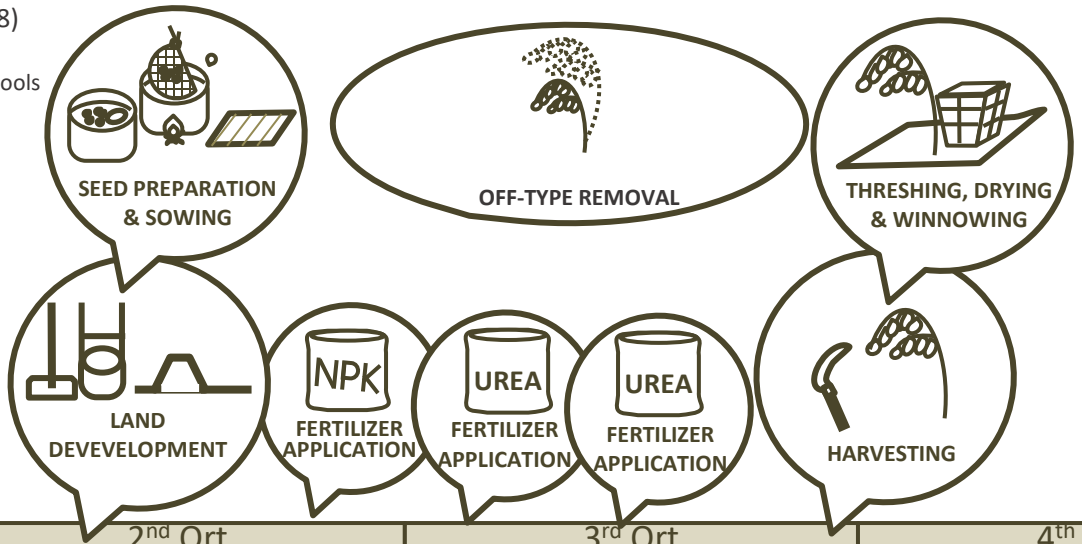
DDA's ACTIONS TO GET BUDGET RELEASE

NORTHERN REGION

Cost for JT: GHC 900 PER TRAINING (GHC 300 x 3 times)

Cost for OST PER DEMONSTRATION PLOT : **GHC 3,554**

TRAINING : GHC 1,225 (GHC 245 x 5 OSTs)
(Estimate from A CYCLE 2 MMDA in 2018)
INPUT: GHC 547 TOOLS (ALL): GHC 1,727
* This can be reduced according to availability of tools etc.



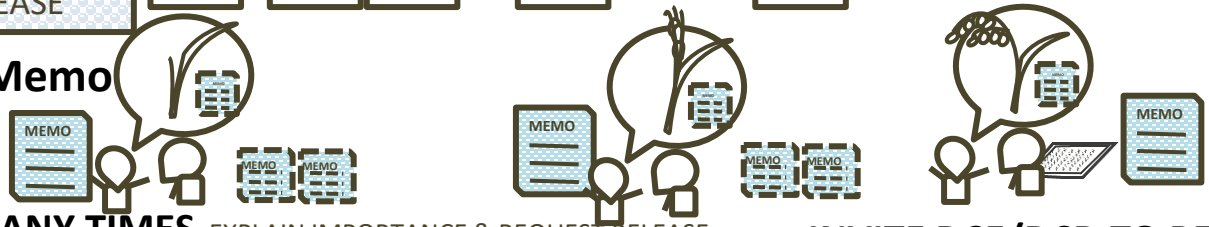
TIMELINE

1st Qrt	2nd Qrt	3rd Qrt	4th Qrt

TRAININGS & ACTION TO GET BUDGET RELEASE

JT, OST | JT, OST, OST | OST | JT, OST | FIELD DAY/ TRIP

Write Memo



- **MEET DCE/DCD MANY TIMES**: EXPLAIN IMPORTANCE & REQUEST RELEASE
- **PICTURE**: TAKE PICTURE OF PLOT & SHOW THEM TO DCE/DCDS
- **SPEND CAREFULLY**: DON'T USE UP ALL MONEY RECEIVED

- **INVITE DCE/DCD TO BEST PLOT & LET THEM TALK WITH FARMERS!**
- **BUY INPUTS & TOOLS FOR NEXT SEASON**

IF FUND IS RELEASED IN 4 QRT

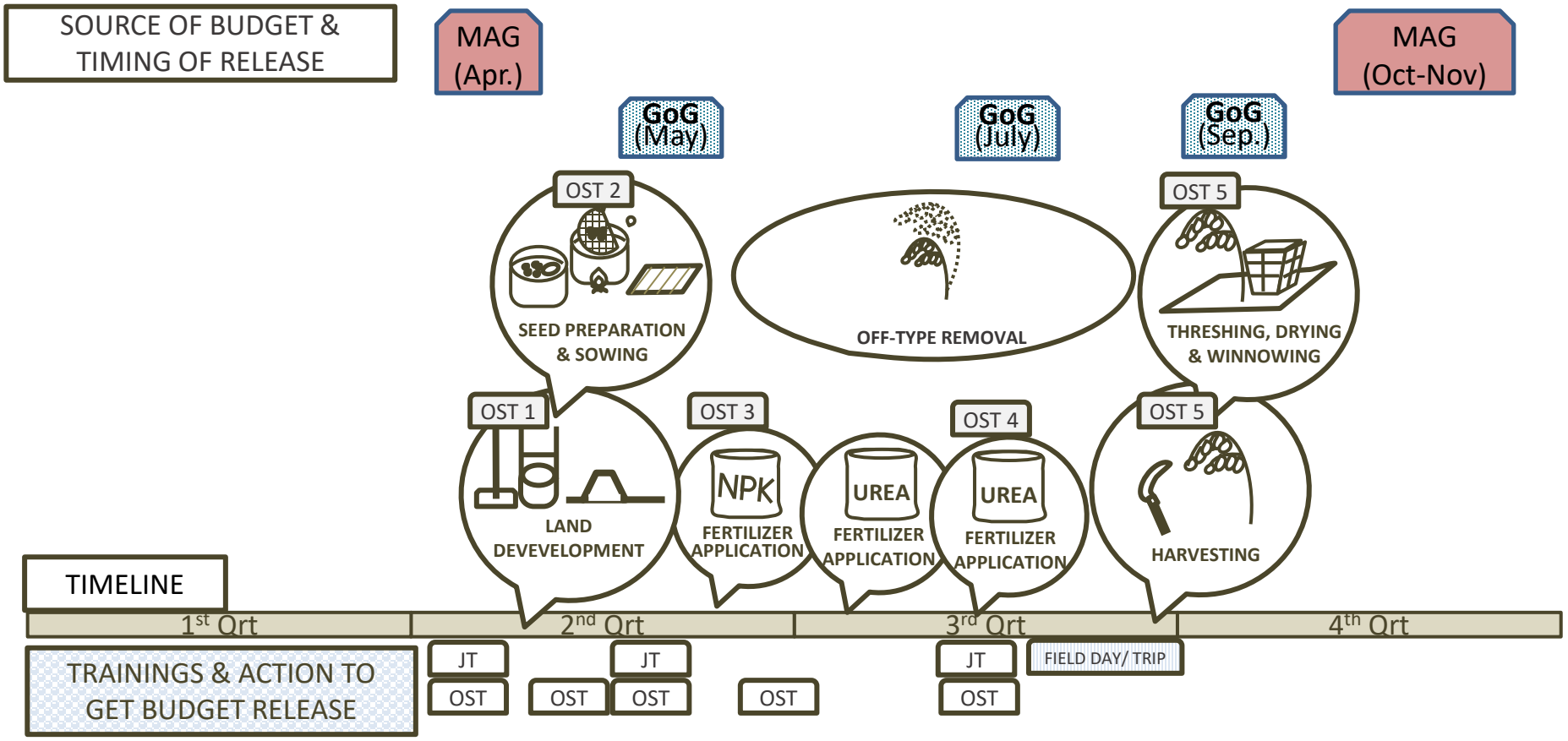
PLAN& BUDGET PREPARATION FOR NEXT YEAR

- PLAN& BUDGET ACTIVITIES by SEVERAL SOURCES (GOG, DACF, IGF as well as donor etc.)

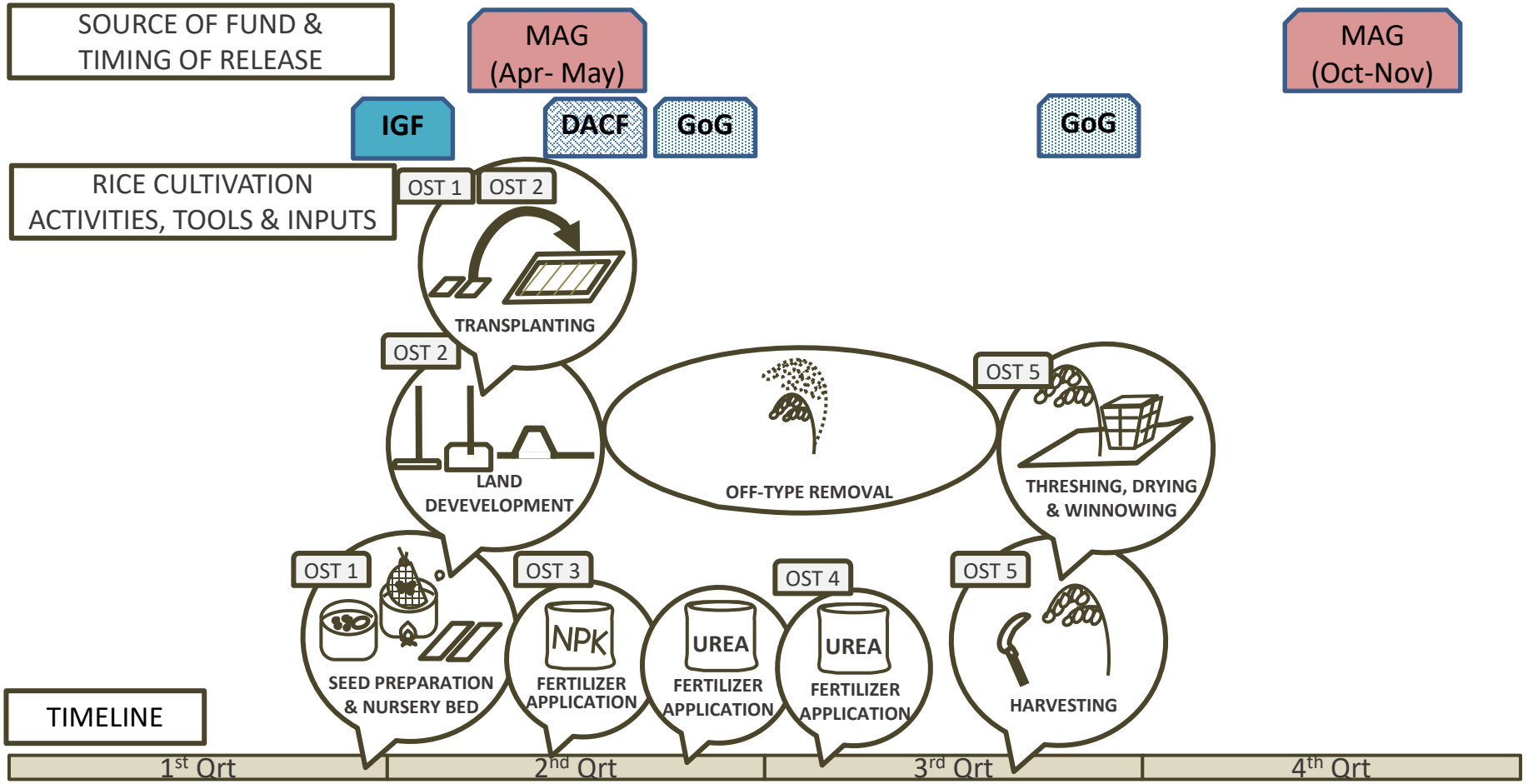
Let’s think what we can do rather than what is difficult.

BE READY FOR LATE RELEASE

TIMING OF RELEASE OF CYCLE 2 MMDAs in 2018 (NR)



TIMING OF RELEASE OF CYCLE 2 MMDAs in 2018 (AR)



Observation from results:

- MAG: Q1&Q2 are released in early Q2.
- If MMDAs want to start rice cultivation earlier like this year, MAG cannot be used.
- DACF/GOG: Late transfer for Q2 almost at the end of the Quarter.
- IGF or PFJ are those that can be used to kick start rice cultivation.

STRATEGIC USE OF FUND TO START RICE EXTENSION ACTIVITIES AT RIGHT TIMING?

Case 2: Adansi South

- Adansi South is the district suffered from late release in 2017, but established some demo plots in major season from June.
- The same DDA was transferred to Ejura Sekyedumase in May 2018. The district hadn’t received neither GoG nor MAG (Predecessor DDA didn’t plan demo plot sourced by MAG).
- But the DDA established some demo plots again.
- The key was use of the other source of fund.

- Now the DDA is the RDA of Bono Region.

Good Practices to Access Other Source of Fund

- Adansi South District obtained inputs and cash from four (4) Agro Input Dealers and a farmer in 2017.
- The following inputs and cash were contributed by the Agro Input Dealers for the three (3) demonstration plots;
  - Two bags of NPK
  - One bag of Urea
  - 2 litres of Herbicides
  - 20 kg of seeds from a beneficiary woman farmer under Phase 1, who was awarded by MoFA-JICA
  - Cash of GHC140.00 (used to buy 6 hoes and additional inputs)

How Did the District Obtain the Contributions?

- Step 1: There was meeting with the MoFA-JICA project team to discuss about other sources for funding for the demonstration.
- Step 2: After the meeting the district decided to appeal to the input dealers in the district for support.
- Step 3: Five (5) selected Agrochemical dealers in the district were invited for a meeting to discuss about the establishment of demos to train rice farmers, technical support from JICA and funding of demos.
- Step 3: A budget was presented to them, in order for them to willingly select what input they can sponsor either in kind or cash.
- Step 4: They selected what input they will provide.

Benefits Used to Persuade Input Dealers

- Promotion of their business in the beneficiary communities for farmers to buy from their store.
- Invite them to field days/field trips to show them how their inputs were utilized.
- Appreciate their support/sponsorship at any agricultural gathering/foram.
- Be part of any agricultural programme where their services will be needed. For example training, planning session, etc.
- Erect sign post with their company names on it as sponsors.

Appreciation to the Sponsors

- They were invited to participate in a field trip organised by the district at Obonsu, one of the communities.
- One of the dealers was also invited to the field trip organised by MoFA-JICA project team at Fumso in Adansi North district during TOT.
- All the four (4) sponsors were invited to the district monthly technical review meeting to thank them and to show our appreciation to them.
- They expressed their happiness about the acknowledgement and also learning more about rice cultivation especially using salt solution and egg in selecting good seeds.

Promotion material for inviting input dealers

RICE EXTENSION FOR THE DISTRICT

MOFA-JICA PROJECT FOR SUSTAINABLE DEVELOPMENT OF RAIN-FED LOWLAND RICE PRODUCTION PHASE II

PROJECT OUTLINE
2016-2021

In April 2016, MoFA and JICA jointly launched the Project for the Sustainable Development of Rain-fed Lowland Rice Production Phase II aiming at dissemination of the **Rice Extension Guideline** to 35 districts in Ashanti and Northern regions in line with decentralization, contributing to the increase of domestic rice production. The Project provides the target districts with technical assistance pertaining to improved rice cultivation techniques, while target districts prepare the District Rice Extension Plan and budget for rice extension activities.

AVERAGE YEILD OF DEMONSTRATION PLOTS IS
5.1 T/HA IN 2017 AND 4.9 T/HA IN 2018 IN ASHANTI

RICE EXTENSION GUIDELINE instructs the improved rice cultivation techniques and skills; e.g. land development, seed preparation, line sowing, transplanting, weed control, fertilizer management, timely harvesting and post-harvest.

Bund construction is the key land development techniques to harvest water and avoid loss of fertilizer through moving water.

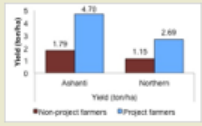
Using **improved variety of the seed** is crucial.

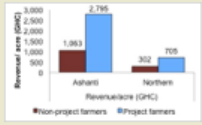
Seed selection by salt water method is recommended to get heavier seeds which germinate uniformly and give sufficient nutrients to become healthy seedlings.

Transplanting method is recommended if sufficient water is available at rice field. Otherwise direct sowing will be selected. **Line planting/sowing** has lots of merit to make crop management easier such as weed and pest control and fertilizer application.

SUCCESS IN PHASE I
(2009-2014)

The Project Phase I developed the Rice Extension Guideline which provides the improved technical package and extension methodology for rain-fed lowland rice cultivation. **Beneficiary farmers** of Phase I enjoyed the **increase of the yield up to 4.70 t/ha in Ashanti and 2.69 t/ha in Northern region.** In addition, there are several **success stories** among target farmers; in Ashanti region one farmer established **rice milling center** and another farmer purchased a **power tiller.** In Northern region, one group purchased a **tractor.**





VOL 1

MOFA-JICA PROJECT FOR SUSTAINABLE DEVELOPMENT OF RAIN-FED LOWLAND RICE PRODUCTION PHASE II

Weeding is essential key technology to obtain high yield. The yield declines significantly without weed control. It is done by hoe, push weeder or herbicide.

Fertilizer should be applied three times at right timing per rice growth stage; e.g. tillering, booting and heading. Recommended amount of fertilizer is N:P:K=60:30:30 as shown in the table below.

Preguancy	Type of fertilizer	N-level (kg/ha)	Amount (kg/acre)
1st	N:P:K(15:15:15)	30	50
2nd	UREA (N:46)	15	13
3rd		15	13

Good quality of rice is determined such as no contamination of stone/husk, higher percent of whole grain, and same variety. To meet the demand of high quality rice, **rogues are removed** from the field.

Harvesting at optimum moisture contents (25-20%) is important to avoid over drying grains. Threshing on tarpaulins is recommended to avoid contamination of sand and stone.

Finally, the rice produced by trained farmers meets the good quality due to intensive works done in the field as instructed by Rice Extension Guideline.

ARE YOU INTERESTED IN THE PROGRAM?
We are looking for the supporters.

This Project has a unique approach towards sustainability. First, the Project aims at mainstreaming Rice Extension Guideline into the national rice policies. Second, the Project develops capacity of regional and district officers on rice extension in line with decentralization process so that the District can secure the necessary fund for rice extension activities from their own resource. However, many districts face the difficulty of procuring agricultural inputs timely due to delays in the release of funds for the purchase of **seed, fertilizer, chemicals, tools and equipment** for rice extension activity at the demonstration plot. Estimated cost for inputs is around GHc 500 per 1 acre (e.g. 30 kg of seed, one and half bags of NPK and a half bag of Urea).

Now, we are looking for the supporters of those inputs. Our demonstration plots can be utilized for promotion of your products and our farmers can be possible customers of your products. Would you like to collaborate with us?

Please contact us;
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P.O. box 3820 KSI, Mobile: 0508516437
Northern Regional Office: MoFA rice processing center, Tamale, Northern
P.O. box 14 Tamale

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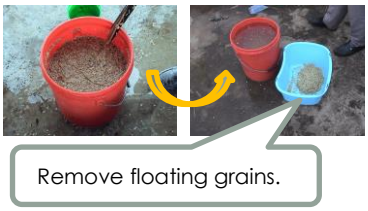

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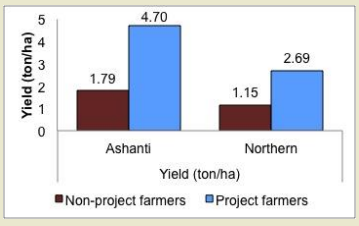

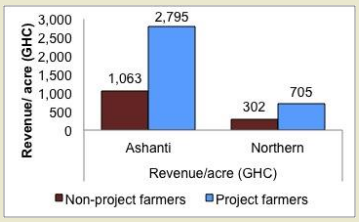

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LAND DEVELOPMENT

3RD TOT

CONTENT

- Bunds
- Levelling
- Field Measurements
- Timeliness of LD and the Weather
- Water and Flood control

What is an Irrigation Bund?

BUNDS

- Bunds are *small earth embankments used to contain and manage irrigation water within basins.*
- They are sometimes called *ridges, dykes or levees*.
- The height of bunds is determined by *the irrigation depth and the freeboard.*
- The freeboard is *the height above the irrigation depth* to be sure that water will not overtop the bund.
- The width of bunds should be such *that leakage will not occur, and that they are stable.*

Well constructed and stable bunds

Unstable bunds

Why do we construct Irrigation Bunds for rice fields?

REASONS FOR BUNDS CONSTRUCTED

- Helps in *conserving water* in the field for the rice plants
- *Direct water* in and out of the field for water management
- *Controls* floods
- *Walk ways* and boundaries
- Interlocking and main bunds (10-20cm/30-50cm)

Without Irrigation Bunds.....

WITHOUT BUNDS

- *Lack of water* in the field
- *Frequent floods* or *over flows*
- *Poor drainage* problems
- Difficulty in *applying fertilizer*

Why do we level our irrigation plots?

WHY LEVELLING?

- *Minimize* the undulation levels
- Ensure *equal distribution* of water in the field
- Ensure *adequate use of water* by the plants
- Enhances the *optimum usage of fertilizer* by the plants

Evenly levelled field

Unevenly levelled field

Without levelling.....

