

Millet processing

Principles, Techniques and Challenges

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13th May 2020

About the Know Millets Webinars

▲ Different aspects of millets

- ✦ Ecology
- ✦ Historical context
- ✦ Sustainable food systems
- ✦ Community centric
- ✦ Nutrition & Socio – economics
- ✦ Technology & Engineering

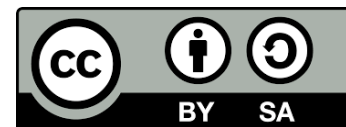
Sustainable food systems perspective



Please note slide number
for easy reference during Q&A



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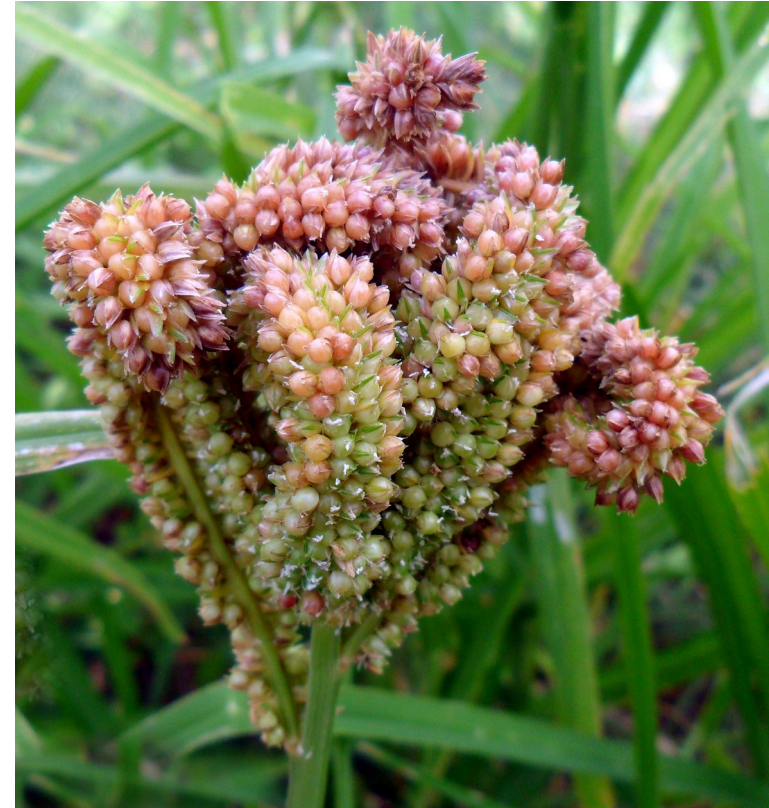
In this presentation

- ▲ Types of Millets
 - ✦ Naked grains
 - ✦ Husked grains
- ▲ Stages of processing
 - ✦ Grading
 - ✦ Destoning
 - ✦ Dehusking
 - ✦ Cleaning
- ▲ Challenges in Millet Processing
- ▲ Summary



Types of Millets – Naked Grains

- ▲ No husk layer
- ▲ Might have a significant glume layer
- ▲ Higher susceptibility to pests
- ▲ Typically used in its flour form
- ▲ Even today
 - ✦ Widely grown and used
 - ✦ Local infrastructure & skills exist



Types of Millets – Husked Grains

- ▲ Hard cellulosic husk layer
- ▲ Extremely low susceptibility to pests (as long as husk is intact)
- ▲ Typically used in its rice form
- ▲ Need to rebuild
 - ✦ Cultivation practices
 - ✦ Consumption practices
 - ✦ Local infrastructure
 - ✦ Skills



