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Indigenous Knowledge of Agricultural Practices and Communication Pattern of Tribal Farmers in Sidhi District of Madhya Pradesh

Vinod singh, G Sivanarayana, G B M Ram Naidu and V Srinivasa Rao
Department of Agricultural Extension, Agricultural College, Bapatla – 522101, Andhra Pradesh

ABSTRACT

The study was conducted in six villages of Kusmi and Majhauli Block of Sidhi district of Madhya Pradesh. The primary objective of this paper is to identify the indigenous knowledge used in agriculture practices by tribal farmers in that area. Indigenous knowledge is the knowledge that has been developed over time in a community mainly through accumulation of experiences and intimate understanding of the environment in a given culture. This research covers indigenous knowledge on farming tasks such as managing soil fertility, controlling pests and diseases, harvesting, storage of grains, weather prediction, detection of underground water and mixed cropping pattern. From the results we can conclude that indigenous knowledge should be recorded and used to devise innovative research for agricultural researchers, extension workers and development practioners for improvement in agriculture. In relation to communication pattern of tribal farmers most of the farmers are preferred Bhauji bazaar (91.11%), for source of information followed by Baithaki/ Mukhiya (86.66%).

Key words : Indigenous knowledge, Pest management, Weather prediction.

Indigenous technical knowledge (ITK) is the knowledge that people in given community have developed. It is based on experience, often tested over long period of use, adapted to local culture and environment, dynamic, changing and lay emphasis on minimising risk rather than maximising profits. Knowledge, skill and survival strategy of farmers operating with low external inputs have often ignored to promote modern agriculture. Farmers based indigenous/traditional knowledge has scientific rational and great deal of relevance for agriculture productivity and sustainability.

Indigenous knowledge is found to be socially desirable, economically affordable, sustainable and involves minimum risk and rural farmers and producers. the living conditions of poor masses. (Rizwana and Lyaqet, 2011).

The failure of modern chemical farming to deliver prosperity to agriculture communities is due to increase in pest attack of crops, deterioration of soil and water resources, cost to human and animal health and has forced scientists to examine whether traditional practices of farmers have any answers to the problems of modern agriculture. Thus the study was conducted to identify the indigenous technological knowledge of agricultural practices and communication pattern of tribal farmers in Sidhi district of Madhya Pradesh.

MATERIAL AND METHODS

The study was conducted in Sidhi district of Madhya Pradesh. Two mandals (Kusmi and Majhauli) were selected for the study and from each mandal three villages were selected randomly. Thus a total of six villages selected for the study. From each village 15 farmers , were selected, thus a total number of 90 farmers were selected for the study.

In accordance with the objectives, the respondents of this study were wise farmer (as indicated by study) from the selected village panchayats. The majority of interviews were conducted with the individuals although there were a small number of group interviews (up to 15 people) too, for consensus opinion.

Oral history method was selected for the study. Oral history involves interviewing a person or group to get an inside perspective into what it

was like to live in a particular time or is like to live as the member of a particular group within a society.

The main instrument used for collecting data in the study was interview guide. This is having a list of questions, which help to collect data on requisite information. Keeping in view of the specific objectives, different areas (i.e. Agriculture, Livestock, Human health, and Weather prediction) were included in the study. An interview guide was prepared in a simple and intelligible in local language to avoid ambiguity to collect data from the respondents.

RESULT AND DISCUSSION

Indigenous technical knowledge is possessed by the farmers and passed on from generation to generation. Many of the modern agriculture practices based on indigenous agriculture practices are prevailing in the farming community. The ITKs may vary from region to region based on farmers needs. It was found in all the six villages, respondents were making use of the indigenous knowledge for different practices, such as:

A. ITK in soil fertility management:

1. Farmers use Mahua *(Madhuca indica*), Mustard and Neem Cake to maintain the soil fertility and moreover to protect crop from soil born insects and diseases.
2. Deep ploughing by deshi wooden plough in the summer season for turning of soil and exposed to the sun kills harmful insects and pests and buried weed propagule seeds to deep layer.
3. Decomposed leaves, crop residues and forest waste materials are mixed in the field followed by harrowing by bullock drawn blade harrow.
4. Forest residue and soils broadcasted over the field and deposit during rainy season to increase the soil fertility.

The present findings of the study was in conformity with the findings of Achale (2007)

B. ITKs in water conservation and irrigation:

1. Traditional system of water conservation followed since ancient times by construction of tanks and ponds for irrigation and drinking water as well as daily use purpose within and outside the village.
2. Dhenkur system for irrigation: This is a traditional method of irrigation in which farmers irrigate field with the help of bucket attached to wooden handle. It requires continued/ permanent manpower (labour) to operate irrigation.

