

Seed and Planting Material in Natural Farming

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SEED?

Subeejam Sukshetre Jayte Sampadyatey

Good seed in good land yields abundant

- Seed – a crucial, critical, vital and basic input
- It ensures productivity as well as cost affectivity of other inputs
- Use of improved seed can alone improves yield to the tune of 15-20%

Concept of quality seed

- **Genetic quality**
 - It govern the yield potential of a variety
 - This can be achieved through adopting seed chain and production practices like isolation distance, rouging etc.
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- **Physical quality**
 - It can be achieve through seed processing
- **Physiological attribute** i.e. Seed Germination and vigour
 - It can be improved through various pre and post harvest practices
- **Seed Health** : Seed should be free from seed borne inset pests and diseases

GENETIC QUALITY

➤ uniformity



Removal of knol khol plant from broccoli seed plot



Physiological attribute



➤ **Good Germination & Vigour**

Physical quality



Genetic Principles of Seed Production

- Developmental variation
- Mechanical mixtures
- Mutation
- Natural crossing
- Minor genetic variations
- Selective influence of diseases
- Techniques of plant breeders

Various steps suggested for maintaining genetic purity

- Providing adequate isolation to prevent contamination by natural crossing or mechanical mixtures
- Rouging of seed fields prior to the stage at which they could contaminate the seed crop.
- Periodic testing of varieties for genetic purity.
- Avoiding genetic shifts by growing crops in areas in their adaptation only.
- Certification of seed crops to maintain genetic purity and quality of seed.
- Adopting the generation system.
- Grow out tests.

Different components of Natural Farming

Components

Jeevamrit: A fermented microbial culture derived from cow dung and urine, jaggery, pulse flour, and soil

Beejamrit: A microbial coating for seeds, based on cow dung, urine, and lime

Acchadana/ mulching: Covering the topsoil with cover crops and crop residues

Whapasa: Soil aeration, a result of jeevamrit and acchadana- represents water management through improved soil structure and humus content

Intercropping / Mixed/Multiple cropping:

Cultivation of combination of different types of crops with different canopy and maturity time simultaneously

Expected benefits

Stimulate microbial activity to synthesise/ to make bioavailable plant nutrients in situ; protect against pathogens

Protects young roots from fungus and seed borne or soil borne diseases

Protects soil from direct exposure from sunlight, produces humus, conserves top-soil, increases water retention, encourages soil fauna, prevents weeds

Increase water availability, water use efficiency, increase resilience to drought.

Reduces demand of a particular types of plant nutrients and increases availability of different types of crop produce on regular basis to augment farmers income, increase microflora diversity, checks insect-pests and diseases spread

Beejamrit

- Cow dung: 5kg
- Cow urine: 5 lt
- Lime: 50 g
- Forest soil: one handful
- Water: 20 lt

Mix all these in water and keep for 24 hr. Stir 2-3 times. Treat the seed (100 kg) for some time dry them under shade and then sow in the field. Add Bijamrita to the seeds of any crop: coat them, mixing by hand; dry them well and use them for sowing. For leguminous seeds, just dip them quickly and let them dry.

Jeevamrit

- Cow dung: 10 kg
- Cow urine: 10 lt
- Jaggery (Gur): 1-2 kg
- Gram flour (Besan): 1-2 kg
- Forest soil: 200 g
- Water: 200 lt (final volume)



- Preparation: Put 200 liters of water in a barrel; Add 10 Kg fresh local cow dung and 5 to 10 liters cow urine; Add 2 Kg of Jaggery (a local type of brown sugar), 2 Kg of pulse flour and a handful of soil from the bund of the farm. Stir the solution well and let it ferment for 48 hours in the shade. Now jeevamrit is ready for application. 200 liters of jeevamrit is sufficient for one acre of land.

Ghanjeevamrit

- Cow dung: 100 kg
- Cow urine: as per requirement
- Jaggery (Gur): 1-2 kg
- Gram flour (Besan): 1-2 kg
- Forest soil: 200 g

Mix the above material. Spread on floor and dry under shade. Make powder form and apply at the time sowing or in between @1-2 q/ acre

Achhadan or Mulching

- Straw Mulch:

Straw material usually refers to the dried biomass waste of crops, it can be composed of the dead material of any living being (plants). This provide dry organic material which will decompose and form humus through the activity of the soil biota which is activated by microbial cultures.

- Live Mulch (symbiotic intercrops and mixed crops):

It is essential to develop multiple cropping patterns of monocots and dicots grown in the same field, to supply all essential elements to the soil and crops. For instance, legumes are of the dicot group/ nitrogen-fixing plants. Monocots such as rice and wheat supply other elements like potash, phosphate and sulphur

Whapasa

- Plant roots need water vapour.
- Whapasa is the condition where there are both air molecules and water molecules present in the soil.