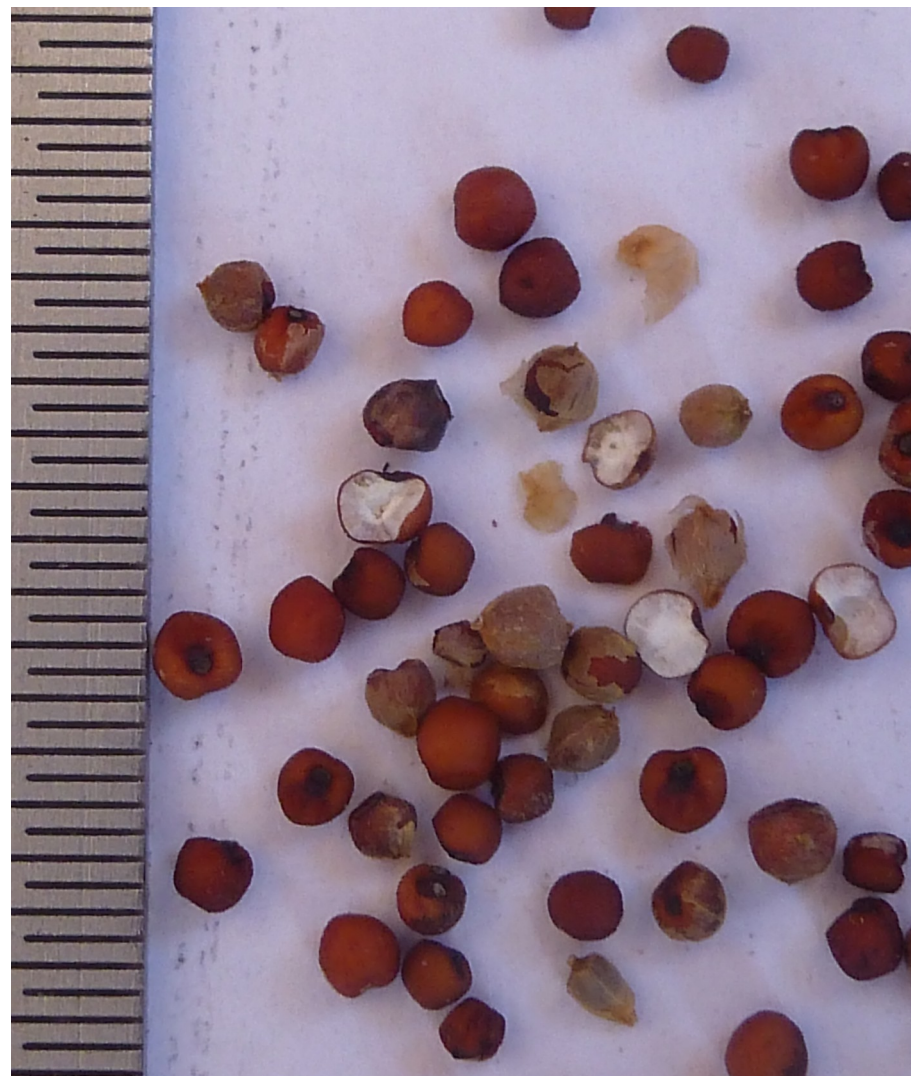
Processing naked grains

▲ Steps in primary processing

- ✦ Pre-cleaning
- ✦ Grading
- ✦ Milling
- ✦ Sieving/Cleaning

▲ For a typical unit

- ✦ Machines & tools - ₹.1 to 5L
- ✦ 2 people



Processing husked grains

▲ Steps in primary processing

- ✦ Pre-cleaning
- ✦ Grading
- ✦ Dehusking / hulling
- ✦ Cleaning

▲ For a typical unit

- ✦ Machines & tools - ₹.5 to 25L
- ✦ 2 + 1 people
- ✦ Training



Pre cleaning

- ▲ As received grains
- ▲ Principles
 - ✦ Differences
 - ★ Density
 - ★ Size
- ▲ Removed material
 - ✦ Coarse (larger) MOTG
(Material other than grains)
 - ✦ Fine (smaller) MOTG



