Indigenous Knowledge Use in Maize Cultivation in Andhra Pradesh

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ABSTRACT

Indigenous crop cultivation practices are generally organic in nature, do not cause damage to air, water and soil and are safe to human beings. These practices differ considerably from region to region depending on soil type, rainfall, topography etc., and show often modifications by local farmers. In recent years, there has been a growing scientific interest in these indigenous practices as a source of sound ideas that could lead to sustainable use and management of land resources. This article reports the indigenous maize cultivation practices of the farming community in Karimnagar district of Andhra Pradesh. The scientific rationality of these practices as perceived by the scientists is also discussed.

Key words: *Indigenous knowledge; Maize; ITK; Scientific rationality*

Farmers are very keen to observe the problems arising during farming and seek solutions to adjust to their local environmental conditions. They continuously adapt and manage their farming systems and in this way, they develop a rich storehouse of practical knowledge on their situation. It is evident that so called uneducated farmers are capable of creating and maintaining large and complex systems to achieve mutually beneficial results. The traditional solutions are often highly suited to the ecology of the region and for the farmers concerned. They developed farm systems based on local resources with minimal use of outside inputs. Maintenance of diversity, as a basis for ecological balance and economic stability, is based on agro-climatic conditions, soil types and the availability of water. Since Indigenous Technical Knowledge (ITK) used for maize production is not readily available to researchers, there is a need to systematically document, study and test its validity. Therefore, the study was designed to i. To identify and document the indigenous practices followed by maize growing farmers in selected areas of Andhra Pradesh.ii. To analyse the scientific rationality behind these indigenous practices.

METHODOLOGY

The study was conducted in the Karimnagar district of Andhra Pradesh. Six mandals (Metpally, Jagityal, Vemulavada, Karimnagar, Sriramnagar and Jammikunta) were selected for the study and from each mandal two villages were selected randomly. Thus, a total of 12 villages were selected for the study. From each village five marginal farmers (upto 1ha land holding), five small farmers (between 1-2 ha land), and five big farmers (above 2 ha land) were selected by stratified random sampling. Thus, each group consisted of 60 farmers with a total of 180 farmers. Indigenous practices that are practiced by farmers in the investigated area were collected during 1990-95, (five Rabi and five Kharif seasons) by adopting a participatory technique. The investigator held informal interviews through discussion in the field with various respondents to elicit and collect indigenous practices. Farmers replied that various practices were passed on to them from generation to generation. Keeping the objectives of the study in view, information was collected on indigenous technical knowledge followed for at least 20-25 years. Information was collected on land preparation, nutrition and manuring, plant protection, inter-cultivation, drying, storage and processing. After collecting the indigenous practices from the farmers, the practices were listed and sent to twelve scientists with 5-10 years experience in maize crop production for judging their scientific value. Assigned one (score) if rational and zero if considered irrational. For the listed practices their rationality, frequency and percentages were calculated and ranks assigned.

RESULTS AND DISCUSSION

A total of 13 indigenous practices were collected from maize growing farmers of different land holding sizes in the studied villages of the Karimnagar district of Andhra Pradesh. The data are presented in Table1 and discussed below:

Table: 1. Table1: Indigenous maize cultivation practices, and their scientific rationality as revealed by the farmers and scientists, respectively. (Sample size: Each farmers category, N=60; Scientists N=12)

