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Perception of Farmers Regarding the Effectiveness of ITKs in Modern Agriculture: A Study of Haryana State

Nitu Sindhu, Joginder Singh Malik and P. S. Shehrawat

Department of Extension Education, CCS Haryana Agricultural University, Hisar-125001, India

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ABSTRACT

India is a country of many aboriginal communities, with unique traditional knowledge. These traditional knowledge and technologies have played a significant role in the development of the communities. To find out the perception of the modern farmers about the value and effectiveness of the ITKs in today's agriculture a study was carried out about the effectiveness of indigenous technical knowledge. The study was conducted in two districts Haryana state namely, Karnal and Sirsa by interviewing 60 farmers from each district. During the course of the study, it was observed that most of the farmers were of middle age group (31 to 50 years) and educated up to matriculation. It was also observed that the use of spent compost, neem leaves, biogas slurry and ash were ranked 1st as they were perceived to be very effective and popular methods of ITK. The use of egg shells was ranked 2nd followed by bone meal, crop rotation, use of alcohol, growing pest repelling plants, dhatura, chilli, cowpathy, use of barriers and traps, growing only native plants, talex of aak, tobacco, kerosene oil and garlic. Other ITKs like use of canola oil, amritpani, castor oil, engine oil, soap, karanj seeds, buttermilk, garlic, limonene and vinegar were not known by the farmers. This indicates that the modern farmers don't much rely on the ITKs due to the availability of chemical fertilizers and pesticides in market and also because there is lack of awareness among them about certain ITKs thus, there is an urgent need of documenting and preserving the Indigenous Technical Knowledge, many of which are at the edge of extinction. There is also lack of proper links between the practice of indigenous and modern knowledge and technologies which can be a reason for the losing faith of modern farmers in their traditional knowledge.

Introduction

Indigenous Technology Knowledge (ITK) refers to the unique traditional local knowledge existing within and developed around the specific conditions by women and men indigenous to a particular geographic area (Grenier. L, 1998). It put greater emphasis on minimizing risks rather than maximizing profit. The traditional knowledge focuses on preventative measures rather than curative, they are dependent on long-range planning. But in

*Corresponding author.
E-mail address: nitisindhu@gmail.com (Nitu Sindhu)
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today's modern world the indigenous technical knowledge is losing its importance and farmers have started relying more on new scientific techniques and chemical ways of farming. Though many of the modern farming techniques are based on the centuries old traditional ways, the modern farmers find the conventional method to be more easy and effective to carry out. The present study was conducted in Haryana state by purposively selecting two districts, i.e. Karnal and Sirsa. These two districts were selected as they consumed the highest amount of chemicals fertilizers and pesticides and it was important to study why they did not use other traditional and organic ways of controlling insect pest on their farm. Thus a study on the perception of farmers about the effectiveness of ITK in today's agriculture was conducted. It is important to study the perception as this will enable us to understand why the modern farmers abandoned the indigenous technical knowledge and depend highly on conventional methods of agriculture.

Methodology

The study was conducted in Haryana state which is geographically located at 30.73° N and 76.78° E. The study was conducted in two districts namely Karnal and Sirsa, these two districts were selected purposively as they consumed highest amount of agrochemicals in entire state. From each districts six villages were selected. From Karnal Pabana Hassanpur (Gharaunda), Padhana (Nilokhedi), shyamgardh (Nilokhedi), Gangar (Nilokhedi), Chapra Kheda Rasoolpur (Karnal) and Phoosgardh (Karnal) were selected. From Sirsa district Rupana Khurd (Chopta), Bakriyawali (Chopta), Panihari (Sirsa), Kheja Kheda (Sirsa), Shahpur begu (Sirsa) and Farwain khurd (Sirsa) were selected. From each village ten farmers were selected randomly. Thus a total number of twelve villages and one hundred twenty farmers were selected for the study.

Results and Discussion

Personal profile of the respondents

Under the study it was found out that only 12.14 percent of the farmers' belonged to young age group, 53.57 percent of farmers belonged to middle age group and 34.28 percent of farmers to old age group. Among the farmers 17.14% were illiterate, 4.28% educated up to primary, 27.14 educated up to middle school, 30% educated up to matriculation, 12.85% educated up to higher secondary, 8.57% educated up to graduation and none were post graduate. Occupation of farmers was also studied and it was seen that 83.57 percent of farmers were engaged only in farming and 16.42 percent were doing job/business along with farming as presented in the Table 1.