WITHOUT LEVELING

- *Uneven water* distribution
- *Difficulty in controlling water* in the field
- *Difficulty in applying fertilizer* and its usage by the plants
- *Low yields* of the rice plants

POINTS TO NOTE WHEN LEVELLING

- Do not use top soils for bunds construction
- There should be minimal push or pull of top soil
- Materials should be imported to fill depressions on the field if interlocking bunds cannot be used
- Top soils should be replaced for depleted sections.
- M/DAOs who attends 1st TOTs should supervise AEAs land development activities in respective M/DA

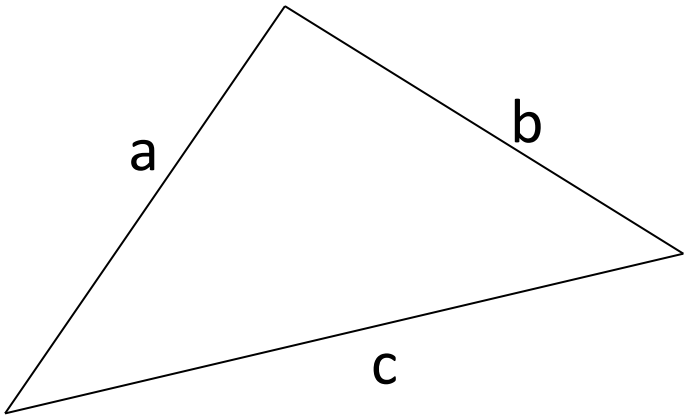
FIELD MEASUREMENTS (TAPE AND GPS)

- Helps to know the *exact size of fields*
- Helps to *estimate the cost and expenditure of field activities*
- Determine *yields*
- Determine *income or revenue margins*
- *Use the Tape measure to confirm the actual plot size.*

HERON'S REMINDER 1

$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

$$s = \frac{1}{2}(a+b+c)$$



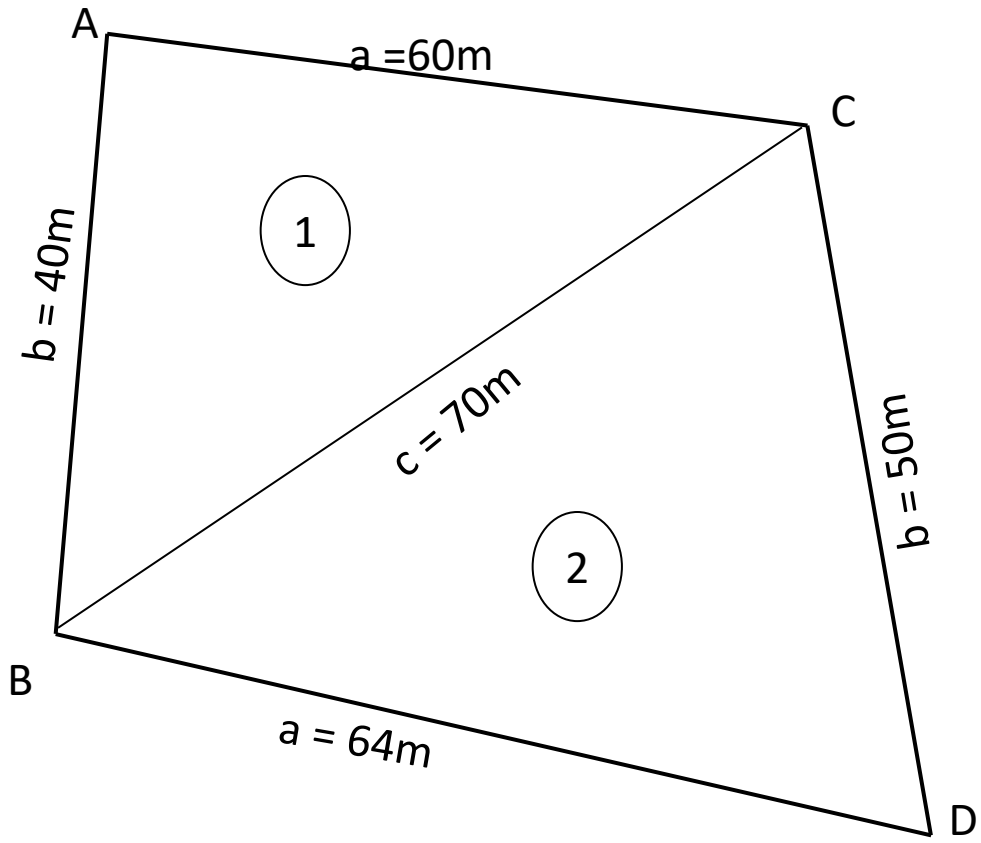
Where;

A → Area

a,b,c → the sides of the triangle

s → semi perimeter

EXAMPLE TO TRY



FORMUALAR	Triangle1	Triangle 2

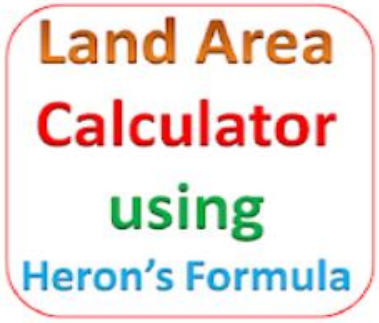
ANSWER

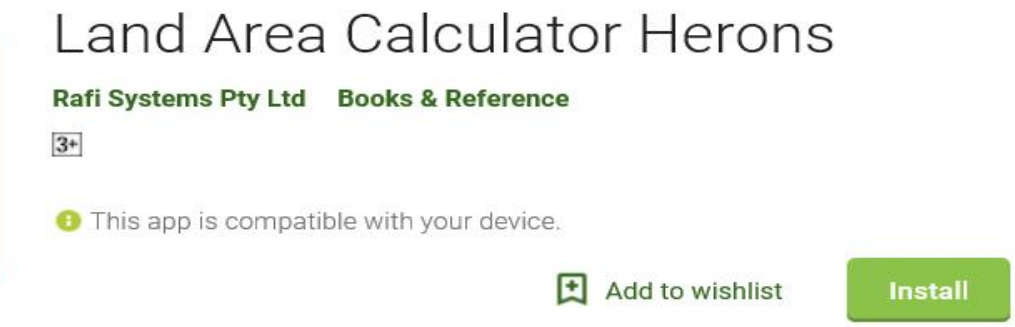
FORMUALAR	Triangle1	Triangle 2
a	60	64
b	40	50
c	70	70
a+b+c	170	184
s=1/2 (a+b+c)	85	92
(s-a)	25	28
(s-b)	45	42
(s-c)	15	22
s (s-a)(s-b)(s-c)	1434375	2380224
$A=\sqrt{s(s-a)(s-b)(s-c)}$	1197	1542
Total area	2739	

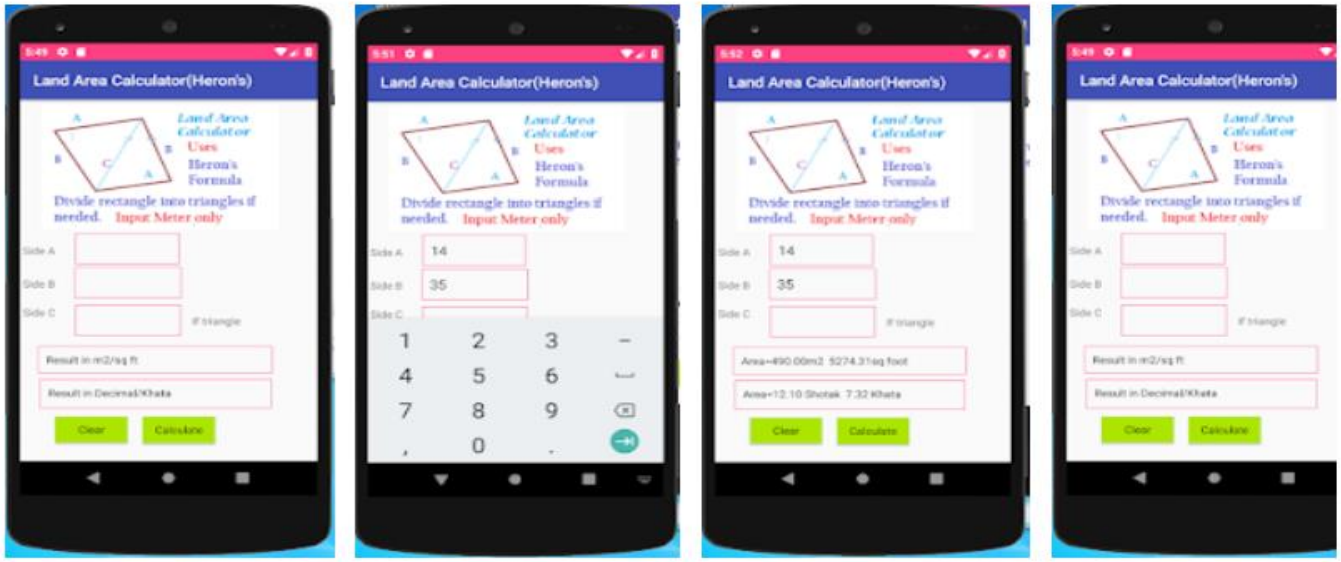
FIELD MEASUREMENT [HERON'S] USING GOOGLE APP

https://play.google.com/store/apps/details?id=rafisystemsptyltd.landareacalculatorherons

Install application from *Google Play Store*







TIMELINESS OF LD ACTIVITIES AND THE WEATHER

No.	TIME	MONTH	WEATHER	LD ACTIVITIES
1	1st Quarter	Jan, Feb, March	Dry	Land preparation (site selection, measurements, clearing and bunding)
2	2nd Quarter	April, May, June	Rain	Ploughing, leveling and water control
3	3rd Quarter	July, Aug, Sept	Minor Rain	Flood control and drainage
4	4th Quarter	Oct, Nov, Dec	Minor Rains (mid Nov), Dry	Bund maintenance and reshaping

WATER MANAGEMENT AND FLOOD CONTROL

- Know when water is *needed and not needed* in rice fields [eg. draining and drying field before harvesting]
- Check *off farm water availability*
- *Use* the on and off farm water resources available *well with bunds and canals*
- *Construct canals* to allow water in or drain out of the fields
- Always *use bunds* to help in your water control
- In emergency cases *use sand bags to manage floods*

WATER MANAGEMENT AND FLOOD CONTROL

No.	GOOD WATER MANAGEMENT PRACTICES	POOR WATER MANAGEMENT PRACTICES
1	Results in healthy plant growth and good tillering [*following recommended water application levels in the cropping calendar*]	Results in poor plant growth and tillering, when you do not follow recommended water application levels.
2	Prevents weed growth on the field and nutrients competition with rice plants	Enhances weed growth on the field and nutrients competition with rice plants when there is no water in the field.
3	Aids in ripening [*reducing water levels to the right depth between heading and ripening stage. i.e. 3cm]*	Results in poor ripening, when soil is too dry.
4	Reduces incidence of diseases	Increases incidence of diseases. i.e. Rice Blast occurs when rice plants are water stressed.

SUSTAINABILITY OF TENSUI CONCEPT

- Continuous dissemination of technology to every community in the districts where farmers cultivate rice with or without formal intervention.
- Continuous expansion of training and demo plots by farmers where possible to maximize production
- Regular maintenance of structures during and off planting season

THANK YOU

RICE CULTIVATION

3rd Training of Trainers

Edited 2019

Contents

How to Use a Moisture Meter

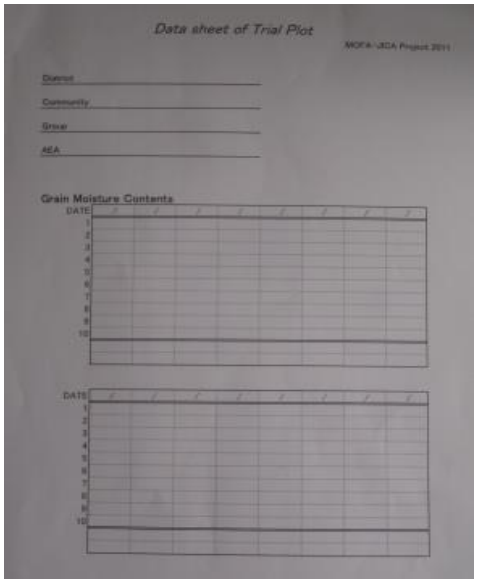

- Open the case and check the content.

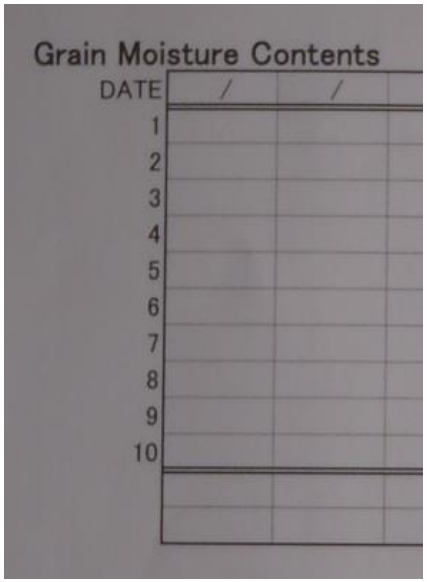
- Set the batteries.
- Be careful about direction of batteries.
- Push the measuring button, then the mark indicates “**PADDY”** and the letter “L” appears.
- (L means that no sample is inserted)
- The meter is ready for measurement.



- Put a spoonful of materials on the saucer by using spoon and tweezers.
- Insert the saucer into the body.

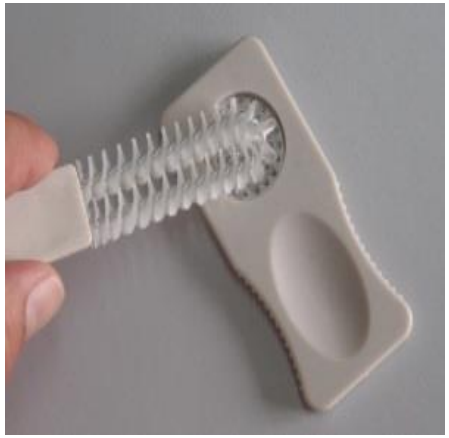
- Tighten the handle unit until it comes across the stopper.
- Push the measuring button and the moisture content is indicated.





- Enter the data in the datasheet.





- Loosen the handle unit, take out the saucer and throw out materials.
- Clean the head and the saucer.

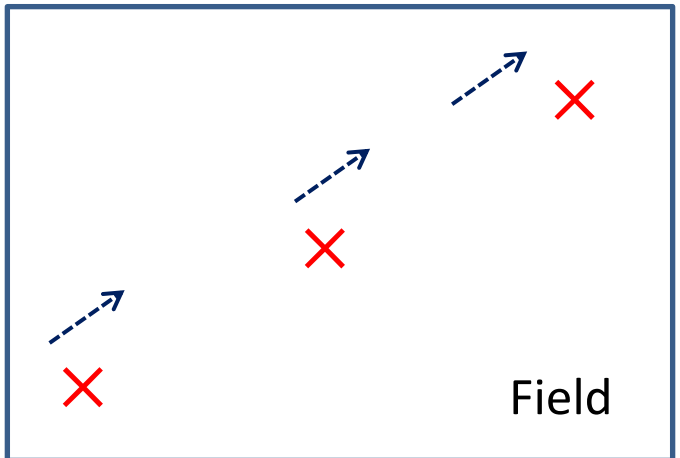
The measurement of moisture content

The measurement of moisture content

- The moisture content of grain is different from plant to plant and from place to place in the same field.
- Therefore, in order to grasp an average moisture content of grains in the field, samples must be taken from different locations to represent the entire field.

Taking samples (for officers)

- From 10 days or 1 week before harvesting, check moisture content every 2 - 3 days.
- Do not take samples from only one location.
- Take an average panicle from each location.
- Take samples from at least 3 different locations.
- Do not take samples from a border.



Measurement

- Thresh all grains of one panicle.
- Mix all grains well.
- Measure moisture content by the moisture meter.
- Measure moisture at least 5 times.
- Record in the data sheet or a note book.
- Calculate average moisture content.

Bird scaring
and
Timely harvesting

Bird Scarer


Scarecrow

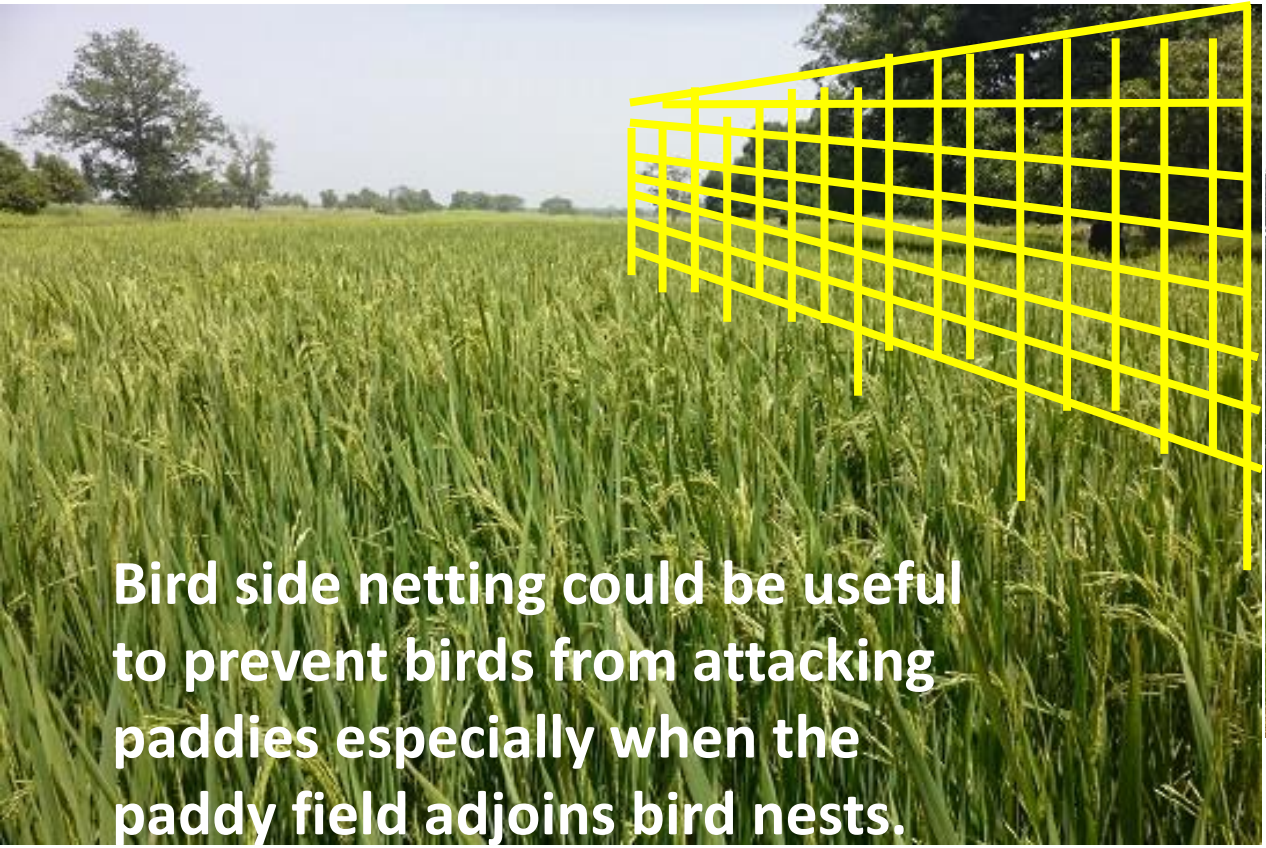

Catapult (Slingshot)

Visual Scarers might be effective to scare birds at least for the time being.


Windmill


Balloon

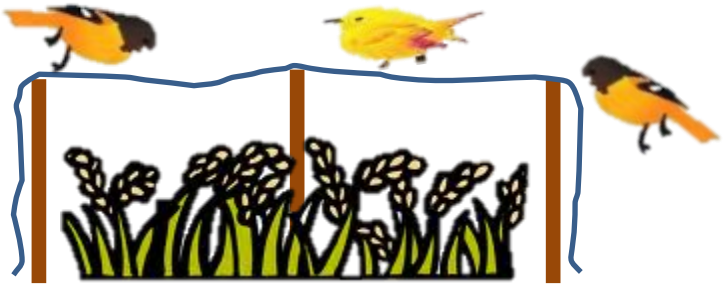
Bird Netting
(1) bird side netting



Bird Netting

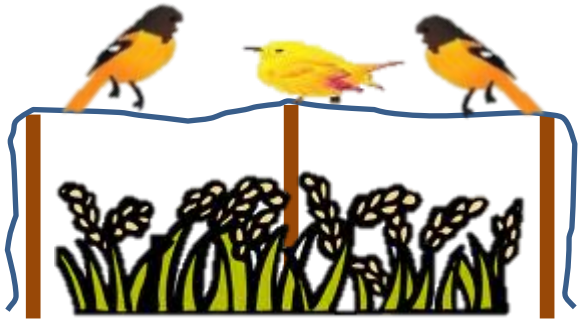
(2) bird netting over rice field

Cover top of sticks with plastic bottles/ bags to make covering of bird netting easier. It also helps keep bird nets longer.

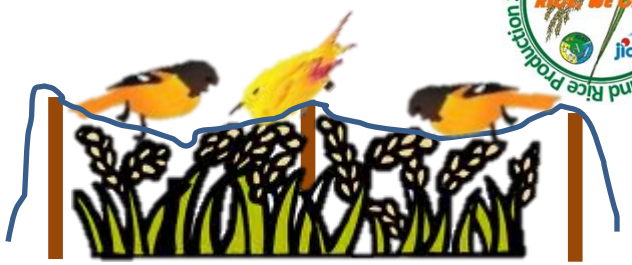


Good ✓

Not Good X

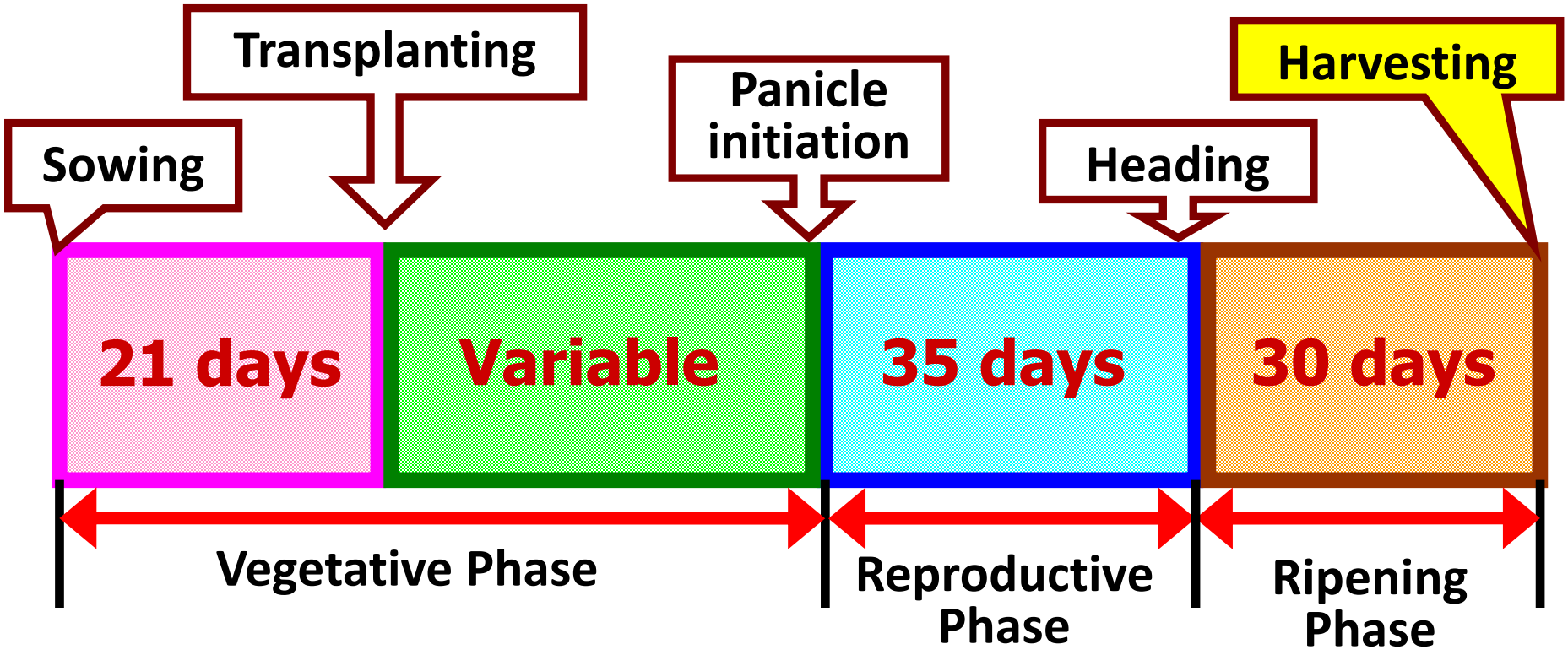


Good ✓



X Not Good

Growth period in each phase



[Jasmine85/Agra]

0 day

90-100 days

120 -130 days

Estimated harvesting date

DISTRICT	SOWING DATE	Expected Dates for 3rd Fertilizer Application (80 DAYS AFTER SOWING)	Expected Heading Date (100 DAYS AFTER SOWING)	Actual Heading Date	120 DAYS AFTER SOWING	130 DAYS AFTER SOWING
Amansie Central	27/04/19	16/07/19	05/08/19		25/08/19	04/09/19
Sekyere South	12/04/19	01/07/19	21/07/19		10/08/19	20/08/19
Mampong Municipal	29/04/19	18/07/19	07/08/19		27/08/19	06/09/19
Sekyere East	08/04/19	27/06/19	17/07/19		06/08/19	16/08/19
Sekyere Kumawu	19/04/19	08/07/19	28/07/19		17/08/19	27/08/19
Afram Plains	13/05/19	01/08/19	21/08/19		10/09/19	20/09/19

Observe the degree of maturity

From 25-30 days after heading,

- Watch colour of grains

  Percentage of yellowish grains : 80 - 85 %

- Check moisture contents every 2 - 3 days

  Optimum moisture contents : 25 - 20 %

17.8%

20.5%

25.6%

Agra

At the proper harvesting time

- Rachis and flag leaf are still green
- Grains can be broken by the fingernails

Drain Water before Harvesting

- Drain water from rice fields 1 – 2 weeks before harvesting.
- Otherwise, harvesting work is difficult in water.
- Grain quality will be lost by water.

