

Original Research Article

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Traditional Practices Prevalent among Farmers in Haveri District, Karnataka State, India Pertaining to Seed Selection, Treatment, Storage and Sowing Methods

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ABSTRACT

Agriculture, which forms the backbone of Indian economy, depended heavily on the traditional knowledge. In this study, we have documented some of the traditional practices pertaining to seed selection, treatment, storage and sowing methods prevalent among farmers in Haveri district, Karnataka state, India. Traditional methods were adopted for seed selection and treatment. The seeds were checked for their germination potential during Navratri. Applying kemmannu, neem oil, mixing with dry neem leaves, mixing with ash are common methods of seed storage. Some farmers also used to store onions, paddy in straw heaps. 65.57 % of the total study participants used gunny bags for storage, 26.22% of the respondents used palatha and 8.20% of the respondents used underground silos. One of the most common methods for storage is by using neem leaves. Farmers also use lime or Calcium hydroxide for storage of seeds. Traditional sowing methods used by farmers in Haveri district include drilling, dribbling and transplanting. The sowing method used depends on the crops that the farmers intend to sow. While all three methods were used for paddy crops, drilling and dribbling were used for maize, jowar, groundnut and sunflower. Transplanting and dribbling were used for chilly and cotton crops.

Keywords

Traditional knowledge, Seed storage, Seed treatment, Seed selection, Seed germination, Agriculture

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Introduction

Indigenous traditional knowledge (ITK) is a collection of knowledge unique to a particular culture, society or geographical region. They have been preserved over several generations and have been efficiently used for the betterment and conservation of natural resources (Mehta *et al.*, 2010). In indigenous practices, people have developed knowledge over a period of several centuries based on their interaction with the surrounding, thus

propelling this into a primary source of knowledge (Rajagopalan, 2003). ITK among farmers has evolved through experimentation, though unintended, as a result of adaptations based on pragmatic approach to survive in a fragile soil system (Adedipe, 1983 and 1982). This knowledge system comes through generations of development, preservation and refinement as a result of interacting, observing and experimenting with the environment (Pushpangadan, 2002). Traditional knowledge has been passed on to subsequent generation

through oral means. There are no/limited accounted versions of this knowledge, which can be preserved for future reference and dissemination (Pandey *et al.*, 2017). The source of this knowledge base is the older generation and there is an imminent requirement to document this before they fade away (Rajagopalan, 2003). Traditional information on health, animal health, livestock management, food, agriculture, timber, dye, religious ceremonies *etc.* can be put into the best use for future generations through documenting. Projects associated with conservation of biological diversity, sustainable uses of natural resources, indigenous health practices *etc.* will be benefitted as important aspects of the ITK can be used for their proper implementation. It also increases the awareness of the younger generations towards the traditional knowledge (Pandey *et al.*, 2017). Through the current study, an attempt has been made to document some of these practices related to agriculture for the future benefit of the mankind. Traditional practices for seed selection, treatment, storage and sowing methods prevalent among farmers in Haveri district of Karnataka state has been documented in this study.

Materials and Methods

Locale of the study

The study was conducted to analyze the folk practices followed in agriculture at Haveri district of Karnataka State, India. Haveri district is located at the center of the state of Karnataka. The district is well known for agriculture. The major crops of the region include rice, pulses, cereals and vegetables.

Research design

‘Ex-post facto design’ was employed in the present study as the event has already

occurred and design was considered appropriate. Discussions were initiated with the farmers regarding several agricultural practices. In this study, we focussed on the information regarding the traditional practices involved in pest and disease management. In all, 122 farmers were involved in this study. All the information that was collected from the farmers during the course of discussion was noted down immediately. This information were later grouped and analyzed.

Sampling technique

The sampling technique of the farmers chosen to participate in this study was mainly based on random selection. Through this technique, every participant of the study was chosen randomly and the choice was based entirely on chance. The participants of this study were recruited through snowball sampling because the potential participants were few. This technique is a non-probability sampling technique, where the future participants are recruited by the existing participants among their acquaintances.

Results and Discussion

Seed Selection

Good seed production calls for good selection of seeds. The selection of seeds was to be done in such a way that it ensured

Healthy plant was used to select the seed
Well-developed plant
Maintained the genetic quality of the seed

Traditional seed selection practices ensure that rural farming communities use seeds which are of good quality and are genetically pure. They are an integral part of informal seed systems which support sustainable production in marginal agricultural production systems. (Balcha and Tanto, 2008)

The farmers generally selected their seeds based on the phenomena of natural selection. This method was seen as the best method to enhance the vigour of the seed. This practice has also been reported by Randhwa in 1980. Seeds were exchanged among farmers to bring in genetic heterosis and practice rotation of variety.

