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The Indigenous Methods Of Irrigation And Water Management In The Sedentary Terrace Paddy Fields: The Tangkhul Naga Tribe

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Abstract

This article gives an in-depth understanding of the indigenous tribal method of water management and irrigation system practiced by Tangkhul Nagas. The Tangkhuls inhabit a region in the world that receives heavy rainfall between the months of May to September but due to the topography, the rainwater runs off through the numerous streams and rivers. Agriculture being the main occupation and rice cultivation as the main food crop, this tribal community has adapted well with the environment and has developed an efficient water management system to ensure adequate and timely water supply to the terrace rice fields. Their cultivation methods exhibit that the rice farms require the minimum supply of water, or the rainwater is efficiently channeled into the fields from the mountain slopes and the nearby streams. Once water is channeled into the top terrace, it is efficiently distributed to the lower terraces and the neighboring terrace fields.

Keywords Dikes, monsoon, terrace, jhum, water management, embankments

Introduction

Tangkhul tribe is one of the largest sub-tribes of the Naga tribe inhabiting the Patkai hills range in Manipur. They occupy Ukhrul and Kamjong districts of Manipur and the Somrā track of Myanmar. Their history is shrouded in mystery as there was no written history due to the absence of script. The rich culture and traditions have been passed down orally through folksongs and folklores. It is only with the arrival of Rev. William Pettigrew and the introduction of Western Education and script that research and documentation has been done. Every effort has been made to retrieve, revive, preserve, and protect the forgotten traditions and of what remains after tremendous socio-economic, political and religious changes.

They live a simple agrarian life depending much on agriculture and forest products. Their main occupation and livelihood had been agriculture. The main methods of farming of the Tangkhuls have been Jhum cultivation and Sedentary terrace cultivation from time immemorial. They are very skillful in Jhum cultivation and transforming mountain slopes into beautiful terraces for cultivation of rice.

They are also known for weaving exotic traditional shawls and wraparounds. In the bygone days, Tangkhuls produced cotton to produce handloom products. Every Tangkhul girl is expected to learn the art of weaving in the girl's dormitory and every boy is expected to learn the art of war, basket weaving, history, handicraft skills etc. in the boy's dormitory. The traditional costumes are known for their bright red and black color and beautiful designs. They are weaved using simple tools

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and traditional looms. The art and skill of handicrafts and handloom, pottery etc. are practically taught by the parents and the elders in the dormitory as every family is expected to produce their own for self-consumption. Of course, there are villages or areas that specializes in the production of certain goods such a weaving is mainly by villages such as Hunphun, Ngainga, Tuinem, Somdal, Kachai etc., Pottery by Longpi village, cane baskets and tables by villages from the south, and salt by villages that own salt wells. Every village is self-sufficient, and the main source of livelihood and employment is Agriculture.

Methods of rice cultivation

The Tangkhuls are well known for their skills and traditional knowledge of various agricultural practices. They observe natural and bio-indicators and predict natural phenomena. These indicators are significant to the tribal community in the absence of modern technology. They cultivate different varieties of food crops for self-consumption such as pulses, cabbage, yam, potatoes, chilly, Mustard leaves, corn, cucumber, pumpkin etc. but the staple food is rice. Tangkhuls have two main methods of cultivation, namely, Shifting and Sedentary cultivation depending on the availability of land and water resources.

Shifting Cultivation

Shifting (Kaphunglui/Ahanglui/Khayailui) cultivation is one of the major methods of cultivation. An ideally selected area is cleared of the forest, burnt, and cultivated. This method of cultivation does not require much water but timely rainfall. Rice is the main crop that is cultivated but other necessary crops are also cultivated simultaneously. The area is abundant after a few seasons and a new spot would be selected again with the help of various traditional rituals such as boiling egg, axe or big knife cut and attached to a tree etc.