Agniaster

- Cow urine 10 Litres
 - Tobacco leaves 1 Kg
 - Green chili pulp 500 Grams
 - garlic pulp 12.5g per liter of cow urine
 - Crushed neem leaves 5 Kgs
- Add 10 Litres of Cow's Urine to the Pot. cut the Tobacco and add them to the Cow's Urine. cut the Green Chillies and add them as well. Cut the Neem Leaves and adds the pulp. Boil this mixture and allow this solution to ferment for 24 hours. Before use, Filter the solution using a cloth. For 1 acre mix 6 to 8 liters of Agniastra with 200 liters of water and it can be sprayed on the crops.

Sour Butter Milk

- Butter milk 4-6 days old 3 lt
- Water 100 lt
- Mix and spray on crops at weekly interval to check disease incidence.

Sounthaster

- Dried ginger powder: 200 g
 - Milk: 5 lt
 - Water: 200 lt
- Boil the 200 g dried ginger powder in 2 lt of water till it remain 1 lt. Separately boil milk and let it cool down. Mix both of these in in 200 lt water. It is sufficient to spray in 1 acre to check leaf spots/ blights and other diseases in crops.

Effect of Natural Farming Practices on Quality Seed Production in Pea

Sr. no.	Details of treatments:
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Data is yet to be published

Field Preparation



Different Natural farming inputs



Ghanjivamrit



Beejamrit



Jeevamrit

General view of the field



Effect of Natural Farming practices on Days to field emergence, Days to 50 % flowering and plant height (cm) of pea cv. Punjab 89

Data is yet to be published

Effect of Natural Farming practices on number of seeds per pod, seed yield (kg/ha), seed yield (q/ha) and disease incidence (%) of pea cv. Punjab 89

Data is yet to be published

*Figures in the parenthesis are square root transformed values

Effect of Natural Farming practices on 100 seed weight (g), germination (%) and seedling length (cm) of pea cv. Punjab 89

Data is yet to be published

*Figures in the parenthesis are square root transformed values

Soil properties of experimental site before the start of experiment

Particular	Value	References
pH	6.77	Digital pH meter (Jackson, 1973)
EC (dS/m)	0.232	Digital conductivity meter (Jackson, 1973)
Organic Carbon (%)	1.93	Rapid titration method (Walkley and Black, 1934)
Available N (kg/ha)	320.11	Alkaline potassium permanganate method (Subbiah and Asija, 1956)
Available P (kg/ha)	60.50	Alkaline sodium bicarbonate method (Olsen et al., 1954)
Available K (kg/ha)	266.36	Normal neutral ammonium acetate method (Merwin and Peech, 1951)
Bacteria (10^8 cfu/g soil)	8.62	Serial dilution standard spread plate technique (Subba Rao, 1999)
Fungi (10^2 cfu/g soil)	7.83	
Actinomycetes (10^4 cfu/g soil)	10.67	

Effect of natural farming practices on available nitrogen, phosphorus and potassium in the soil after harvesting (kg/ha)

Data is yet to be published

Effect of natural farming practices on viable microbial count (cfu/g) in the soil

Data is yet to be published

Effect of natural farming practices on benefit: cost ratio of pea cv. Punjab 89

Data is yet to be published

Crop Combination: Tomato + French bean + Brinjal



Crop combination: Cauliflower+ Spinach+ Coriander



Crop combination: Peas + Spinach+ Coriander



Effects of mulching



Silver-black mulch



Black mulch



Crop residue mulch



No mulch

CONDITIONS FOR INTER-CROPPING DURING CERTIFIED SEED PRODUCTION OF OILSEEDS AND PULSES

- Inter-cropping will be applicable to oilseeds and pulses crops only for production of certified seeds class. The foundation seed class shall be raised strictly as a single crop only;
- Other types of cropping patterns such as mixed cropping etc. will not be permitted;
- The crops selected for inter-cropping should belong to different genus and preferably with different maturity;
- Only basic crop (Seed Crop) pertaining to oilseeds or pulses as the case may be will be registered for certification and companion crop will not be eligible for certification.
- It should be ensured that the number of rows of seed crop alternating with the companion crop are uniform throughout the field;
- The Certification Agencies will prepare a list of the crop combinations which may be followed in respective States. The list so prepared will be circulated among the seed producers in advance. At the time of deciding the crop combinations, the Certification Agencies will ensure that :
 - (a) the companion crop does not hamper the operation needed for seed crop;
 - (b) it does not starve the seed crop of nutrients and moisture;
 - (c) it does not mature simultaneously with the seed crop or it does not carry weed seeds which may mix with the seed crop at maturity;
 - (d) it does not have common pests and diseases; and
 - (e) it does not render certification work difficult.

Challenges of Natural Farming

- A proper market infrastructure is yet to establish for selling of the produce
- Awareness among the farmers is required for proper implementation of all the schemes that are promoting the Natural Farming in India.

Thank You