Judging Right Harvesting Time by Accumulated Temperature after Heading
- An example of Tetrem Community, Afgya Kwabre District -

- Expected harvesting date would be mid-September, based on accumulated temperature.
- Actual harvesting date will be decided by observation.
- Please note temperature data used in the table are for Kumasi. Use your own temperature data if possible.

	Accumulated Temperature in Kumasi 2018																			
	Date	Day	Max	Min	Av.	Tetrem														
August	10	Fri	30	22	26.0	26.0														
	11	Sat	27	23	25.0	51.0	25.0													
	12	Sun	29	24	26.5	77.5	51.5	26.5												
	13	Mon	28	22	25.0	102.5	76.5	51.5	25.0											
	14	Tue	27	22	24.5	127.0	101.0	76.0	49.5	24.5										
	15	Wed	30	23	26.5	153.5	127.5	102.5	76.0	51.0	26.5									
	16	Thu	28	23	25.5	179.0	153.0	128.0	101.5	76.5	52.0	25.5								
	17	Fri	29	23	26.0	205.0	179.0	154.0	127.5	102.5	78.0	51.5	26.0							
	18	Sat	30	23	26.5	231.5	205.5	180.5	154.0	129.0	104.5	78.0	52.5	26.5						
	19	Sun	29	23	26.0	257.5	231.5	206.5	180.0	155.0	130.5	104.0	78.5	52.5	26.0					
	20	Mon	30	23	26.5	284.0	258.0	233.0	206.5	181.5	157.0	130.5	105.0	79.0	52.5	26.5				
	21	Tue	30	24	27.0	311.0	285.0	260.0	233.5	208.5	184.0	157.5	132.0	106.0	79.5	53.5	27.0			
	22	Wed	30	23	26.5	337.5	311.5	286.5	260.0	235.0	210.5	184.0	158.5	132.5	106.0	80.0	53.5	26.5		
	23	Thu	29	24	26.5	364.0	338.0	313.0	286.5	261.5	237.0	210.5	185.0	159.0	132.5	106.5	80.0	53.0	26.5	
	24	Fri	27	23	25.0	389.0	363.0	338.0	311.5	286.5	262.0	235.5	210.0	184.0	157.5	131.5	105.0	78.0	51.5	25.0
	25	Sat																		

Yield Components

MOFA-JICA

TENSUI RICE

Sustainable Development of Rain-fed Lowland Rice Production Project

Growth stages which affect the yield components

Tillering

Panicle formation

Flowering

Ripening

Yield = Number of panicles per unit area x Number of grains per panicle x Ripening ratio x 1000 grains weight

Importance of the yield components

1. To understand the causes of yield fluctuation

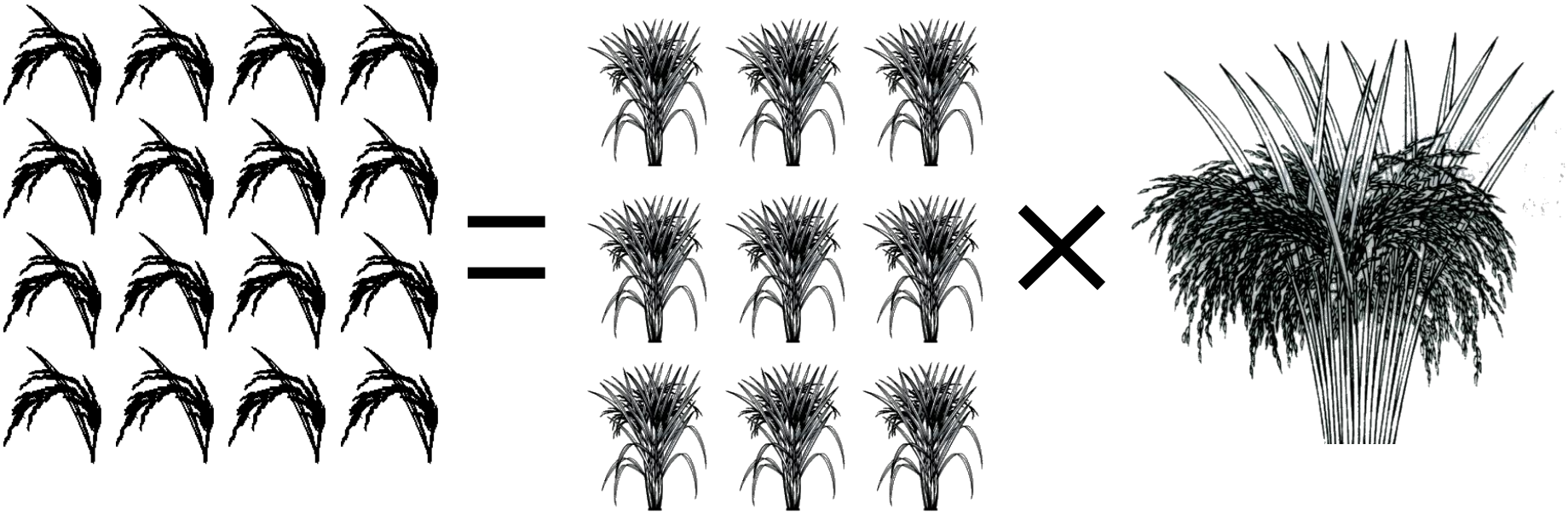
2. To improve rice cultivation in order to achieve the target yield

3. To facilitate yield estimation

4 yield components

1. Number of panicles per unit area
2. Number of grains per panicle
3. Ripening ratio
4. 1000 grains weight

1. Number of panicles per unit area

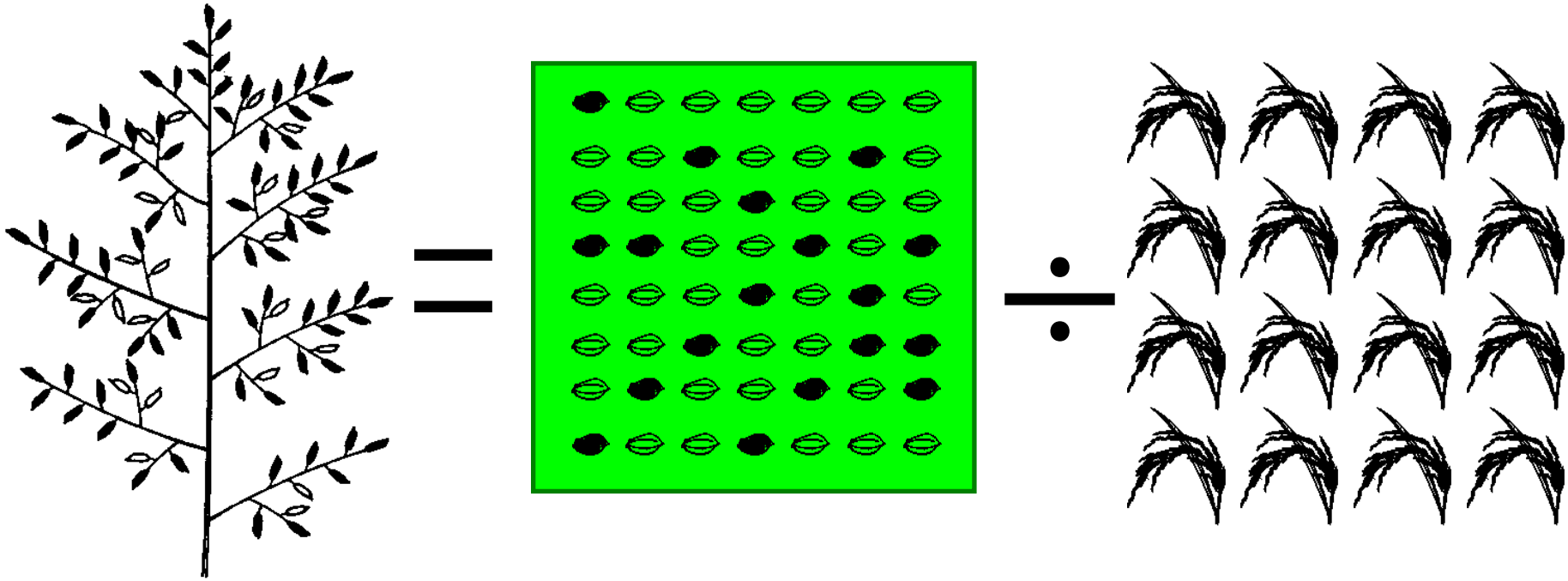


Number of panicles per unit area

Number of hills per unit area

Number of panicles per hill

2. Number of grains per panicle



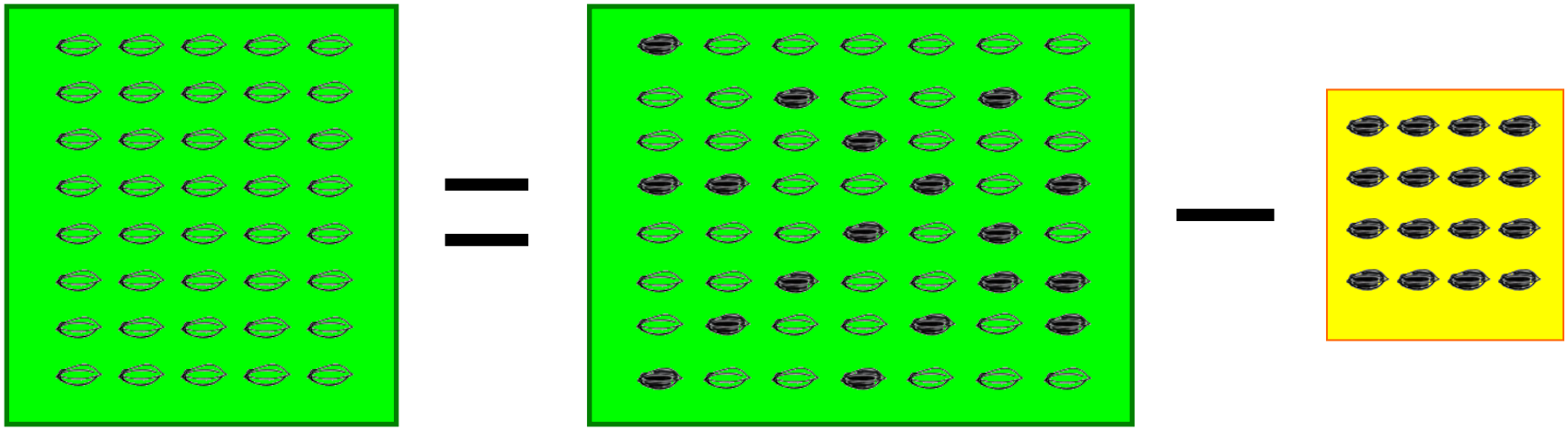
Number of grains per panicle

Number of grains per unit area

Number of panicles per unit area

3. Ripening ratio

Number of ripened grains per unit area

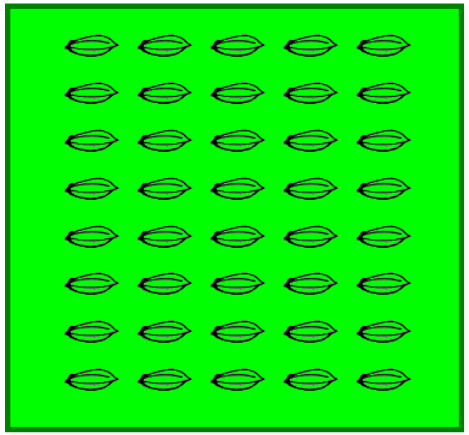


Number of ripened grains per unit area

Number of grains per unit area

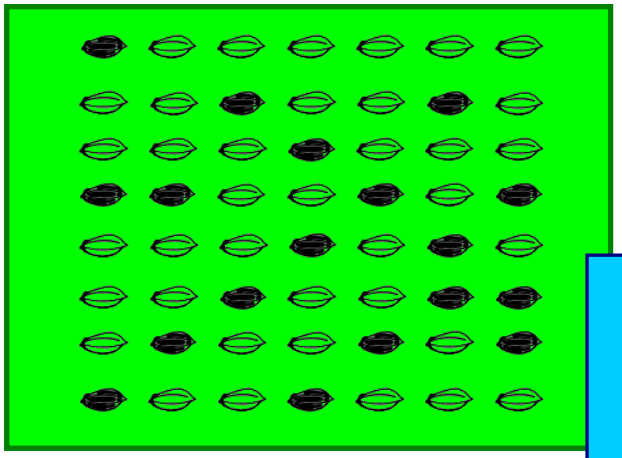
Unripened grains

3. Ripening ratio



Number of ripened grains per unit area

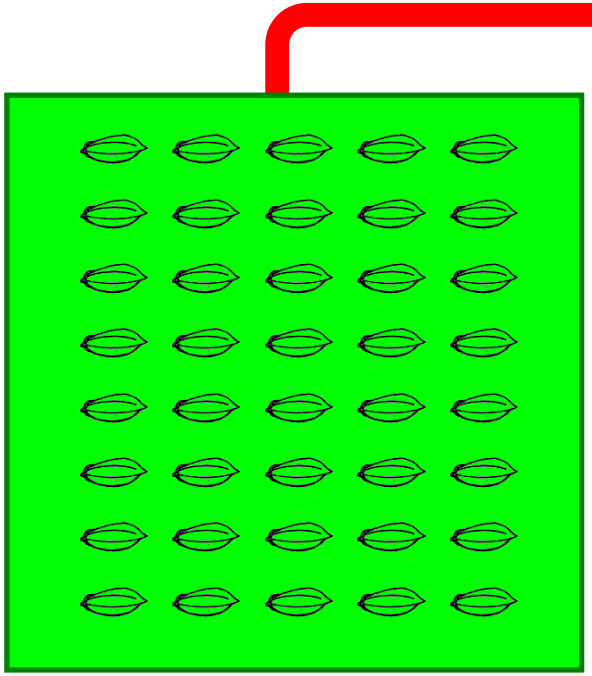
x 100 =



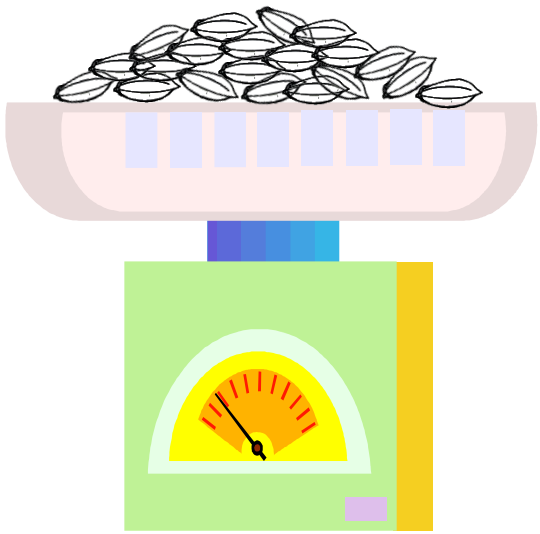
Number of grains per unit area

Ripening ratio (%)

4. 1000 grains weight



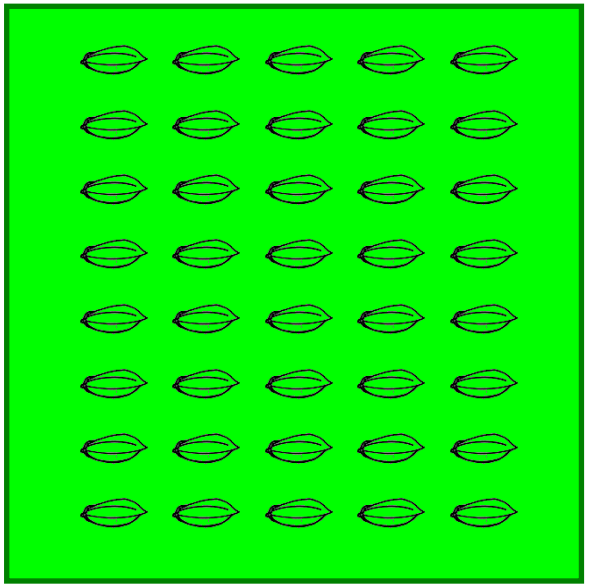
1000 ripened grains



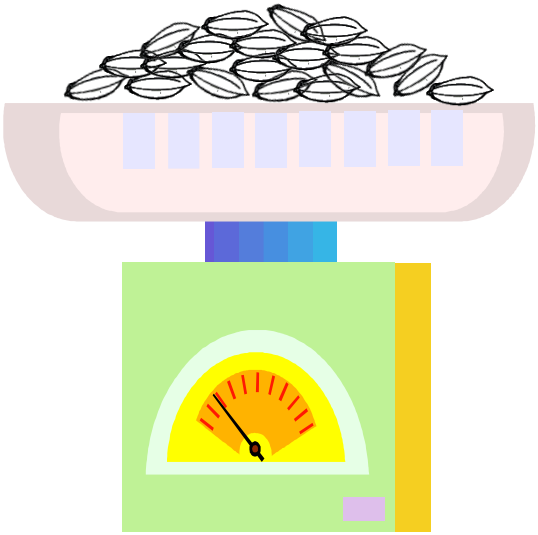
1000 grain weight

Yield

1 m²



x



÷ 1000

Number of ripened grains per unit area (1m²)

1000 grain weight

Recommended strategies for improving yield component

- Deficiency in number of panicle

→ Number of seedlings per hill
Number of hills per unit area
Sowing rate (Direct sowing)
Transplanting depth of seedlings
Depth of water in the field during tillering stage
Quantity of basal (1st) and additional(2nd) fertilizer

- Deficiency in number of grains per panicle

→ Timing and quantity of top dress (3rd) fertilizer

Recommended strategies for improving yield component

- Reduction in ripening ratio
  - → Timing and quantity of top dress (3rd) fertilizer
    Water management
    Controlling the number of grains per unit area
    Weed and Pests/Birds control
- Reduction in 1000 grains weight
  - → Timing and quantity of top dress (3rd) fertilizer
    Water management
    Controlling the number of grains per unit area
    Weed and pest control

Yield and yield components

An Example of Fumso, Adansi North District

Number of hills per unit area 32.7hills/m²

× Number of panicles per hill 6.8

= Number of panicles per unit area 222.4/m²

Number of panicles per unit area 222.4/m²

× Number of grains per panicle 103.7

= Number of grains per unit area 23,062/m²

Number of grains per unit area 23,062/m²

× Ripening Ratio 79.9%

= Number of ripened grains per unit area 18,427/m²

Number of ripened grains per unit area 18,427/m²

× $\frac{\text{1000 grains weight 35.0g}}{1{,}000}$

= Yield per unit area 645g/m²

Example of Fumso, Adansi North District

Moisture content at harvesting = 19.7 %

Weight at harvesting = 645 g

$$\frac{100\ \% - 19.7\ \%}{100\ \% - 14\ \%} \times 645\ g = 602\ g$$

(6.02 tons/ ha)

Harvesting
and
Post Harvesting

Purpose

- Harvesting of paddy includes cutting, stacking, handling, threshing, drying, winnowing, cleaning and hauling of paddy.
- The goal of good harvesting is to maximize grain yield, and to minimize grain losses and quality deterioration.

1. What is good quality local rice?

Is milled rice with the below characteristics accepted by the majority of end users? ;

- No stone, husk, chaff, soil, chalky, other impurities
- Higher percent of whole grain
- Same variety
- Preferred aroma
- Acceptable taste
- Good texture and required moisture content
- Uniform colour

2.Parameters considered

Quality factors which cover aspects such as;

- Safety and suitability for human consumption
- Flavors and odors
- Moisture content
- Wholesomeness of kernels
- Foreign (unwanted) matter
- Contaminants (heavy metals and agro-chemicals residues)

3. Wrong methods of rice cultivation

- Improper planning and management of enterprise(scale, field management constraints)
- Mixture of varieties: delayed in harvesting(affect moisture content at harvesting)
- Improper management of on- field water at harvesting (contamination of harvested paddy)
- Poor weed management
- Inappropriate tool and poor harvesting methods
- Moisture reabsorption during harvesting

4. Wrong methods of rice processing

- Re-absorption of moisture due to harvested paddy getting in contact with the bare soil
- Threshing using a rusty drum
- Threshing and drying on a bare floor
- Using field boot to stir paddy on drying floor
- Uneven exposure of paddy to sunshine at drying
- Old milling machine and unskilled operators


X


✓


X


✓

Preparation towards harvesting

Around GH¢ 5.00 / sheet

Wear clean foot wear

Make sure not to bring any dirt or stones with contaminated foot wear.
Wear clean foot wear .

Avoid contamination

By Using tarpaulin and “Bambam box”

Cleaning Methods

Winnowing

- Lighter materials such as unfilled grains, chaff, weed seeds, and straw can be removed from the grain by using a blower, air fan or by wind.

- Winnowing recovers only the heavier grains but other heavy particles like heavier weed seeds, off types, stones and dirt might still be included in the rice.

Harvesting too early

- Harvesting rice earlier will result in a larger percentage of unfilled or immature grains, which results in lower yield and grain quality.

- If the grain has a moisture content of more than 25% , it is more difficult to remove the grains from the panicle and some damage may occur during machine threshing.

Harvesting too late

- Shattering of grain
- Logging during rain storm
- Losses through birds, insects and rodents.
- Grains that dry during the day might absorb moisture during night or during rainfall resulting in cracks, which reduces the milling yield. In addition, grains become more brittle and therefore break easier in the thresher.