The result was in accordance with the findings of Neetam (2004) and Achale (2007)

C. ITKs in agricultural tools/implements:

1. Hundi and Tokani: Broadcasting method of sowing of seeds is most popular among the tribes. During broadcasting the seeds are kept in Hundi (soil made pot) and Tokani (bamboo made pot).
2. Bansa Paila: It is deshi-seed drill plough. Mainly used for line sowing.
3. Hal: Deshi plough used for ploughing or cultivation.
4. Jhuma: Used for tiying of two oxes for ploughing or threshing.
5. Akhaini: Used for separation of straw after threshing by bullock.
6. Fawada: Used for preparation of land.
7. Gaity: Used for preparation of land.
8. Ghonta: Used for drank the medicinal solution to animal.
9. Jarkati: Used for harvesting purpose.
10. Musar and Kandi: Used for separation of rice from paddy and used for killing of minor insects.
11. Khurpi: Used for weeding.
12. Hasiya: Used for harvesting.
13. Jatan: Used for separation of paddy husk and grain.
14. Pata : Used for levelling of land

The present findings of the study was in conformity with the Neetam (2004), Achale (2007), Das and Nag (2006).

D. ITKs in local varieties:

1. Paddy: Gurmutiya, Sari, Lochai, Krishna, Sari, Masri, Karanful, Lamera, dehula.

Out of them some varieties like Dehula and Karanful are early varities, tolerant to drought and Sari variety is vary early maturing variety (less than 100 days) and also resistant for drought.

2. Maize: Bade Dana, Chote Dana, Lalbeej Wali, Choti Ghera Wali, Lamba Ghera Wali.
3. Jawar: Chikna, Safed Dana, Chote Dana.
4. Kodo: Choti Dana, Badi Dana.

Farmers of this region informed that kodo herb collected before reproductive stage possess valuable medicinal properties. In early days they have seen it's uses in treatment of wounds. Farmers also intended that dry leaves and roots of kodo are useful in treatment of liver related problems.

5. Til: Choti Tili, Badi Tili.
6. Pigeonpea: Gol Dana, Bade Dana, Safed Dana, Lal Dana.
7. kutki: Choti kutki, Badi kutki

In general natives recovering from exhaustive diseases are suggested to consume kutki grains as meal as cheap as well as effective tonic. The result was in accordance with the findings of Neetam (2004) and Achale (2007)

E. ITKs in weather prediction:

1. On the basis of vast experience, farmers are generally imaginate that if thick clouds are seen at the last shuklapaksh indicates heavy rains.
2. The forecasting of intensity of rain is done by size of moon and sun appeared in the sky.
3. If moon is shining clear at night in sawan month indicate no rain.
4. Ants running from down to up with their eggs indicates heavy rain.
5. Clouds of dark brown colour cause heavy rains for a fortnight.
6. Extreme heat during June month is an indication of heavy rain in rainy season.
7. Termites and dragonfly flying near the ground is an indication of rain.
8. Frog protends sound at night in sawan month indicates no rains.
9. Wind blowing from north-west direction are indication of rains.
10. Another extinction method is "Jhamdi method" in the day of Guru Poornima farmers keep one flagged stick in field and observe the direction of wind blowing and forecast the rain. If wind blowing from east to west direction indicates less rain. If wind blowing from west to east direction indicates heavy rain.
11. Rust in "Khajulaiyan" trees shows that during the year there would be more chances of rust in wheat. Thus farmers do not sow durum variety of wheat because it susceptible to rust.

The result was in agreement with the findings of Sivanarayana (1993) and Achale (2007)

F. ITKs in detection of underground water:

1. Farmer believed that person walk with "V" shaped stick of Imali (*Tamarindus indica*) or Neem or Jamun attached with their abdomen horizontally at which spot it errects vertically itself. It assumed that it would be most efficient spot.
2. It is a belief that there will be sufficient ground water available near by bargad (*Ficus benghalensis*) and khijda (*Prosopis cineraria*) trees.
3. Water availability will found to be more near termitarium.
4. Availability of frog below the soil indicates sources of water.
5. Constantly daldali (moisture) land indicates sources of water
6. Any point within 10 meters in north and west direction from bushy plants like Ber, Babool and Bamboo indicates sources of water.

