

Traditional Manuring Techniques for Sustainable Agriculture: A Study of Monpa Tribe of Tawang, Arunachal Pradesh

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ABSTRACT

Monpas have distinct traditional knowledge of manuring the agricultural land using varieties of locally available resources. Despite of having its own script, the traditional knowledge among Monpas has been passed on from generations through oral tradition. With the passing time and change in marketing system of agricultural crops, the traditional manuring techniques are given less importance resulting in unsustainable use of land resources and loss of indigenous knowledge. Therefore, the present study aims to document the indigenous knowledge system and the recent changes in manuring techniques among Monpa tribe of Tawang, Arunachal Pradesh. The present study has been carried out in Tawang District of Arunachal Pradesh having geographical area of 2,172 Sq. km. Multi-stage random sampling technique has been used. The study area has been divided into 5 (five) altitudinal zone and 30% of villages from each altitudinal zones have been selected randomly totalling to 45 villages. Open ended interview have been conducted with the farmers, village elders and resourceful persons to collect the information. This has been verified using observation and participatory approach. It has been observed that Monpas have been following sustainable agriculture practices by means of their traditional manuring knowledge. They have been highly using the dry leaves to prepare varieties of manures. However, the modernization has also penetrated among the Monpas, and vast changes in application of manures and tools have also been observed in the study area in past few decades. Therefore, blended application of traditional and modern techniques is hereby suggested for the sustainability of the land resources, and to increase the productivity of the crops.

Key words: *Monpa, Traditional knowledge, Manure, Sustainable, Agriculture.*

Introduction

Agriculture is the backbone of rural economic development has been practiced with different strategies since ancient time in India. The major challenge facing agriculture today is to feed a fast growing population without degrading the environment, further leads to increasing pressures on a fixed resource.

The concept of sustainable agricultural development has been observed in Indian tradition. It means that while achieving the needs of the present we

must not compromise the availability for future generations. Therefore, long-term agriculture sustainability is of equal importance to short-term economic gain. Sustainable agriculture gives equal weight to environmental conservation, social desirability, and economic concerns in agriculture. Therefore, it can be considered that any agricultural practice, machinery or technology that has these three basic qualities is a sustainable agricultural practice or technology.

The role of traditional knowledge in indigenous

land management is indisputable because of its better acceptability and sustainability in nature. It plays a very important role in economic, social and cultural development of society.

Monpa tribe inhabiting the western part of Arunachal Pradesh have distinct traditional knowledge system for livelihood and resource management like that of any other tribes of the state. Although the Monpas have its own script, but most of the traditional knowledge have been passing down from generations through oral tradition, festivals, socio-cultural and religious practices. The economy of Monpas is largely based on agriculture and animal rearing. Nanda, (1982) observed that the Monpas are so far the best and most sophisticated cultivators in Arunachal Pradesh, matched perhaps only by the Apatanis. The Monpas practice variety of cultivation techniques based upon the environmental condition of the area as a part of their livelihood and to sustenance. They use organic manures,

age old traditional agriculture tools and techniques for working in the fields however modern machineries like hand-held tractors are use very in some villages. Monpas have their own way of growing agricultural crops by maintaining the soil fertility using manures made up from locally available natural resources. However with the changing dynamics and occupation, the traditional land management techniques are given less importance resulting in unsustainable use of land resources and loss of indigenous knowledge. Therefore, the present study aims to document the indigenous knowledge system and the recent changes in land management system among Monpas of Tawang, Arunachal Pradesh.

Study Area

The study has been carried out in Tawang district of Arunachal Pradesh. The study area, i.e. 'Tawang' is the 16th administrative district of Arunachal Pradesh which was established on 6th October 1984 (District