Tips for harvesting

- For manual threshing, the crop cut should be threshed on the same day with less difficulty. Harvested, non threshed paddy will normally dry at 1-2% moisture per day when left in the field hence should not be left on the field after harvesting
- If the crop has a lot of surface moisture, e.g. from previous rainfall or early in the morning, it is advisable to wait for the surface moisture to dry first before cutting.

Cleaning

- Removes unwanted materials from the grain.
- Clean grain has a higher value than the ones which is contaminated with straws, chaff, weed seeds, soil, rubbish and other non-grain materials.
- Grain cleaning will improve the drying and the storability , reduce breakage at time of milling and improve milling output and quality.

Drying

Moisture content of paddy should be 14 % before milling or storing.

Half day with mixing paddy every 30 min under sunlight

Whole day with mixing paddy sometimes under cloud

How to measure yield

1. Specify type of sacks.
2. Count number of sacks after drying and cleaning.
3. Calculate weight applying specific weight depending on the type of sacks used.

   Jute sack: 84kg/sack
   “Type 4” sack: 100kg/ sack
   “Type 5” sack: 120kg/ sack

Example 1. 6 sacks of “Type 4” sack
100kg/sack X 6 sacks = 600kg

Example 2. 5 sacks of “Type 5” sack
120kg/sack X 5 sacks = 600kg

For sacks less than full sack, measure actual weight by weighing scale.
OR
Use black rubber bucket to measure.
One level bucket of paddy could be 8kg.

Types of Storage

This depends upon ;

- Forms of the produce, e.g. paddy, milled, brown
- Quantity of the rice
- Purpose
- Location of the facility
  (i) Farmer's store/hut
  (ii) Milling site

Some storage containers

Importance of Proper Storage

- Rice is hydroscopic
- To improve and maintain quality
- For a better price
- Prevent quality deterioration
- Prevent rodent attack

Cost Saving is Fun!!

3rd TOT

-Farm Management-

Contents

1) Do you know your profit per bag?
2) Discussion points with group farmers
3) How can farmers save cost for inputs?
4) Let’s discuss good practices in the field!

1) Do you know your profit per bag?

First, let's compare cost and yield between Project and Non-Project farmers!

Farmer	Cost/acre (GHC)	Yield (kg/ha)
Project farmers	205	2,693
Non-Project farmers	235	1,152

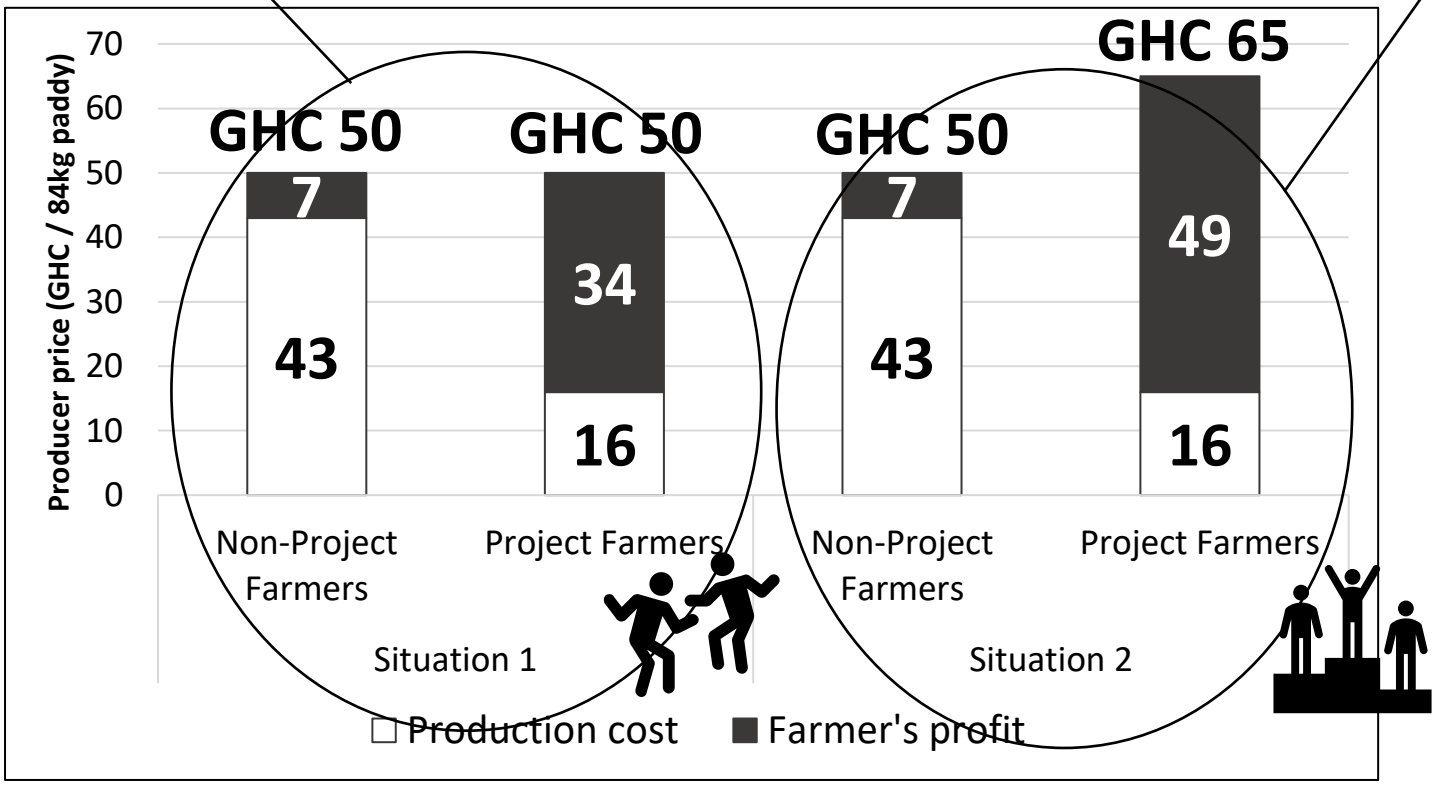
Source: Impact Survey, 2013
Remark: Cost includes materials, tractor hiring and paid labour

Project-farmers put smaller cost but…

Yes, Project-farmers can get a higher return!

When there's no price difference between quality…

When there's price difference between quality, fortunately…



Situation 1: Farmers' profit can be increased only by applying the TENSUI technical package

Situation 2: Farmers' profit can be increased by applying the TENSUI technical package and with an increase in producer price reflecting quality

Expected Increase in Farmers' Profit per Unit in Different Situations

How do you figure out cost per bag?

Project Farmers

1) Convert cost per acre to cost per hectare: 205 (GHC/acre) x 2.5 = 513 (GHC/ha)
2) Figure out cost per kg: 513 (GHC/ha)/2,693(kg/ha) = 0.19 (GHC/kg)
3) Figure out cost per 84kg: 0.19 x 84 (kg) = **16 (GHC/84kg)**

Non-Project Farmers

1) Convert cost per acre to cost per hectare: 235 (GHC/acre) x 2.5 = 588 (GHC/ha)
2) Figure out cost per kg: 588 (GHC/ha)/1,152 (kg/ha) = 0.51 (GHC/kg)
3) Figure out cost per 84kg: 0.51 x 84 (kg) = **43 (GHC/84kg)**

Let's practice!! (Figure out cost and profit!)

Farmer	Cost/acre (GHC)	Yield (kg/ha)
Project farmers	255	3,127
Non-Project farmers	321	1,673

Remark: Inputs = Cost includes materials, tractor hiring and paid labour

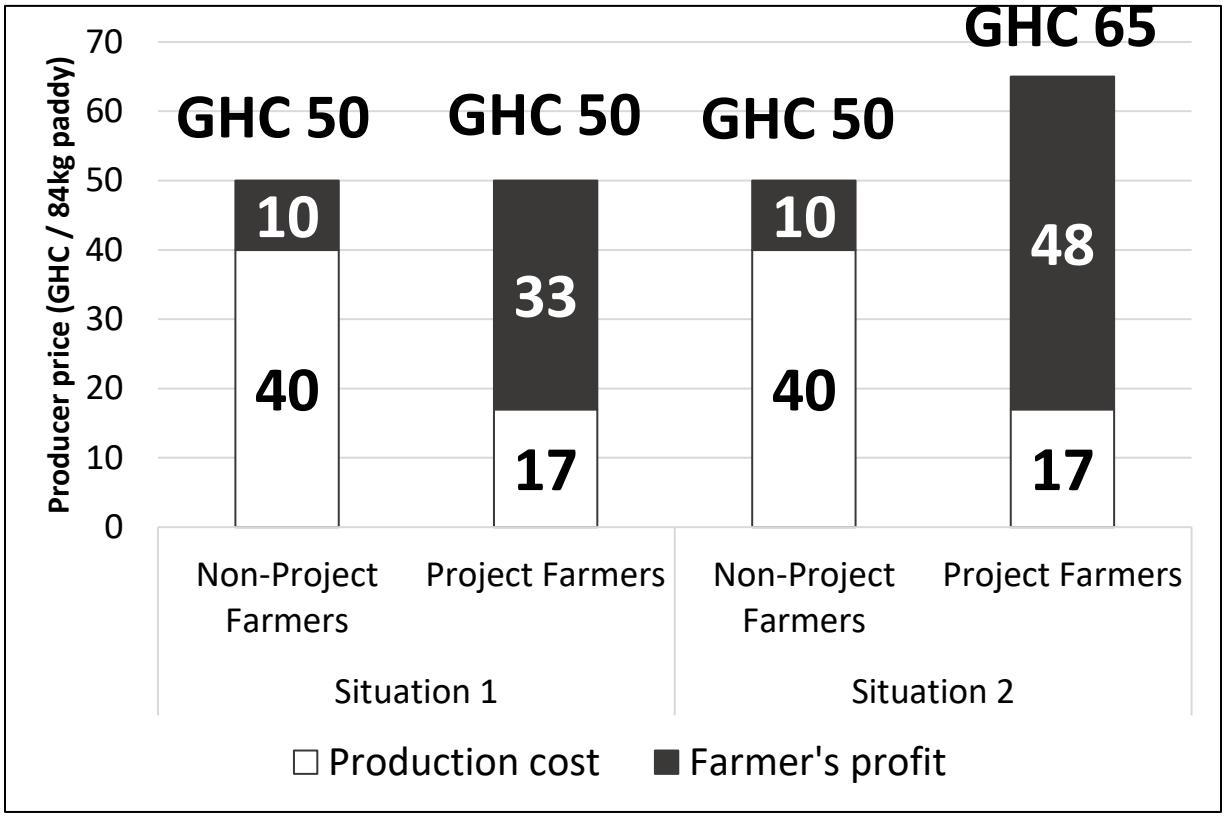
Note: For profit calculation, please use "GHC 50" for farm-gate price of Non-Project Farmers and "GHC 65" for Project Farmers.

Let's practice!! (Figure out cost and profit!)

	Non-project farmers		Project farmers	
District (TOT) or Community (Joint training)	Cost (GHC/84kg)	Profit (GHC/84kg)	Cost (GHC/84kg)	Profit (GHC/84kg)

This table is to be used for an exercise. Put names of districts or communities in these columns depending on where participants of the TOT are from!

Answer!!



Situation 1: Farmers' profit can be increased only by applying the TENSUI technical package

Situation 2: Farmers' profit can be increased by applying the TENSUI technical package and with an increase in producer price reflecting quality

Expected Increase in Farmers' Profit per Unit in Different Situations

Answer!!

Project Farmers

1) Convert cost per acre to cost per hectare: 255(GHC/acre) x 2.5 = 638 (GHC/ha)
2) Figure out cost per kg: 638 (GHC/ha)/3,127 (kg/ha) = 0.20(GHC/kg)
3) Figure out cost per 84kg: 0.20 x 84 (kg) = **17 (GHC/84kg)**

Non-Project Farmers

1) Convert cost per acre to cost per hectare: 321 (GHC/acre) x 2.5 = 803 (GHC/ha)
2) Figure out cost per kg: 803 (GHC/ha)/1,673 (kg/ha) = 0.48 (GHC/kg)
3) Figure out cost per 84kg: 0.48 x 84 (kg) = **40 (GHC/84kg)**

Confirm that Project-farmers' share can be larger in rice value chains…

Farmer's share in a rice value chain

34/100 x 100 = 34 (%) 10/90 x 100 = 11 (%)

Actor	Breakdown of consumer price (GHC/unit)	Unit	Project Farmers			Non-Project Farmers		
			High quality			Low quality		
			Cost	Share (%)	Selling price	Cost	Share (%)	Selling price
Farmer	Production cost	84kg paddy	16	16		35	39	
	Farmer's profit	**84kg paddy**	**34**	**34**	**50**	**10**	**11**	**45**
Marketer	Transportation from farm-gate to market	84kg paddy	1	-		1	-	
	Marketer's profit	84kg paddy	4	4	55	4	4.4	50
Parboiler	Transportation from market to home	84kg paddy	1	-		1	-	
	Fire wood	84kg paddy	5	-		5	-	
	Transportation from home to milling station	84kg paddy	1	-		1	-	
	Milling charge	84kg paddy	5	-		5	-	
	Transportation from milling station to market	50kg milled rice	1	-		1	-	
	Parboiler's profit	50kg milled rice	32	32	100	27	30	90
Consumer	-							

*Production costs are recalculated data of Impact Survey 2013 (assumption: Project Farmers produce high quality paddy while Non-Project Farmers produce low quality paddy)

*Other costs and selling price are sourced from a market survey in Walewale, West Mamprusi in 2014

Now…how do you teach farmers that Project-Farmers can get a higher return?

➔ *See "A Tale of Two Farmers"*

A Tale of Two Farmers

Project Farmer

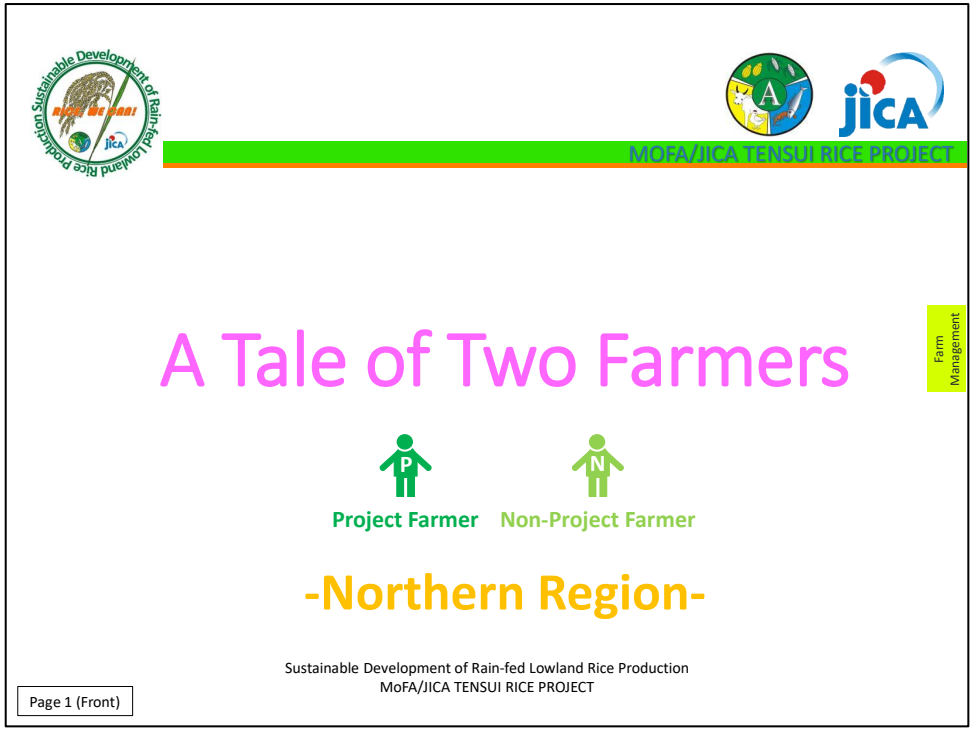
Non-Project Farmer

-Northern Region-

Sustainable Development of Rain-fed Lowland Rice Production
MoFA/JICA TENSUI RICE PROJECT

A Tale of Two Farmers…

- This is a story about two rice farmers in Northern Region.
- Figures used here are based on the actual data collected by the Impact Survey done in 2013 to compare Project farmers and Non-Project farmers and a market survey in 2014 in Northern Region.



Page 1 (Back)

Once upon a time, there were two farmers…

TENSUI RICE?
Sounds interesting! I like to apply new techniques. Let me invest money, time and energy to it!

TENSUI RICE?
Hmmm…. sounds painful…
I don't want to put so much energy on rice cultivation,
I don't want to make any investment. Let me continue the traditional methods.

Once upon a time, there were two farmers…

- Read the farmers' words in the balloons.

Once upon a time, there were two farmers…

Page 2 (Front)

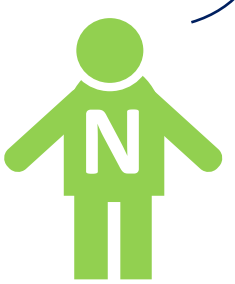
Page 2 (Back)

Then, they began to be called…

TENSUI RICE?
Sounds interesting! I like to apply new techniques. Let me invest my money, time and energy on it!

Project Farmer

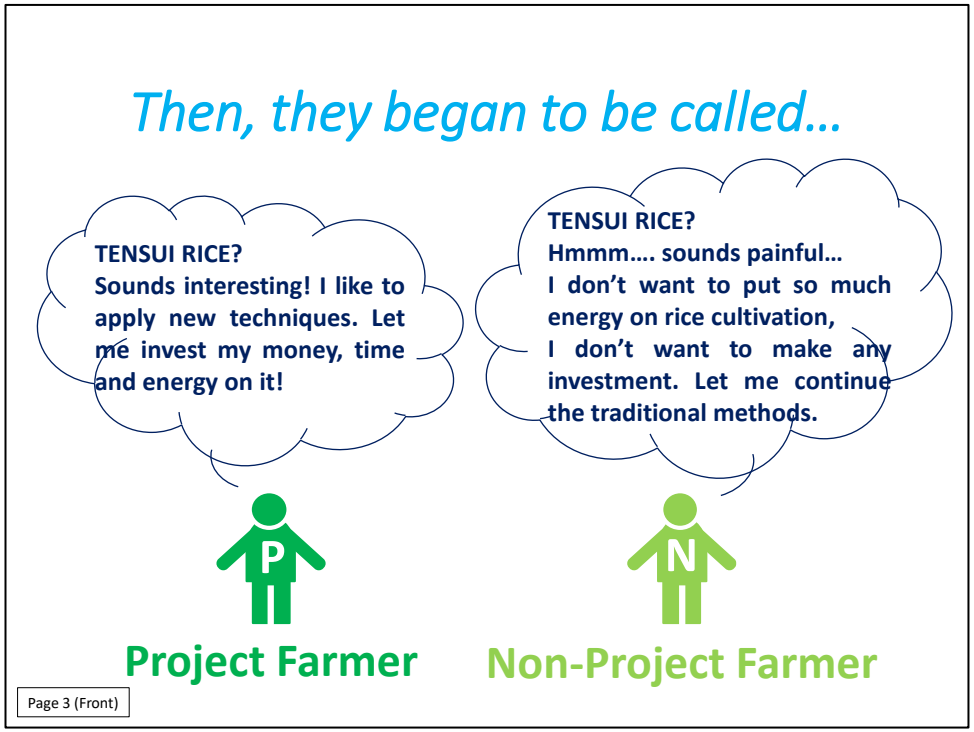
TENSUI RICE?
Hmmm…. sounds painful…
I don't want to put so much energy on rice cultivation,
I don't want to make any investment. Let me continue the traditional methods.



Non-Project Farmer

Then, they began to be called…

- “Project Farmer” and “Non-Project Farmer”.
- The one who is willing to try the TENSUI methods is the “Project Farmer” and the one who is sticking to the traditional methods is the “Non-Project Farmer”.