Seed germination checks

The farmers use indigenous methods of germination tests in order to determine the germination potentiality or viability of the seeds. Through these methods the farmers determine the seed is able to emerge and develop into a seedling, to a stage where its structural features indicate if it would have the capability to develop into a healthy plant under the conditions provided in the field. This is also a method of sampling a few seeds from a whole resource before utilizing under field conditions. The test also helps the farmer in putting his resources under best use, by avoiding the usage of seeds which have lesser potential to germinate.

One of the methods most commonly adopted by the farmers here is to associate the germination of seeds as a part of an important celebration. A common example is the festival of Navratri, which falls in the month of Oct-Nov. Navratri is a 9-day festival celebrated across the country. One of the most important and prevalent practices during this festival is to sow pulses, cereals and other seeds on the first day in a pot which is watered for nine days (Figure 1). This pot is worshipped throughout the nine days. These pots are considered as a symbol of prosperity and growth. The seeds sprout during the course of the festivities. In some states like Karnataka, the farming community uses a base of cow dung for sowing the seeds during Navratri. The sowing of seeds during Navratri give a good idea about the germination potential of

the seeds before the next agriculture season begins. Towards the end of the 9 day celebrations, the seeds develop into seedlings, big enough to give the farmers a fair idea about the vigor of the seeds that they would use for the subsequent cropping season.

Seed treatment and storage

Seed treatment and storage comprise of one of the most important aspects of agriculture. The seed treatment practices have to appropriate to get good germination, plant establishment, and crop protection in early stage of crop growth (Mathad *et al.*, 2013) Traditional farmers follow various methods of seed treatment. Ancient texts such as Parashara's Krishi-Parashara, Surapala's Vrikshayurveda, Kautilya's Arthashastra, and Varahamihira's Brihat Jataka prescribe various methods for seed treatment.

A number of factors like the humidity, temperature, packaging, storage material, gas exchange and the composition of atmosphere influence the storage. All these external factors play a role in determining the quality and time of storage. Through trial and error method, farmers have designed and developed various methods to store the farm produces and to protect them from insects and pests. It is estimated that in India, 60-70% of food grains produced is stored at home level in indigenous structures ranging from bamboo baskets to mud structures, gunny bags and modern bins (Kanwar and Sharma, 2003; Channal *et al.*, 2004).

Applying kemmannu (red soil), neem oil, mixing with dry neem leaves, mixing with ash are common methods of seed storage. Some farmers also used to store onions, paddy in straw heaps.

In the study population here, it was observed that the farmers used different methods to

store the seeds. The storage was dependent on the seeds that were being stored. In general, paddy, maize and jawar were stored in gunny bags, underground silo or silos made with bamboo or wood, known locally as Palatha. A majority of the farmers were found to be using gunny bags. Among the farmers who participated in the study, 80 farmers were found to be using this technique for the storage. This corresponded to 65.57 % of the total study participants. They used gunny bags to store seeds like Paddy, maize, chilli, ground nut, sunflower, Jawar, cowpea *etc.* The next method for storage was using palatha, which was used by 32 farmers, which corresponded to 26.22% of the respondents. Underground silo was used by 10 farmers, which corresponded to 8.20% of the respondents. Both these silos were used to store crops like jawar paddy and maize. The details of the seed storage method adopted by these farmers have been summarized in Table 1. A representation of on ground seed storage silo also known as Kanaja is shown in figure 2.

One of the most common methods for storage is by using neem leaves. In Ratnagiri district of maharashtra, leaves of neem (*Melia azadirachta*), or nigadi (*Vitex negundo*), or teak (*Tectona grandis*) trees or fruits of Kubhali or Triphala (*Zanthoxylum rhesta*) or gelkand were mixed in the grains by the farmers. They reported that rice were soaked in thin slurry of 1 portion of cow dung and 2 portions of cow urine for half an hour and dried in shade. After complete drying, these seeds were stored with leaves of neem (*Azadirachta indica*) and banyan trees. Finally, the whole structure was covered with cow dung. (Anonymous 2000) Some farmers also use neem leaves along with leaves from other plants to protect ragi from the storage pests. Neem leaves help in keeping pests like grain borers (*Rhizopertha dominica*), saw toothed beetle (*Oryzaephilus surinamensis*) and flat grain beetle (*Cryptolestes minutus*) away. Neem oil and neem seed kernels are also used as pest repellants. (Karthikeyan *et al.*, 2007)

Fig.1 Check seed germination in cow dung during Mahanavami festival



Fig.2 Kanaja (on the ground seed storage silo)



Fig.3 Nellu (hanging rope) for storage of jaggery and Hagevu (underground seed storage silo)