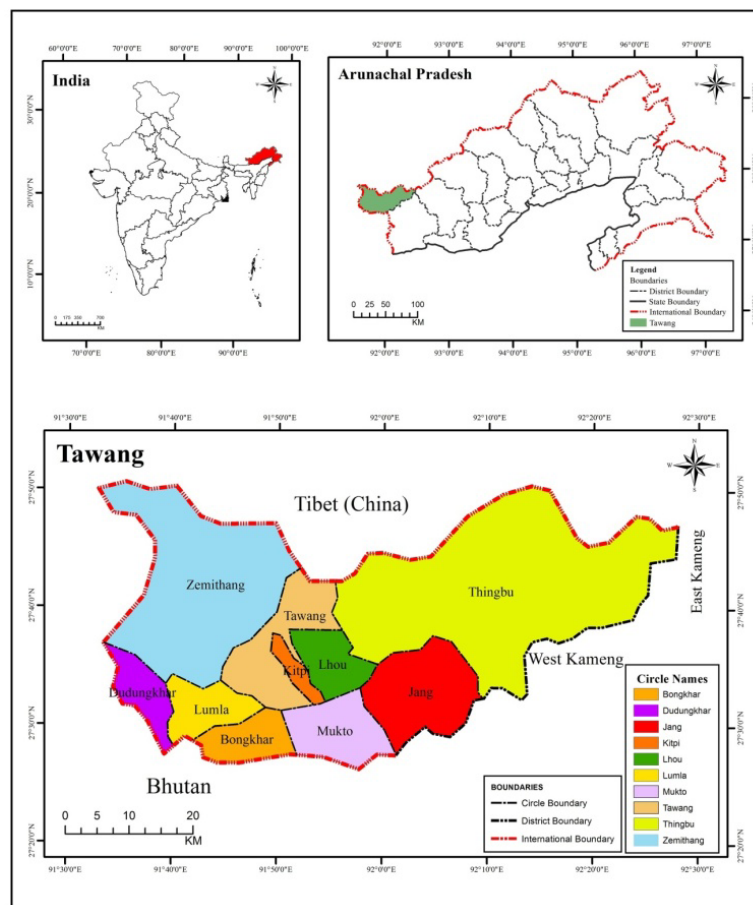


Fig. 1. Location Map of study area
Source: Generated using ArcGIS 10.3 software.

Statistical Handbook 2016-17) with its headquarters at Tawang town. Earlier the district was part of the West Kameng district. Tawang occupies an area of 2,172 sq. Km., the latitudes and longitudes extend between 27°29'N to 27°52'N and 91°33'E to 91°26'E.

The district is inhabited by Monpas, which is one of the major tribes of Arunachal Pradesh having their own social, cultural, and traditional practices. The study area spreads into 10 administrative circles having 219 villages including both urban and rural with 10,062 households. The total population of the district is 49,977 with 29,151 males and 20,826 females (District statistical handbook 2016-17).

Methodology

In order to have representative information over varied altitudes, the study area have been divided into 5 (five) altitudinal zones viz. Below 2000m, 2000 – 2500m, 2500 – 3000m, 3000 – 3500m and above

3500m using SRTM DEM in ArcGIS 10.3 and 20% of villages of the study area have been selected randomly from each altitudinal zones, totalling 45 villages (Table 1). The open ended interviews have been conducted with the farmers and village elders of the study area to gather information related to traditional practices. Further, various officials of Agriculture Department have been consulted to understand the various incentives given by the government and also to gather information related to various modern farming techniques being practiced in the study area.

Results and Discussion

The present study found that the Monpas have developed location specific indigenous strategy for organically manuring agriculture land using dry leaves, mostly of *paisheng* [*Quercus rex* (Hemsl.)], *ketsheng*, *rhosheng* (pine species, *Pinus wallichiana* A.

Table 1. Altitude-wise sample villages

Name of district	Altitudinal zones	Total number of villages (100%)	Number of villages surveyed (20%)
Tawang	Below 2000	65	13
	2000-2500	115	23
	2500-3000	24	5
	3000-3500	13	3
	Above 3500	2	1
Grand Total		219	45

Source: District statistical handbook 2016-17

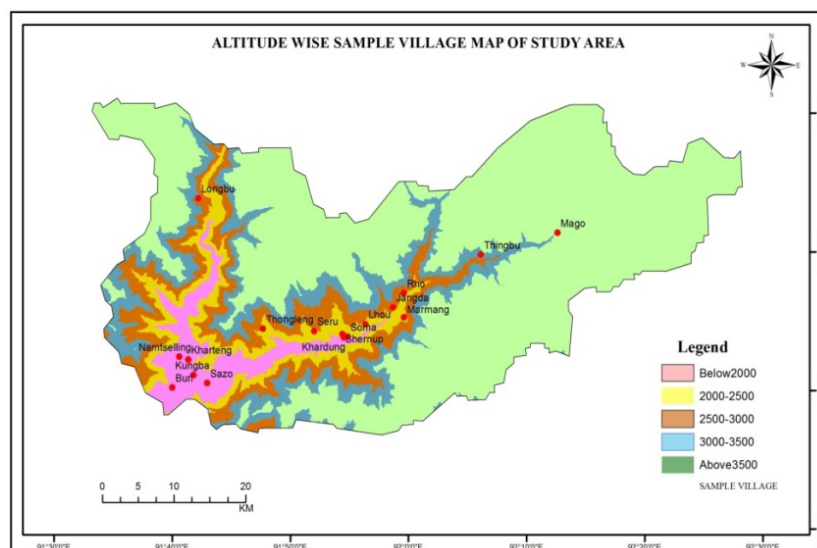


Fig. 2. Altitude wise sample villages map of study area.

