

# SEED CLASSIFICATION SYSTEMS, THEIR PRODUCTION REQUIREMENTS AND MAINTENANCE

**Presented by**

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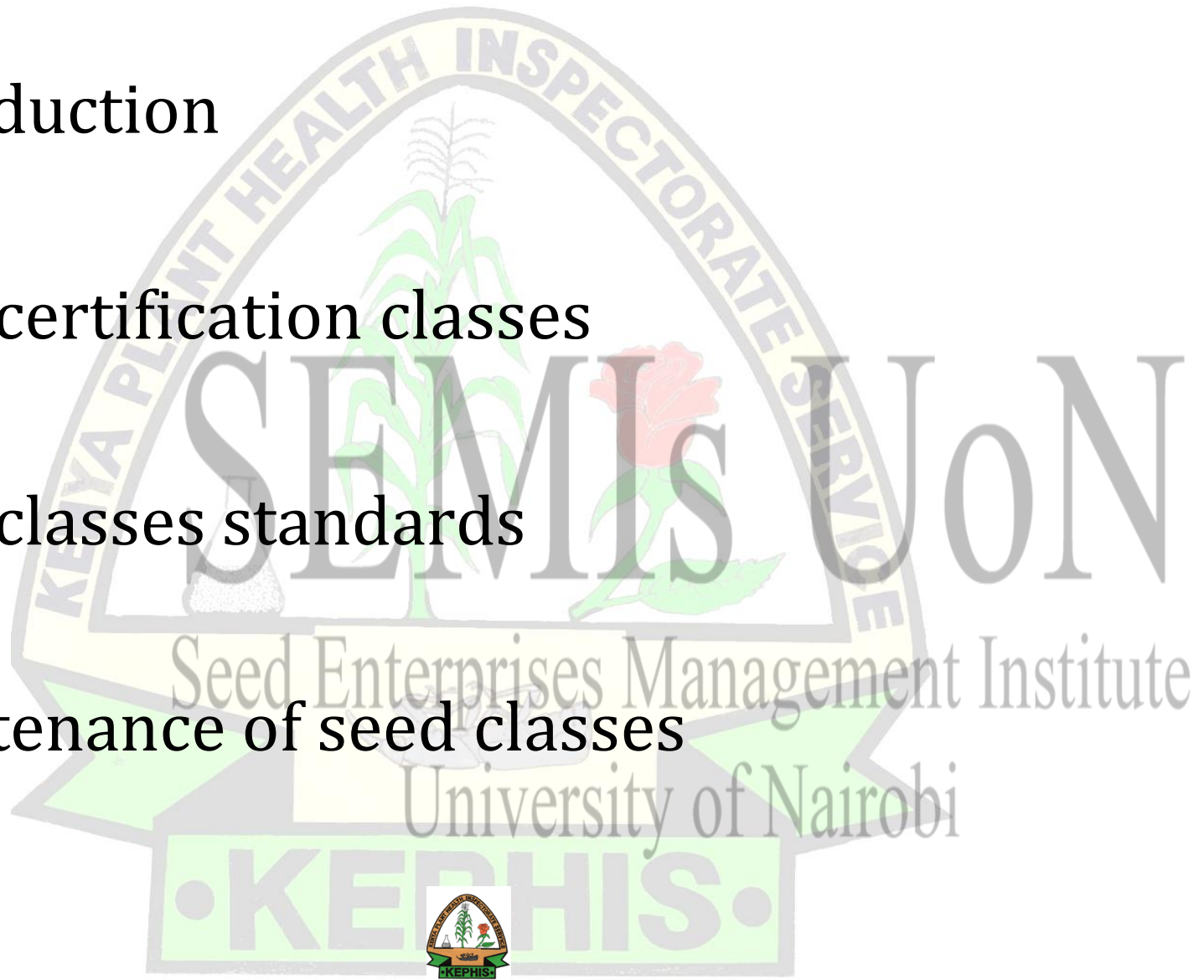
Seed Enterprises Management Institute  
Semis Seed Production Course - UON

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# Outline of the presentation

- Introduction
- Seed certification classes
- Seed classes standards
- Maintenance of seed classes