S. No.	Indigenous practice	Marginal farmers		Small farmers		Big farmers		Total		Scientific rationality (Asexpressed by scientists)	
		F	%	F	%	F	%	F	%	F	%
1.	Burning of crop residues before next land preparation	44 (4)	73.33	49 (2)	81.67	52 (2)	86.67	145 (2)	80.56	12	(100)
2.	Ploughing the one feet height maize stalks	28 (9)	46.67	36 (7)	60.00 (6)	43 (8)	71.67	107	59.44	6	(50)
3.	Application of sheep/goat and poultry manure than FYM	29	48.33 (8)	37	61.67 (6)	47	78.33 (3)	113	62.78 (7)	12	(100)
4.	Tying the 4-5 matured tall plants of maize together at flag head juncture	17 (10)	28.33	19 (10)	31.66	16 (12)	26.66	52 (13)	28.88	6	(50)
5.	Bamboo sticks tied with bird feathers are erected in the field	34 (7)	56.67	29 (8)	48.33	39 (8)	65.00	102 (9)	56.67	12	(100)
6.	Beating empty iron drum (or) use of catapult	46 (3)	76.67	52 (1)	86.67	54 (1)	90.00	152 (1)	84.44	12	(100)
7.	Cutting the tassel of the plant after silking stage	38 (6)	63.33	42 (4)	70.00	45 (5)	75.00	125 (6)	69.44	12	(100)
8.	Maize cobs used as fuel	46 (3)	76.67	18 (11)	30.00	11 (13)	18.33	75 (12)	41.67	12	(100)
9.	Farmers dry the seeds under sun before sowing	48 (1)	80.00	38 (5)	63.33	42 (7)	70.00	128 (4)	71.11	12	(100)
10.	Cobs will be hanged above the fire place	43 (5)	71.67	48 (3)	80.00	46 (4)	76.67	137 (3)	76.11	9	(75)
11.	Keeping neem leaves in storage bins/bags	38 (6)	63.33	26 (9)	43.33	22 (10)	36.67	86 (11)	47.78	12	(100)
12.	For seed purpose maize cobs are kept without removing husk and tassels	47 (2)	78.33	42 (4)	70.00	38 (9)	63.33	127 (5)	70.56	12	(100)
13.	Storage bins made of bamboo sticks and pasted with clay and cowdung are used for storage of maize cobs and seeds	43 (5)	71.67	29 (8)	48.33	18 (11)	30.00	90 (10)	50.00	6	(50)

Note: Figures in parenthesis indicates ranks
Indigenous maize cultivation practices and their scientific rationality
Beating empty iron drum (or) use of catapult

This practice ranked first as 84 % of the farmers told that they follow it. In this practice, farmers stand at the centre of the field on an erected platform (locally called as *mancha*) to beat an iron drum or to use a catapult (locally called *vadisala*) to scare birds during the grain maturity stage until harvesting. Since the method is simple, effective and economical, all scientists considered this practice as rational.

Burning of crop residues: This practice was followed by 81 % of the farmers and ranked 2nd among all the 13 practices. They perceived that by burning crop residues pathogens and egg masses of insects and pests are destroyed, weeds are burnt and, thereby, land is cleaned. It was considered as rational by all scientists as this practice is advantageous, ecologically sound and a non-monetary management action.

Hanging cobs for Maize seed above the fire place: Three-fourth of the farmers told that they hang harvested maize cobs on bamboo sticks or rope just below the roof above the fire place (*chullah*). They separate the seeds from the cobs a few days before planting the seed in the next season. Three fourths of the scientists considered this as rational but also expressed that it requires further studies to prove its scientific validity.

Sun drying the seeds before sowing: Seventy one percent of the farmers follow this practice as sun drying the seeds is expected to kill harmful organisms such as insect egg masses, fungi and bacteria. It also reduces the moisture content of grains, which improves storage. Keeping the above advantages in view, all scientists considered this practice as rational.

Keeping seed maize cobs without removing husk: This

practice was also followed by 70 % of the farmers. They store maize seed on the cob without removing the husk. They hang matured and dry cobs in the house which were selected from the fields, the idea behind this is to maintain / preserve the germination points of the seed material within the cobs for next sowing season. This method of storage may avoid the damage to grains from pests and keep its longevity and viability of germination. The scientists also felt that this practice is rational.

Cutting the tassel of the plant after silking stage: More then two-thirds of the farmers told that they follow the practice of cutting the tassel of the plant after silking stage to possibly increase the cob size and to feed the cut portion to animals. All scientists considered this as rational but also felt the need for studies regarding its impact on cob size.

