

# **RICE BREEDER AND CERTIFIED SEED PRODUCTION**

**BY**

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A SEMIS COURSE FOR INTERNATIONAL TRAINING FOR CAPACITY BUILDING  
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# OUTLINE

- Introduction
- Rice research
- Seed certification and production
- Methods of seed production
- Conclusion

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# INTRODUCTION

- **What is seed?**

- is a small embryonic plant (propagule) enclosed by a seed coat with some stored food. (seed, seedlings, corm, cutting, bulb, bulbil, layer, marcott, scion, root, runner, split, set, stem, stock, stump, sticker or tuber)

- **Issues of seed quality**

- Required variety
- Analytical purity; freedom from weeds, other seed and inert matter
- Good plant establishment
- Freedom from disease and pests

# INTRODUCTION <sup>ctd</sup>

- Normal moisture content
- Well and uniform formed seeds
- **Why quality seed?**
  - High quality seed means
    - Healthy crop establishment (germination)
    - Low replanting rate
    - High yields per unit area
    - Early maturity
    - Good profits
    - Easy harvesting and processing
    - Easy grading of products

Uniform and good crop establishment



Quality seeds mean good germination



A healthy crop establishment



# Rice Research

- Its about matching variety to production environments and market demand
- It entails breeding for desirable attributes: yields, grain quality, disease and pest tolerance, market niche etc.
- Up grading of local cultivars to solve their limitations.
- Yield Evaluations – METs
- NPT
- Release by NVRC
- Commercialization



# Improved germplasm evaluation for desirable attributes



Seed

# METHODS OF SEED PRODUCTION

- **A) Informal seed systems**

- 1) Farmers own home saved seed
- 2) Seed fairs
- 3) Market grains
- 4) Research institutes

- **B) Formal seed system**

- i) Panicle to rows
- ii) Nucleus seed
- iii) Labelled breeder seeds
- iv) imported seeds

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# REQUIREMENT FOR SEED CERTIFICATION AND PRODUCTION

- The Seeds and Plant Variety Act (Cap 326), stipulate that varieties can only be released for commercialization if they show agricultural superiority
- They must be sufficiently distinct, uniform and stable (DUS)
- The variety descriptor must be in place

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# METHODS OF SEED PRODUCTION <sup>ctd</sup>

- **1) Farmers own home saved seed**
  - Possible for self pollinated crops, vegetatively propagated crops and open pollinated varieties (OPV)
  - For rice, farmers can rogue off-types to maintain a uniform crop for next season crop establishment
  - Farmers can also select representative panicles (>1000) to set up seed production
    - Especially when the crop is highly mixed up for rouging to be effective

# METHODS OF SEED PRODUCTION <sup>ctd</sup>

- **2) Seed fairs**

- These refer to a space where traders display their products and buyers come to purchase what they need
- Normally organize by a seed committee
- Seed is cheaper than from seed companies



- **3) Market grains**

- Farmers buy grains from market and use them as seed to establish a crop

- **4) Research institutes**

- Mainly during variety testing for adaptability and adoption, or buying

# METHODS OF SEED PRODUCTION <sup>ctd</sup>

- **i) Panicle to rows (stage 1)**

- Method used to establish seed system for a variety
- Single panicles are selected from a population
- Each panicle is grown in a row
- The breeder with stakeholders conduct joint observations for distinctiveness, uniformity & stability (conformity with variety descriptor)
- Any plant not conforming with descriptor lead to row rejection
- Conforming rows are harvested individually

# METHODS OF SEED PRODUCTION <sup>ctd</sup>

## – Single plots (stage 2)

- Seeds from each row are planted in a plot ( $>10 \text{ M}^2$ )
- i.e. Number of approved rows = Number of  $10 \text{ m}^2$  plots
- Joint observation just like for panicle to row is conducted
- Any plot with non-conforming plant(s) is rejected
- Conforming plots are bulk harvested for each variety

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# METHODS OF SEED PRODUCTION <sup>ctd</sup>