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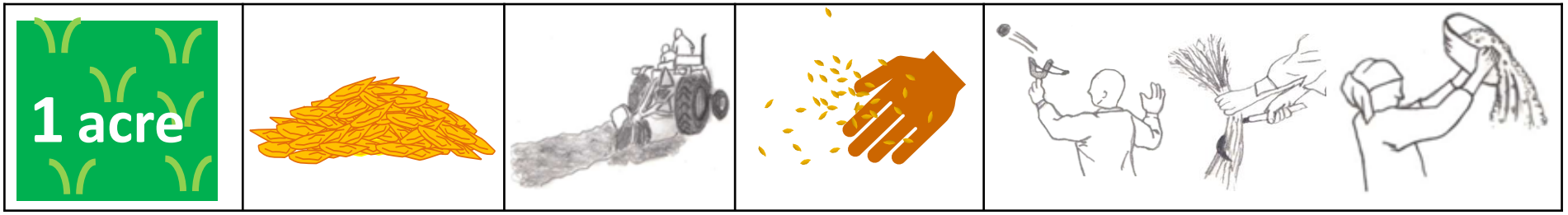
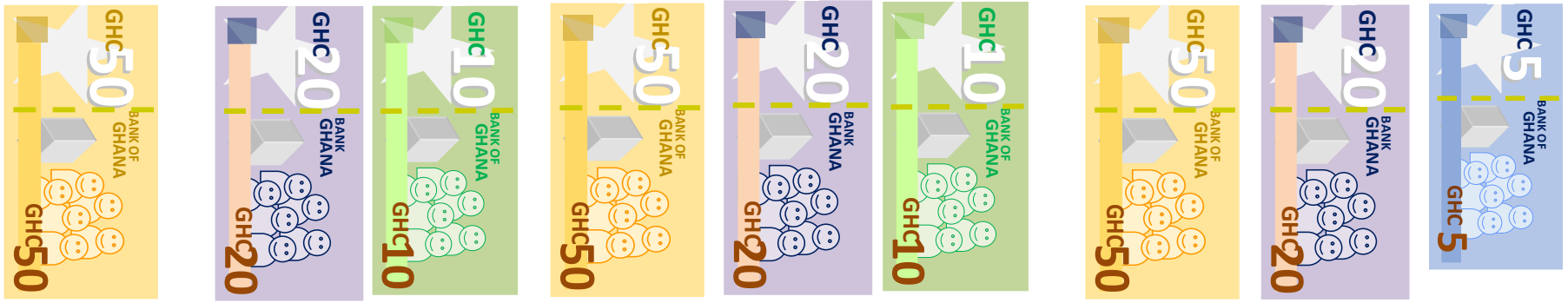
Non-Project Farmer

Total Production Cost per Acre

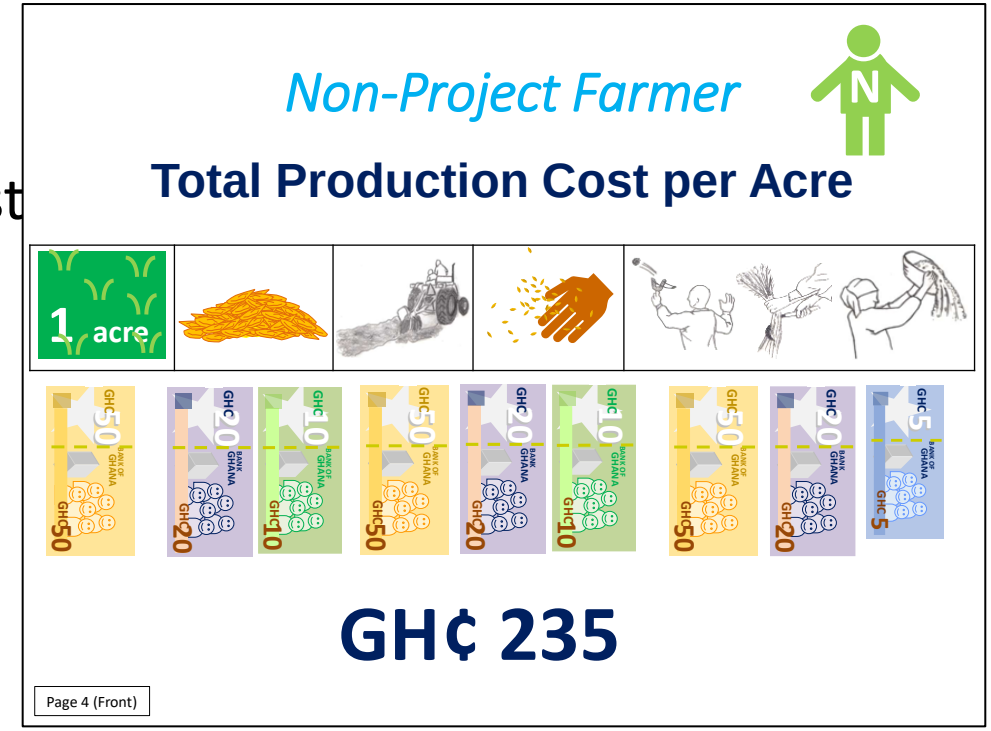




GH¢ 235

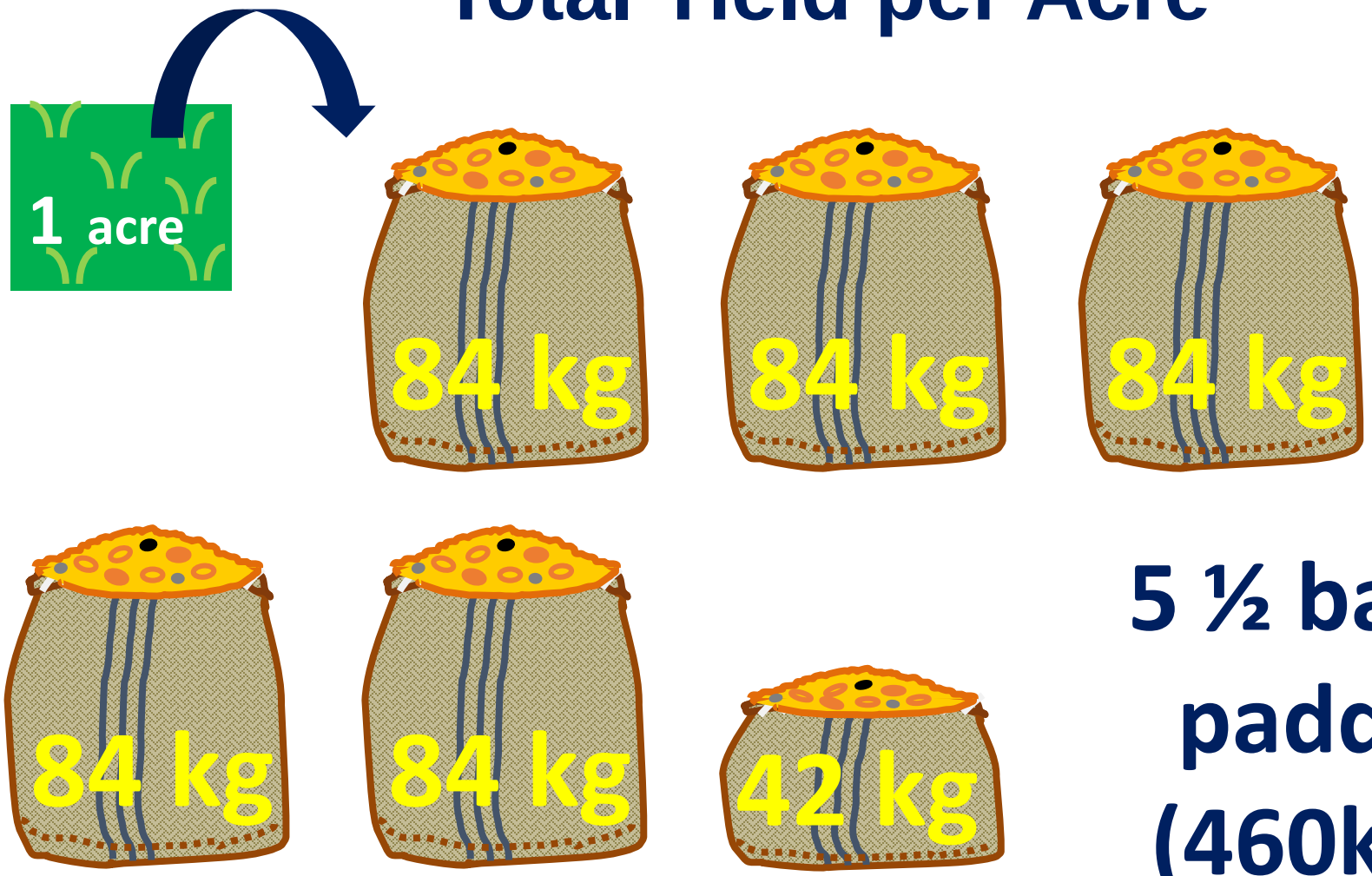
First, let's see how the Non-Project Farmer worked

- He spent some money for renting a land and buying seeds.
- He applied the traditional production methods including tractor ploughing, broadcasting, bird scaring, harvesting and winnowing in an acre of land.
- He didn't apply fertilizers as he didn't buy them.
- In total, his production cost was GHC 235.
- Ask farmers: How much have you spent? More than him or less than him?



Non-Project Farmer

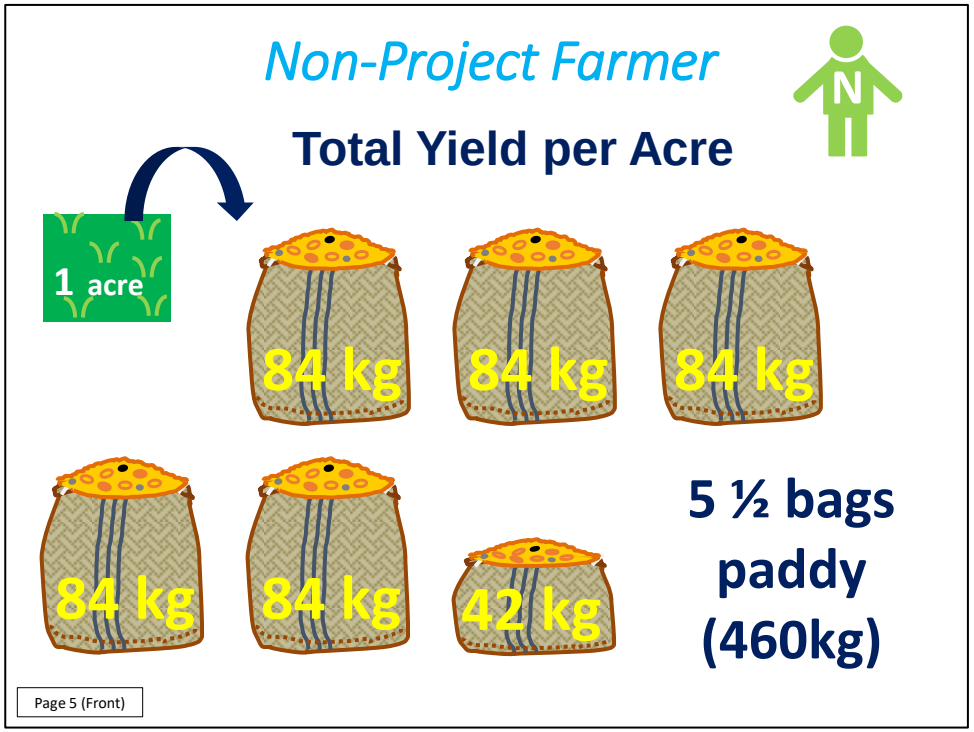
Total Yield per Acre



5 ½ bags paddy (460kg)

Total Yield per Acre

- In the harvest season, the Non-Project Farmer harvested 5 ½ bags of paddy (around 460kg) from 1 acre.
- Ask farmers:
  How much have you harvested? More than him or less than him?



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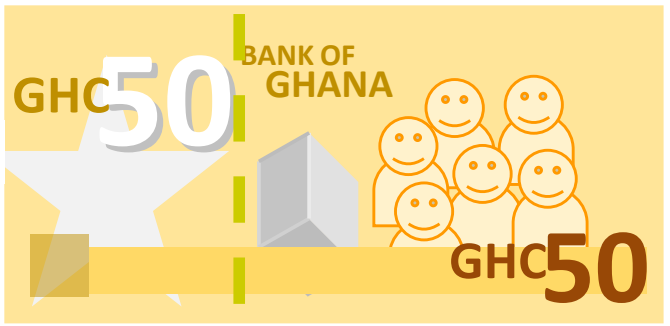
Non-Project Farmer

Producer Price per Bag 84kg Paddy



Low Quality Paddy GH¢ 50

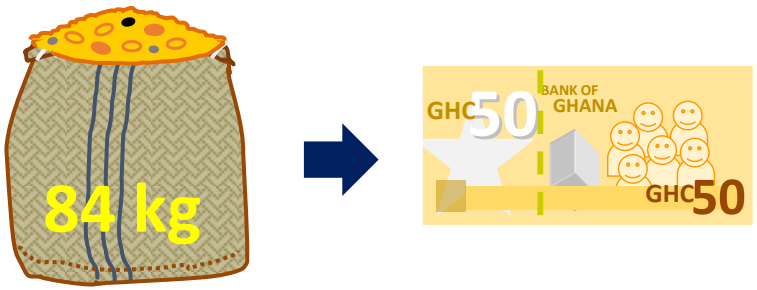
Producer Price per Bag (84kg Paddy)

- Quality of the Non-Project Farmer's paddy was not so high. The paddy included lots of foreign matter such as stones and different varieties.
- A parboiler agreed to buy the paddy at GHC 50 per 84kg bag.
- Ask farmers:

How is the quality of your paddy? What is price of your paddy?

Non-Project Farmer

Producer Price per Bag 84kg Paddy



Low Quality Paddy **GH¢ 50**

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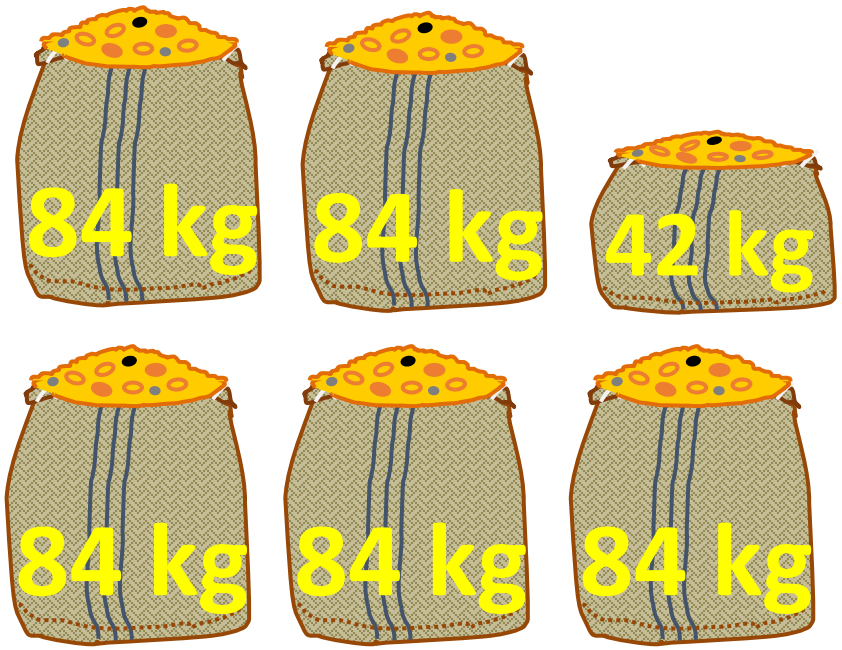
Non-Project Farmer

Total Sales per Acre

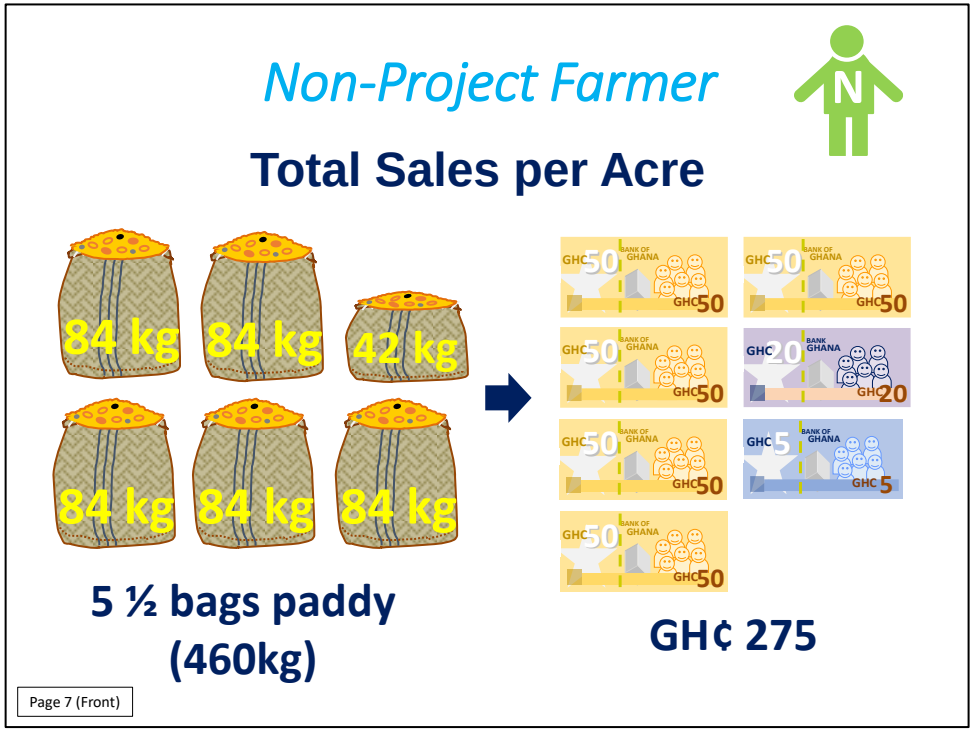


5 ½ bags paddy (460kg)

GH¢ 275

Total Sales per Acre

- In total, the Non-Project Farmer gained GHC 275 from 5 ½ bags of paddy.
- Ask farmers:
  Is his income big or small??



Non-Project Farmer

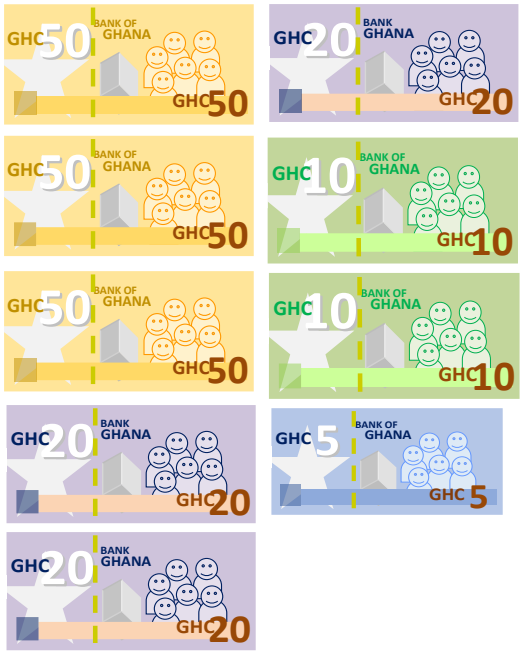
Total Profit per Acre

Sales

GH¢ 275

-

Cost



GH¢ 235

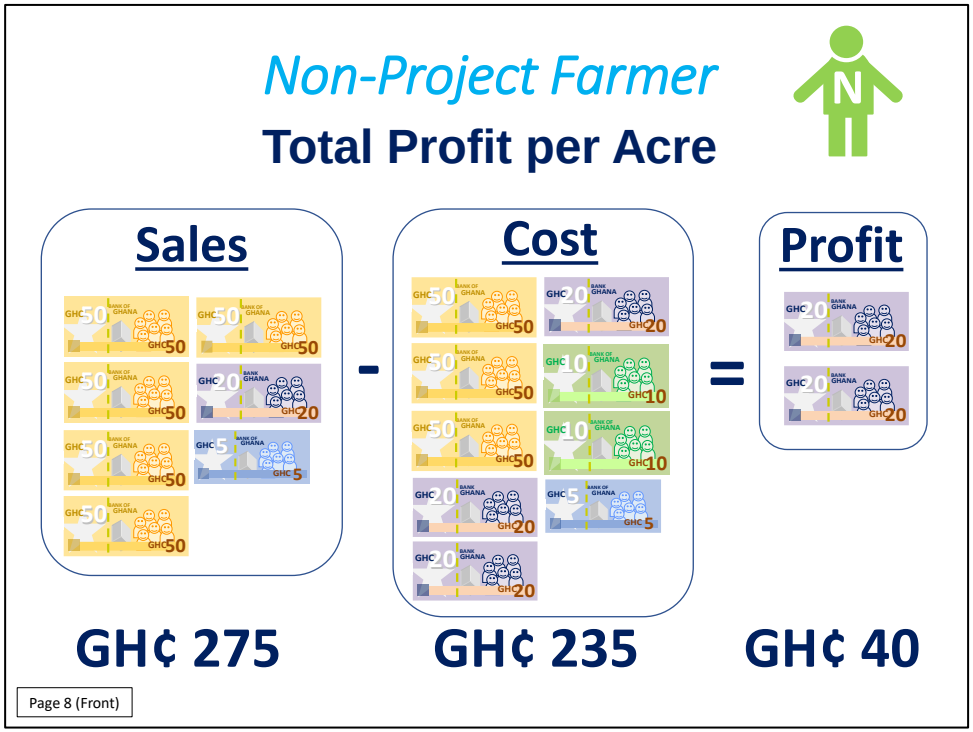
=

Profit

GH¢ 40

Total Profit per Acre

- Eventually, the Non-Project Farmer got GHC 40 as a profit from rice production in an acre. The profit is a difference calculated by subtracting the cost (GHC 235) from the sales (GHC 275).
- Ask farmers: Is his profit big or small??



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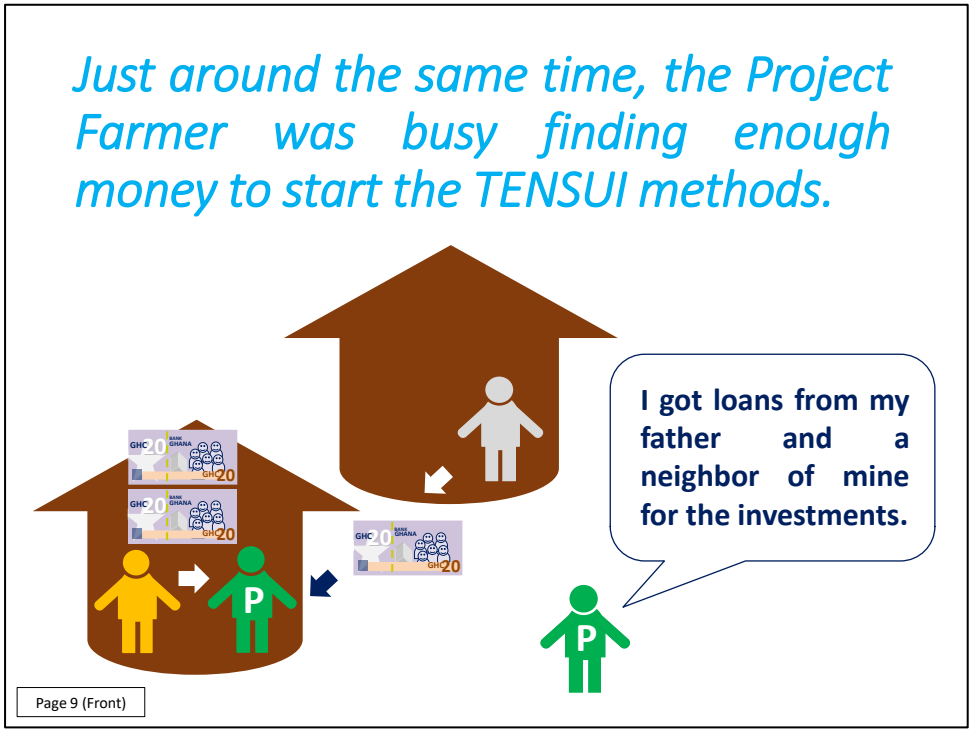
Just around the same time, the Project Farmer was busy finding enough money to start the TENSUI methods.

Just around the same time, the Project Farmer was busy finding enough money to start the TENSUI methods.

- After estimating how much he should spend for rice cultivation per an acre, he borrowed GHC 40 from his father and GHC 20 from his neighbor.

- Ask farmers:
  Have you estimated a production cost before starting to cultivate??
  How did you come up with the necessary money?