Application of sheep/goat /poultry manure (FYM): Two-thirds of the farmers were following this practice by heaping the sheep/goat/poultry manure from the daily collections. Many farmers could not use FYM, considering the small quantity of sheep/goat/poultry manure available. FYM application was generally on a small scale. Storage of seasonal or annual collections made is done properly. Farmers felt that use of FYM adds good nutrients to the soil. Similar findings also reported by Mukuandan (1990). They felt that produce obtained by using FYM (i.e cobs, leaves and stalks) is having a better consumption value. Some farmers explained that manure makes the soil more friable and rich in nutrients which help in root development. All the scientists felt that this practice is rational and farmers must continue it.

Ploughing in the maize stalks: Sixty percent farmers felt that by ploughing in the maize stalks, organic matter is added to the soil. Dry maize stalks that lie on the soil surface, act as a natural mulch that inhibits evaporation losses from the soil during the dry season. Only half of the scientists considered it as rational whereas, the others felt that this practice needs testing in farmers fields.

*Erecting bamboo sticks tied with bird feathers in the field :*More then half of the farmers erect bamboo sticks tied with feathers in the field at grain maturity stage to avoid bird damage of the crop. Farmers felt that birds do not feed in fields where bird feathers are present. Several farmers erect sticks with colored polythene sheets to generate sound caused by wind, in order to scare away birds. Farmers considered this method as cheap. All scientists felt that tying bird feathers to a bamboo stick in the field is a rational practice to avoid crop damage by birds.

Storage bins made of bamboo sticks, pasted with clay and cowdung : Half of the farmers preserved seed to protect from storage pests. Pasted clay and cowdung prevents insect attack from outside. Half of the scientists considered this practice as rational and others felt it as irrational and stressed need on further scientific studies.

Keeping neem leaves/dried chillies in maize storage bins/ bags: About half of the farmers add neem leaves or dried red chillies to maize cobs/seed in storage bins/bags. It is believed that odour of neem leaves/pungency of dried red chillies keeps away pests. Traditionally neem leaves have been best known for their medicinal use. Earlier research findings (Anil, 1992) have revealed that neem based insecticides are effective to control pests. All scientists considered this practice as rational.

Using shelled maize cobs as fuel: After shelling (separation of grains from cob) maize cobs are used by 42 % of the farmers as fuel as they are non-smoky in nature and save money. All scientists considered this practice as ecologically sound and environmental friendly.

Tying 4 -5 matured maize plants together at flag leaf juncture: About thirty percent of the farmers followed this practice. Farmers stated that there is a tendency of lodging (falling) of matured and tall maize plants, due to the weight of developed grains in the ear head, due to wind and loosening of heavy soils after heavy rains or irrigation. Following lodging, ear heads come in contact with soil and the grain quality deteriorates or ear heads are damaged by rats or other pests like birds that move on the ground and thus cause loss to maize produce. Therefore, 4-5 tall and matured maize plants within rows or from adjacent rows are tied together at the flag leaf juncture. Half of the scientists considered this practice as rational; the others felt that this practice must be further tested for scientific rationality.

CONCLUSION

It was brought out in this study that farmers of Karimnagar district of Andhra Pradesh were following a good number of indigenous maize cultivation practices. It was encouraging to find that majority of these practices

were rated as rational and useful by the scientists. Technologies used by rural people, if well documented, can make an important contribution to development. The indigenous knowledge could help in extending the knowledge boundaries of formal science and also provide clues to the scientists which have hitherto not occurred in designing new experiments.

If researches were undertaken to improve the traditional practices in maize, the resultant technologies will have greater applicability and chances of greater adoption. It is imperative and urgent to reorient the research to identify, test and modify the traditional practices, so that the scientifically proven practices are easily be diffused and adopted by the farmers as these were developed by them through their continuous experience. Proven indigenous practice can be disseminated and put into practice under similar agro-materiological conditions. Definitely this will have diffusion impact on researchers, extension personnel and industries. There is a growing need to document and scientifically study the different indigenous practices in different maize growing areas in this country, so that, we can study the scientific rationality of the indigenous practices and later blend these practices with modern recommended practices in order to use these blended technologies for sustainable agriculture.

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