



## Revival of ITK for Sustainable Agriculture under Eastern Uttar Pradesh (India)

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**ABSTRACT:** A study was conducted on indigenous technical knowledge (ITK) for sustainable agriculture under Eastern Uttar Pradesh (India) for 3 consecutive years (2013-2015) to survey the revival of scientific traditional knowledge of agricultural practices for sustainable agricultural development. There were 20 ITKs observed for sustainable agriculture belonging to two groups, crop production and livestock production and each have observed 10 ITKs respectively. Survey was conducted as per methodology of international institute of rural reconstruction (IIRR, 1996) and modified as accessibility. Informal interview method was used for recording. The bidahani (beushening) and sanda (double transplanting) for rice cultivation and surka (cooked liquid gruel) for dairy husbandry are confined very local and traditional knowledge in Eastern Uttar Pradesh conditions.

**Key words:** ITK (Indigenous technical knowledge), Revival, Sustainable agriculture, Eastern Uttar Pradesh, India.

### I. INTRODUCTION

ITK refers for indigenous technical knowledge. The indigenous technical knowledge is also known as, indigenous knowledge, traditional knowledge and ancient knowledge etc. The indigenous technical knowledge is the localized knowledge, transmitted from generation to generations and time tested by local community to solve the particular problems taking cognizance of local factors. It is based on resource conservation to the betterment of next generations. This resource conservation attitude of indigenous technical knowledge foster the sustainability and sustainable agriculture is the urgent need to conserve the agricultural resources for next generations. Most of the agricultural resources are exploited by modern agricultural technologies without taking care of adaptability of local conditions and possible consequences [1]. The modern agricultural technologies like, monoculture causing rapid erosion of crops and livestock genetic diversity, natural soil fertility and pests outbreaks, while chemical inputs causing environmental pollution and chemical hazards and mechanization causing high cost of cultivation are confined, capital intensive agriculture and breakdown of social fabrics of rural communities [2]. Its urgent need to minimize this exploitation for safe hand over the agricultural resources to the next generations keeping healthy agriculture for wealthy nation. Obviously, the development of modern agricultural technologies, substantially increased the crops and livestock production, but gradually decreased the farms income due to heavy investment on costly external resources of uncertain future availability. The sustainable agriculture is the holistic approach of eco-

friendly agricultural technologies. The eco-friendly agricultural technologies can not be ignored the indigenous technical knowledge (ITK). The ITK in agriculture are organic in nature. They do not harm any agricultural resources and environment. It was built up on farmer's own knowledge generated over centuries, unlike modern technologies, which are exogenous. But unfortunately, the mad race for modernization of agriculture, the time tested indigenous technologies are fast getting scarce and improvised. To achieve the goal of sustainable agriculture, its urgent need to revive ITK in agriculture [3]. There are millions of traditional knowledge have been practiced over world. Most are overlapping due to its dynamic nature and often modified by local farmers. Some are based on beliefs and unscientific. Few have unique identity for specific community and country. There are numbers of ITKs for sustainable agriculture have been verified and documented in India [4-7]. The Uttar Pradesh is a agriculture prime state of India have 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 ITK for sustainable agriculture under Eastern Uttar Pradesh.

### II. MATERIALS AND METHODS

An extensive survey was conducted for scientific traditional knowledge of agricultural practices to the revival of ITK for sustainable agricultural development under Eastern Uttar Pradesh (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 districts. Survey was conducted as per methodology of international institute of rural reconstruction [8] and modified as accessibility. 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 ITK for

sustainable agriculture were verified by using available literature, traditional knowledge digital library (TKDL-CSIR, India) and Subject experts respectively.

### III. RESULTS AND DISCUSSION

There were 20 ITKs observed for sustainable agriculture under Eastern Uttar Pradesh belonging to two groups, crop production and livestock production and each have observed 10 ITKs respectively. A list of ITKs for sustainable agriculture observed during the study are shown in Table 1.

