



Screening of Traditional Agriculture Keeping Natural Resource Management under Eastern Uttar Pradesh Conditions

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ABSTRACT

The present study was conducted on screening of traditional scientific knowledge of agricultural practices keeping natural resource management for sustainable agricultural development under eastern Uttar Pradesh conditions for three consecutive years (2013-2015). All 10 districts of 3 administrative divisions - Gorakhpur, Basti and Azamgarh were considered for survey work. Traditional agriculture is mainly based on natural resource management and fosters sustainability. It is also known as Indigenous technical knowledge in agriculture. Indigenous technical knowledge is localized knowledge, transmitted from generation to generation and time tested by the local community to solve particular problems taking cognizance of local factors. It is based on resource conservation for the betterment of the next generations. Most of the agricultural resources are exploited by modern agricultural technologies without taking care of the adaptability of local conditions and possible consequences. The modern agricultural technologies like monoculture causing rapid erosion of crops and livestock genetic diversity, natural soil fertility and pest outbreaks, while chemical inputs causing environmental pollution and chemical hazards. Sustainable agriculture is also urgently needed to conserve agricultural resources for the next generations. Most of the agricultural resources are exploited by chemical hazards. There are millions of traditional pieces of knowledge that have been practised over the world. Most are overlapping due to their dynamic nature and are often modified by local farmers. There are numbers of indigenous technical knowledge for sustainable agriculture that have been verified and documented in India. The survey was conducted per the international institute of rural reconstruction (IIRR, 1996) and modified as accessibility. The informal interview method was used for recording. The summer ploughing, straw mulching and bidahani (beushening) for crop production, castor oil, margosa leave decoction and surka (cooked liquid gruel) for livestock production were confined to very localized traditional knowledge of scientific rationale.

Keywords: Traditional agriculture, Natural resource management, Eastern Uttar Pradesh, India.

INTRODUCTION

Traditional agriculture is mainly based on natural resource management and fosters

sustainability. It is also known as Indigenous technical knowledge in agriculture.

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Indigenous technical knowledge is localized knowledge, transmitted from generation to generation and time tested by the local community to solve particular problems taking cognizance of local factors. It is based on resource conservation for the betterment of the next generations. Modern agricultural technologies exploit most agricultural resources without taking care of the adaptability of local conditions and possible consequences. Modern agricultural technologies like monoculture causing rapid erosion of crops and livestock genetic diversity, natural soil fertility and pest outbreaks, while chemical inputs causing environmental pollution and chemical hazards and mechanization causing high cost of cultivation are confined. Sustainable agriculture is also urgently needed to conserve agricultural resources for the next generations. Most of the agricultural resources are exploited by chemical hazards. Indigenous technical knowledge mostly using physics, chemistry and biology of ancient knowledge to improve agricultural practices without chemical hazards. The indigenous technical knowledge in agriculture is organic in nature. They do not harm any agricultural resources or the environment. It was built up on farmers' knowledge generated over centuries, unlike modern technologies, which are exogenous. But unfortunately, in the mad race for modernization of agriculture, the time-tested indigenous technologies are fast getting scarce and improvised. (Singh et al., 2004; Dey & Sarkar, 2011; Borthakur & Singh, 2012; Barjendra & Singh, 2015; Morya & Kumar, 2015; Tyagi et al., 2018; & Mishra et al., 2020).

To achieve the goal of sustainable agriculture, it's an urgent need to revive traditional knowledge keeping natural resource management in agriculture. There are millions of traditional knowledge have been practised over the world. Most are overlapping due to their dynamic nature and are often modified by local farmers. Several indigenous technical knowledge for sustainable agriculture have been verified and documented in India. In

India, the scientific rationale of traditional knowledge of agricultural practices to the revival of the traditional approach to sustainable agriculture is being documented and maintained by the Traditional Knowledge Digital Library-Council of Scientific and Industrial Research (TKDL-CSIR, India). Internationally, the International Institute of Rural Reconstruction (IIRR, Philippines) and the Globally Important Agriculture Heritage Systems-Food and Agriculture Organization (GIAHS-FAO, Italy) are engaged in the documentation and promotion of traditional knowledge of agricultural practices to the revival of indigenous technical knowledge for sustainable agriculture. Of course, these global efforts to conserve traditional knowledge of agricultural practices believe that the traditional agricultural systems constitute the foundation of present and future farming technologies, and their biodiversity will be maintained as sustainable systems of farming. India has rich biodiversity of crops and livestock, and farmers of this country have been practicing various traditional knowledge of farming over centuries. Most of the traditional practices are identified unique systems of farming. This indigenous technical knowledge can be refined and upgraded to suit the conditions and needs of the farmers. It may be blending with modern technologies to achieve the goal of sustainable agriculture. Uttar Pradesh, a prime agriculture state of India, has the highest crop area and rich biodiversity of crops and livestock. The farmers of this state have been practicing various traditional knowledge of agriculture over centuries. The present study was aimed to survey the scientific traditional knowledge of agricultural practices to the revival of indigenous technical knowledge for sustainable agriculture under Eastern Uttar Pradesh of India. (Prasad, 1999; Flavier et al., 1995; Baver & Jun, 2002; Singh et al., 2004; Sundaramari & Ranganathan, 2013; Morya et al., 2016; Mishra et al., 2020; FAO, 2021; & TKDL, 2021).

