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GENDER ROLES IN SEED STORAGE AND MANAGEMENT

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Abstract: Gender involvement in seed production, processing, packaging and storage was studied in five villages comprising two districts of coastal Orissa. Seed being the most vital input both men and women played a crucial role in seed production and management. However role of women was more spectacular in activities like harvesting, cleaning and grading, packing and storage whereas men play important role in threshing and seed treatment. Survey results indicated that though chemical treatment of grains and seeds were common but women preferred to store seeds with non chemical indigenous methods like mixing leaves of *Vitex negundo, Azadirachta indica, Lantana camara* and inert materials like cow dung ash, charcoal, dried cow dung etc. were reported to be used in the locality for storing green gram (*Vigna mungo*) and arhar (*Cajanas cajan*) seeds. The collected ITKs were validated using experiments for comparing loss of viability of seeds treated in indigenous methods, recommended chemical and untreated control after pretreatment and storing in a clean and ventilated seed storage place. Results revealed that green gram seeds treated with leaves of *Vitex negundo* and cow dung ash had 9.3% less loss in germination than the recommended method (Treated with thiram @ 3 gm per Kg of seed. In Red gram (*Cajanas cajan*) it was found that treatment of seeds with red earth and mustard oil was very effective. The loss in germination was 19% and 20.9 % less than the untreated control respectively. In all above cases germination percentage of seeds treated with ITKs were similar to chemical treatment. So farm women can reliably use ITKs for storage of green gram and arhar seeds.

Keywords: ITK, seed storage, Begunia (*Vitex negundo*), Neem (*Azadirachta indica),* green gram and arhar.

INTRODUCTION

Good quality seeds having good germination capacity and vigour is the key to improved agriculture. The benefits of high yielding varieties and hybrids can only be realized through seeds. The seeds carry over the improved genes from one generation to other. Hence, seeds should be maintained for high genetic purity from sowing to harvesting during multiplication and harvesting to sowing for high physiological purity during storage. Seeds are usually stored for six to eight months before sowing. During storage though the seeds are dormant, life process like respiration is continuing, So there is loss in dry matter and it leads to quick ageing of the seed helping in quick loss of viability. However, by controlling the microclimate and seed micro flora, the storage life can be extended. In order to prolong the

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storage life, the seeds are dried up to a safe moisture level and treated with different chemicals or local materials for controlling seed micro flora. In rural areas farmers mostly store the pulse seeds for both seed and food purpose and chemical treatments are less preferred by them. For protecting their produce from spoilage they treat them with different locally available materials which are found effective also. The knowledge of these methods is being used for generations. It is available locally in plenty, are cost effective and popularly called as *Indigenous Technological Methods or ITKs*. In this experiment an attempt was made to identify and validate some of these ITKs experimentally. For understanding the seed production and storage practices followed by farm women, a brief study was undertaken in the village Khamang Sasan, Dist. Khurda, Orissa for finding the existing storage practices and indigenous technological knowledge used by the farm women for storing pulse and vegetable seeds, evaluation of its efficacy by comparing with the recommended method.

MATERIALS AND METHODS

Farmer saved seeds of Green gram (*Vigna radiata*) and Red gram (*Cajanas cajan)* were used for the study. Indigenous technologies used for seed storage with women perspective were collected by personal interviewing 50 farm women and documented. Few ITKs were selected and validated experimentally by observing its effect on storability of seeds in terms of loss in germination compared to the initial quality of seed. The efficacy of the ITK was then determined by comparing with the recommended method.

Experimental validation for testing the efficiency of the indigenous methods in prolonging the storage life was undertaken in green gram. The seeds were stored in four different methods such as: Seed+ Begunia leaf+ Cow dung ash ($\mathbf{T_1}$), Seed+ Neem leaf ($\mathbf{T_2}$), Seed+ Naguari leaf ($\mathbf{T_3}$), Seeds treated with captan @3 gm/kg of seed($\mathbf{T_4}$). Seeds were stored for 2 years. An attempt was made for validating the ITKs by taking laboratory experiments. Seeds were collected from farmers from the areas where the ITK was in practice. The initial quality of the seed was tested before using different treatments. The tests have been conducted in four replications containing 100 seeds in each replication. The different parameters studied were: Moisture content of seed, Germination percentage, Electrical conductivity, Field emergence percentage and seed vigor (Maguire, 1962). Different tests were undertaken at regular intervals and the seed quality was compared with the initial quality and with the control to determine the efficiency of the treatments.

RESULTS AND DISCUSSION

Assessment of participation of farmwomen in different seed processing and storage revealed that women took active part in almost all activities and possess skill in handling of seeds and grains. Knowledge of seed management was acquired from mothers or as a social practice. They constitute the major labour force in household seed and grain maintenance. They have better access to different types of herbs, weeds, oils, twigs, inert materials like clay, ash, generated from the farm or household having insect repellent properties.

Table 1: Gender role in seed processing, packaging and storage of pulse and vegetables

Activities	Women (%)	Men (%)
Harvesting	75 %	25 %
Threshing	50 %	50 %
Cleaning and grading	90 %	10 %
Seed packaging and treatment	50 %	50 %
Seed storage	80 %	20 %
Intermittent care	100 %	nil

A number of indigenous technologies were collected from farm women by personal interview method. The possible causes for their adoption and effectiveness were evaluated according to their perception. Out of the collected ITKs the following were identified for further evaluation through experimental validation.