Source: Generated using ArcGIS 10.3 software.

B. Jacks. and *Pinus roxburghii* Sarg.) etc. The women folk make a group called *cep-lakpar* to collect dry leaves from the forest mostly during late winter season. They store the collected dry leaves in local hut known as *cep-khem* or in the leeward side or shade to avoid drive away by the wind, which are used from time to time in the agricultural field.

The present study recorded following types of traditional manures prepared by Monpas:

***Sikang-shii* (Pig manure)**

The Monpas prepare organic manure using pig in a traditional hut called *Sikang*. It is a double storied traditional hut (*Sikang*), attached with individual house or located at a few meters distance from the house which serves dual purpose of preparing of traditional manure and also use as toilet. The first storey is used for storing dry leaves collected from forest and the same space is used by human for the excretory purpose. Here the leaves are used instead of water to drain and cover the excreta and related odours which goes in lower story. These human faeces were mix with dry leaves by the Pig. The decomposition takes around 2 – 3 months, and the manure so formed is called as *Sikang-shii* (Fig. 3a) which is then used in the agricultural field by spreading over the unit of land.



Fig. 3. Traditional Manures

Photo by: Yontan

***Baa-shii/Glang-shii* (Cow manure)**

The *Baa-shii/Glang-shii* are made with the help of dry leaves which are laid in the floor of the cow shed (*Baa-brang*), over which cows are being kept at night time to accumulate the dung as well as to shelter them. The leaves and cow excreta decompose and form the organic manure in about 40-60 days which is locally called as *Baa-shii / Glang-shii* (Fig. 3b). This manure is used before ploughing the agriculture field and helps in enhancing the soil fertility.

***Yeng-shii* (Sheep manure)**

The excreta of sheep are collected and directly use as manure in nursery, vegetable garden etc. Further, the sheep are also kept in the rainfed agriculture crop field during winter (night) for 1-2 weeks to increase its fertility. During winter the shepherds (*Lukpons*) come down near the villages to graze their sheep's mainly because of two reasons due to cold weather and unavailability of pasture in higher altitudes.

***Saah* (decomposed leaves)**

The Monpas collect the dry leaves and keep it on the hill shade to avoid the direction of the wind for a year or more. Over the time, these leaves turn into humus or decompose, called *Saah* (Fig.3c) which are then applied in the nursery and vegetable garden. It not only increases the soil fertility but also helps in increasing soil depth and moisture retaining capacity.

***Blaah* (Ash)**

Tawang being located in the higher altitude with cold climate, the local people uses firewood to keep them warm. The ash so formed is called as *Blaah* which are then used for various purposes. The main application of *Blaah* is to control pest attacks on crops and to increase the survival rate of the crops.

***Panh* (agricultural waste/dry weeds)**

While preparing the agriculture land units, the fields are cleared by collecting the remaining mulch of straws of last crop harvested, cutting the grass of periphery and plucking the unwanted weeds. These are then burned before ploughing the soil and the ashes are spread in agriculture field to increase the productivity of soil. They also believe that the burning of straws, grass and unwanted weeds on agriculture field helps in controlling the weed growth.

Conclusion

The Monpas in study area practice traditional method of subsistence farming by using locally available raw materials. The most important source of raw material for organic manure was dry leaves and excretes of human & animal. However, as a result of modernization and government schemes, traditional agriculture system in study area has been influenced with modern techniques of farming in the last few years. The traditional method of cultivation using organic manures is being replaced by the use of chemical fertilizers, pesticides, weedicides to some extent etc. The farmers are dependent on use of modern chemicals and farm machineries which requires less labour and increases its agriculture productivity. Although, such practice have increased the productivity and farmers' income, but in the long run, the use of chemicals have many irreversible effects on the environment and human health.

Lifestyle changes, in particular, have hampered the transmission of knowledge from elders to the younger generation (Singh, 2004). Preserving traditional knowledge will also contribute to the cultural (Posey, 1999) and political goals of self-identity, self-reliance and self-governance by creating a strong, ongoing appreciation within the community of its history and its roots. In recent years, interest in Indigenous knowledge has greatly decreased. While most of the elder people want to preserve, protect and continue to develop their traditional knowledge system and to share it among young generations. The younger generations are busy with day to day activities of modern world.

Conflict of Interest: None

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