Photo Credits: M.N.
Dinesha Kumar
MMT, Kadiri



Grading

▲ Pre cleaned grains

▲ Principles

✦ Differences in

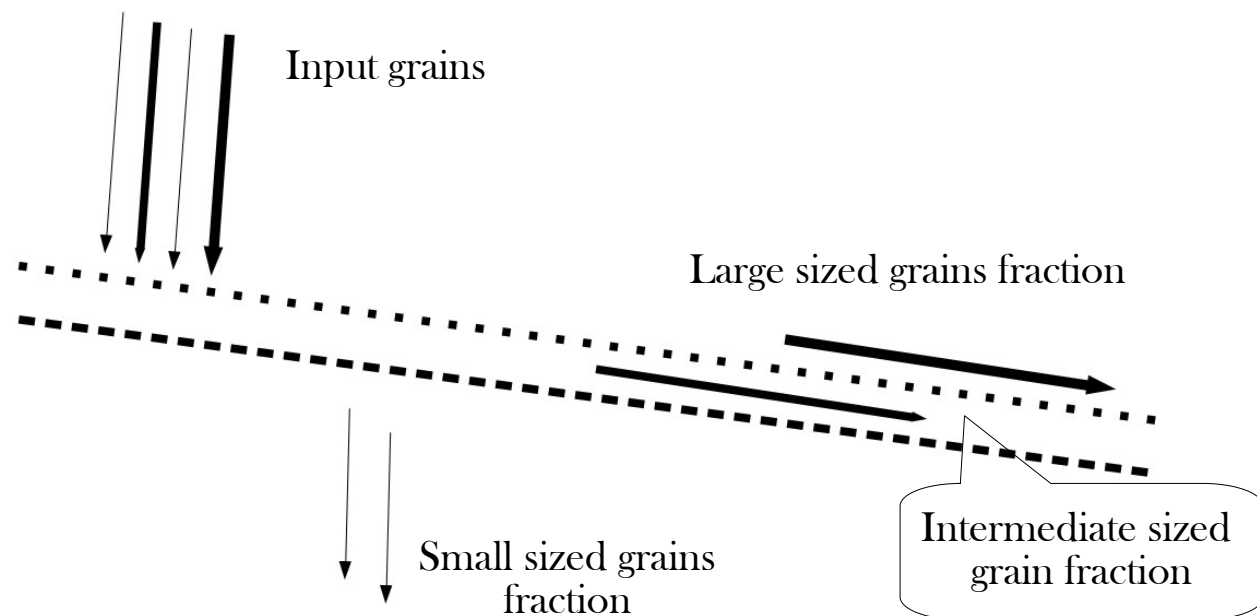
✦ size and

✦ density

▲ Select grains by

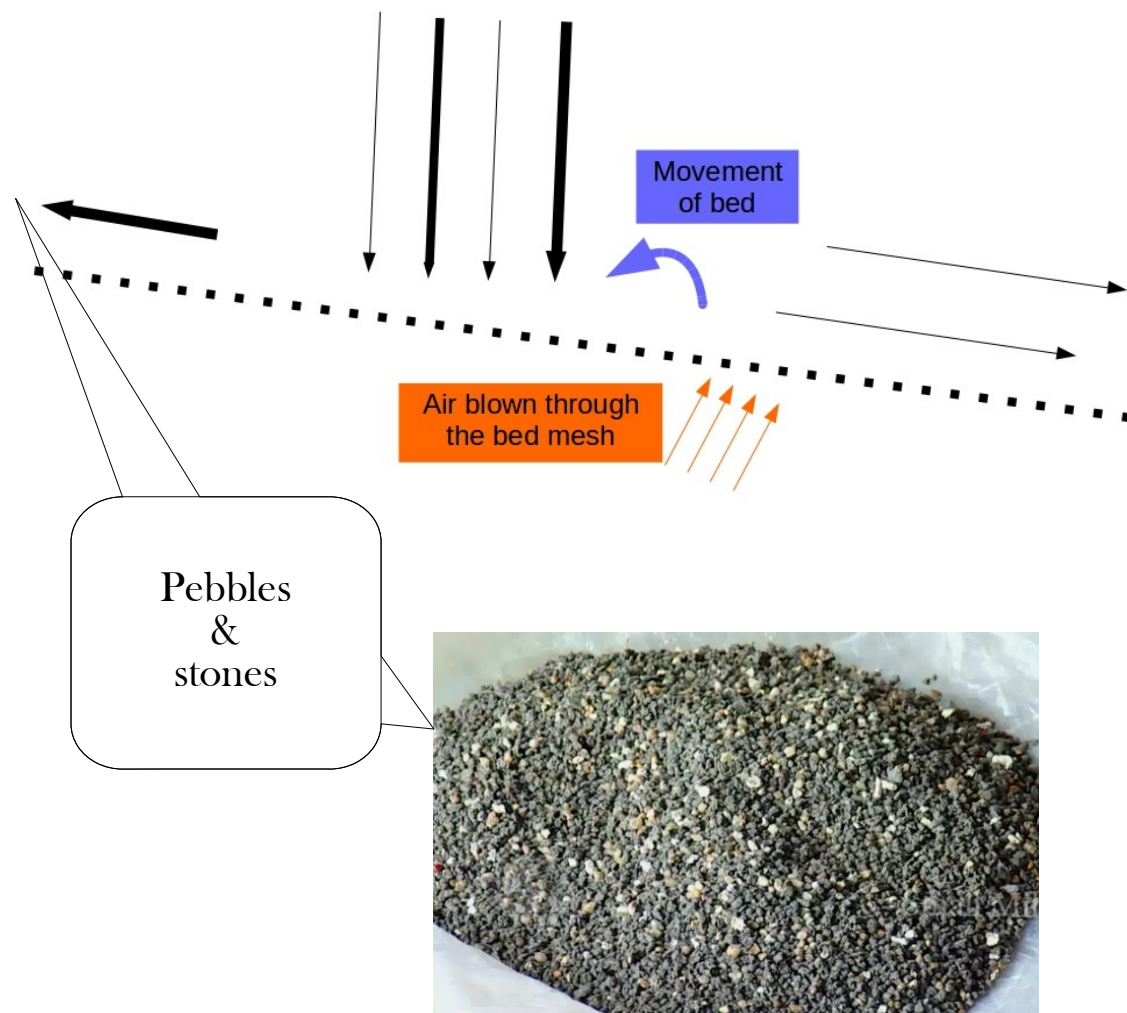
✦ Size

✦ Density



Destoning

- ▲ Graded grains
- ▲ Principles
 - ✦ Differences in density
- ▲ Removed material
 - ✦ Stones & pebbles
 - ✦ Seed grade grains



Dehusking / Hulling or Milling

Husked grains

- ▲ Huller ready grains
- ▲ Husk layer
 - ✦ Remove
- ▲ Bran layer
 - ✦ Retain
 - ✦ Minimize damage

Naked grains

- ▲ Milling ready grains
- ▲ Mill / ground to flour
- ▲ Even / Uniform milling

Cleaning

Husked grains

▲ From Hulling machine/op

▲ Remove

✦ unhulled grains

✦ Grits & flour

▲ Minimize

✦ Bran loss

✦ Bran damage

Naked grains

▲ Milled flour

▲ Remove

✦ Grits

✦ Unmilled bran

Challenges in Millet Processing – 1

▲ Variation in grain characteristics

- ✦ Size
- ✦ Brittleness of the husk
- ✦ Kernel shattering
- ✦ Bran characteristics