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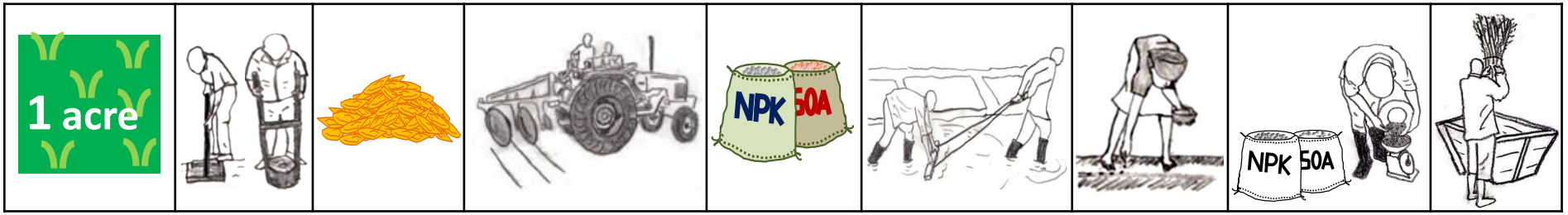
Project Farmer

Total Production Cost per Acre

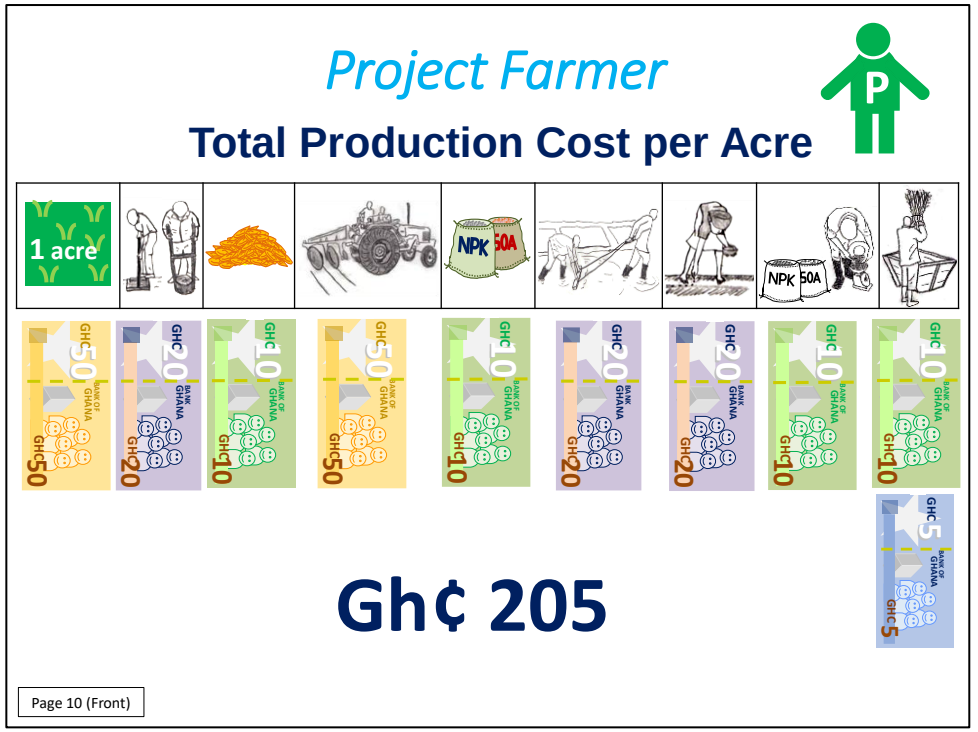


Gh¢ 205

Then, let's see how the Project Farmer worked

- He spent some money for renting a land and buying seeds and fertilizers. As he used seeds harvested in the previous season, he was able to save some cost for seed procurement.
- He applied the TENSUI methods including tractor ploughing and harrowing, leveling, line sowing, fertilizer application and threshing using a bambam box.
- His total production cost was GHC 205.
- Ask farmers: Is his production cost too much or reasonable?

Remark for AEAs: In the Impact Survey 2013, higher production cost was expected for Project Farmers while their production cost was actually lower than Non-Project Farmers for reasons unknown. Although the actual figure is used in this material, its ultimate message is "Project Farmers can gain higher return than Non-Project Farmers".



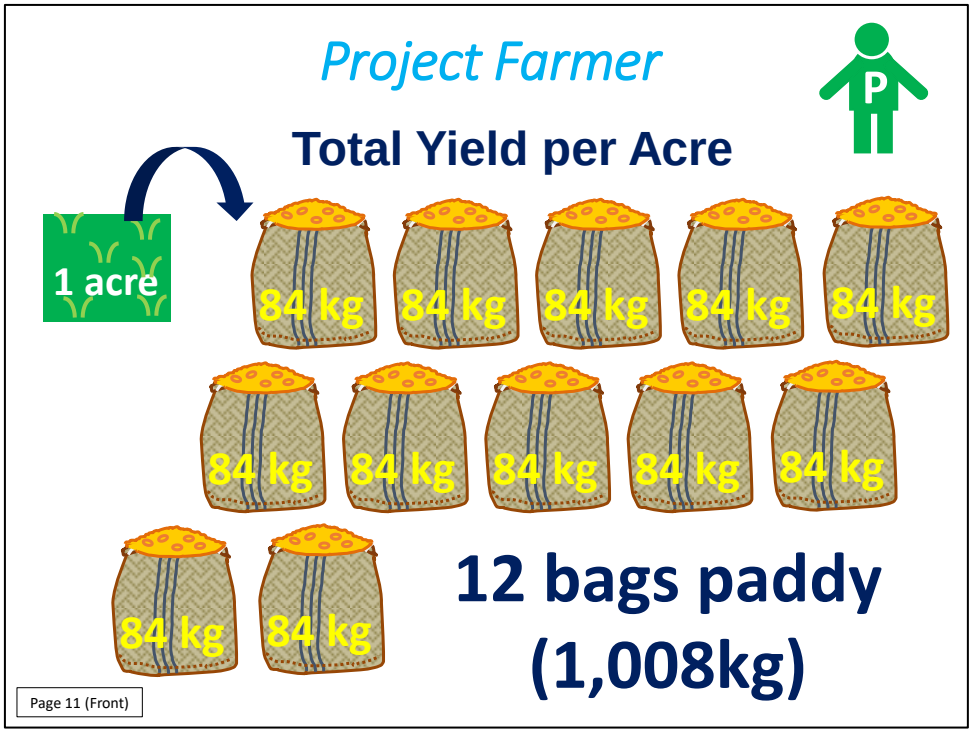
Project Farmer

Total Yield per Acre

12 bags paddy (1,008kg)

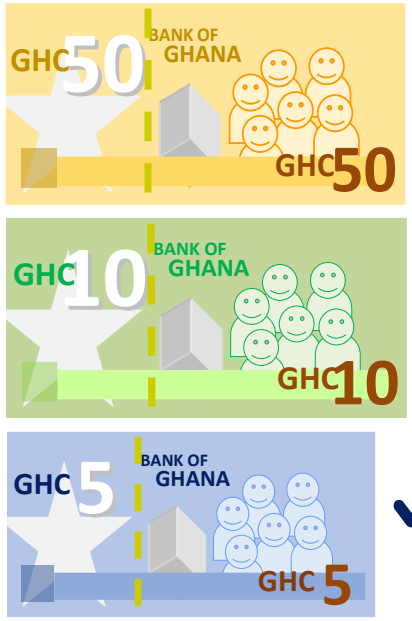
Total Yield per Acre

- The Project Farmer harvested 12 bags of paddy (1,008 kg) from 1 acre.
- Ask farmers:
  Is his harvest big or small?



Project Farmer

Producer Price per 84kg Paddy

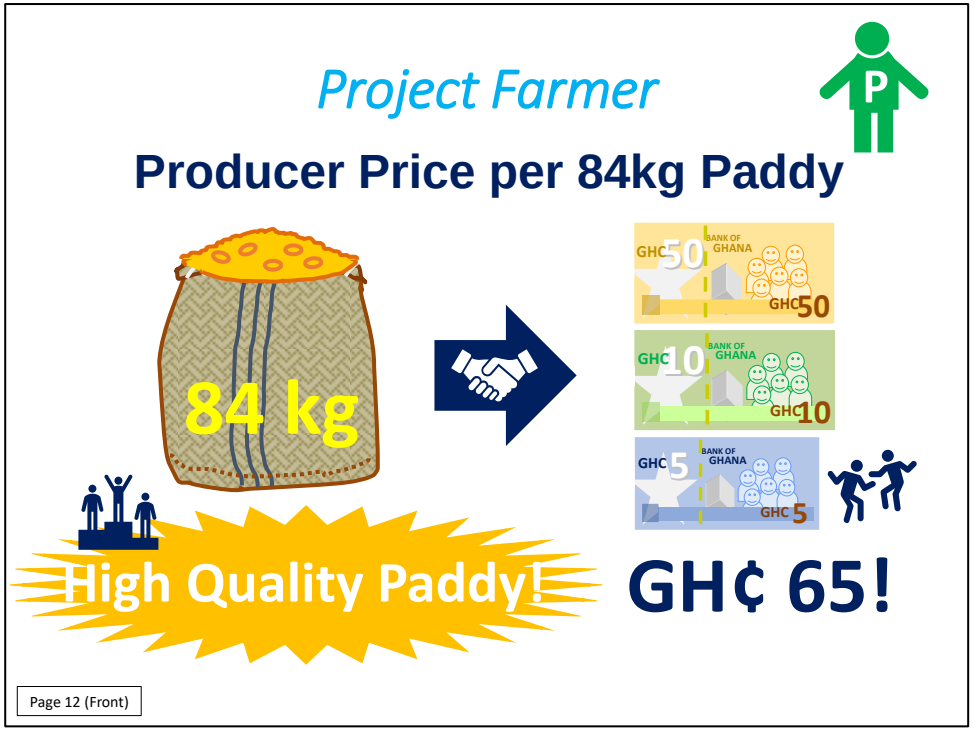


High Quality Paddy!

GH¢ 65!

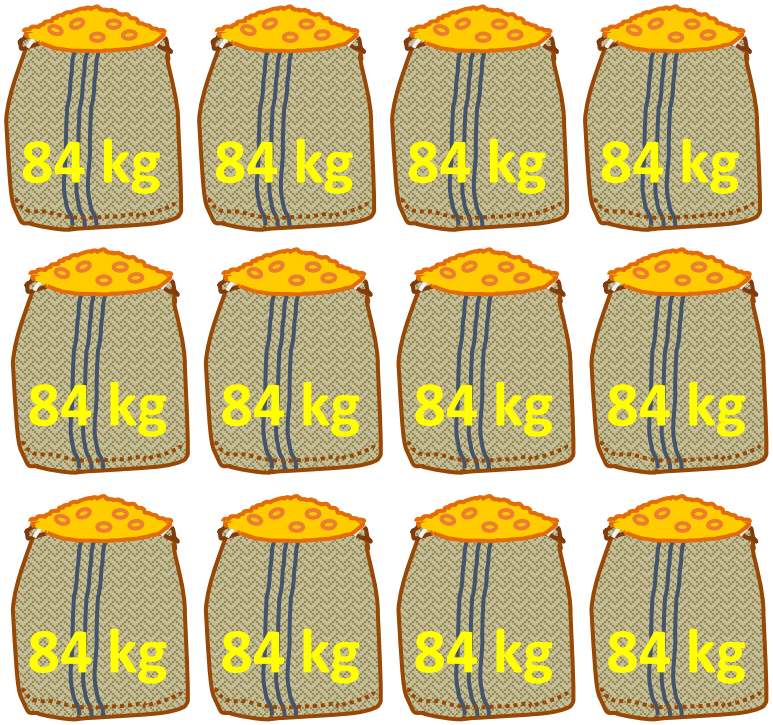
Producer Price per 84kg Paddy

- Quality of the Project Farmer's paddy was very high. The paddy was pure without foreign matters such as stones, husks and different varieties.
- A parboiler agreed to buy the paddy at GHC 65 per 84kg bag.
- Ask farmers: What is the price difference between the low quality and the high quality paddy?

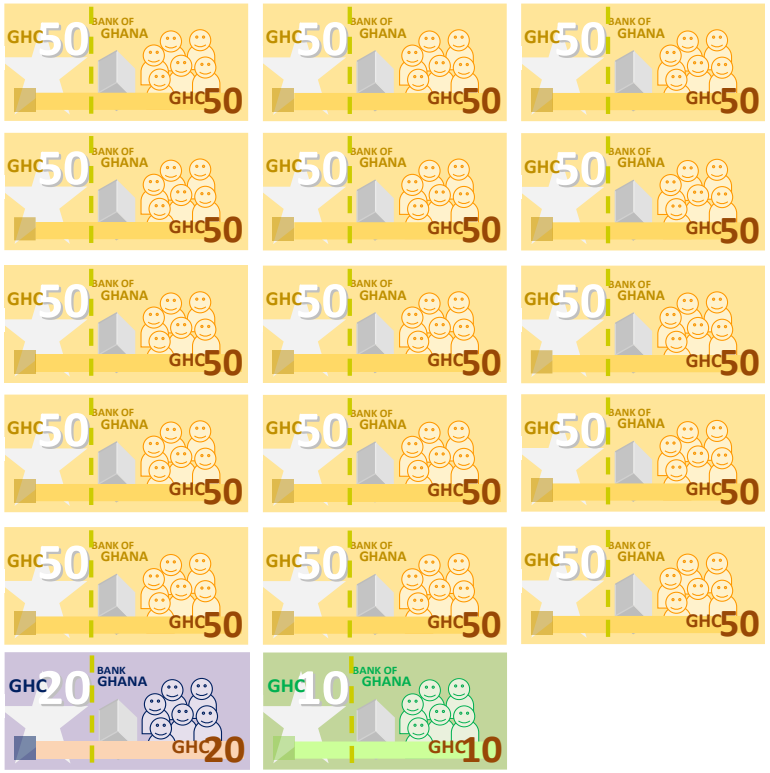


Project Farmer

Total Sales per Acre



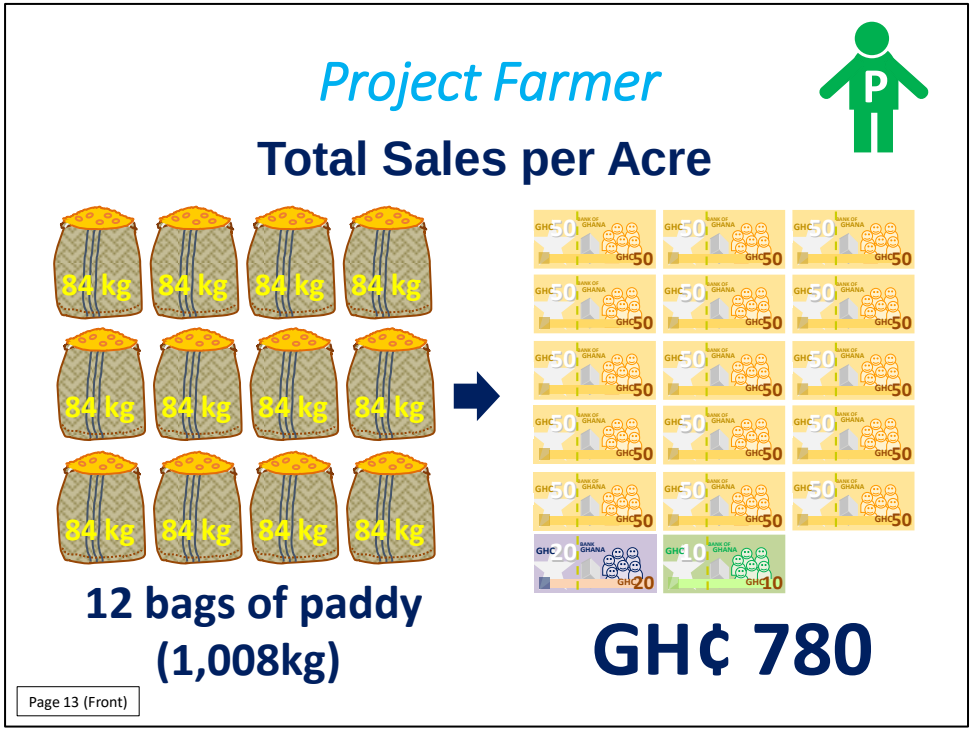
12 bags of paddy (1,008kg)



GH¢ 780

Total Sales per Acre

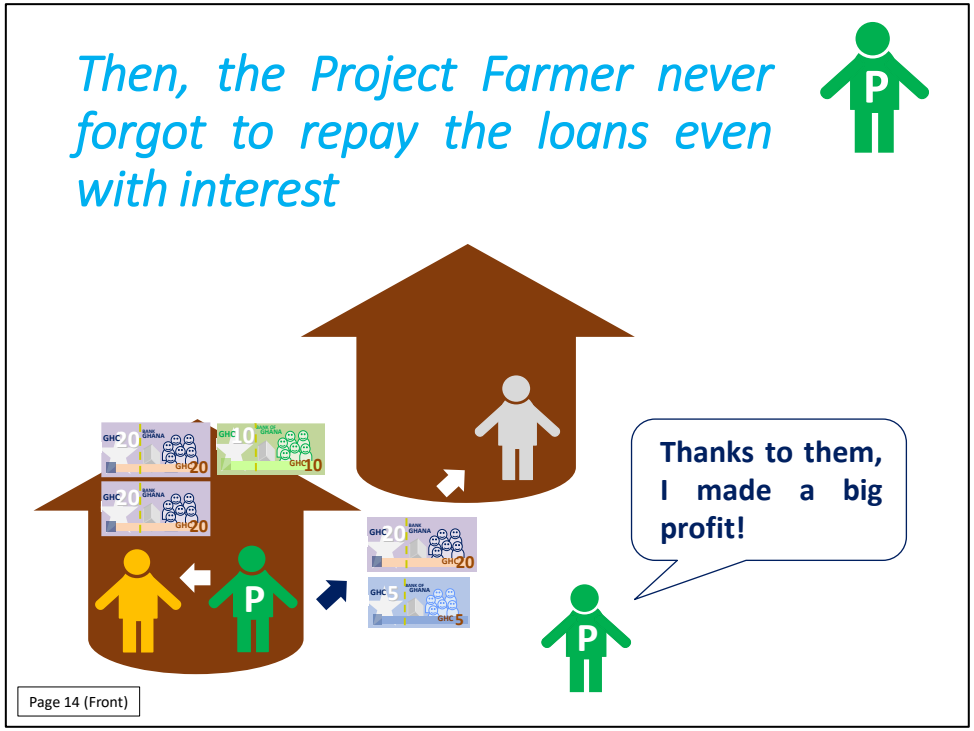
- In total, the Project Farmer gained GHC 780 from 12 bags of paddy.
- Ask farmers:
  Is his income big or small??



Then, the Project Farmer never forgot to repay the loans even with interest

Then, the Project Farmer never forgot to repay the loans even with interest

- He returned GHC 40 to his father with interest (GHC 10) and GHC 20 to his neighbor with interest (GHC 5). The total interest cost was GHC 15.



Project Farmer

Total Profit per Acre

Sales

GH¢ 780

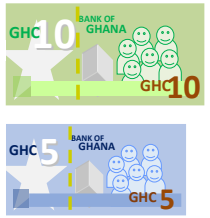
-

Cost

GH¢ 205

-

Interest



GH¢ 15

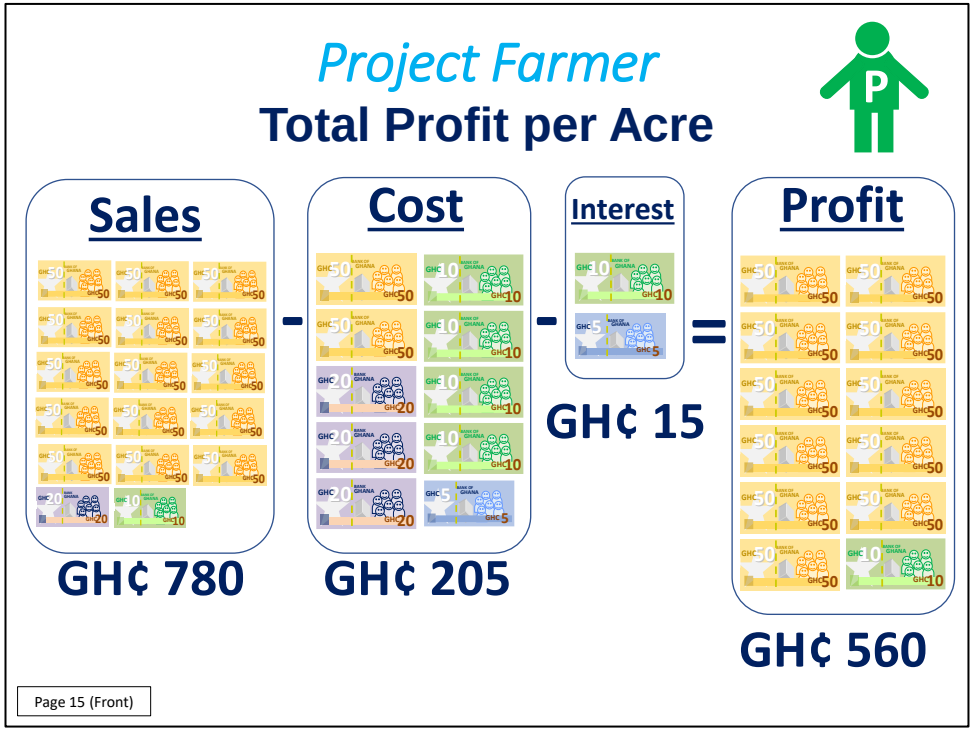
=

Profit

GH¢ 560

Total Profit per Acre

- Eventually, the Project Farmer got GHC 560 as a profit from rice production in an acre. The profit is a difference calculated by subtracting the cost (GHC 205) and the interest (GHC 15) from the sales (GHC 780).



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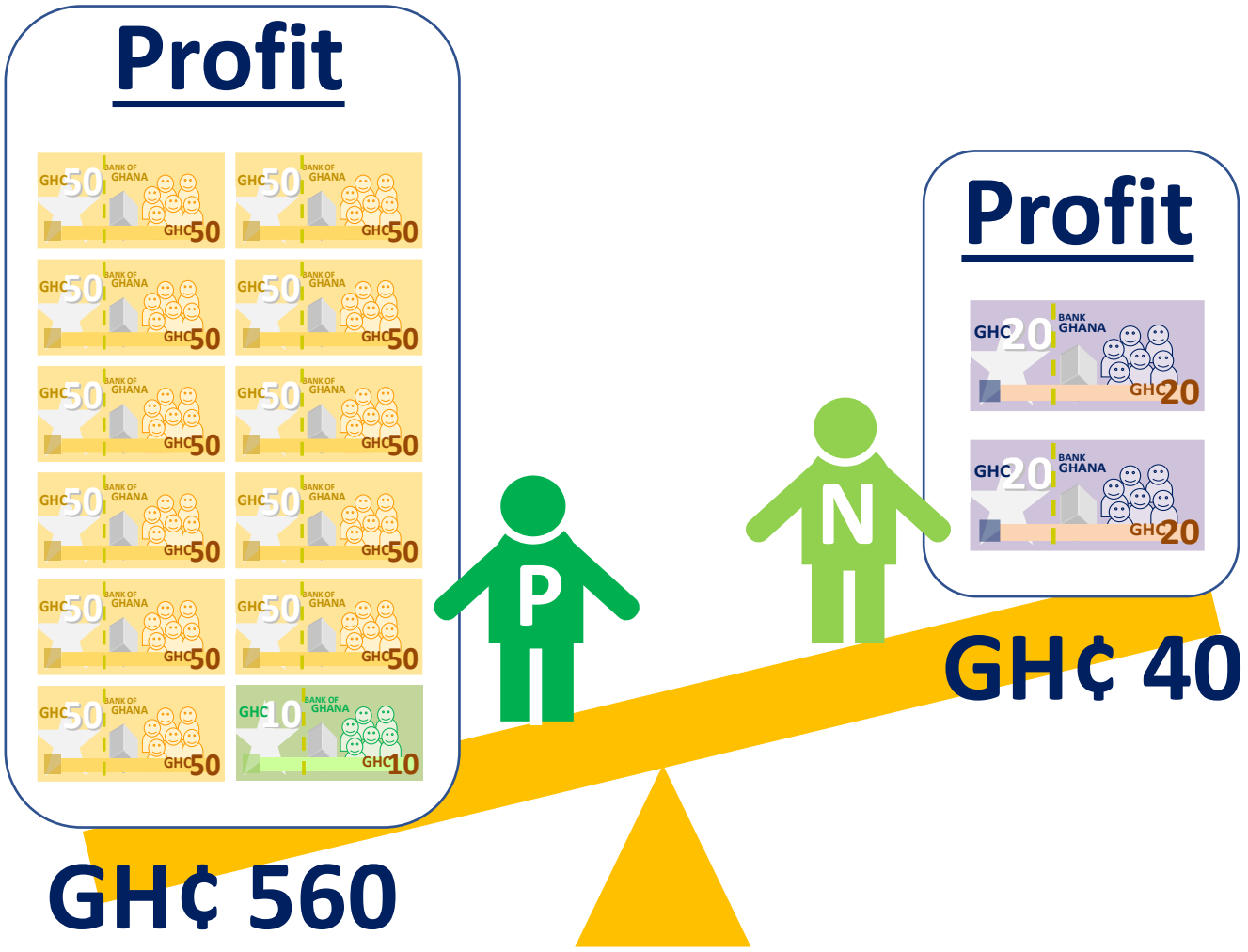
Which farmer's example do you want to follow?!