**Table 1: List of ITKs for sustainable agriculture observed during the study.**

Crop production		Livestock production	
ITK	Application	ITK	Application
1. Scarecrow	Vertebrate pest management	1. Vinegar	Tympany treatment
2. Cattle penning	Soil nutrient Management	2. Castor oil	Deworming treatment
3. Smoke ripening	Fruit ripening management	3. Mustard oil	Body heat management
4. Straw mulching	Orchard weed management	4. Bamboo leaves	Postpartum diet management
5. Ash broadcasting	Orchard insect pest management	5. Turmeric lime paste	Sprain healing management
6. Grain paraheating	Storage insect pest management	6. Margosa leaves decoction	Wounds dressing management
7. Summer ploughing	Soil moisture & Pest management	7. Turmeric mustard oil paste	Antiseptic ointment management
8. Farmyard manuring	Soil texture & nutrient management	8. Black pepper butter oil mixture	Pneumonia fever management
9. Bidahani (Beushening)	Weed & Enhance tillering management	9. Jaggery ginger salt mixture	Indigestion & Appetite loss management
10. Sanda (Double transplanting)	Water & Rainfed rice transplanting management	10. Surka (Cooked liquid gruel)	Postpartum & Stable diet management

#### A. Crop production

**1. Scarecrow.** The scarecrow is a very popular traditional method practiced over world. It is very effective practice for vertebrate pest management to deny lethal hazards to biotic diversity of the chemical methods. Scarecrows in Eastern Uttar Pradesh are made up of old mens clothing filled with grain sacks and straw tied with a pole painted earthen pot hang on pole and white plastic flag atop. When cloth and plastic flag swing in the wind, frighten the vertebrate pests like birds, blue bulls, wild boars, monkeys and other wild mammals [5-6].

**2. Cattle penning.** The cattle penning is a popular traditional method practiced over world. It is very successful practice for soil nutrient management to deny toxic hazards of fertilizers. Cattle penning in Eastern Uttar Pradesh is practiced by keeping the sheep herd overnight on the cultivated land, so that the dung and urine excreted can be directly absorbed by the soil. It is usually practiced in summer, when the land is free from crops [6].

**3. Smoke ripening.** The smoke ripening is a traditional method practiced over India. It is very successful

practice for fruit ripening management to deny toxic hazards of chemical ripening agents like, calcium carbide and ethrel. Smoke ripening of fruits in Eastern Uttar Pradesh is made up of desire capacity of ditch in the soil and close with a straw filled small earthen pot invertly with small back hole. Straw are fired to generate smoke inside the ditch, where unripen fruits are placed. Condensation of carbon dioxide inside the ditch, catalyst the pectinolytic enzyme activity in unripen fruits get ready for ripe.

**4. Straw mulching.** The straw mulching is a traditional method practiced over world. It is very successful practice for weed management to deny toxic hazards of pesticides. Straw mulching in Eastern Uttar Pradesh is practiced by keeping paddy straw in vegetable fields along the plants. It obstructs the sunlight to the weeds get unable to photosynthesis and subsequently weak and dead. Straw mulching is also keeping heat of soil moisture to protect frost bite of the crops [6].

**5. Ash broadcasting.** The ash broadcasting is a traditional method practiced over India. It is very effective practice for insect pests management to deny toxic hazards of pesticides.

Ash broadcasting in Eastern Uttar Pradesh is practiced by broadcasting farmyard burned ashes to the kitchen gardens. Ashes are broadcasted in the morning to stick with foliage moisture, obstruct the foliage feeder insect pests by successful biting, chewing and sucking the foliage. Ashes are also supplement the micro nutrients to the crops [9].

**6. Grain paraheating.** The grain paraheating is a traditional method practiced over India. It is very effective practice for storage insect pest management to deny chemical hazards of pesticides. Grain Paraheating in Eastern Uttar Pradesh is practiced by fire heating of pulse grains for short time. It kills the persistent stages of insect pests and harden the seed coat, get unable to bore the insect pests during storage [10].

