To Study the Awareness and Adoption level among the Tharu Tribes towards Selected Indigenous Technical Knowledge (ITKs) for its cost Effectiveness

ABSTRACT

The frequent use of modern medicines for animal husbandry practices has reduced the usage of Indigenous Technical Knowledge (ITK) but still, they are often used first to treat various animal diseases. The objective of this research work was to level awareness and adoption level of selected Indigenous Technical Knowledge (ITK) among Tharu tribes in terms of reducing the production cost vis-à-vis increasing the overall production of their livestock. The investigation was carried out in the Tharuhat area of the West Champaran district, to explore the therapeutic uses of plants by local inhabitants. Information was gathered from traditional healers and livestock owners of Tharu Tribes, by using participant observation, open-ended conversations, and semi-structured questionnaires. Plants used as ethnoveterinary medicines were collected and identified by farmers of the study area (i.e., Tharuhat area) who had well knowledge about the use of indigenous practices in different areas of livestock rearing i.e., Breeding, Feeding, and Health care and its awareness. Documentation of traditional knowledge-related ethnoveterinary information and identification of potential species for prioritization of conservation through sustainable animal health care management is essential for the benefit of future generations. The present study contributed to the documentation of an inventory of ethnoveterinary medicinal plants, which might provide a better informative database for future scientific validation studies for the sake of animal health.

Keywords: ITKs, Awareness, Adoption, Tharu Tribes, Bihar, and Production cost.

INTRODUCTION

Indigenous technical knowledge (ITK) refers to the unique local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular geographic area (Grenier, 1998). India is a nation of Rishi, Muni, and Vaidhya. India has an extremely rich legacy of indigenous wellbeing security and a few treatment frameworks that have been utilized like Ayurveda, Unani, and Homeopathy for the two creatures just as people since the age of prehistoric and furthermore India has incredible decent variety and

fluctuation in characteristic, social, culture, segment, and strict viewpoints. These practices have been permeating starting with one age then onto the next by oral transmission and are viewed as the all-encompassing methodology for domesticated animals the executive's approaches are embraced by no literate societies. These assorted varieties and varieties give more hues to the nation's viewpoint. India involves the biggest number of ancestral populaces on the planets and Tharu clans are one of them, usually known as Tharu Adivasi. They live in the Tharuhat zone in the West Champaran region of Bihar and Krishi and creature cultivation has the fundamental wellspring of employment. A number of recent works also discuss in the use of plants as an ethnoveterinary medicine in the Indian subcontinent, but no studies are available in the Tharu Tribes of Bihar. Since no comprehensive and elite attempt has been made so far to survey the use of plants in ethnoveterinary practices in West Champaran District of Bihar, the present survey was undertaken to identify, collect and document the indigenous technical knowledge (ITK) or, medicinal plants and their utilization for primary health care of animals in West Champaran district of Bihar, India.

Materials and Methods

The current study was carried out in the West Champaran district of Bihar, India. Out of 18 blocks of West Champaran district, four blocks which were having substantially higher Tharu tribal populations namely, Bagha-2, Ramnagar, Gaunaha, and Mainatand were purposively selected for study-based on the demographic distribution of Tharu tribes. After selecting the block, a list of farmers who belong to Tharu tribes had at least one livestock animal, and practicing ITK was prepared from each block. From the list, 50 livestock owners which are known to use of ITKs and 25 traditional healers who were knowledgeable in ITKs in animal husbandry in surrounding Tharuhat areas were selected randomly with the help of local community leaders (Gumasta) and staff of veterinary hospitals and NGOs from each block. Thus, altogether 200 livestock owners and 100 traditional healers (300 respondents) were identified for the study. The data were collected in two phases using a pre-tested interview schedule. In the first phase, the researcher made informal visits to the selected blocks in the Tharuhat area. During these visits, the researcher has explored the general information about the understanding of the used indigenous technical knowledge (ITK) in animal husbandry like documentation of ITK. In 2nd phase, the researcher has explored the awareness of the most commonly used ITK among livestock owners in the Tharuhat area.

Results and Discussion

In the present study, ITKs were used in different areas for productive purposes of livestock rearing viz, Breeding, Feeding, and Health care. For improving the status of the resource-poor farmers, it is essential that the production and health care of the animals should improve continuously at a low cost that eventually helps to improve the socio-economic condition of livestock owners.