The result was in line with the findings of Neetam (2004)

G. ITKs in storage of grain:

1. In storage structure some rural folk have "Dhusi" made of paddy straw, which is a low cost device and help in storage of grains/seeds for longer duration.
2. Some pulse crops like Gram, Lentil, Moong and Urad are stored in soil pots mixed with ash.
3. Sorghum earheads stored in gunny bags along with the husk to protect from storage pests.
4. Solar heat treatment given to paddy seeds in Chaitra month and stored in soil pot. "kuthla/ Peula" which are not opened in sawan month may help in storage for a long time safely.
5. Grains are stored in soil pots /drums and a burning candle is kept before closing it. Thus all oxygen is burnt so pests can not take respiration.
6. Straw of Methi (fenugreek) is kept in bottom and top of grains in storage.
7. Onion, neem leaves, common salt and turmeric slices ensure the safely storage of grains.
8. To protect pulses from pests, the storage mechanism was to mix the pulses with millet

(*Setaria italica*) or sami (*Panicum miliare*) in a 1:1 ratio it reduces the probability of attack and damage by 50 %.

The result was in agreement with the findings of Nagnur *et al.* (2006), Neetam (2004) and Achale (2007).

H. ITK in seed treatment:

1. Sowing of ash coated seed is a practice adoptable by some tribal farmers. Ash helps in better utilization of moisture present in the soil, which is absorbed by the ash and in turn provided to the seed. Ash also performed as a filter by allowing the moisture to flow but as a barrier to microbes and pests present in the soil.
2. Cow dung treated seeds are sown by the farmers: The rational behind the use of cow dung was hypothesised to be cow dung helps the seed by providing moisture for sprouting. Apart from it cow dung contains minerals. So it provides plant nutrients. As a mechanical barrier it prevents the attack of pests and diseases.
3. Neem Oil (0.5%) treated seeds are sown: The rationality behind it was act as a barrier for attack by pathogens as it can not be easily weathered and degraded by lower organisms like fungi and bacteria.

The result was in line with the findings of Acahle (2007) and Neetam (2007)

I. ITK of Plant Protection (Entomological, Pathological and Animal Aspects)

1. Farmers use ash on various crops for aphid control.
2. Farmers generally apply Neem and Mahua cake for termite control before sowing.
3. Farmers irrigate the crop field for control of termite caterpillar and grasshopper in case of paddy crop.
4. Farmers use neem leaf, harra, baheda cake for insect pest control.
5. Bhelana (*Anacardium spp.)* stem twigs are being adopted by the tribals in transplanted rice for protecting the incidence of Rice Gundhibug.
6. Fermented solution of 5 kg of cow dung, 5 litre of cow urine, 150 gm of lime + 100 litre of water is sprayed to control of aphids, bacterial and viral diseases.
7. Spray of Neem extract solution to control leaf minor insects.
8. Maize cobs without seed are pierced in standing crop filled to control bunky insect (*Nemphula depunctalis*).
9. For controlling disease and pests in paddy the farmers mix cow dung, urine, chilly and garlic at the ratio of 1.5:1.0:0.25:0.25 with adequate water and keep for three weeks for proper decomposition in a pit.
10. Lantana camera leaf, fruit paste (50gm) + wild tulsi leaf (10 to 20) + 50gm pepper and chilli powder boiled for 1-2 hour and filter use against rice ear head bug.
11. Rice bran (2 kg) + kerosene (1 lit) use against rice yellow stem borer, nerium + *Ipomea carnea* leaf extract (2 kg), boiled for 30 min, filtered + soap solution + jaggery use against leaf minor insects of all crops.
12. A man made structure known as "Kakbhagoda" is used for protection from birds.
13. A man made structure known as "Mairamadicha" is used for supervision of crops as well as protection from animals.

The present finding of the study was in conformity with the findings of Deka *et al.* (2006), Acahle (2007) and Neetam (2004).

J. ITKs of mixed cropping pattern:

1. Maize (*Zea mays*) + Jowar (*Sorghum bocolor*)
2. Maize (*Zea mays*) + Pigeonpea (*Cajanus cajan*)
3. Mung (*Vigna radiate*) + Pigeonpea (*Cajanus cajan*)
4. Sarson (*Brassica nigra*) + Wheat (*Triticum aestivum*)
5. Chana (*Cicer arietinum*) + Rai (*Brassica nigra*) + Masur (*Lens culinaris*)
6. Chana (*Cicer arietinum*) + Alsi (*Linum usitatissimum*) + Rai (*Brassica nigra*)

Traditional benefit of mixed cropping:

a) The risk of total crop failure due to uncertain monsoon is reduced if two crops of different nature are grown simultaneously as a mixed crop.

b) A variety of produce could be obtained from a single crop to meet the varying requirements of the family like cereals, pulses, vegetables etc.
c) Component crops have a complimentary effect on one another. For example, legume crops have a beneficial effect on cereal or non-legume crops as they help in increasing the fertility of soil. There is higher yield by this method.
d) Crops of a particular species are more prone to a particular type of pest (weed, insects, and diseases) infestation. When different types of crops are grown together chances of pest infestations are reduced or diluted.