## ❖ Bulk plot (1-20 acres) stage 3

- The seed harvested from stage 2 is planted in between 1-20 acres for inspection and certification as breeder seed.
- In this case any off-type (s) is rogued off
- The crop at maturity is harvested as breeder seed
- ***NB/ for stage 1-3 the isolation distance is 10 m all round the crop***



Population for establishing seed system



Each panicles planted in a single seedling tray



Panicle to row plots



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Joint observation with stakeholders



Joint Observation per row plot

# Joint Observation



A certified seed field ready for harvesting



Seed certification

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# Seed Processing



Seed treatment



Drying dressed seeds



Harvested seed crop in store



Certified seeds ready for dispatch



Packaged seed



Seed dispatch

# Single plot stage –irrigated rice



Friday, July 6, 2018



Special joint observation



Critical observation for aberrant traits



Consensus building



Approved single plots for bulk stage

# METHODS OF SEED PRODUCTION <sup>ctd</sup>

- **ii) Nucleus seed**
  - In case of bred varieties, the small quantities with the breeder or accessions are used to establish seed system
  - The nucleus seed is multiplied into breeder seed
  - The breeder seed is increased into foundation seed [pre-basic and basic seed] (up to here, the breeder is involved)
  - The foundation seed is multiplied to produce registered seed
  - Registered seed is used to produce certified seed

# METHODS OF SEED PRODUCTION <sup>ctd</sup>

## – iii) Labelled breeder seeds

- » These can be used to establish seed system of a variety (under MoU)
- » They are increased into foundation seed
- » The foundation seed into registered seed
- » And registered seed into certified seed

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# METHODS OF SEED PRODUCTION <sup>ctd</sup>

- **iv) imported seeds**

- These are usually accessions from GCIAR, NARS or regional programmes
- These can be used to establish seed systems for a variety thro' any of the methods above

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# Seed certification

- Seed certification is undertaken by an independent authority for purpose of agricultural products quality assurance.
- Certification is done in the field, during processing and post control
- **Field certification**
  - This involves observing the crop for distinctiveness, uniformity and stability
  - Absence of weeds, especially noxious weeds, diseases and other aberrant traits
  - Checking on isolation requirements
  - Crop stand status and lodging
  - Estimating yield per unit area

# Seed certification <sup>ctd</sup>

## ■ Factory processing

- ✓ Once the seed crop is approved for harvesting, a transport order is issued for delivery to processing store.
- ✓ Seeds are cleaned ready for processing
- ✓ In the store, the machines are inspected for any other seed and working condition
- ✓ Samples (untreated are taken) for purity test, diseases and pests observation
- ✓ Seed lot is then treated and sampled (for germination test)
- ✓ The seeds are labelled appropriately, sealed and stored



# Seed certification <sup>ctd</sup>

## ■ Post Control

- This is normally undertaken to ascertain the quality of seeds farmers are accessing
- Its normally undertaken by seed agency in collaboration with stakeholders

## ➤ Why use good seeds:

- ✓ Good germination
- ✓ Eliminate replanting
- ✓ Uniform crop
- ✓ Vigorous early growth
- ✓ Early maturity
- ✓ Higher yields



# Seed Marketing and distribution

- For commercialization of a variety, seed must be accessible and affordable to farmers
- NARS are best placed for high status material development
- Seed companies or merchants are the best placed to undertake certified seed production
  - **Because;** have marketing and distribution infrastructure
    - Are in contact with network of seed growers
    - Have processing infrastructure
    - Have a tradition in certified seed production
    - Some are public companies
    - They are profit oriented

# Seed Systems Establishment





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# Conclusion

- Quality seeds are a prerequisite for good crop yields
- Isolation and proper agronomic management are vital for production of quality seeds
- Proper seed handling, right from harvest to storage of dressed and packaged seed is crucial as seed is a life form
- People with basic seed technology knowledge are imperative in seed production
- Seed business is highly profitable, but price put should not be a constraint to farmers

Thank you for attention



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