A. ITKs used by Tharus for Breeding Purposes

1. Mixture of Mung Sprouts and Wheat Sprouts

This ITK has mainly been practiced in cattle and buffalo in which 250-300 gms mung (*Vignaradiata*) sprouts and 400-500 gms wheat (*Triticumaestivum*) sprouts are fed to animals daily for 15 days to one month to induce heat and increase conception rate.

2. Boiled Grains of Methi

One kilogram of Methi (*Trigonellafoenum-graecum*) grains was boiled and fed on an empty stomach to animals for one week to induce heat.

3. Extracted Solution of Satawar Root Powder, Jaggery (Gur) and Ajwain

100-200 gms of satawar (*Asparagus racemosus*) root powder, 1 kg of jaggery (Gur), 100-200 gms of ajwain (*Trachyspermumammi*), are mixed and boiled in 5.0 liters of water. The extracted liquid is cooled and provided to the animal for the treatment of retention of the placenta (50-100 ml BID for 4-5 days).

4. Mixture of Unripe papaya, Bael, Satawar, and Methi

Unripe papaya 4-5 kg per adult animal is fed by cutting it into small pieces followed by feeding 100-150 gms mixture prepared from bael (*Aegle marmelos*), satawar (*Asparagus racemosus*), and methi (*Trigonellafoenum-graecum*) for treatment of retention of the placenta (ROP).

5. Leaves of Bamboo

Bamboo leaves (*Bambusaarundinacea*) about 4-5 kg were fed to animals for the expulsion of the placenta after parturition.

6. Paste of Haldi and Mustard oil

100-150 gms each of turmeric or haldi (*Curcuma longa*) powder and 100 gms mustard (*Brassica juncea*) oil mixed are fed to the animal in case of retention of placenta.

7. Paddy seed or Dhan

The animals were provided 1-2 kilogram of Paddy seed or dhan (Oryzasativa) which helps in the expulsion of the placenta.

Among all the above ITKs that are used for breeding practices like inducing heat and increasing conception rate in animals "mixture of mung sprouts and wheat sprouts" was most common among livestock farmers and in the treatment of retention of the placenta (ROP) "Extracted Solution of Satawar Root Powder, Jaggery (Gur) and Ajwain" was most common among farmers.

B. ITKs used by Tharus for Feeding Purposes

1. Mixture of Berseem, Maize, Bajra, and Til oil

One kg of Berseem (*Trifoliumalexandrinum*), 1/2 kg makka or maize (*Zea mays*), 1/2 kg bajra (*Pennisetumglaucum*), and 50 ml til oil (*Sesamum indicum*) was fed to the animal once a day. It was increased the milk yielding potential of animals.

2. Root of Satawar

The dairy animals were provided 200 gmssatawar (*Asparagus racemosus*) root 7-10 days a month to increase the milk yielding of animals. It also helps to improve uterine health.

3. Extract liquid of Bair leaves

Bair or Badar leaves (*Ziziphusmauritiana*) 400-500 gms were boiled and extract liquid is cooled and provided to the animal once a day for 10-15 days a month to increase milk production.

4. Mixture of Masoor and Mung dal, Satawar, and Sweet Saunf

Animals are fed equal proportions of a mixture of masoor (*Lens culinaris*) dal, mung (*Vigna radiate*) dal, satawar (*Asparagus racemosus*), and sweet saunf (*Foeniculumvulgare*) @50 gms mixed with 250 gms of gur (Jaggery) in empty stomach to increase milk production and general body health.

5. Leaves of Khajur or, Date palm

3-5 kg of leaves of khajur or Date palm (*Phoenix dactylofora*) were fed to animals. It increases the fat content of milk and milk production also.

6. Pieces of Ripe Banana

12-15 pieces of ripe kela or banana (*Musa acuminate*) was used as a galactagogue to improve the udder issues.

For increasing milk production and fat content most common ITK followed in the Tharuhat area was feeding of the "root of satawar" (*Asparagus racemosus*).