Sedentary Terrace cultivation

The sedentary or permanent method of cultivation is also widely practiced by the Tangkhuls. They are known as earth movers for carving beautiful terraces off the mountain slopes or in the valley wherever it is possible. The terraces are of different sizes and shapes depending on the topography. In the creation of terraces, the main considerations are the availability and the possibility of water drainage and soil stability. There are two major types of terraces cultivation;

1. Wet (Chihui) fields
   These are paddy fields mostly in the river valley where there is perennial water supply from the river. It could also be a few terraces in the hill or mountain slopes that have natural perennial springs. These are fields that have water throughout the year and are more fertile and productive. The owners of these fields are rich and economically better off than the rest of the villagers. Its owners' pride and neighbors' envy.
2. Terrace (Akāng) fields
   These are dry permanent terrace paddy fields on the hill slopes that largely depend on monsoon for water supply. They are owned by the commoners or poorer sections of society. They are supposedly less productive, and cultivation is later than the wet fields. The water supply to these terraces is mostly from the run-off water from the mountain slopes during monsoon season or from the swollen streams where the farmers have built dikes to collect water. The water from the slopes or the streams is then channeled to the fields through the canals dug by the farmer or a group of farmers.

Monsoon

Agricultural activities are dependent on the mercy of the timely arrival and sufficient rainfall. The fields at the riverbanks or have access to the perennial river water do not depend on monsoon and are more fertile and productive. Farmers who own such fields are economically stable and rich. The sole source of water to the terrace field on the hill slopes is the monsoon. The Tangkhul territory receives good rainfall and so the terrace fields "Akanglui" are cultivated at the onset of monsoon. The rainwater is carefully channeled into the paddy field from the hill slopes through a systematic network of canals called "rayai". With the onset of good monsoon, there will be numerous springs of water called "ngakharakhavao". It is the springs of rainwater absorbed into the ground, but this is an important source of water in the terrace system. Failure of such springs is an indication that the rainfall has been scanty and insufficient indicating poor harvest.

Irrigational methods and Water management

Knowing the importance of water and scarcity of water, Tangkhuls have developed a very elaborate traditional system of water management and irrigation system. The system is to ensure sufficient and timely water to the terrace fields. It is a system in which the rainwater is directed into the paddy fields through networks of canals on the mountain slope and also building dikes in the streams to collect water and direct it to the nearest field. Various traditional indigenous methods are used to control the volume of water inflow to the fields to prevent it from flooding and causing landslide of the field dikes.

A. Dikes

There are two types of traditional indigenous Dikes to collect, channel and managethe water into the terrace paddy fields:

1. Dikes across the nearby stream and rivers:

During the dry "Kānrei" season when the water level in the streams and rivers is low, farmers build strong dikes called "Raka" across the streams using seasoned pine logs and stones. The side of the dike is lined "AngachāngNgareisang" with oak leaves to channel the water flow. The dams or dikes collect the water, which is then channeled through the canal "Rashong" into the nearest, preferably to the terrace field at the top or most strategic location. From there, water is managed into the subsequent terrace through an opening called "ratak".

There is a mechanism to control the excessive inflow of water from the river or stream into the canal and the field by blocking it with a stone. Another mechanism to control the inflow of water into the paddy field is digging a canal across or around the field called "rayai".

The fields that have access to a perennial supply of water through such supply are more productive and desirable as it is not dependent on the mercy of monsoon. There is another dike on every terrace called "Tankui", it not only Ensures the collection of water in the terrace but also the quantity of water at different periods. These dikes on the terrace are also used as the pathway to access different parts and sections of the field and as an area to grow various necessary horticultural crops such as pulses, cucumber, soya, etc.

2. Tankui

The is a raised mud dike on every terrace to prevent the water from flowing out freely. It is also used as a footpath for farmers to walk across the fields. The farmers also use these dykes to grow lentils, millet, cucumber, soya beans, etc.

B. Irrigational canals and water distribution

1. **Rashongra**

   This is the networks of irrigational canals, natural and manmade that channeled the rainwater and water from the river dams to the desired terrace. The runoff rainwater in the mountain slopes is carefully studied and small necessary canals are dug to direct the path of the flow to the fields. There is one main canal that runs around or across the terrace fields to manage the flow of water into the desired terrace. Dikes and canals are always built and dug in the interest of all the neighboring fields. In case canals are not possible to be dug, bamboo is used for irrigation.