Table 2: ITKs collected (Seed treatment materials)

ITKs	Green gram	Red gram
1	Seeds stored adding Cow dung ash and leaves of *Vitex negundo*	Seeds stored after being coated with red earth
2	Seeds stored adding leaves of *Azadiracta indica*	Seeds stored after being smeared with mustard oil.
3	Seeds stored adding leaves of *Lantana camara*	Seeds stored after being mixed with neem leaves.

Seed utilization pattern by farm women

The sources for procuring seed vary from farmer to farmer. The seed collected from the previous crop has to be stored for six to eight months before sowing it in the next cropping season. This prolonged period of storage poses problem for seeds as it is infested by pests and pathogens. The problem is more severe in protein rich pulse seeds and less in vegetable seeds. Farmers mostly use farm saved seed. The seed procurement pattern is dependant on the factors like personal preferences, availability of resources, level of awareness among the farm families & timely availability of seeds in nearby areas. Besides, they procure seeds from

different sources. Farm women use farm saved seed up to 80% of their requirement in different pulse crops.

Table 3: Seed utilization pattern of farm women

Crop	Source of seed	Frequency	Percentage
Pulse crops Greengram (*Vigna radiata*) Arhar (*Cajanus cajan*)	Farm saved seed	38 (50)	76%
	Private company seed	0 (50)	0%
	Agricultural institutes	2 (50)	4%
	Supplied from block	10 (50)	20%

Seeds were stored in the above methods for 2 years. The efficiency of different methods with respect to germination percentage and moisture content were studied. Seeds treated with Begunia leaves and cow dung ash had no increase in moisture content and there was minor loss in germination percentage. Hence, this method of seed storage was better under village conditions. Green gram seeds treated with Begunia leaves (*vitex negundo*) and cow dung ash had 9.3% less loss in germination than the recommended method (treated with thiram @ 3 kg of seed) after 12 months of storage (Table 4).

Table 4: Comparison of different indigenous treatments/materials for storing green gram seeds

Treatments	**Parameters for testing storability of seed (Months of storage)**							
	Germination (%)				**Loss in germination (%)**			
	12	**18**	**24**	**30**	**12**	**18**	**24**	**30**
T_1	82 (94)*	73(94)	31(94)	0(94)	12.76	22.34	67.02	100
T_2	74 (94)	65(94)	17(94)	0(94)	21.27	30.85	81.9	100
T_3	72 (94)	68(94)	21(94)	0(94)	23.4	27.65	77.65	100
T_4	81 (94)	75(94)	25(94)	0(94)	13.8	20.21	73.9	100

**Figures in parentheses indicate the initial germination percentage*

In arhar seeds, six different treatments such as seeds coated with red earth and stored in polythene bag (T_1), seeds smeared with red earth and stored in cloth bag (T_2), seeds treated with mustard oil and stored in polythene bag (T_3), seeds treated with mustard oil and stored in cloth bag (T_4), seeds stored without any treatment and stored in cloth bag (T_5), seeds stored without any treatment and stored in polythene bag (T_6) were tested with respect to germination percentage (Table 5).

Table 5: Comparison of different indigenous treatments/materials for storing arhar seeds

Treatments	Parameters for testing storability of seed							
	Germination (%)				Loss in germination (%)			
	12 months	18 months	24 months	30 months	12 months	18 months	24 months	30 months
T_1	82(84)	62(84)	27(84)	-	2.38	26.19	67.85	-
T_2	73(84)	57(84)	30(84)	-	13.09	32.14	64.28	-
T_3	71(84)	59(84)	19(84)	-	15.47	29.76	77.38	-
T_4	75(84)	66(84)	31(84)	-	10.71	21.42	63.09	-
T_5	72(84)	49(84)	13(84)	-	14.28	41.66	84.52	-
T_6	70(84)	53(84)	17(84)	-	16.66	36.9	79.76	-

Figures in parentheses indicate the initial germination percentage of arhar seed before storage.

The lowest loss in germination was reported from the seeds treated with red earth and stored in polythene bag (16.67%). This was followed by seeds treated with mustard oil and stored in cloth bag (21.43%). Arhar seeds were stored in the above methods for two years. The efficiency of different methods with respect to germination percentage and moisture content were studied and findings were shown in the table given below. The effect of different indigenous storage treatments was also studied on the germination of radish seeds. The loss in germination in radish seeds treated with chemical (Captan @ 3g per kg of seed) was the lowest (3.7%). Among the indigenous treatments, seeds treated with neem leaf and stored in steel containers retained higher germination percentage (76%) and was comparable to the recommended method of chemical treatment i.e. Captan @ 3g per kg of seed.

Conclusion

From the above experiments it can be inferred that some of the ITKs could be successfully exploited for storage of green gram, arhar and radish seeds only after following the recommended pretreatment measures i.e. cleaning the seed and removing all inert matters and weed seeds, drying the seeds properly (moisture content should be below 10%), maintaining dryness and cleanliness in the seed store, keeping it well ventilated and checking in between for any infestation by insects.

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