**7. Summer ploughing.** The summer ploughing is a traditional method practiced over India. It is very effective practice for soil moisture conservation to deny costly inputs of irrigation. Summer ploughing in Eastern Uttar Pradesh is practiced by ploughing the fields in March-April( Summer season). It is checked the loss of soil moisture through dust mulching by minimizing evaporation and at the same time soil became more receptive to the further rainfall. Summer ploughing is also served the purpose of preparatory tillage and pest control [11-13].

**8. Farmyard manuring.** The farmyard manuring is a traditional method practiced over world. It is very successful practice for soil nutrient management to deny toxic hazards of fertilizers. Farmyard manuring in Eastern Uttar Pradesh is practiced by storing farmyard dung and wastes for manuring. Rotted farmyard manures applied to the field before cultivation. Well rotted farmyard manure enrich the humus in the soil and soil fertility. It enhance the soil compactability and water retention capacity.

**9. Bidahani (Beushening).** The bidahani (beushening) is a traditional method practiced over Eastern India. It is very effective practice for weed management deny toxic hazards of pesticides. Bidahani in Eastern Uttar Pradesh is practiced in direct seeded low land rice crops. This practice involves, cross ploughing the young crops, 5 to 6 weeks after sowing with light country plough in 8-10 cm standing water once or twice depending upon the density of weeds and crop stand, followed by planking, if there are too many weeds. Following this operation, the crop are weeded, thinned and the gaps are filled with the uprooted seedlings. Bidahani facilitates, increased grain yield through effective weed management and stimulated root growth with enhanced tillering.

**10. Sanda (Double transplanting).** The sanda (double transplanting) is a traditional method practiced localized to the Eastern Uttar Pradesh. It is very effective method for transplanting rainfed rice cultivation to deny costly inputs of irrigation. Sanda in Eastern Uttar Pradesh is practiced by 20-25 days old seedlings are densely transplanted in nearby area of the field. On the onset of monsoon, 40-45 days old seedlings are

transplanted in water logged fields. If nursery is not sufficient to cover the field, tillers may be separated and then again transplanted. Sanda facilitates stable rice yield under uncertain climatic conditions through effective water management and weed management.

#### *B. Livestock production*

**1. Vinegar.** The vinegar is a very popular traditional medicine practiced over India. It is very effective practice for tympany treatment in ruminants to deny costly inputs on synthetic drugs and side effects. Vinegar in Eastern Uttar Pradesh is practiced by feeding vinegar to the livestock. Tympany is an acute fatal ailment of ruminants, does not give enough time to a farmer for bringing a veterinarian for treatment. Vinegar acts as an antizymotic agent. Feeding 50 ml of vinegar for 2-3 days, twice or thrice a day, tympany in ruminants get cured [11].

**2. Castor oil.** The Castor oil is a traditional medicine practiced over India. It is very successful practice for deworming treatment in ruminants to deny costly inputs on synthetic drugs and side effects. Castor oil in Eastern Uttar Pradesh is practiced by feeding castor oil to the livestock. Worms are internal parasites of ruminants causing chronic weakness require regular dose of anthelmintic. Castor oil acts as strong laxative and remove parasites along with their eggs. Feeding 50 ml of castor oil for 2 days, twice a day every 3 months deworms the ruminants regularly.

**3. Mustard oil.** The mustard oil is a traditional medicine practiced over India. It is very successful practice for inducing body heat to dairy animals to deny costly inputs on treatment of cold stroke. Mustard oil in Eastern Uttar Pradesh is practiced by feeding mustard oil to the livestock. Mustard oil acts as stimulant to induce body heat. Feeding 20ml to new born calves and 50ml to milking animals for 2-3 times once a day at 15 days interval during winter months, to prevent cold stroke of livestock and mild laxative for calves to maintain good health [14].