# Introduction

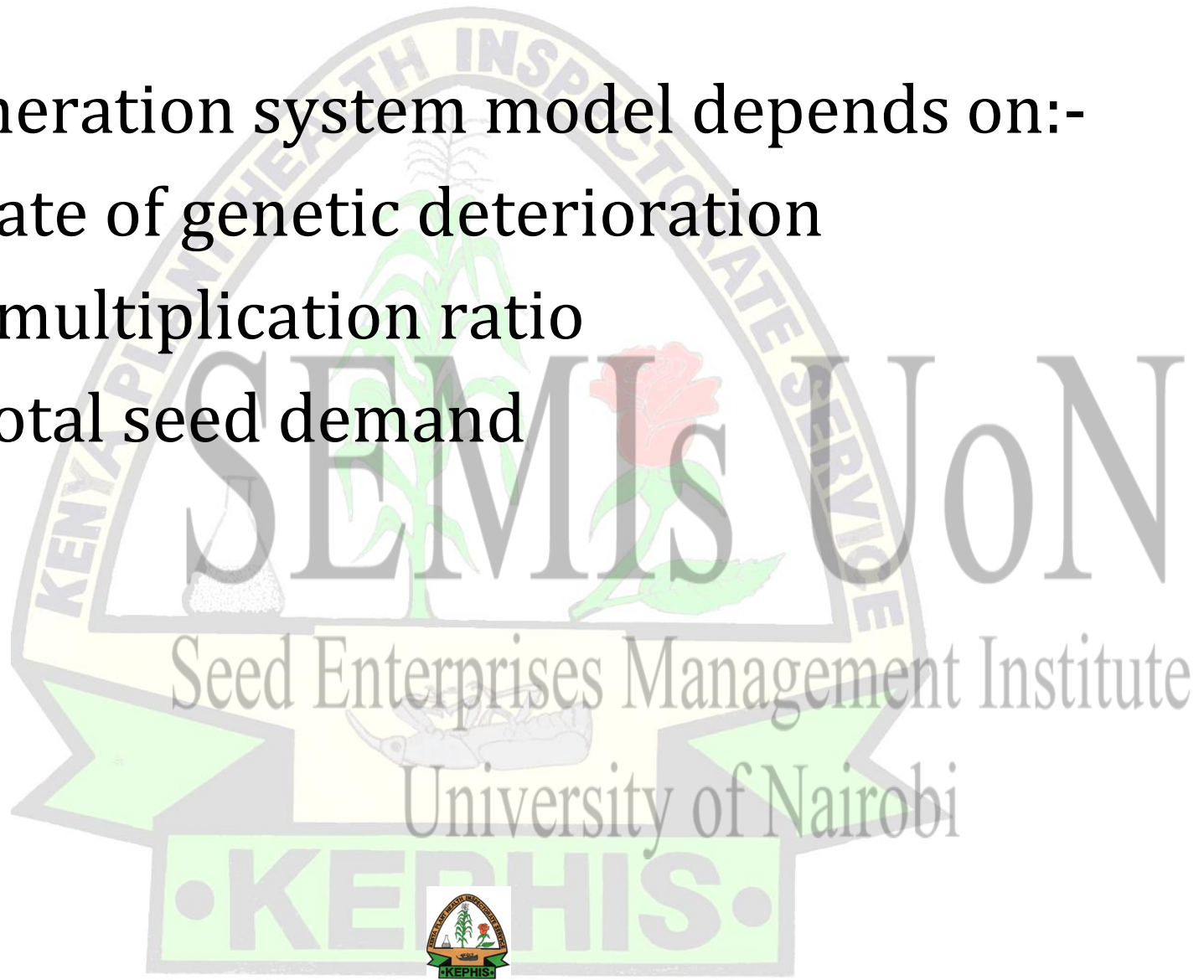
- Seed certification class is system that shows the generations involved during seed multiplication.
- It indicates the generation distance of the seed from the original seed produced by the plant breeder
- Means a stage in a seed multiplication system well defined in respect of parental seed standards of cultivation and seed quality



# Introduction cont'd

The generation system model depends on:-

- The rate of genetic deterioration
- Seed multiplication ratio
- The total seed demand



# Introd' continued

Based on these factors different seed multiplication class models can be derived

- Three-Generation model: Breeder seed (BRS), Foundation seed (FS) and certified seed (CS)
- Four-Generation model: BRS, FS, Registered seed (RS), and CS or BRS, Pre basic seed (PB), Basic seed (BS), and CS
- Five-Generation model: BRS, FS (i), FS (ii), CS(i) and CS (ii)