Table 1. Personal profile of respondents

S/No.	Age	Frequency	Percentage
1	young	17	12.14
2	middle	75	53.57
3	old	48	34.28
S/No.	**Education**	**F**	**%**
1	Illiterate	24	17.14
2	primary	6	4.28
3	middle	38	27.14
4	Matriculation	42	30
5	higher secondary	18	12.85
6	graduate	12	8.57
7	post graduate	0	0
S/No.	**Occupation**	**F**	**%**
1	only farming	117	83.57
2	business/job and farming	23	16.42

Proneness to change in farmers

It refers as the disposition of the farmers to accept or to reject a change. The change proneness was measured by using the scale developed by Moulik (1965). The responses were checked by reading the statement of change proneness. Table 2 highlights that majority of the respondents in both the districts i.e. 92.50 per cent in Karnal and 88 per cent in Sirsa had high level of the change proneness and remaining 7.50 per cent in Karnal and 12 per cent in Sirsa had medium level of change proneness. It shows that most of the respondents had very high tendency to adopt any new technology introduced to them. It is apparent that they may use every new fertilizers or pesticides introduced in market, ignoring the traditional methods which require lot of efforts and show late results. High proneness to change may be one of the reasons why farmers has abandoned the ITK and adopted modern agricultural practices.

Table 2. Proneness to change in farmers

S. No.	Category	Karnal (%)	Sirsa (%)
1.	Low (<6)	00.00	00.00
2.	Medium (6 to 12)	07.50	12.00
3.	High (>12)	92.50	88.00

Mass media exposure of farmers

Mass media plays an important role in the transfer of technology from technocrats to farmers. Particularly when a

farmer is not able to contact an extension agent frequently, media comes to rescue to some extent by bringing the required information to the farmers. In order to access the extent of use of mass media by the respondent, different mass media were listed and respondents were asked to how often they used these mass media. The scoring pattern was adopted as of Bhatti (1985). The more the exposure of farmers to mass media, more would be the gain in knowledge and information. But it has been observed that the TV, radio, newspaper and other sources mostly promote the modern technologies and not the traditional ones. Hence, it is clear that the farmers are more aware of the modern technologies rather than the old ones, thus adopting them. Under the present study although the mass media exposure was low, the farmers used TV, radio and newspaper as a source of information. It could be illustrated from Table 3 that in Karnal district, from all the mass media, TV ranked 1st with weighted mean score of 1.1, followed by newspaper (0.65), radio (0.55), internet (0.08), magazine (0.07) and KVK (0.03). Whereas in Sirsa district, TV (0.95) ranked 1st followed by radio (0.67), newspaper (0.53) and KVK (0.28). It was observed that the farmers in Sirsa district did not use magazine, internet and farmers of both the districts never attended any workshop.

Table 3. Mass media exposure of farmers

S. No.	Mass media exposure	Karnal (WMS)	Karnal (Rank)	Sirsa (WMS)	Sirsa (Rank)
1.	Radio	0.55	3	0.67	2
2.	TV	1.10	1	0.95	1
3.	Newspaper	0.65	2	0.53	3
4.	Workshop	0.00	7	0.00	5
5.	Magazine	0.07	5	0.00	5
6.	KVK	0.03	6	0.28	4
7.	Internet	0.08	4	0.00	5

Perception about the effectiveness of various fertilizers used in ITK system

Conventional agriculture involves use of chemical fertilizers, pesticides, insecticides, herbicides, fungicides and various other types of agrochemicals. The deliberate use of these harmful agrochemicals can adversely affect human and environmental health. Thus there is urgent need of choosing a method which is preventive rather than curative. Our ancestors have immense knowledge that has evolved within the local (grassroots) community and has been passed on from one generation to another, encompasses not only local or indigenous knowledge, but also scientific and other knowledge gained from outsiders. The implementation of those knowledge and practices can prevent the environmental degradation leading to sustainable development. Thus it is very important to know what the modern farmers perceive about indigenous technical knowledge.

A list of fertilizers (as presented in Table 4) that are used in traditional farming system was prepared and the farmers were asked about their effectiveness and their responses were arranged rank-wise. In Karnal district, green manuring (Fageria, 2007), poultry litter/manure (Boateng *et al.*, 2006), organic manure, compost/vermicompost (Adhikari, 2012), spent compost, bio-gas slurry and ash were ranked 1st as all the farmers mentioned them to be most effective fertililizer. Use of egg shells (Nikose, 2015) was ranked 2nd with weighted mean score (3.9) followed by bone meal (3.7) (Kivela *et al.*, 2015) and organic fertilizers (3.6). In Sirsa district, use of compost/ vermicompost, spent compost, bio-gas slurry and ash were ranked 1st with weighted mean score of 4. Green manuring, poultry litter/manure, organic manure and egg shells were ranked 2nd with weighted mean score of 3.8. Organic fertilizers were ranked 3rd and bone meal was ranked 4th with weighted mean score of 3.6 and 3.4, respectively.

Perception about the effectiveness of various pesticides used in ITK system

Among various pesticides used in ITK system, use of neem leaves (Lokanadhan *et al.,* 2012), was ranked 1st with weighted mean score as 4 followed by alcohol (Aristizabal *et al.*, 2016) and growing pest repelling plants as 2nd with weighted mean score as 3.1. Dhatura (2.8) (Kuganathan *et al.*, 2007) was ranked 3rd followed by cowpathy (Khan *et al., 2015)* & chilli (2.6) (Varghese and Mathew, 2012) and biological control (2.3). Using barriers and traps, growing only native plants, trees and grasses and using latex of *Aak* plant were ranked 6th. Use of tobacco (2.1) was ranked 7th, kerosene oil (1.9) was ranked 8th, physical control & use of garlic (1.7) was ranked 9th and use of butter milk (1.5) was ranked 10th. Use of hormones/ pheromones was ranked 11th. Use of limonene, castor oil, canola oil, engine oil, soap, karanj and apple cider/vinegar was felt non-effective by all the farmers.