C. Most Commonly ITKs used by Tharus for Health Care Practices

1. Mixture of Jeera and Black Salt

50-60gm of jeera or, cumin (*Cuminumcynimum*) seed powder and 10 gm of black salt were mixed with 1 litre of water and given orally for 4-5 days in case of mild indigestion occurred during monsoon season.

2. Leaves of Amaltas

Leaves of amaltas or haedma (*Cassia occidentalis*) were grind boiled and the decoction was given to the animal to cure the indigestion problem.

3. Fleshy Leaves of Aloevera

5-10 piece of fleshy leaves of gheekumari or Aloe vera (*Aloe barbadensis miller*) was fed to an animal to cure anorexia and indigestion.

4. Tisi or, Flax Seed Oil

200-400 ml of Tisi or flax (*Linumusitatissimum*) seed oil was given to the animal in case of indigestion.

5. Mixture of Pudina, Leaves of Peepul, Ajwain, Salt and Karela

Pudina (*Menthaviridis*), leaves of peepul tree (*Ficusreligiosa*), Ajwain (*Trachyspermumammi*), salt and bitter gourd or karela (*Momordicacharantia*) each of 50 gms are ground and use to cure tympany and indigestion problem.

The most common ITK among livestock farmers for preventing indigestion in the study area was "Tisi or, Flax Seed Oil".

6. Leaves of Kadam and Molasses

1-2 kg of leaves of Kadam (*Neolamarckiacadamba*) along with molasses was fed to animals in case of constipation.

7. Mixture of Leaves of Kadam and Bark of Mango

1-2 kg of leaves of kadam (*Neolamarckiacadamba*) and 100-300 gms of bark of Mango (*Mangiferaindica*) tree are grinded and use to cure constipation.

8. Mixture of Ajwain, Hing, Til Cake, Amaltas Seeds and Black Salt

25-50gms each of Ajwain (*Trachyspermumammi*), Hing (*Asafoetida*), til cake, amaltas (*Cassia fistula*) seeds and Black salt are grinded, powdered and fed @ 50-100gms BID for 2 days to the animals in case of constipation.

9. Mixture of Desi Ghee and Concentrates

Desi ghee 50-100 gms mixed with concentrates was fed orally to the animals suffering from constipation.

10. Mixture of Isabgol Husk and Water or, Milk

250-300 gms of Isabgol (*Psyllium*) husk mixed in 1-2liters of lukewarm water or milk and fed to the animals in the treatment of constipation.

11. Mixture of Saumf and Wheat flour

100-200 gms of saumf (*Foeniculum vulgare*) was mixed in wheat flour and fed to animal once a day.

The most common ITK practiced by the livestock farmers in Tharuhat area for management of the constipation in animals was the use of "Tisi or, Flax Seed Oil".

12. Leaves of Gumma

Gumma leaves (*Leucasaspera*) 200-250 gms is used to control the diarrhoea and other related issues in animals.

13. Mixture of Unripe Bael Fruits and Leaf of Shisham

Unripe bael (*Aegle marmelos*) fruits mixed with fresh leaf of shisham (*Dalbergiasissoo*) was fed orally to the animals to cure the bloody diarrhoea or, dysentery in animals.

14. Plant of Doodle or, Asthma

200-500gms doodle or asthma plant (*Euphorbia hirta*) commonly called as 'Doodhkijadi' was fed to animals once a day to cure diarrhoea or, dysentery.

	
Image-1: Bair or Badar leaves (*Ziziphusmauritiana*)	Image-2 Date palm (*Phoenix dactylofora)*
	
Image-3 Pudina (*Menthaviridis*)	Image-4 Doodhi*(Euphorbia hirta)*

15. Ash of Datura fruits

Datura fruits (*Daturastramonium*) 100 gms burned in fire and ash is fed orally to the animal with a normal diet to cure diarrhoea or, dysentery.

16. Paste Prepared from Banana and Turmeric

Paste prepared from Banana (*Musa acuminata*) flower and turmeric (*Curcuma longa*) 250 gms were fed orally to the animal to control diarrhoea.

Among all the above ITKs that is used for the cure and treatment of diarrhoea or, dysentery in animal husbandry "mixture of unripe bael fruits and the leaf of shisham" was most commonly used by livestock farmers in the Tharuhat area.

