Making a business case for IRRI Super bags: A Decision Tool for Storing Seed

Rationale

IRRI hermetic Super bags provide clear and demonstrable benefits for a variety of end-users. However, for sustainable adoption and scaling out to occur, end-users must recognize a profitable business case for continuing use of any technology. In other words, technical benefits alone may be insufficient to convince end-users to purchase and continue using a technology. As such, this business case decision-making tool is meant to help end-users determine whether a sound business case exists for adoption of IRRI Super bags based on their own participatory trials compared with current storage practices.

These business cases can be written up and used for sharing learning and for developing communication and other extension materials. This will help create greater awareness and support for the technology amongst other stakeholders. For example, local retailers could be engaged to scale out and monitor participatory trials with farmers to help the latter understand the value proposition from purchase and use of Super bags as a sustainable approach. (Another idea may be to give farmers who complete trials a coupon upon presentation of his/her business case for redemption at a local Super bag outlet to re-enforce buyer/supplier nexus).

Objectives

1) Create awareness of benefits of Super bags compared to current storage practices through participatory trials for seed storage.

2) Calculate additional profit (or savings) from use of Super bags for the individual end-user trialling Super bags, thus enabling a "go or no-go" decision regarding continued use (and future purchase) of Super bags.

3) Write up business cases from participatory trials for communication and extension materials to aid scaling out and linking of farmers to local sources of Super bag supply.

Making a Business Case

A business case is a *decision-making tool* that makes a persuasive economic argument in favor of a particular course of action. For example,

"Should I or shouldn't I use IRRI Super bags?"

For making your business case, you will need the following aids (attached):

1) **Protocols** for trialling IRRI Super bags compared to current practices;
2) **Data collection sheets** for gathering trial data and calculating profit to the end-user;
3) **Pre-trial survey and post-trial interview questions** for writing up and sharing business cases for continuing use and possible scaling out adoption elsewhere.

Writing up a Business Case

Local partners overseeing trials can assist end-users write up their individual business cases to aid decision-making and learning. The business case "write-up" should include:

1) End-user's name, location, contact details, and brief description for their farm enterprise activities, including seed storage;

2) Profit calculation with supporting trial data (i.e., using measurements taken at beginning and end of the trial);

3) Post-trial interview to document learning and feedback. This includes checking whether the end-user correctly calculated additional profit, talked about Super bags with friends, and knows a point of local sale/supply for future purchase.

We are attaching several business case "write-ups" as examples from previous participatory trials of IRRI Super bags overseen by Postharvest Learning Alliance partners.

For more information or sharing of your business case "write-ups", please contact:

Postharvest Unit
International Rice Research Institute (IRRI)
postharvest@irri.org

Super bags can be purchased at:

(fix dealer label here)

Protocols for Trialling Super bags

1.0 Introduction

This trial will compare 50kg IRRI Super bags with an end-user's current storage practice.

2.0 Equipment needed

- 3 Super bags
- 3 Woven bags, or 3 PE bags, or other currently used storage technology)
- 1 Moisture meter
- Access to nearby mill (optional)

3.0 Materials and Trial Set-up

Treatment 1 *Current end-user storage practice:* ***(e.g., woven bags)***

- Fill 3 (woven) bags with paddy (50 kgs each).
- Label each bag: bag no., variety, weight, trial start date.
- Take 500gram sampling from each of the 3 bags for initial analysis.
- Close bags and place on pallet or current open pile system (whatever is currently practiced).

Treatment 2 *50kg IRRI Super bags*

- Place 3 Super bags inside woven bags for added protection from mechanical damage or careless handling. (Super bags are reusable if not punctured and if sealed properly). Fill each Super bag with 50kg of paddy (same source of paddy as above).
- Label each bag: bag no., variety, weight, trial start date.
- Take 500gram sampling from each of the 3 bags for initial analysis.
- Follow instructions printed on Super bag before closing. Remove excess air and twist before taping or tying closed (see right). Place bags on pallet (next to treatment 1).