***NB: In cross pollinated crops three and four generation model system is used***





# Introd' continued

Generally two categories of seed classes nomenclature are recognized,

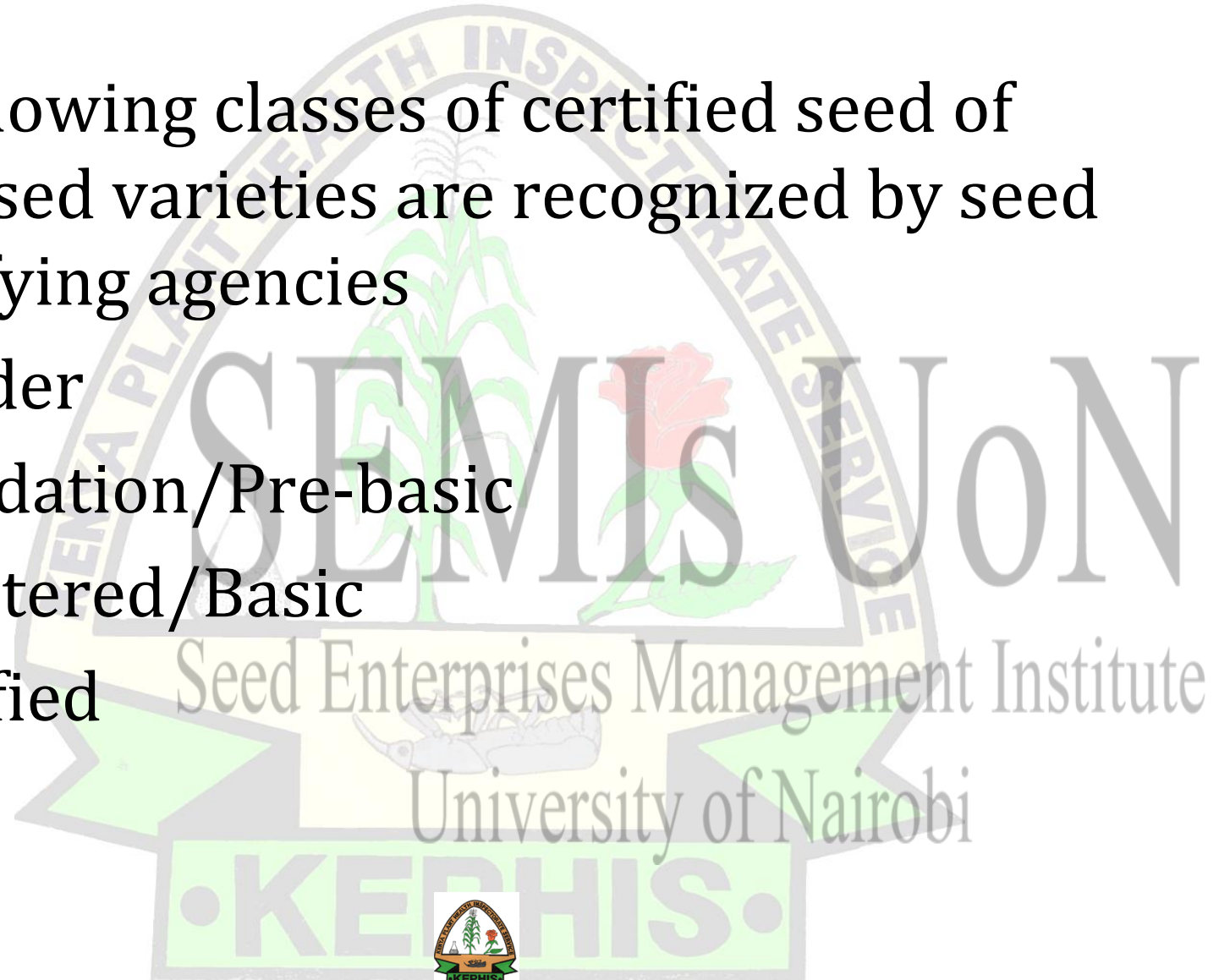
- Organization for Economic Cooperation and Development (OECD) and;
- Association of Official Seed Certifying Agencies (AOSCA)



# SEED CLASSES

The following classes of certified seed of released varieties are recognized by seed certifying agencies

- Breeder
- Foundation/Pre-basic
- Registered/Basic
- Certified



# Breeder seed

- It is the progeny of the nucleus seed
- Produced directly under plant breeder supervision
- Produced in one or more stages
- Used for production of pre-basic or basic seed.
- 99.9% genetically and 100% physically pure.
- Labeled upon meeting quality standards
- Pre-controlled to determine its genetic purity.
- Not available for general cultivation





# Pre-basic seed

- It is the progeny of breeder seed
- Produced under the supervision of the breeder and seed certifying agency.
- The seed is not available for general cultivation.
- It is the source of basic seed.
- Pre-controlled to determine its genetic purity
- Labelled upon meeting the quality standard



# Basic seed

- It is a progeny of pre-basic seed
- Produced under the supervision of the plant breeder and the seed certifying agency
- Not available for general cultivation
- Pre-controlled to determine its genetic purity.
- Labeled upon meeting quality standards



# Certified seed

- Progeny of basic seed
- Available to farmers for general cultivation.
- Produced under control of seed certifying agency
- Further generations of certified classes may be produced using this class.
- Labeled upon meeting quality standards
- This class of seed requires post controlling.