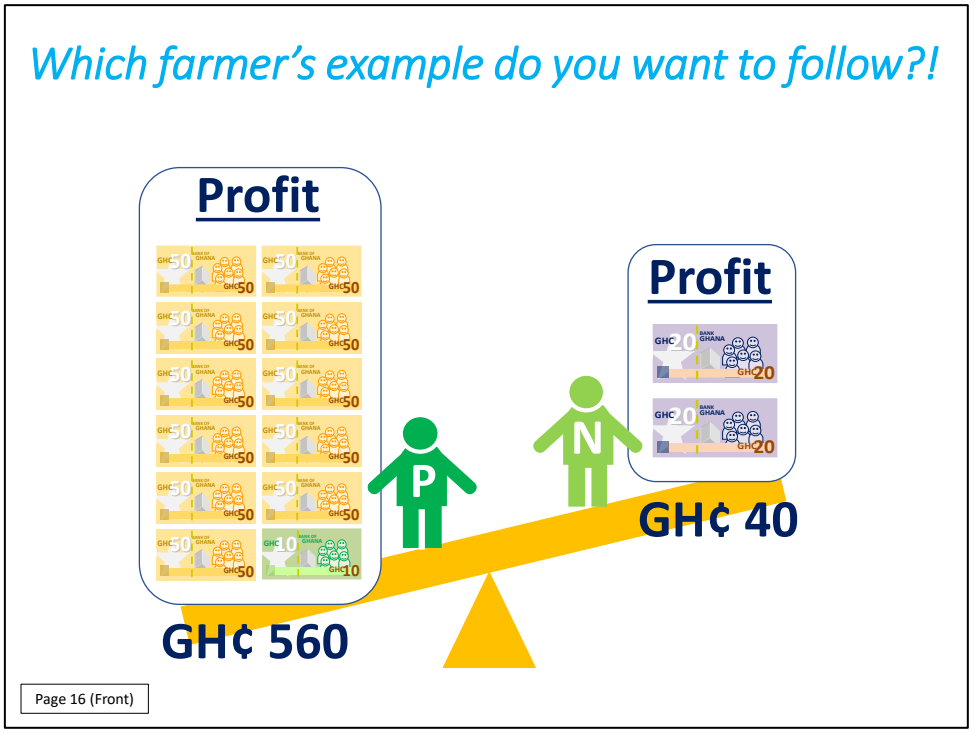


Which farmer's example do you want to follow?!

The profit from the Project Farmer's field was higher than that for the Non-Project Farmer!

Ask farmers:

- What is the difference between their profit?



But sometimes, quality was not reflected to producer price… 

But sometimes, quality was not reflected to producer price…

But sometimes, quality was not reflected to producer price… 

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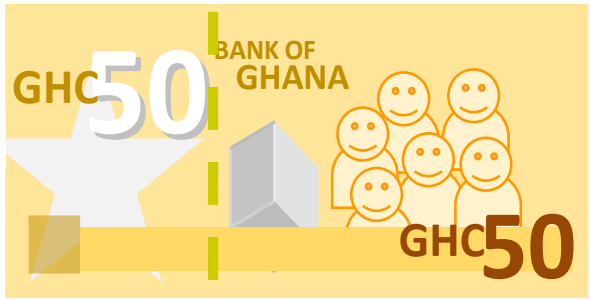
Project Farmer

Producer Price per 84kg Paddy

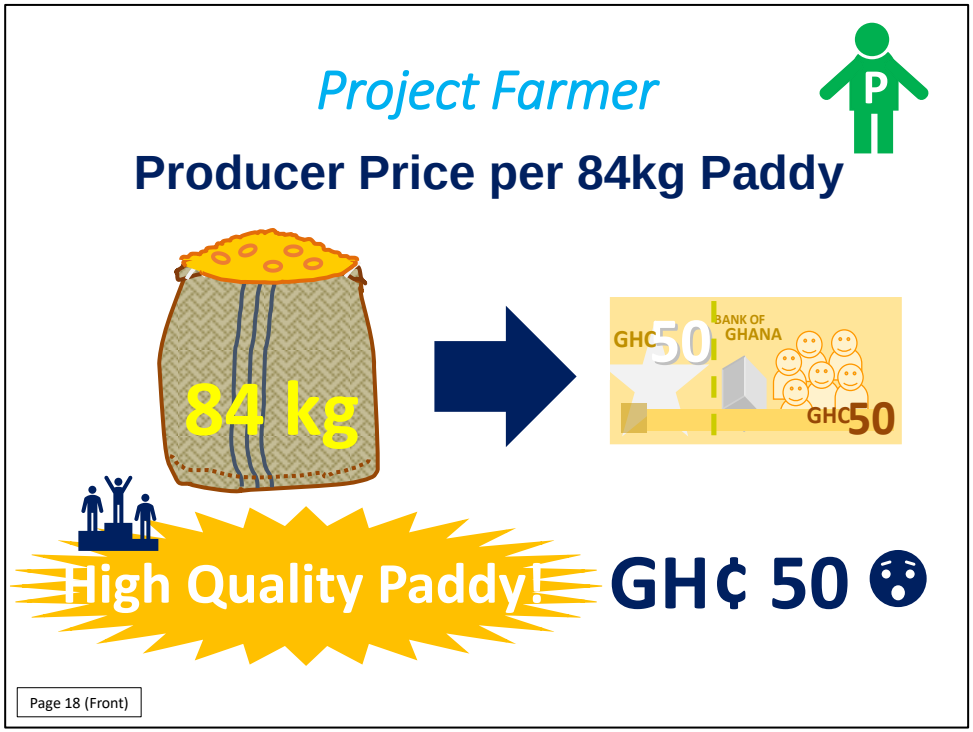


High Quality Paddy!

GH¢ 50 😮

Producer Price per 25kg Milled Rice

- Quality of the Project Farmer's paddy was very high. But a parboilor agreed to buy the paddy at GHC 50 per bag.
  This is the same price as the producer price of the low quality rice.
- Ask farmers: How is your experience?



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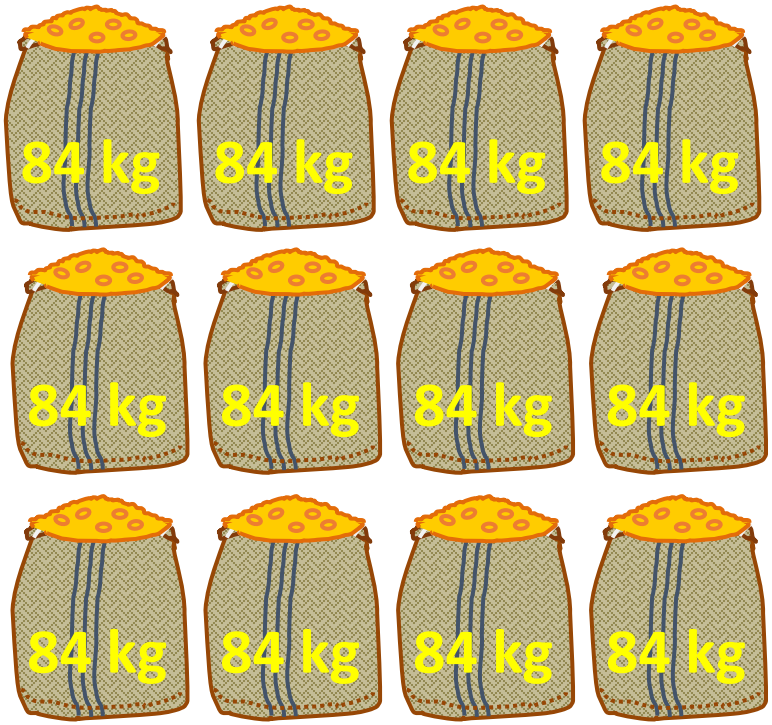
Project Farmer

Total Sales per Acre

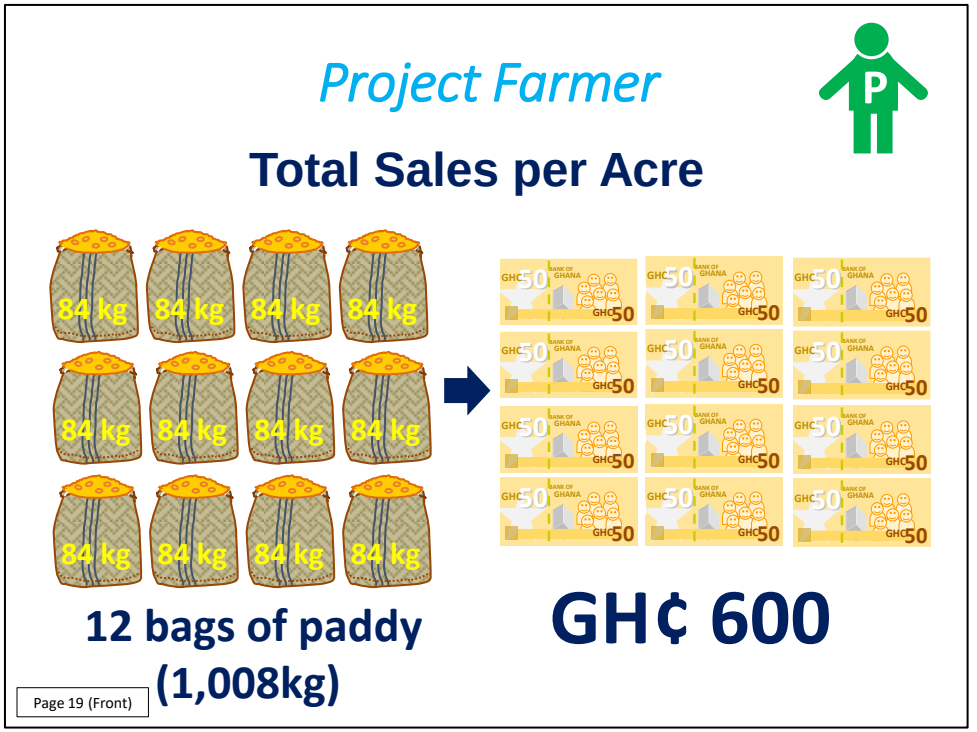


12 bags of paddy (1,008kg)

GH¢ 600

Total Sales per Acre

- In total, the Project Farmer gained GHC 600 from 12 bags of paddy.
- Ask farmers:
  Is his income big or small??



Project Farmer

Total Profit per Acre

Sales

GH¢ 600

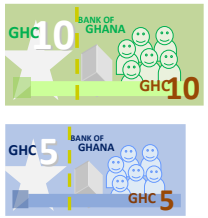
\-

Cost

GH¢ 205

\-

Interest



GH¢ 15

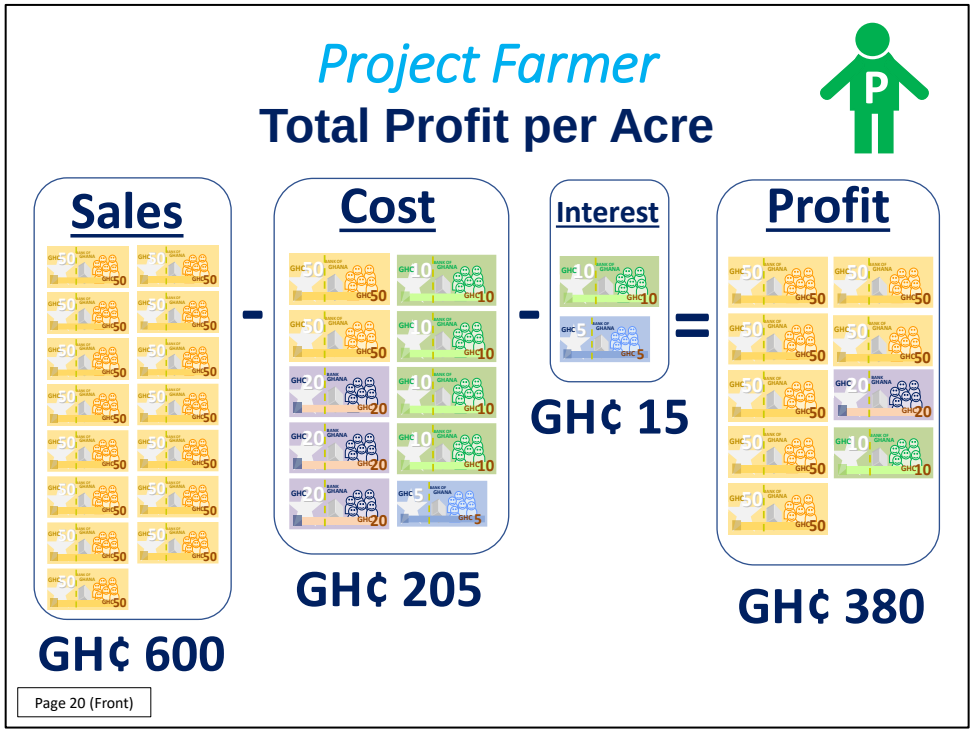
=

Profit

GH¢ 380

Total Profit per Acre

- Eventually, the Project Farmer got GHC 380 as a profit from rice production in an acre. The profit is a difference calculated by subtracting the cost (GHC 205) and the interest (GHC 15) from the sales (GHC 600).



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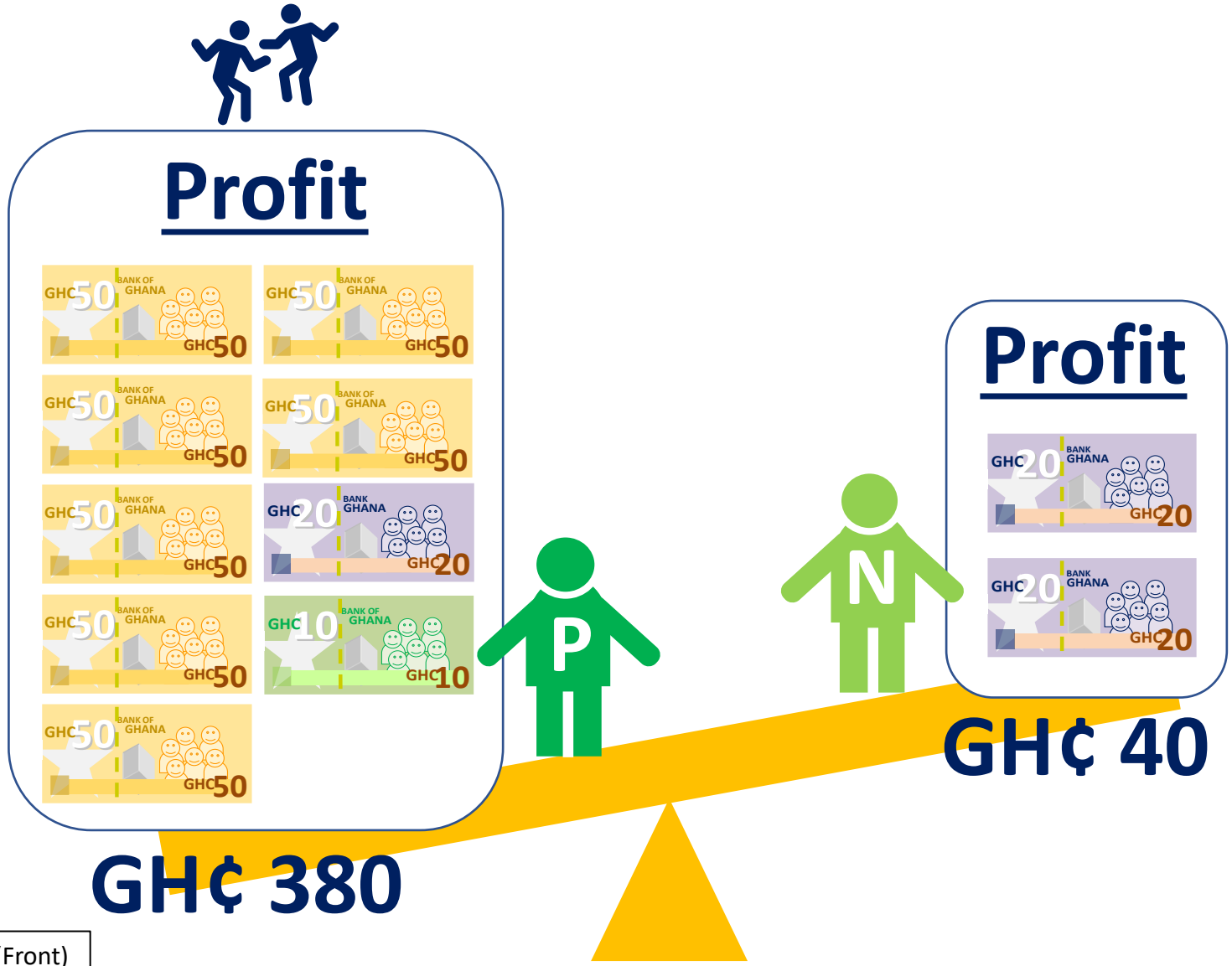
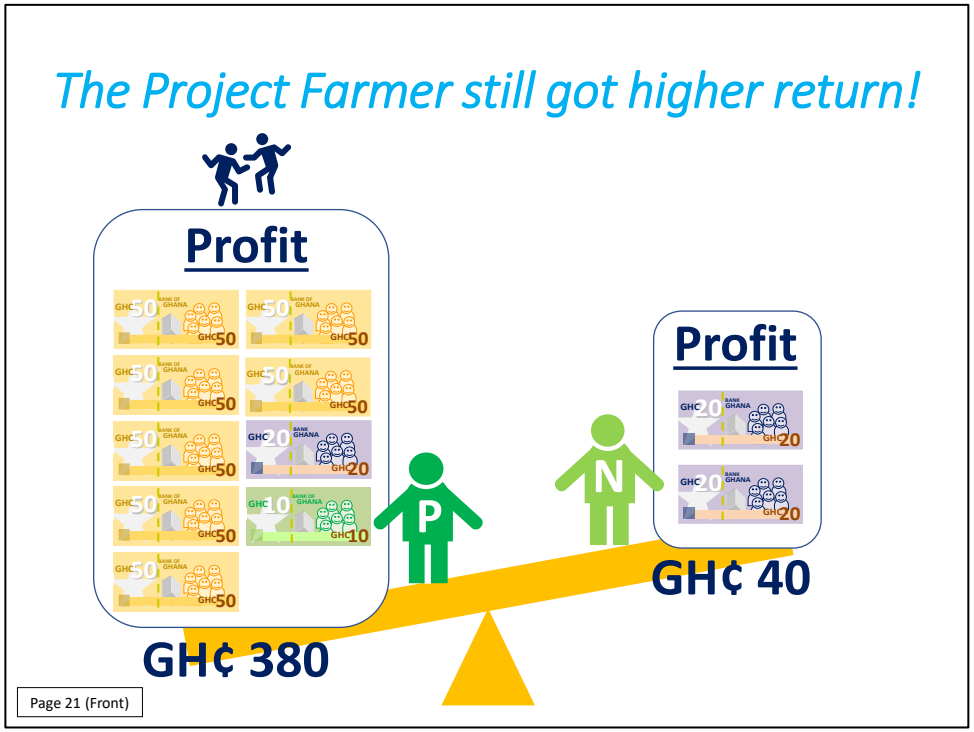
The Project Farmer still got higher return!



The Project Farmer still got higher return!

- Although the produce price of the Project Farmer's high quality paddy was same as the one of the Non-Project Farmer's low quality paddy, the profit from the Project Farmer's field was still higher than that from the Non-Project Farmer's field!



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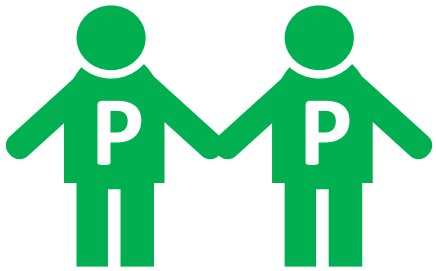
After a few seasons, the Non-Project Farmer started to follow instructions of the Project Farmer.
And they lived happily ever, continuing to produce rice every season through the TENSUI methods…

The End



After a few seasons, the Non-Project Farmer started to follow instructions of the Project Farmer.
And they lived happily ever, continuing to produce rice every season through the TENSUI methods…

- This is the end of the story.

After a few seasons, the Non-Project Farmer started to follow instructions of the Project Farmer.
And they lived happily ever, continuing to produce rice every season through the TENSUI methods…

The End

Now, let's check your profit! 

Now, let's check your profit!

- Ask farmers:

Are you keeping record of a cost and income for your rice production? If yes, let's calculate profit. How is the difference between profits before and after starting the TENSUI methods?
If not keeping record, it's not too late yet! Let's remember what you have learnt in the first On-site training (record keeping sheet).

Now, let's check your profit! 

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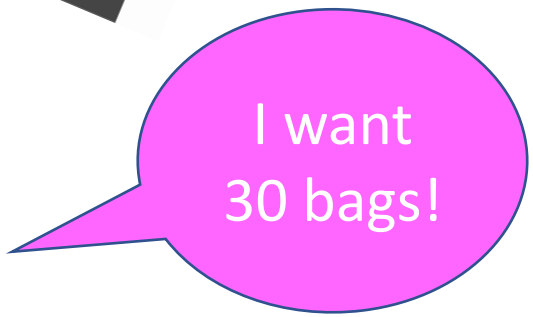
2) Discussion points with group farmers

When you have a review meeting with group farmers after harvest,

➔ *Discuss with farmers how TENSUI technical package can save the cost…*

Discussion Points

- Point 1: Target
  - How many bags do you want to harvest?



- Point 2: This year result of conventional method
  - How many acres did you cultivate?
  - How much did you spend in total?
  - How many bags did you harvest?

Discussion Points

Example answer from farmers

Farmer	Area cultivated (acre)	Cost – Land rental (GHc)	Cost - Input (GHc)	Cost - Equipment (GHc)	Cost – Labor (GHc)	Total Cost (GHc)	No. of bags harvested
A	3	300	320	180	150	**950**	25
B	3	300	345	180	150	**975**	29
C	4	0	567	140	300	**1,007**	24
D	3	0	637	11	1,000	**1,648**	17
E	3	0	622	82	1,180	**1,884**	20

*Examples shown above are raw data of baseline (2017) collected from target farmers in Cycle 2 districts .