1) Place the Super bag as a liner inside an existing storage bag.

2) Fill bag with dry grain or seed.
3) Remove excess air and twist.

4) Fold plastic over and seal with tape or strona rubber bands.

4.0 Measurements for Data Collection

- Take measurements from each collected sampling (6 samples total from both treatments) at start of trial period. Then take again at end of the trial period, 500 gram samples, from each of the (6) bags.

- For each initial sampling at the start of the trial record:
    1) Moisture content
    2) Number of dead (or dormant) insects vs. live insects.
    3) Discoloration (number of discolored grains in 100 grains sampling)
    4) Germination rate (see attachment, How to do a Seed Germination Test)

- For each final sampling at end of the trial period:
    1) Moisture content
    2) Number of dead (or dormant) insects vs. live insects
    3) Discoloration (number of discoloured grains in 100 grains sampling)
    4) Germination rate

Data Collection Sheet for Super bag trials

1.0 End-user Details:

Name: _____

Address: _____

Telephone: _____

User type (farmer, miller, etc): _____

Gender: _____ Age: _____

No. of years farming: _____

Other sources of income: _____

2.0 Initial Measurements

Start date of trial: _____ (pls fill in)

Current practice: _____ (e.g., woven bags)	**Bag #1**		**Bag #2**		**Bag #3**	
Weight of paddy (kgs)	kgs		kgs		kgs	
Moisture Content %	%		%		%	
Insect Count (no. in 500g sampling)	Live	Dead	Live	Dead	Live	Dead
Discoloration (no. of discoloured grains in a 100 grain sampling)	grains		grains		grains	
Germination rate (see attached instructions)	%		%		%	

IRRI Super Bag	**Super bag No. 1**		**Super bag No. 2**		**Super bag No. 3**	
Weight of paddy (kgs)	kgs		kgs		kgs	
Moisture Content	%		%		%	
Insect Count (no. in 500g sampling)	Live	Dead	Live	Dead	Live	Dead
Discoloration (no. in 100 grain sampling)	grains		grains		grains	
Germination rate (see attached)	%		%		%	

3.0 Final Measurements End date of trial: _____(pls fill in)_

Current practice: _____ e.g. woven bags	**Bag #1**		**Bag #2**		**Bag #3**	
Weight of paddy (kgs)	kgs		kgs		kgs	
Moisture Content %	%		%		%	
Insect Count (no. in 500 g sampling)	Live	Dead	Live	Dead	Live	Dead
Discoloration (no. in 100 grain sampling)	grains		grains		grains	
Germination rate (see instructions)	%		%		%	

IRRI Super Bag No.	**Super bag No. 1**		**Super bag No. 2**		**Super bag No. 3**	
Weight of paddy (kgs)	kgs		kgs		kgs	
Moisture Content (%)	%		%		%	
Insect Count (no. in 500g sampling)	Live	Dead	Live	Dead	Live	Dead
Discoloration (no. in 100 grain sampling)	grains		grains		grains	
Germination rate (see attached)	%		%		%	

Pre-Trial Survey Questions for End-users

1) How much paddy do you usually get from your wet season harvest?

   _____ ha (area cultivated) _____ bags (_____kg/bag)

2) How much paddy do you usually get from your dry season harvest?

   _____ ha (area cultivated) _____ bags (_____kg/bag)

3) How much seed do you usually store? _____kgs/season _____kgs/bag

4) Where do you currently store your seed? _____ (e.g., granary, in house)

5) What do you currently use to store seed? _____ (e.g., PE bag)

6) Cost of material for current practice (e.g. woven sack) _____ Pesos/bag

7) What is the current price of seed (Good farmer seed)? _____ Pesos/kg

8) What is your current seed rate when planting? _____ kg/ha

9) Do you sell seed? How much per season? _____ kgs/season

10) If so, to whom? _____ (e.g., farmers, cooperative, govt program, etc.)