MATERIALS AND METHODS

An extensive survey was undertaken for screening of scientific traditional knowledge of agricultural practices to the revival of indigenous technical knowledge for sustainable agriculture under Eastern Uttar Pradesh of India for 3 consecutive years (2013-2015). There were all 10 districts of 3 administrative divisions of Eastern Uttar Pradesh, *i.e.*, Gorakhpur (Gorakhpur, Deoria, Kushinagar and Maharajganj), Basti (Basti, Santkabirnagr and Siddharthnagar) and Azamgarh (Azamgarh, Mau and Balia) considered for survey work. A total of 100 samples were taken randomly from 10 villages of each district. The survey was conducted as per the methodology of the International Institute of Rural Reconstruction (IIRR, 1996) and modified as accessibility. The informal interview method was used for recording the traditional knowledge of agricultural practices. The scientific rationale of traditional knowledge of agricultural practices to the revival of traditional approach of sustainable agriculture were verified by using available literature, Traditional Knowledge Digital Library-Council of Scientific and Industrial Research (TKDL-CSIR, India) and Subject experts, respectively. Various types of traditional knowledge of agricultural practices were recorded from respondent samples. Traditional knowledge of agricultural practices were classified into two groups, namely- crop production and livestock production. Traditional agricultural practices were verified on the basis of scientific rationale.

RESULTS AND DISCUSSION

There was 30 traditional knowledge of agricultural practices observed, keeping natural resource management under the Eastern Uttar Pradesh region of India of scientific rationale as indigenous technical knowledge. They were grouped into two categories of application, crop production and livestock production, and each have observed 15 traditional knowledge of agricultural practices, respectively. A list of traditional knowledge of agricultural practices keeping

natural resource management under Eastern Uttar Pradesh region of scientific rationale observed during the study are shown in table 1.

Bidahani (beushening) is a traditional method of rice planting practiced in Eastern India. It is the most effective traditional practice for weed management, denying the toxic hazards of herbicides. In Eastern Uttar Pradesh of India, the bidahani method of rice planting is practised in direct seeded low land rice crops over centuries. This practice involves, cross ploughing the young crops. The field is ploughing 5 to 6 weeks after sowing with indigenous plough in 8-10 cm standing water. The field ploughing is depending upon the density of weeds and crop stand, that would be once or twice followed by planking. The weeding is followed by ploughing and gaps are filled with the uprooted seedlings, followed by crop density thinned. bidahani facilitates increased grain yield through effective weed management and stimulated root growth with enhanced tillering. Sanda (dual transplanting) is also a traditional method of rice transplanting practised over centuries in Eastern Uttar Pradesh of India. It is most adopted method for transplanting rainfed rice cultivation to deny costly inputs of irrigation. The sanda method of rice transplanting is applied for 20-25 days old seedlings. The seedlings are densely transplanted in nearby area of the field first time and the second time, 40-45 days old seedlings are transplanted in water logged fields on the onset of monsoon. Sanda method of rice transplanting facilitates enhance rice yield through effective water management and weed management under uncertain weather conditions. Grain paraheating is a traditional method practiced over India. It is most adopted practice for storage insect pest management. The grain paraheating is a traditional method of grain storage practiced in Eastern Uttar Pradesh of India over centuries. This method applied fire heating of pulse grains for a short time. It kills the persistent stages of insect pests and harden the seed coat to deny boring the insect pests during storage. Straw

mulching is also a traditional method practised over the world. It is the most effective method for weed management keeping natural resource management in Eastern Uttar Pradesh. The straw mulching method is applied paddy straw in the vegetable field along the plants. It weakens the weeds germination by unable to get photosynthesis and also keeps soil moisture heat to protect frost bite of the crops. (Prasad, 1999; Singh et al., 2004; Dwivedi, 2015; Morya, 2016; Morya et al., 2016; & Mishra et al., 2020).