**4. Bamboo leaves.** The bamboo leaves is a traditional diet practiced over Eastern India. It is very successful practice for postpartum management in dairy animals to deny costly inputs on synthetic drugs and side effects. Bamboo leaves in Eastern Uttar Pradesh is practiced by feeding tender bamboo leaves after parturition for light diet and placenta expulsion in cattle and buffaloes for 2-3 days. Sometimes, bamboo leaves applied with barley porridge.

**5. Turmeric lime paste.** The turmeric lime paste is a traditional medicine practice over India. It is very effective practice for livestock sprain management to deny costly inputs on synthetic drugs and side effects. Turmeric lime paste in Eastern Uttar Pradesh is practiced by poultice the affected parts with lukewarm cooked paste of turmeric powder (50gm) and lime(50gm) solution. It is applied for 4-5 days, once a day, sprains of livestock get cured [6].

**6. Margosa leaves decoction.** The margosa leaves decoction is a traditional medicine practiced over India. It is very successful practice for wound dressing to deny costly inputs on synthetic drugs and side effects. Margosa leaves decoction in Eastern Uttar Pradesh is practiced by dressing wounds by decoction of tender margosa leaves. It is also applied to body dressing for lice and ticks eradication from livestock due to its insecticidal and acaricidal properties of azadirachtin.

**7. Turmeric mustard oil paste.** The turmeric mustard oil paste is a traditional medicine practiced over India. It is very effective practice for antiseptic ointment to deny costly inputs on synthetic drugs and side effects. Turmeric mustard oil paste in Eastern Uttar Pradesh is practiced by ointment the affected parts with the paste of turmeric powder (50gm) and mustard oil(100ml) mixture. It is applied for 4-5 days, twice a day to heal burns, injuries and wounds of livestock, quickly [6].

**8. Black pepper butter oil mixture.** The black pepper butter oil mixture is a traditional medicine practiced over Eastern India. It is very successful practice for pneumonia fever to deny costly inputs on synthetic drugs and side effects. Black pepper butter oil mixture in Eastern Uttar Pradesh is practiced by feeding mixture of black pepper powder (50gm) and butter oil (100gm). It is applied for 6-7 days, twice a day, pneumonia fever of livestock get cured [15].

**9. Jaggery ginger salt mixture.** The jaggery ginger salt mixture is a traditional medicine practiced over Eastern India. It is very effective practice for indigestion treatment to deny costly inputs on synthetic drugs and side effects. Jaggery ginger salt mixture in Eastern Uttar Pradesh is practiced by feeding mixture of jaggery(500gm) with dried ginger powder(100gm) and common salt(50gm), 2-3 days, twice or thrice a day, indigestion and appetite loss of livestock get cured [6,9,11].

**10. Surka (Cooked liquid gruel).** The surka (cooked liquid gruel) is a traditional diet practiced localized to the Eastern Uttar Pradesh. It is very effective practice for postpartum diet management to deny costly inputs on synthetic drugs and side effects. Surka in Eastern Uttar Pradesh is practiced by feeding lukewarm cooked liquid gruel of millets, wheat, barley and rice bran in equal proportions. Postpartum animals require light diet to prevent constipation and uterus stress. Surka is fed for 4-5 days, twice or thrice a day, for light diet to involution of uterus and increasing milk flow. In postpartum livestock. Surka facilitates easy digestion and excretion to relax muscles, got stress during parturition [11].

## CONCLUSION

The present study concluded that, there were 20 ITKs observed for sustainable agriculture belonging to two groups, crop production and livestock production and

each have observed 10 ITKs respectively. The bidahani (beushening) and sanda (double transplanting) for rice cultivation and surka (cooked liquid gruel) for dairy husbandry confined very local and traditional knowledge. The bidahani system of rice cultivation is very localized to the Maharajanj and Kushinagr districts, whereas the sanda system of rice cultivation confined very localized to the Azamgarh and Mau districts. The surka, a kind of livestock diet confined very localized to the Basti and Santkabirnagar districts. Obviously, this study will be adding to improve the knowledge of revival of ITK for sustainable agriculture under Eastern Uttar Pradesh conditions.

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