Post-trial Interview Questions

1) Condition of Super bag after the trial:
   - ☐ - Good (can be used again)
   - ☐ - Punctured or damaged
     If punctured or damaged, pls explain how this might have occurred:

2) Where were the paddy-filled bags stored? (e.g., inside house, in granary, etc.)

3) Using the below, can you calculate your added profit from using Super bags to store your seed?

Current practice: (e.g., PE bag):	
Current Seed Rate	kg/ha
Amount of seed used (current seed rate x no. of hectares)	kg
Current Germination Rate	%
Actual wt of seed germinated per ha using current practice (current seed rate x current germination rate)	kg/ha
No. of growing seasons/year	seasons/yr
Seed stored in Super bags	
SB Germination Rate	%
Actual wt of seed germinated per ha using SB (current seed rate x SB germination rate)	kg/ha

New Seed Rate (Actual wt of seed germinated per ha using current practice / SB germination rate)	kg/ha
Amount of seed saved per ha (current seed rate – new seed rate)	kg
Market price of good farmer seeds	PhP/kg
Total additional profit per ha (amount of seed saved x market price of good farmer seeds)	PhP/ha
SB Cost (Cost of Super bag) X (No. of SB for 1st season)	PhP
Additional net profit for 1st season (Total additional profit per ha x no. of ha) – (SB Cost)	**PhP**
Additional net profit for succeeding season SB is reused (Total additional profit per ha x no. of ha)	**PhP**

4) What would be your new seed rate for seed stored in Super bags? _____ kgs/ha

5) How does this compare with the seed rate from your current practice?

6) Do you plan to use Super bags again? ☐ Yes ☐ No

7) Do you have access to a local seller of Super bags? ☐ Yes ☐ No
Location:

Price of Super bag: _____ Pesos

8) Other comments and observations you have about Super Bags:

_____

_____

Measuring Seed Germination

What is a germination test?

A germination test determines the percentage of seeds that are alive in any seed lot. The level of germination in association with seed vigor provides a very good estimate of the potential field performance. While the speed of germination varies slightly across varieties, seeds should absorb moisture within 2 days and produce a root and the first leaf within 4 days. At this point the seed is considered to have germinated.

Why is measuring germination important?

A germination test is often the only test a farmer can conduct on seed to determine if it is suitable for planting. When seed is stored in traditional open systems the germination rate of most rice seed begins to deteriorate rapidly after 6 months. Also many varieties have a dormancy period immediately after harvest that can last for 1-2 months. By knowing the germination rate farmers can adjust their planting rates to attain the desired plant population in the field

How to measure germination

Sampling

To obtain a random sample for testing it is always best to take samples from different parts of the bag or container. If the seed to be tested is contained in more than one bag, a sample must be taken from several bags. A good rule of thumb for determining how many bags to sample is to take samples from a number of bags that represents the square root of the lot size. For example, if the lot contains nine bags, then sample at least three bags. If the lot contains 100 bags, then sample from at least 10 bags.

Equipment

To conduct this test you will need the following:

- Waterproof tray. A flat-sided water bottle cut in half lengthwise makes a good tray.
- Water absorbent material. Tissues or cotton wool are ideal.
- Seeds.
- Water supply.

Procedure

- Place water absorbent material inside the waterproof tray
- Take random sample from each seed lot and mix in a container
- Take at least three seed samples from the mixed grain
- Count out 100 seeds from each sample and place on absorbent material inside the tray
- Carefully saturate the absorbent material
- For each of ten [10] days check that absorbent material remains moist and record the number of germinated seeds
- Compute germination test for five [5] days and for ten [10] days

The rate of germination is an indicator of vigor. Rapid seed germination increases the chance that seed will establish in the field.

Calculating the germination rate

Germination rate is the average number of seeds that germinate over the five and ten day periods.

$$\text{Germination (\%)} = \frac{\text{Number of seeds germinated}}{\text{Number of seeds on tray}} \times 100$$

For example, If 86 seeds germinated in a tray of 100 seeds after 10 days, then

$$\text{10-day germination (\%)} = \frac{86}{100} \times 100 = 86\%$$