17. Mixture of Hing and Ajwain

25-50 gms of each hing (*Asafoetida*) and ajwain (*Trachyspermumammi*) mixed and fed orally 50-60 gms twice daily to the animal in case of bloat as well as abdominal pain and discomfort.

18. Mixture of Aloevera, Ajwain, Kalajeera, and Kalanamak

250 gms of Gheekumari or Aloe vera *(Aloe barbadensis miller)* was given to animals. The outer layer of Aloe vera was peeled off and the remaining portion was roasted in the fire. To it, 200 gmsAjwain (*Trachyspermumammi*), 200 gms of kalajeera (*Cuminumcyminum*) and kala namak (Black salt) were and its mixture was fed to the animal once a day in case of bloat.

19. Leaves of Tulsi

Leaves of 'Tulsi' (*Ocimum sanctum*) 100 gms were given orally to the cattle to relievetympany or, bloat.

20. Mixture of Mattha, Blacksalt, Ban-Kundri, Water, and Mustard oil

1-2 liters of whey or mattha, 50-100 gms of black salt, 100-200 gm of kachri or, ban-kundri (*Cucumiscallosus*), 500-1000 ml of water, and 50-60 ml of mustard (*Brassica nigra*) oil is fed orally to control tympany and bloat.

The most common ITK practiced by the livestock farmers in Tharuhat area for management and care of tympany or, bloat "Mixture of Hing and Ajwain**".**

21. Paste prepared from Bark of Sahajan tree, Lime and Haldi

Paste prepared from equal part of the bark of moringa or, sahajan tree (*Moringaoleifera*), lime, and turmeric or, haldi (*Curcuma longa*) and it is heated and applied with external fixation to the animal.

22. Paste prepared from Mehdi leaves, Haldi, Harjora Leaves, and Cactus stems

A paste prepared from equal part of mehdi (*Lawsoniainermis*) leaves, turmeric or, haldi (*Curcuma longa*), harjora (*Cissampelosquadrangularicus*)leaves, and cactus (*Cactaceaejuss*) stems is applied, and support is provided by the bamboo stick (*Bambusaauriculata*) externally in the treatment of fracture or, sprain.

23. Paste prepared from Methi seeds and Til oil

Paste prepared from 200 gms of methi (*Trigonellafoenum-graecum*) seeds in 200 ml of til (*Sesamumindicum*) oil was applied in case of the sprain.

Among all the above ITKs that are used for cure and treatment of fracture or, sprain in animal husbandry "Paste prepared from Mehdi leaves, Haldi, Harjora Leaves and Cactus stem" was most commonly used by livestock farmers in the Tharuhat area.

Level of awareness about the most commonly used indigenous technical knowledge (ITK) in the Tharuhat area

This segment presents the degree of awareness of indigenous technical knowledge (ITK) for various animal husbandry practices among selected livestock owners of selected Tharuhat region i.e., (Bagaha-2, Ramnager, Mainatanr, and Gawnaha blocks) of Bihar. The degree of awareness was studied for the most commonly utilized five documented ITK's i.e, use of satawar root(*Asparagus racemosus*) for increasing milk production, Paste prepared from Mehdi leaves, Haldi, Harjora Leaves, and Cactus stems for fracture or, sprain, Mixture of Hing and Ajwain for bloat as well as abdominal pain, a mixture of unripe bael fruits and the leaf of shisham for diarrhoea or, dysentery and Tisi or, Flax Seed Oil for indigestion by the selected respondent in their animals for various animal husbandry practices.

Table 01: Awareness of most commonly used ITKs to reduce production cost and increase production of livestock in selected areas.

S.N.	Category	Blocks				
		Bagaha-2 (n=50)	**Ramnager (n=50)**	**Mainatanr (n=50)**	**Gawnaha (n=50)**	**Pooled value (N=200)**
1	Low (0-25%)	15 (30.00)	23 (46.00)	13 (26.00)	08 (16.00)	59 (29.50)
2	Medium (26-50%)	22 (44.00)	20 (40.00)	28 (56.00)	21 (42.00)	91 (45.50)
3	High (51-75%)	09 (18.00)	07 (14.00)	04 (08.00)	11 (22.00)	31 (15.50)
4	Very high (76-100%)	04 (08.00)	00 (00.00)	05 (10.00)	10 (20.00)	19 (09.50)

(Figures in parenthesis indicate percentage)

The table revealed that the maximum (46.00 percent) respondents of Ramnager block had a low level of awareness. Whereas in the blocks Bagaha-2, Mainatanr, and Gawnaha, the majority of the respondent i.e., 44.00 percent, 56.00 percent, and 42.00 percent respectively showed a medium level of awareness. It is very much distinguished that none of the respondent of the block Ramnager had a very high level of awareness of the most commonly used ITK practices.