In Sirsa district, use of neem leaves ranked 1st with weighted mean score as 4 followed by growing pest repelling plants (3.1), alcohol & dhatura (2.8), cowpathy & chilli (2.6). Use of barriers and traps, growing only native plants, trees and grasses and latex of *Aak* plant were ranked 5th with weighted mean score of 2.2. Biological control, tobacco and kerosene oil were ranked 6th with weighted mean score of

1.9. Use of garlic was ranked 7th followed by physical control and use of butter milk with weighted mean scores of 1.7, 1.6 and 1.4. Hormones/pheromones with weighted mean (1.2) was ranked 10th followed by using soap. Use of limonene, castor oil, canola oil, engine oil, karanj and apple cider/vinegar was felt non-effective by all the farmers (Table 5).

Conclusions

From the present study it can be concluded that farmers in both the districts had high proneness to change but had low level of mass media exposure. It was observed that most of the farmers used TV, radio and newspaper as a

Table 4. Perception about the effectiveness of various fertilizers used in ITK system

		Karnal		Sirsa		Extension functionaries	
S. No.	**Fertilizers**	**WMS**	**Rank**	**WMS**	**Rank**	**WMS**	**Rank**
1.	Green manuring	4.00	1	3.80	2	4.00	1
2.	Poultry litter/ manure	4.00	1	3.80	2	4.00	1
3.	Organic manure	4.00	1	3.80	2	4.00	1
4.	Compost/vermicompost	4.00	1	4.00	1	4.00	1
5.	Spent compost	4.00	1	4.00	1	4.00	1
6.	Bio-gas slurry	4.00	1	4.00	1	4.00	1
7.	Ash	4.00	1	4.00	1	3.70	2
8.	Egg shell	3.90	2	3.80	2	1.70	4
9.	Bone meal	3.70	3	3.40	4	1.90	3
10.	Organic fertilizers	3.60	4	3.60	3	4.00	1

Table 5. Perception about effectiveness of pesticides used in ITK system

		Karnal		Sirsa	
S. No.	**Pesticides**	**WMS**	**Rank**	**WMS**	**Rank**
1	Neem leaves	4.00	1	4.00	1
2	Alcohol	3.10	2	2.80	3
3	Growing pest repelling plants	3.10	2	3.10	2
4	Dhatura	2.80	3	2.80	3
5	Cowpathy	2.60	4	2.60	4
6	Chilly	2.60	4	2.60	4
7	Biological control	2.30	5	1.90	6
8	Barriers and traps	2.20	6	2.20	5
9	Growing only native plants, trees and grasses	2.20	6	2.20	5
10	Latex of *Aak* plant (*Calotripis gigantea*)	2.20	6	2.20	5
11	Tobacco	2.10	7	1.90	6
12	Kerosene oil	1.90	8	1.90	6
13	Physical control	1.70	9	1.60	8
14	Garlic	1.70	9	1.70	7
15	Butter milk	1.50	10	1.40	9
16	Hormones/pheromones	1.20	11	1.20	10
17	Limonene	1.00	13	1.00	12
18	Castor oil	1.00	13	1.00	12
19	Canola oil	1.00	13	1.00	12
20	Engine oil	1.00	13	1.00	12
21	Soap	1.00	13	1.10	11
22	(*Pongamia Pinnata*) Karanj	1.00	13	1.00	12
23	Apple cider/ vinegar	1.00	13	1.00	12

source of information that mostly promotes the chemical fertilizers and pesticides used in conventional agriculture; they don't promote the indigenous technical knowledge of farmers which is unique, traditional , local knowledge existing within and developed around specific conditions of women and men indigenous to a particular geographic area. Perception about effectiveness of various fertilizers used in ITK system revealed that green manuring, poultry litter/manure, organic manure, compost/vermicompost, spent compost, bio-gas slurry and ash were observed to be most effective were as the pesticides use in ITK system like neem leaves, pest repelling plants, alcohol, dhatura, cow-pathy & chilli were considered to be most effective. The farmers were not much aware about the indigenous technical knowledge and perceived them to be not very effective method of practicing agriculture. Thus there is need of spreading awareness and educating farmers that our traditional knowledge system has great potential of practicing agriculture without disturbing the ecological balance. The study clearly indicates that there is lack indigenous technical knowledge among the farmers and there is an instant need of documenting and preserving the Indigenous Technical Knowledge, many of which are at the edge of extinction. There is also lack of proper links between the practice of indigenous and modern knowledge and technologies. By building a bridge between modern and traditional knowledge better agriculture can be performed along with clean, green and safe environment to live and flourish in.

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