Fig.4 Seed drilling method



Fig.5 Seed dribble method



Fig.6 Transplanting method



Table.1 Typical ways of storage of seeds and crops

Sl. No.	Method of storage	Seeds/Crops	No of farmers	Percentage of respondents
1	Gunny bags	Paddy, maize, chilli, ground nut, sunflower, Jawar, cowpea	80	65.57
2	Underground silo	Jawar, paddy, maize	10	8.20
3	Palatha (Bamboo or wooden silo)	Paddy, Maize, Jawar	32	26.22

Table.2 Sowing methods adopted by the farmers for various crops

Sl. No	Crops	Seed sowing method followed
1	Paddy	Drilling, dribble, transplanting
2	Maize	Drilling, dribble
3	Jawar	Drilling, dribble
4	Groundnut	Drilling, dribble
5	Sunflower	Drilling, dribble
6	Chilly	Transplanting, dribble
7	Cotton	Dribble, transplanting

Products of neem leaves are available in plenty in rural areas. These traditional methods using the products of neem trees are very easy to be put into practice. Moreover, these products are easily available and hence, the cost for practicing these methods will be very cheap. This prompted some of the farmers to make use of these traditional practices to get rid of the pests rather than relying on chemical methods which will be more expensive and harmful.

Another method commonly adopted by farmers is to use lime or Calcium hydroxide for storage of seeds. This method involved mixing of lime with water, allowing it to settle down and soaking the seeds in the supernatant. This is also a cheap alternative for chemical methods, without any side effects. The chemical component, calcium hydroxide present in lime confers protection against various diseases like smut and bunt. (Mathad *et al.*, 2013)

Other methods include use of cow urine, salt water, cow dung, storing seeds along with horse gram seeds and plant dusts, coating seeds with fine red soil from the village pond, using bitter gourd powder and drumstick extract *etc.* Seeds treatment with cow dung helps to prevent microbial attack to seeds in soil, mimics rizobium treatment like conditions in modern agriculture, its source of micro-nutrients, attract useful microbes (commensals) towards plant seeds. Figure 3

represents some of the traditional storage practices in Haveri district.

Seed sowing methods

Traditional sowing methods used by farmers in Haveri district include drilling, dribbling and transplanting. The sowing method used depends on the crops that the farmers intend to sow

Drilling: This is one of the most common methods that the farmers in Haveri district adopted for agriculture (Figure 4). They were using this method for crops like paddy, maize, jowar, groundnut, sunflower, chilly and cotton.

In this method, seeds are dropped on the soil with the help of certain specific implements. The implements used may be seed drill, seed-cum-fertilizer driller or mechanical seed drill. A contact is established between the seed and soil using a wooden plank.

Dribbling

This method was as popular as seed drilling among the farmers of Haveri district. They were using this method for crops like paddy, maize, jowar, groundnut, sunflower, chilly and cotton along with seed drilling.

The process of dribbling is done manually. It involves placing or dribbling of seeds at

specific cross marks made in the field with the help of marker as per the requirement of the crop in both the directions (Figure 5).

Transplantation: This method was less popular among the farmers in Haveri district. One of the probable reasons that the researcher thinks could be because of the extra care that the plant may require at the nursery and the cost involved. The farmers involved in the study were seen to be using this technique for crops like paddy, chilly and cotton along with other methods like drilling and dribbling.

In this method, the seeds are allowed to grow as seedlings in the nursery and later transplanted into the fields. Before transplantation, the seedlings are allowed to grow in the nursery for a period of 3-5 weeks. The field should be well irrigated before transplantation. This would enable the seedlings to establish themselves well to the field conditions. This also ensures that most of the seedlings retain their viability (Figure 6).

For the crops that were a part of this study, it was seen that more than one of the above-mentioned methods was used in combination. While all three methods were used for paddy crops, drilling and dribbling were used for maize, jowar, groundnut and sunflower. Transplanting and dribbling were used for chilly and cotton crops. The sowing methods adopted by the farmers for various crops have been summarized in Table 2.

Though ITKs originated in the ancient period and have been practiced by people from time immemorial, no written documents are available for recording and disseminating it. Uncontrolled usage of such output-oriented farming practices has led to deterioration of soil fertility, increased accumulation of chemicals in the form of fertilisers and

pesticides in food products, single cropping, and loss of wild crop and seed varieties (Sugam *et al.*, 2016). Hence, the awareness among the researchers about the importance of these traditional practices is on the rise and the practices have to be documented for every community (Brokensha, 1990). ITK has the advantage of being cost effective and readily available. They are very effective in solving problems of local nature and have many a times beaten the modern technology by offering the better solution. In spite of these advantages, very few attempts have been made to collect, record and analyze them (Pandey *et al.*, 2017). Through the current study, the researcher has attempted to record the prevalence of traditional practices pertaining to agriculture in the Haveri district of Karnataka state.

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