The result was in accordance with the findings of Sivanarayana (1993) and Achale (2007)

K. ITKs in seed maturity testing

1. When grains can be easily cut by teeth. It indicates that crop is ready for harvesting.
2. When crop having yellowish colour it indicates that crop is ready for harvesting.
3. If paddy ear heads moves it indicates it's maturity.
4. When Maize cobs fibres (stigmas) completely dried up. It is mark of its maturity.

The result was in line with the findings of Achale (2007) and Neetam (2004)

COMMUNICATION PATTERN:

The media/ sources of information utilised by the tribal farmers were depicted in Table 1

It was evident from Table 1 that with respect to tribal farmers, most of the farmers are preferred Bhauji bazaar (91.11%), for source of information followed by Baithaki/Mukhiya (86.66%), wise farmers (72.22%), Radio (66.66%), Ramlila (63.33%), Folk Songs (57.77%), Folk Dance (54.44%), Folk Tale (53.33%), Neighbours/ Friendss (50.00%).

The result was in accordance with the findings Efa *et al.* (2008) and Mishra and Sah (2008).

1. Baithaki/ Mukhiya: is the major source of information but not seem to be effective because of the non-tribal Mukhiya of upper caste.
2. Ramlila: In many rural areas, traditional venues for Ramlila have developed over the centuries, and hundreds of people will often make the trip nightly to attend the play. Surrounding areas temporarily transform into bazaars to cater to the audience. Depending on the region, interspersed breaks in the play can become important talent shows for local society, and a de facto competition takes place between neighbouring Ramlilas, each vying to stage a more lavish production. Though the play itself is thematically religious, this social aspect often draws in people from non -Hindu segments of the community as well.
3. Folk Song: Were usually medium for group communication which serves to bring attention of groups to a common focus, to prepare them for a singular response, and produce consensus. Occasions for songs in rural life: Ceremonies, Marriages, Agricultural Operations, Religious festivals and communal works etc. The folk songs also acted as carrier of traditional and cultural heritage.

Table 1. Distribution of respondents according to media/source of information utilised by them.

Sr. No	Media/ Sources	Frequency	Percentage	Rank
1	Bhauji bazaar/chuhiya bazaar (Weekly market)	82	91.11	I
2	Baithaki/ Mukhiya	78	86.66	II
3	Wise farmers	65	72.22	III
4	Radio	60	66.66	IV
5	Ramlila (drama)	57	63.33	V
6	Folk song	52	57.77	VI
7	Folk dance	49	54.44	VII
8	Folk tale	48	53.33	VIII
9	Neighbours / friends	45	50.00	IX

4. Folk Dance: Tend to be ritual in character, exhibiting a wide variety of themes such as agriculture and occupations, marriage ceremonies, religious observance and other festivals.

5. Folk Tale: The unwritten, but living literature of a people often provides a sensitive reflection of their values and world view. This form is often used as a vehicle for transmitting both generationally and geographically the history and culture of a people. The folk tales helped a primitive man to satisfy his curiosity about the mysteries of the world and particularly the inexpliable phenomena of nature around him.

6. Bhauji Bazaar/ Chuhiya Bazaar: This is a meeting place, where people came from the long distance for purchasing essential goods as well as communicating ideas. People interact each other and discuss about the information related to agriculture, livestock, health etc.

Ramlila, Folk dance, Folk songs, Folk tales were the most potent sources of entertainment by describing nature and their surroundings. There is need to review these traditions. Folk singers (Artists) must be encouraged. They can act as a forceful channel of communication for transfer of technology.

To sum up, indigenous media /sources identified in this study and present modern media should be integrated for use in development contexts. It may be useful for inter-transfer and intra-transfer of knowledge of this area and also, enhancing the feeling in the country. All the prospects make folk media, in combination with electronic media, a viable communication form to use in making effective messages for development.

CONCLUSION:

It was brought out in this study that farmers of Sidhi district of Madhya Pradesh were following a good number of indigenous agricultural practices. Farmers find the ITKs used by them very beneficial but for enhancing the authenticity of the same and make this knowledge scientifically rational, it becomes necessary to validate the knowledge scientifically. ITKs are cheaper and locally available. Thus, it can be concluded that indigenous technical knowledge possessed by the farmers shall be identified and given due importance and recognition.

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