Surka (cooked liquid gruel) is a traditional method of diet management practised over centuries in Eastern Uttar Pradesh of India. It is the most effective practice for postpartum diet management. The surka method of diet applied by feeding lukewarm cooked liquid gruel of millets, wheat, barley and rice bran in equal proportions. To prevent constipation and uterus stress, postpartum animals are provided a light diet for 4-5 days at intervals of twice or thrice a day. In postpartum livestock. Surka

facilitates easy digestion and excretion to relax muscles, which got stressed during parturition. Jaggery-ginger-salt mixture is a traditional medicine practiced over Eastern India over centuries. It is the most successful traditional medicine applied for indigestion treatment keeping natural resource management. The Jaggery-ginger-salt mixture is a combination of jaggery (500 gm) with dried ginger powder (100 gm) and common salt (50 gm). To cure indigestion and appetite loss of livestock, this mixture was applied for 2-3 days at intervals of twice or thrice a day. Black pepper-butter oil mixture is also a traditional medicine practiced over Eastern India over centuries. It is most effective traditional medicine for pneumonia fever curing. The black-pepper butter oil mixture is a combination of black pepper powder (50 gm) and butter oil (100 gm). To cure pneumonia fever of livestock, this mixture was applied for 6-7 days at intervals of twice a day. (Banerjee, 1998; Singh et al., 2004; Morya, 2016; Morya et al., 2016; & Shubeena et al., 2018).

Table1. List of traditional agriculture keeping natural resource management

A. Crop Production			B. Livestock Production		
S.N.	Traditional Agriculture	Application	S.N.	Traditional Agriculture	Application
1.	Compost	Soil fertility	1.	Castor oil	Deworming treatment
2.	Green manure	Soil nitrogen fixation	2.	Mustard oil	Body heat management
3.	Cattle penning	Soil nutrient Management	3.	Bamboo leaves	Postpartum diet management
4.	Field Scarecrow	Vertebrate pest management	4.	Alcohol and Vinegar	Tympany healing management
5.	Smoke ripening	Fruit ripening management	5.	Turmeric-lime paste	Sprains healing management
6.	Straw mulching	Orchard weed management	6.	Margosa leaves decoction	Wounds dressing management
7.	Ash broadcasting	Orchard insect pest management	7.	Turmeric-mustard oil paste	Wound healing management
8.	Grain paraheating	Storage insect pest management	8.	Black pepper-butter oil mixture	Pneumonia fever management
9.	Summer ploughing	Soil moisture & Pest management	9.	Jaggery-ginger-salt mixture	Appetite loss management
10.	Bidahani (Beushening)	Weed & Tillering management	10.	Surka (Cooked liquid gruel)	Postpartum diet management
11.	Sanda (Dual transplanting)	Rice transplanting management	11.	Lime + Salt of ammonia	Mastitis & Pain management
12.	Seed soaking in common salt	Hard seed germination	12.	Sulphur + Arecanut seeds (<i>Areca catechu</i>) powder	Anthelmintic treatment
13.	Tobacco (<i>Nicotiana tabacum</i>) stems extract	Caterpillar management	13.	Babool (<i>Acacia arabica</i>) leaves decoction	Diarrhoea treatment
14.	Madar (<i>Calotropis gigantea</i>) leaves extract	Thrips management	14.	Chirata (<i>Swertia chirata</i>) roots decoction	Antipyretic treatment
15.	Mahua (<i>Madhuca indica</i>) dried flowers in the soil	Termite management	15.	Deodar (<i>Cedrus deodara</i>) twigs decoction	Acaricide treatment

CONCLUSION

To achieve the goal of sustainable agriculture, its an urgent need to revive traditional knowledge keeping natural resource management in agriculture. There are millions of traditional knowledges have been practised over world. Most are overlapping due to their

dynamic nature and are often modified by local farmers. There is several indigenous technical knowledge for sustainable agriculture have been verified and documented in India. There was 30 traditional knowledge of agricultural practices observed, keeping natural resource management under the

Eastern Uttar Pradesh region of India as indigenous technical knowledge. Bidhani (beushening), Sanda (dual transplanting), Grain paraheating and Straw mulching were confined most effective traditional knowledge in crop production; and Surka (cooked liquid gruel), Jaggery-ginger-salt mixture and Black pepper-butter oil mixture were confined most effective traditional knowledge in livestock production. These are the most popular traditional knowledge of scientific rationale practised in Eastern Uttar Pradesh of India over centuries.

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Conflict of Interest:

There is no such evidence of conflict of interest.

Author Contribution:

Both authors contributed equally to establishing the research and design experiment topic.

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