Spent a lot!

Discussion Points

- Point 3: Review
  - Did you achieve your target?
  - How many bags did we harvest from demo plot?

- Point 4: Next Year Plan
  - If you fully apply TENSUI technical package next year…
    - ✓You will achieve your target even from smaller acreage and at smaller cost than this year
    - → How?

*31 bags were harvested at Wundua training plot (4,037m^2) East Mamprusi in 2018

Discussion Points

Farmer	Area cultivated (acre)	Total Cost (GHc)	No. of bags harvested
A	3	**950**	25
B	3	**975**	29
C	4	**1,007**	24
D	3	**1,648**	17
E	3	**1,884**	20

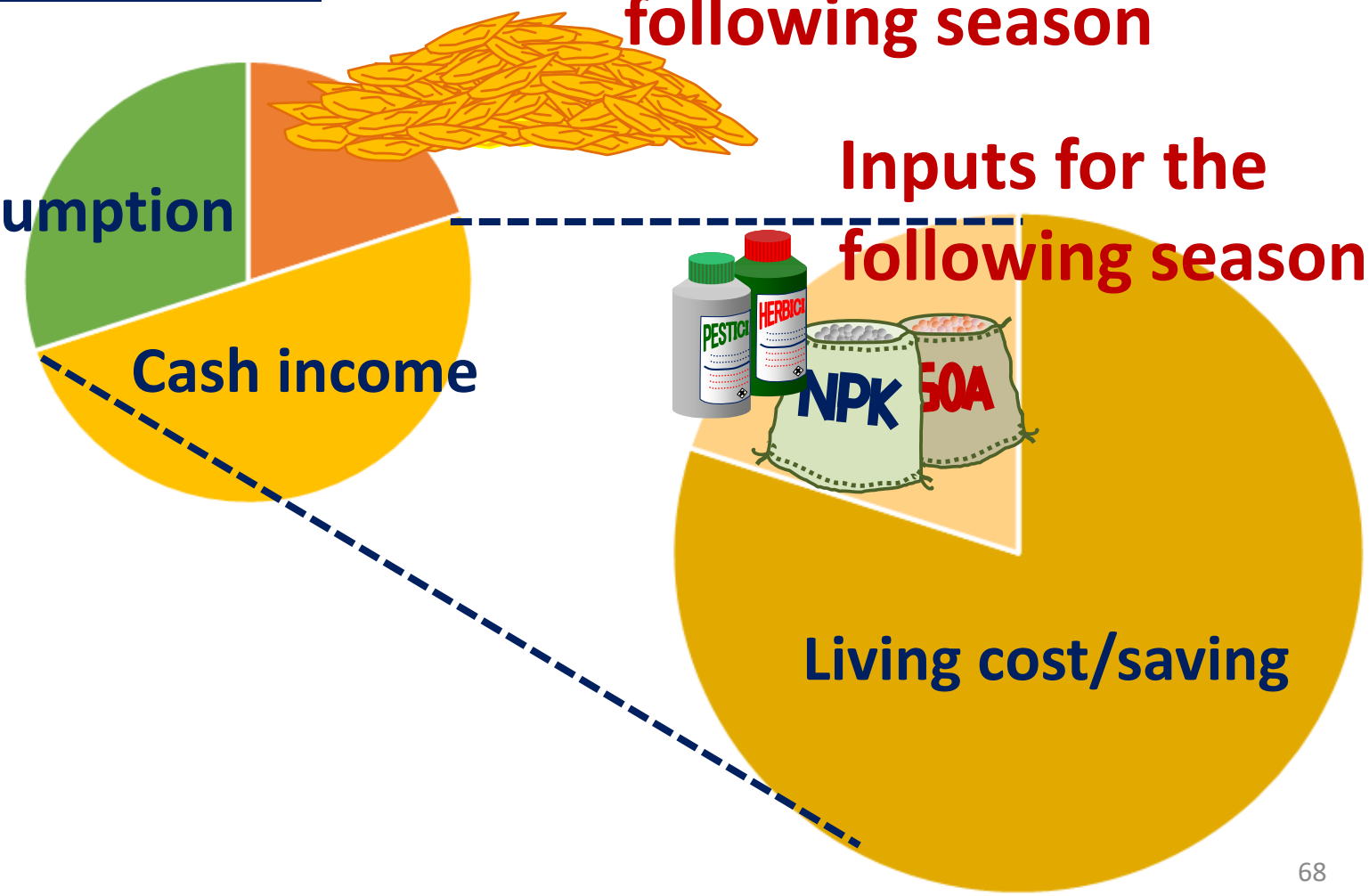
Area cultivated (acre)	Total Cost (GHc)	No. of bags harvested
1		31

Everyone wants to apply TENSUI technology!!

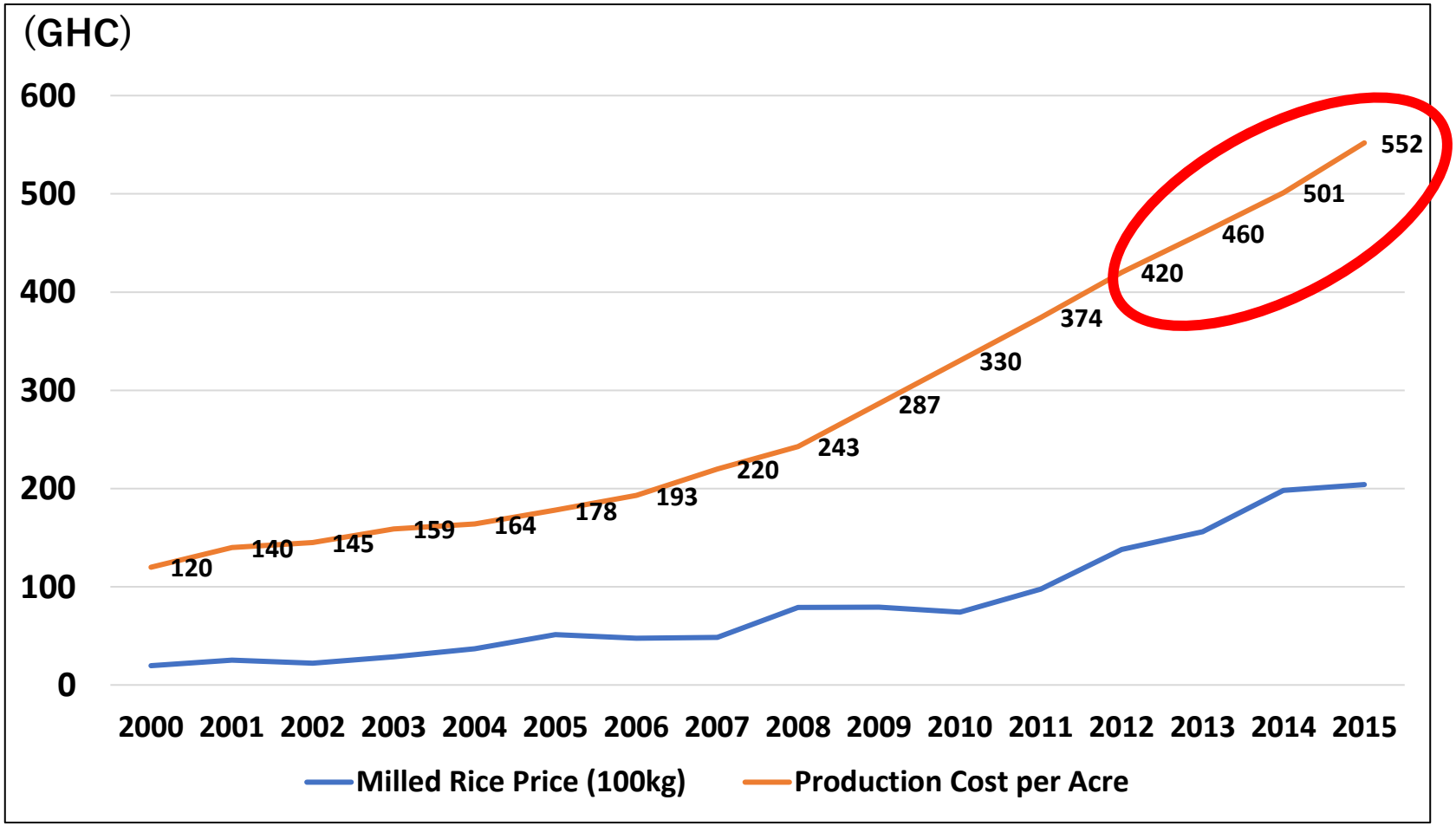
2) How can farmers save cost for inputs?

How can you save cost for inputs?

Production (grain)

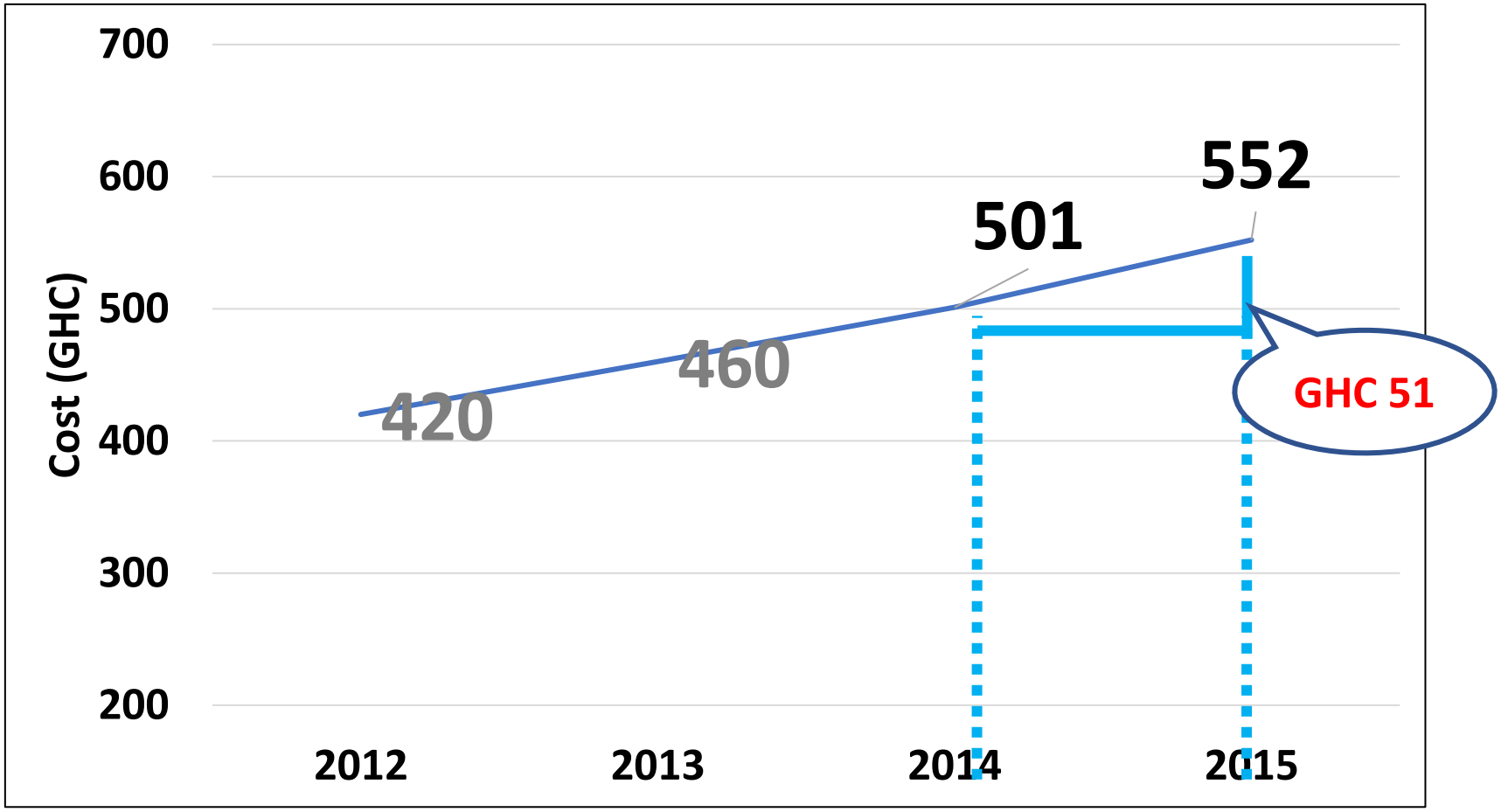


Annual average price of rice and production cost in Northern Region



Source: Rice price = "Local Rice: Monthly Wholesale Market Price (¢) in Tamale, Northern Region UNIT OF SALE:100kg=(1 MAX. BAG)" compiled by MOFA Northern Regional Office, Production cost = Estimated based on the data of the Impact Survey 2013"

Annual average rice production cost in Northern Region

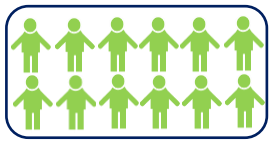


Source: Estimated based on the data of the Impact Survey 2013

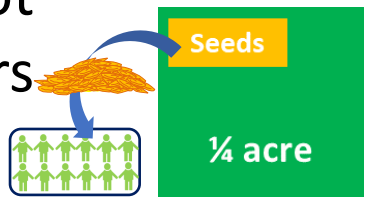
3) Let's discuss good practices in the field!

Purchase and store inputs after the minor season

Good practice: Beposo Rice Growers Association (12 members), Atwima Mponua



- In 2015, the group harvested 8.5 bags of paddy in ¼ acre of a demo-plot (714kg, approx. 7t/ha).
- After milling the paddy at a mill, the group sold the milled rice at GHC 1,100.
- The group purchased fertilizers for the following season to be used in the demo-plot and also by individual members.
- In addition, the group established a seed plot in the demo-plot to share seeds among the members so that they could save cost for procuring seeds.



- Furthermore, the individual members give monthly contribution to the group to sustain it.

Purchase and store inputs after the minor season

Good practice: Cyprian of Konongo

Year 2012

X 6

X 6

X 6

Total: GHC 447

GHC 31/50kg bag **GHC 32/50kg bag** **GHC 11.5/1 L bottle**

Year 2013

Use the inputs purchased in 2012 (no procurement in 2013)

1.5 acre **1.5 acre**

Total: GHC 0

Made a difference: GHC 273/3 acre

Price increase in 2013:
NPK: GHC 51/ 50kg
Urea: GHC 55/ 50kg
Herbicide: GHC 14/ 1L

If he purchased in 2013, he would spend...

Total: GHC 720

Do you know any good practice in your district?
Let's share them!
They can be compiled in this material as good practices.

End

Extension

3rd TOT

Contents

1. Points of Monitoring by AEAs
2. TIPs for good preparation and implementation for Field Trip and Field Day
3. Sample Program for ToT at district and Detailed Timeframe/ Points to be Emphasized
4. Farmer groups strengthening & Rice extension activity continuity.

Points of Monitoring by AEAs (1)

[After Heading]

- Visit the demo plot for continuously checking;
  - Water level in the plot
  - Pest and disease appearance
  - Off type removal
  - Lodging
- Estimate harvesting date based on heading date.

Points of Monitoring by AEAs (2)

[10 days before estimated harvesting date]

- Check the optimum timing of harvest by;
  - Observing 80-85 % of grains turn out yellow
  - Measuring moisture contents 25-20% (optional – Based on availability of moisture meter)
- Once optimum timing is reached, inform group farmers and start harvesting immediately.
- Drain water before harvesting.

Action plan

-Are farmers following their Action plan?

- Do farmers recognize the best timing for harvesting/threshing based on moisture level of paddy?
- Are they aware of proper drying (half day on a hot and sunny day or 1 day on a cloudy day)

Farm record keeping
-Are farmers keeping record?

- Have farmers managed to figure out profit?
- Are they making higher profit than non-project farmers?
- Was there any difficulty for farmers to keep record?
  - Calculation is tedious, difficult, etc.

Marketing support

Have you collected any good practice?

- Were farmers linked with any buyer?
- Are farmers aware of prevailing price in their community?
- Do farmers know about better price in other market?
- Did farmers manage to increase producer price for higher quality achieved through the TENSUI technical package?

EX-IHT.3-1

TIPS FOR GOOD PREPARATION AND IMPLEMENTATION FOR FIELD TRIP AND FIELD DAY

For 3rd TOT by district

Field Trip

- [Target] DAOs, AEAs, Key farmers. The trip is organized between community and community.
- [Purpose] To share the good performance of the improved rice cultivation technology .
- If possible, **invite DCE, DCD, and other Assembly officials** to show the positive outcome of District Rice Extension Plan and to understand the importance of allocating budget to agricultural sector and releasing fund in timely manner for rice extension activities. If they can talk with farmers, they can understand demand on them.

Field Day

- [Target] Farmers who are not part of target group and **potential rice/paddy buyers** within the same community are invited to observe demo plot and appreciate critical rice cultivation activities based on the guideline.
- [Purpose] Create awareness of good paddy produce to rice/paddy buyers and facilitate linkage between producers and buyers.

Tips: Preparation for Field Trip

- Venue: Select the best demo plot where is good enough for show case of rice extension.
- Program: inform District Assembly in advance.
- Budget: arrange within limited resource and request release as early as possible.
- Main Resource person(s): AEA, Key Farmer, others.
- AEA in-charge, with the assistance of the Key farmer, should be ready to explain the rice cultivation process to participants.
- Transfer of knowledge through questioning and answers.

Sample Program for Field Trip

	Time	Activity	Remark/Person in charge
1	8:00	Start from RAD	
2	10:00	Arrive at District Assembly (DA)	
3	10:00-11:00	Opening Prayer Self-introduction Opening Remarks Brief Explanation of the Project	 Schedule officer PCU, DDA
4	11:00	Leave DA for demo plot	
5	11:30	Arrive at demo plot	
6	11:30-12:30	Field Observation	DAO-Crop, AEA in charge, Group farmers
7	12:30-13:00	Question and Answers	all
8	13:00	Leave demo plot for DA	
9	13:30-15:00	Closing Remarks Lunch Arrive at RAD	

SAMPLE PROGRAM FOR TOT AND DETAILED TIMEFRAME/ POINTS TO BE EMPHASIZED

For 3rd TOT by district

Sample Programme for 3rd TOT

Time	Topic
8:00-8:15 (0.5 hour)	Registration, Purpose of training
8:15-9:15 (1 hour)	Land Development
9:15- 10:15 (1 hour)	Rice Cultivation
10:15-11:45 (1.5 hours)	FMSS
11:45-12:45 (1 hour)	Lunch
12:45-14:15 (1.5 hour)	Extension, M&E
14:15-14:45 (0.5 hour)	Way forward Closing remarks

Detailed Time Allocation and Points to be Emphasized (2) - Land Development

Contents (Material names)	Mode of Training	Points to be Emphasized	Time Allocation
Bunds and Levelling	Explanation by Trainer	• Bunds to be constructed during the minor season • Reasons for bunds construction • Importance of field levelling	15 mins
Field Measurements & Timeliness for LD	• Explanation by Trainer • Worked example for Trainees	• Importance of field measurement • Reminder of the Heron's formula • Practice session	30 mins 5mins
Water and flood control	Explanation by Trainer	• Water management and flood control	10 mins

Detailed Time Allocation and Points to be Emphasized (3) - Rice Cultivation

Contents	Mode of Training	Points to be Emphasized	Time Allocation
Bird Scaring and Timing of Harvesting	Lecture	• Understand two recommended ways to set up bird netting. • Learn how to observe degree of maturity of panicles. • Understand how to apply accumulated temperature to judge harvesting time.	20 min.
Yield components	Lecture	• Learn 4 yield components. • Understand strategies to improve yield components for higher yield.	20 min.
Harvesting and Post harvesting	Lecture	• Learn factors for good quality rice. • Understand right and wrong methods of rice processing after harvesting.	20 min.

Detailed Time Allocation and Points to be Emphasized (4) - FMSS

Contents (Material names)		Mode of Training	Points to be Emphasized	Time Allocation
FM IHT-3	Do you know your profit per bag?	Explanation by an Instructor	Cost per acre is higher in project –farmers" field but their profit per bag is also higher	5 min.
		Practice	To understand how to find cost and profit per bag	10 min Practice 10 min Answer
	A Tale of two farmers.	Explanation by an Instructor	Cost per acre is higher in project –farmers" field but their profit per bag is also higher	35 min.
	How can farmers save cost for inputs?	Explanation by an Instructor	You can reduce cost of Inputs by buying in advance	15 min.

Detailed Time Allocation and Points to be Emphasized (5) - Extension

Contents (Material names)	Mode of Training	Points to be Emphasized	Time Allocation
Points of Monitoring by AEA	Explanation by trainer	- Determination of Heading Date - How to estimate harvesting date	10 min
Tips for Field Trip and Field Day	Explanation by trainer	- Target participants for field day - AEA role during field day - Farmers role during field day	10 min

Detailed Time Allocation and Points to be Emphasized (6) - M&E

Contents (Material names)	Mode of Training	Points to be Emphasized	Time Allocation
Observation and Feedback	Explanation by Trainer	- Baseline and end line information to be collected - Timing of information collection	10 min
3rd Quarter and Annual Report Preparation	Explanation by Trainer	Collection and submission of end line information on target farmer	10 min

Detailed Time Allocation and Points to be Emphasized (7) - Way forward

Contents (Material names)	Mode of Training	Points to be Emphasized	Time Allocation
Way Forward			

Rice extension activity continuity & Farmer groups strengthening.

- In other to bridge the gap deficit of rice production in the country; there need to continuity of rice production in the country. Unfortunately, projects of the ministry/departments come to an end when projects expire. Factors that lead to collapse of project continuity are, but not limited to: mismanagement, financial constraints, lack of trained personnel, etc.

Points to consider to improve rice extension activity continuity

- Clear goals should be set, which should be realistic
- Infuse rice extension plan in department's plans.
- Budget for rice extension activity in composite budget
  a. In case of late arrival of government funds, other sources for funds should be resorted to: IGF and Input dealers(For timely start. Small amount is enough) etc.
  b. proceeds from sale of produce can be saved to be used for subsequent cropping seasons
- Collective in-serving training for all staff.
- Set up farmer groups
- Revitalize farmer groups.
- Maintaining effective extension delivery services
- Proper supervision and backstopping.

Farmer groups strengthening.

- Many farmer groups that go through a high activity phase become inactive or defunct over a period of time. This is a normal process for many groups.
- A lot of farmer groups have collapsed because of mismanagement, conflict, and lack of clear goals.

Farmer groups strengthening. CONT.

To maintain and strengthen Farmer groups, the following points should ne considered:

- Organization and Management

a. Participation b. Leadership & Management

c. Holding Meetings d. Keeping records

e. Financial Management

- Planning and Implementing activities

a. Developing an action plan b. Implementing activities c. Monitoring & Evaluation

Farmer groups strengthening. CONT.

- Communication and Networking

a. Conflicts and negotiation

b. Communication

c. Helping group to grow.

THANK YOU.