# Comparison of seed classes and colour of labels for selected regions

Definition	COMESA	SADC	OECD	AOSCA
1 <sup>st</sup> Generation supplied by the breeder	Pre-basic - White with Violet band	Breeder	Pre-basic - White with diagonal violet stripe	Breeder - White
2 <sup>nd</sup> Generation	Basic - White	Pre-basic - violet band on white	Basic - White	Foundation - White
3 <sup>rd</sup> Generation	Certified 1 <sup>st</sup> generation - Blue	Basic - white	Certified 1 <sup>st</sup> generation - Blue	Registered - Purple



# Comparative seed classes and colour of labels for selected regions

Definition	COMESA	SADC	OECD	AOSCA
4th Generation	Certified 2nd generation - Red	Certified 1st generation - Blue	Certified 2nd generation - Red	Certified - Blue
5th Generation		Certified 2nd generation - Red		
Others		Quality declared seed - Green	Not finally certified - Grey	





# Kenyan seed certification classes

Class	Colour of Label
Breeder	White
Pre-Basic	White
Basic	White
Certified 1 <sup>st</sup> Generation	Blue
Certified 2 <sup>nd</sup> Generation	Pink
Standard	Grey



# Regional Seed Classes Standards For Hybrid Maize

Field Standard	SADC		COMESA	
	Basic	Certified	Basic	Certified
Minimum previous cropping season			1	1
Isolaton (M)	400	350	400	200
Maximum off-types	0.1	0.3	0.1	0.2
Minimum number of inspections	5	5	3	3
Head smut at final inspection			0	0
Minimum germination (%)	70	90	80	90
Minimum pure seed (%)	99	99	99	99



# Standards of various seed classes in Kenya

Class	Isolation Distance	Max No. of Offtypes/100 Plants
Breeder	400	0
Pre-Basic	400	0
Basic	400	0
Certified 1 <sup>st</sup> Generation	200	1
Certified 2 <sup>nd</sup> Generation	200	2



# Maintenance of seed classes

- The objective is to maintain the purity and identity of a variety
- Causes of loss of genetic purity of seed
  1. Developmental variation
  2. Mechanical Mixtures
  3. Mutation
  4. Natural Crossing
  5. Genetic drift
  6. Selective influence of Disease
  7. Breakdown of male sterility
  8. Improper Seed Certification



# Maintenance of Genetic Purity during seed Production

The following methods have been suggested for maintenance of genetic purity

- Use of approved seed in seed multiplication
- Inspection of seed fields prior to planting
- Field inspection of seed crops
- Sampling and sealing of cleaned lots
- Pre/post control (Grow -out test)





# Various steps in genetic purity maintenance

Various steps suggested for maintaining genetic purity are:

- Providing isolation to prevent cross fertilization or mechanical mixtures
- Rouging of seed fields prior to planting
- Grow in adapted areas only to avoid genetic shifts in the variety
- Certification of seed crops to maintain genetic purity and quality
- Adopting generation system



# Procedures for variety maintenance

- Maintenance procedures are the extension of normal breeding process but selection is mild and aims not to improve the variety but to keep the identity unchanged
- The commonly used processes are:
  - Mass selection
  - Ear-to-row/Plant-to-row



# Maintenance procedure for self-pollinating crops

- Pure line or Ear-to-row selection method can be used
- Procedure
  - At least 100 true-to-types ears or plants are selected and harvested separately
  - The seeds from each plant are then planted together in a separate rows or small plots
  - Eliminate rows/plots which do not conform to variety description



# Maintenance procedure for self-pollinating crops cont'd

- Only row/plots that are uniform and definitely true to the variety are harvest for seed
- The harvested seed from the different uniform-looking rows can be bulked to constitute breeder seed

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*Self-pollinating crops are easy to maintain*