▲ Causes

- ✦ Variety
- ✦ Season
- ✦ Cultivation practices

▲ Steps to overcome

- ✦ Flexibility in
 - ★ Machines & Tools
 - ★ Process
- ✦ Skill Development

Challenges in Millet Processing – 2

- ▲ Bran layer
 - ✦ retaining it
 - ★ Simple testing
 - ✦ Minimizing damage
 - ★ Hard to test
- ▲ Appropriate design
 - ✦ Machines & Tools
 - ✦ Process
- ▲ Skill Development



Challenges in Millet Processing – 3

▲ Pest Management

- ✦ Nutritious for all species !
- ✦ Infestation probability
maximum at processing unit

▲ Appropriate design

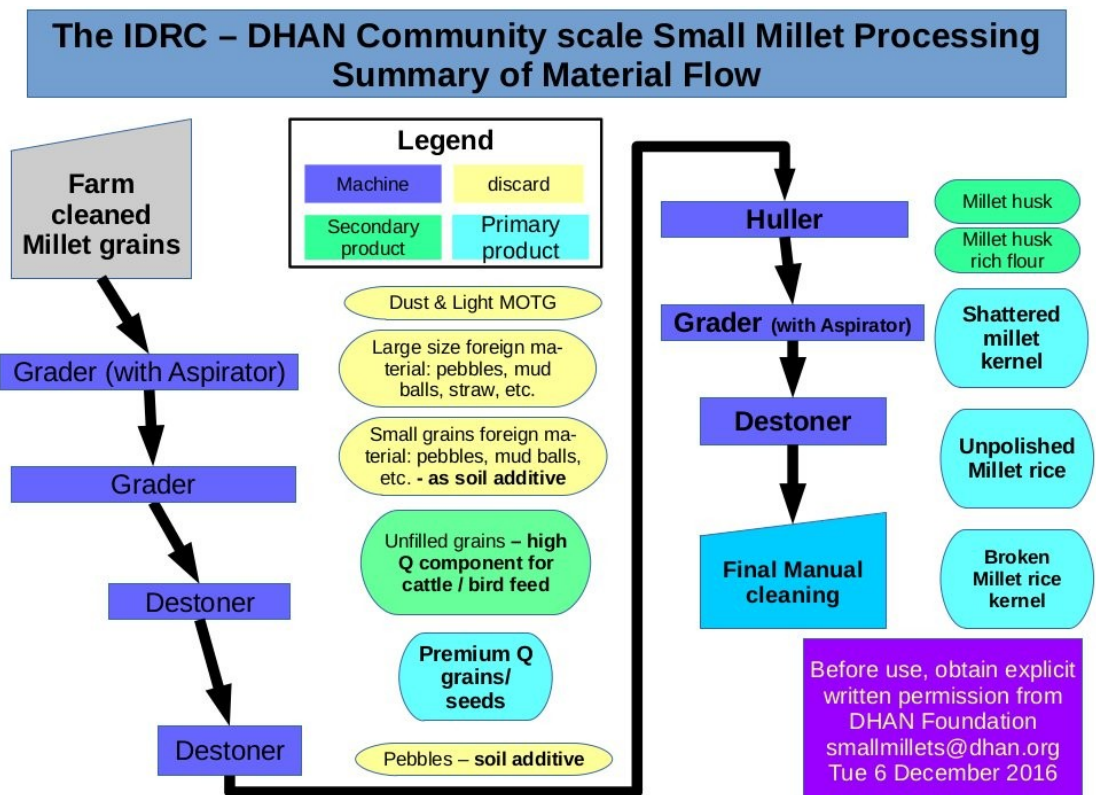
- ✦ Processing space
- ✦ Machines & Tools
- ✦ Process
- ✦ Material Handling

▲ Skill Development



Summary

- Simple principles
- Easy for those who are trained
- Appropriate (re)design of machines & tools
- Skill development
- Shorter & tighter supply chain





Thank you !

For more info ...

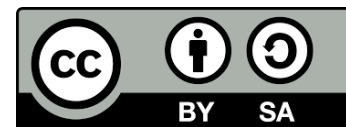
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