The pooled value indicated that 45.50 percent of the respondents were in the medium category and only 09.50 percent of respondents had a very high level of awareness of the most commonly used ITK practices. This trend might be due to their low education level and due to the rearing of low-cost animals with lesser concuss towards their health issues.

Fig 01: In this figure distribution of Livestock owners according to their Awareness of the most commonly used indigenous technical knowledge (ITK) practices.

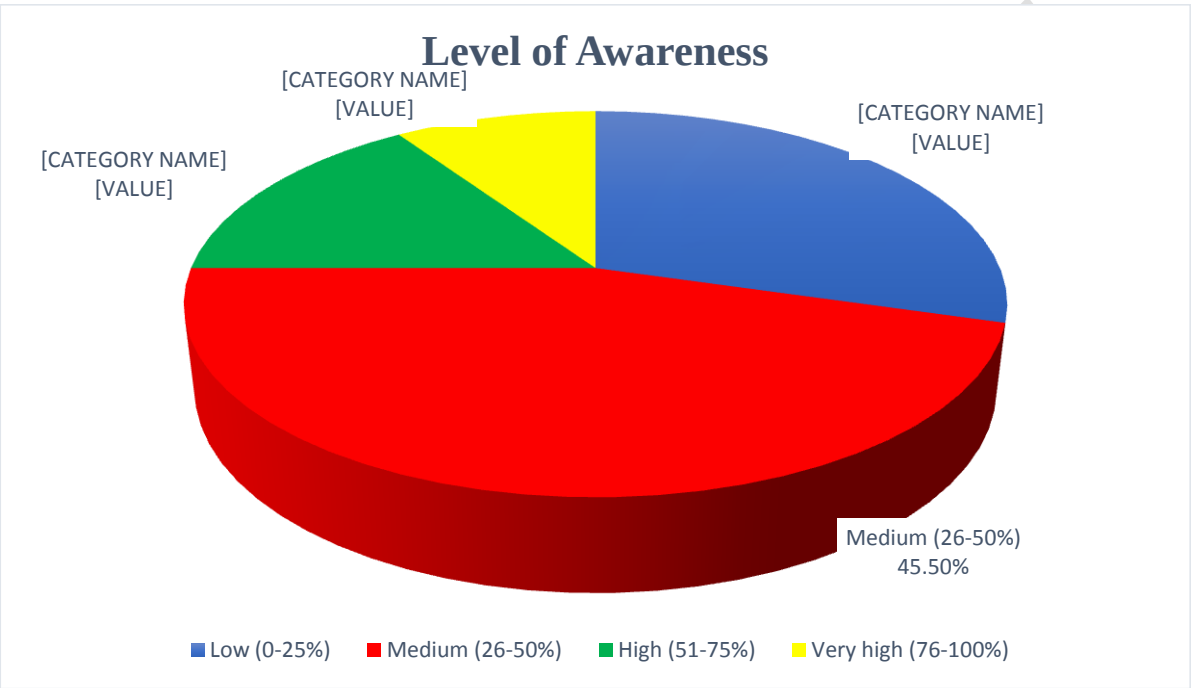


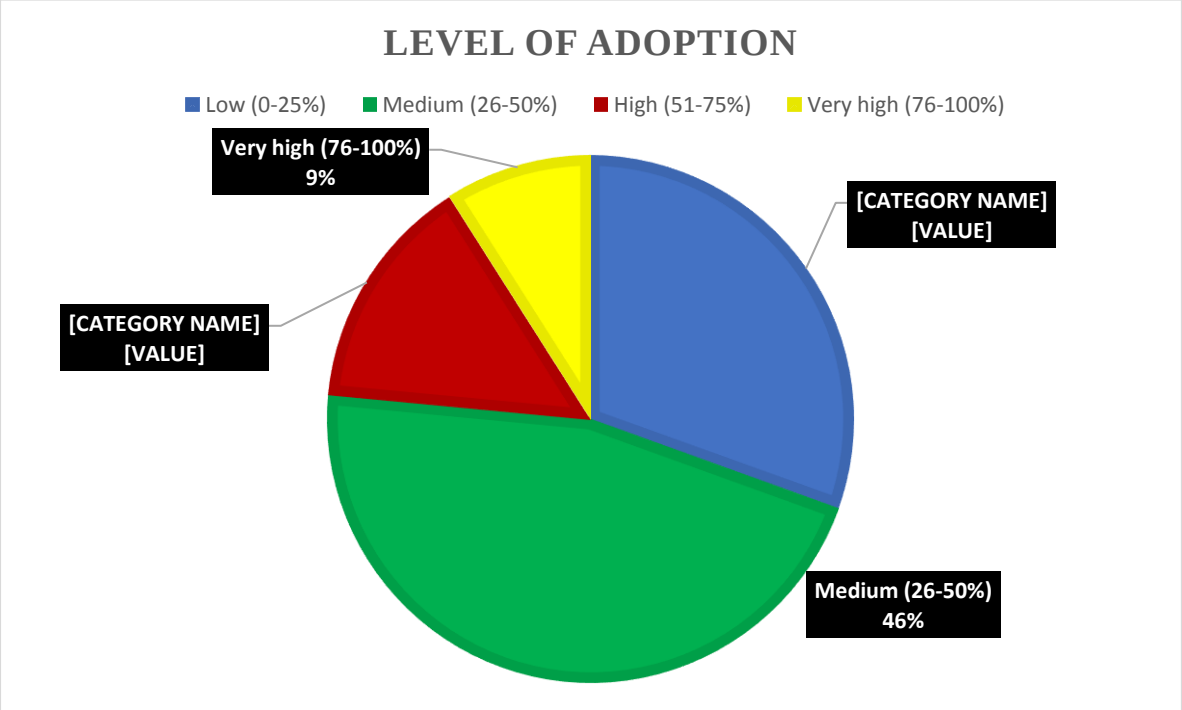
Table 02: Adoption of most commonly used ITKs to reduce the production cost and increase the production of livestock in the selected area.

S.N.	Category	Blocks				
		Bagaha-2	**Ramnager**	**Mainatanr**	**Gawnaha**	**Pooled value**
1	Low (0-25%)	14 (28.00)	22 (44.00)	15 (30.00)	10 (20.00)	61 (30.50)
2	Medium (26-50%)	24 (48.00)	20 (40.00)	27 (54.00)	21 (42.00)	92 (46.00)
3	High (51-75%)	10 (20.00)	08 (16.00)	03 (06.00)	08 (16.00)	29 (14.50)
4	Very high (76-100%)	02 (04.00)	00 (00.00)	05 (10.00)	11 (22.00)	18 (09.00)

(Figures in parenthesis indicate percentage)

The pooled data revealed that the majority (46.00 percent) of respondents showed a medium adoption level towards the most commonly used ITK practices of animal husbandry whereas only 09.00 percent of the respondents were having a very high level of adoption regarding the most common used ITK practices. This trend might be due to their low educational level and concuss towards animal's health conciseness in remote rural areas.

Fig 02: In this figure distribution of Livestock owners according to their Awareness of most commonly used indigenous technical knowledge (ITK) practices



Conclusion

The presence of a considerable number of ITKs in the area under research indicates the richness of the age antique expertise of the Tharuhat peoples. In spite of the presence of the lessor-availability of adequate veterinary facilities, Tharu tribespeople is still relying upon ITKs and treating their animals themselves because Tharu tribespeople mostly lives in the forest area. The Tharuhat peoples have to take lively components and create provisions for documentation and maintenance of this precious expertise. The need of the hour is to discover the medical purpose at the back of the documented ITKs in order that their benefit can be harvested at a massive scale. After documentation, the ITKs can be included with the

contemporary medical knowledge on the way to be useful to the farmers, scientists, environment, biodiversity, and the countrywide economy.

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