# Maintenance procedure for cross-pollinating crops

- Ear-to-row method is used
- Procedure:
  - Select at least 200-500 good looking ears with all the typical characteristics of the variety
  - Plant rows with the seeds of each plant (ears). These rows may consist of at least 10 plants depending on the available field size





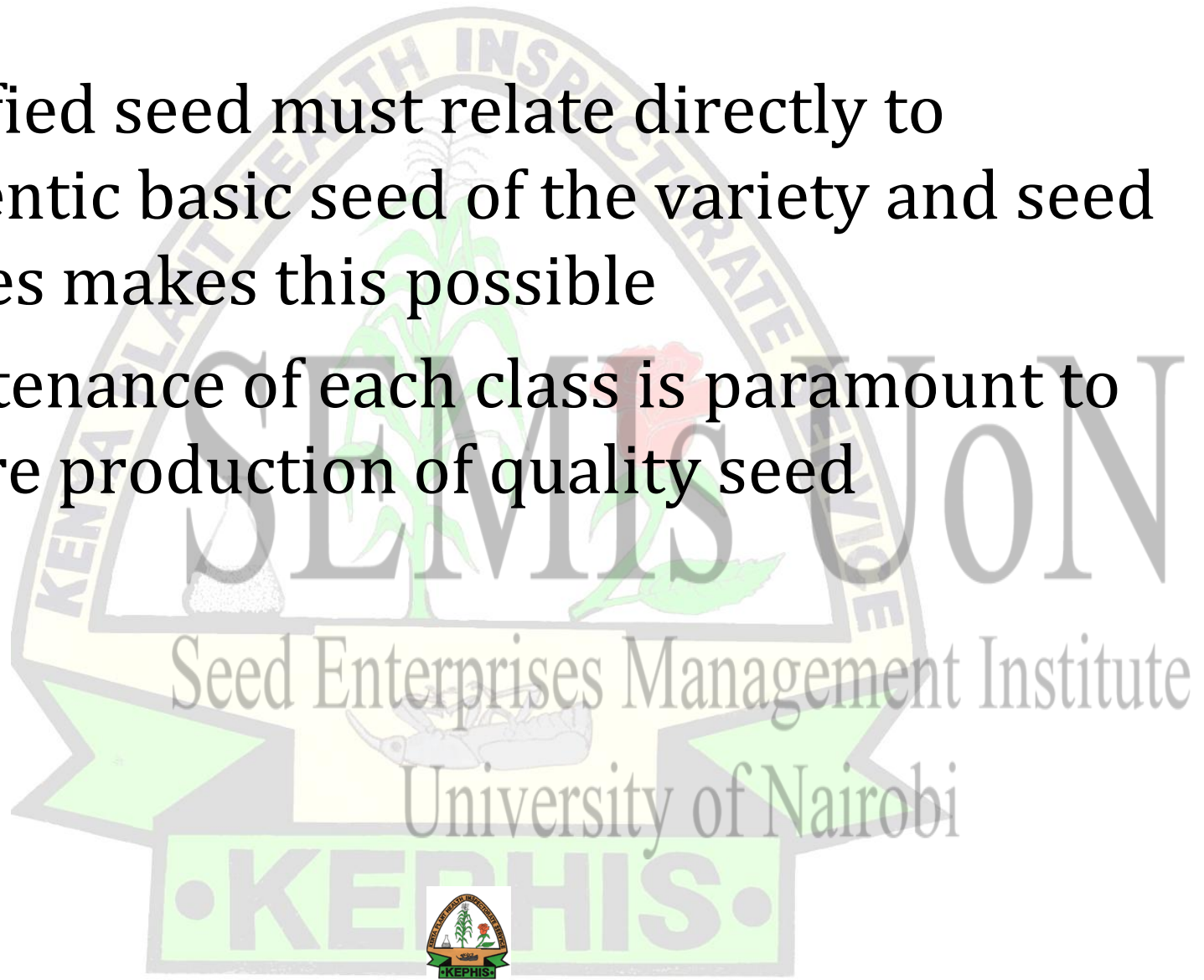
# Maintenance procedure for cross-pollinating crops cont'd

- Remnant seed from each row should be kept safely
- Eliminate rows with non-conforming plants preferably at flowering
- If enough measures were taken to exclude pollen contamination, seed of selected rows can be harvested and bulked.
- If not, the harvested seed should be discarded and the remnant seed that was spared is used for the next cycle



# Conclusion

- Certified seed must relate directly to authentic basic seed of the variety and seed classes makes this possible
- Maintenance of each class is paramount to ensure production of quality seed



*Thank You*

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