2. **Rayai**

   These are the small manmade drainage or canals on the hillslopes to drain the runoff rainwater may be channeled to or away from the paddy fields. These are necessary for the terrace fields that have little access to the perennial rivers and streams for water supply. Rayai also refers to the manmade drains around the paddy fields to control the volume of water inflow in the fields and to distribute the water to various terraces.

3. **Ratak**

   Every terrace has water outlet in the dyke. The outlet is strategically located at the lowest point of the dyke to let excess water flow into the next terrace. Normally each terrace has one outlet but some of the terraces have more than one outlet depending on length and size of the terrace. Each dyke is blocked with a bamboo net to prevent the escape of fish. The excess water from the higher terrace flows into the lower terrace regardless of ownership. If the next terrace or owner does not require water, it is released into the 'Rayai', which eventually flows off into the hillslope.

C. Water Management in the field

The success of the traditional practice of rice cultivation among the Tangkhul greatly depends on the availability of sufficient water at the right time regardless of the nature of the field. The arrival of monsoon on time and normal rainfall is therefore very critical. There are many traditional ways of predicting rainfall such as snowfall, bird nesting etc. Once the conditions are favorable, the canals are checked and prepared and with the onset of monsoon, water is drained into the fields for ploughing. The ground is broken and softened, and the young paddy is transplanted in the terrace filled with 2 - 4 inches of water. This level of water is maintained through the next few months until the grains ripen and turn golden. As the grains ripen and the later rain falls, the water level slowly drains out 2 – 3 weeks before harvest. The water must be drained out dry to help the grains ripen properly if not the grains will fail ripen.

It is an indigenous method of water management from one terrace to another. Once sufficient water flows into the field from the mountain slope canal or the river canal, the excess water is then directed into the next terrace through an opening in the terrace dike called "Ratak". The Ratak is a small opening usually at one end of the terrace. Mud is used to block the outflow, which is removed when water is to be released. Normally, the Ratak always has some piece of basket or sticks to prevent the escape of fish from the terrace while the outflow of water is still possible. This process of sharing water continues into the neighbor's field.

Indigenous Dams "Raka"

This is one of the indigenous methods of the Tangkhul tribe that clearly exhibits how advance the tribe is when it comes to farming and adapting to the topography and the climatic conditions. It is

method of creating a water reservoir by building dams across the streams using the available resources. This dams or "Raka" serves two major purposes

1. To collect water in the streams and prevent rain water run-off.
2. To provide water to the farms through canals along the hillslopes.

It is constructed using only logs. At a strategic location, large logs are laid across the river or stream held together by small logs in between the large logs. Then three long large logs from the dam are laid into the stream. These logs are held to the ground by smaller wooden sticks known as "Karhui"nailed into the ground. The purpose of the three logson the inside is to hold and not a support from behind the embankment, two on the sides and one in the middle of the stream and these logs are to hold dam in place. Holes are drilled in the logs and wooden sticks known as "Karhui" are nailed through it deep into the bed of the river to hold. This clearly indicates the knowledge and understanding of the people ofcreating embankment against the force of flowing water and create irrigational facilities.On normal conditions these embankments are strong enough to withstand the force of the flow of water.This structure is critical to supply water to the terrace farms during the rainy season and in some low-lying areas perennially. This great indigenous knowledge and skill on dam construction is relevant to the landscape and needs to be preserved.

Conclusions

Times have changed in many dimensions and we live in a very dynamic world but that does not mean that the indigenous knowledge and skills are to be discarded and forgotten. It needs to be reminded that the practices that has sustained the community for centuries surely cannot become irrelevant in decades. Effort must be made to preserved the practices with necessary modifications to adapt to the environmental and technological changes. The traditional indigenous methods and modern methods can successfully co-existto manage the important and scarce resources, especially water. With the environmental degradation, deforestation, climatic changes and its adverse impact on the pattern of rainfall, farming has become very challenging. In such narratives, indigenous methods are practically applicable while modern knowledge and technology are critical for sustainable development.Improvising the indigenous water management and irrigational facilities will not only sustain the traditional agricultural activities but also increase production and productivity

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