

## Folk knowledge of natural phenomena by some ethnic groups in Northern mountainous area

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**Abstract:** *Vietnamese ethnic minorities in general and the ones in Northern mountainous area in particular like Hmông, Dao, Tày, Nùng, Thái... are the population living by long-time cultivation agriculture. Weather and time are important factors that impact on effectivity and productivity of crops. So people have accumulated rich experiences to cope with natural phenomena. From generation to generation, these experiences were completed and verified by practices, helping the farmers understand the laws of weather that impact on crops by the cycle of one year or maybe several years in order to deal properly in service of agricultural production. These experiences and knowledge will be clarified as below.*

**Keywords:** Folk knowledge, Weather, Climate, Northern mountain ethnic group.

Indigenous knowledge, local knowledge, or traditional knowledge, are knowledge system that people of a community have accumulated and developed based on experiences, and that have been verified by practices and often change to adapt themselves to socio-cultural environment. In Vietnam, ethnic minorities in general and the ones in Northern mountainous area in particular like Hmông, Dao, Tày, Nùng, Thái, Khơ Mú... are the population living by long-time cultivation agriculture. By experiences accumulated through generations, the Vietnamese ethnic minorities have understood the laws of

weather that might impact on crops by the cycle of one year or maybe several years in order to deal properly in service of agricultural production.

It is just why local knowledge are not like scientific knowledge. They essentially have been formulated mainly by accumulated trials and not by scientific and systematic experiments (Lê Trọng Cúc, Kathllen Gillogy, A. Terry Rambo, 1990: 12). These knowledge of forecasting natural phenomena have existed and developed essentially through memory and oral way, through sayings, idioms, proverbs and practical labour of the farmers. They are just

experiences of people that have been long-time accumulated and practised in order to adapt and change natural and social environment, in service of people and community.

### **I. Folk knowledge of forecasting weather and climate**

#### *1. Making knowledge by botanic system*

In experience of Dao people, only by seeing the wild banana leaf we can forecast rain or drought. When it is drought, if the new sprouting leaf of banana in the forest breaks at the end, then it is the signal that it is to rain.

In some localities, Dao people have the habit to forecast the weather by examining the abrasin leaf, including the wild abrasin leaf. If the abrasin leaf changes its colour into white, it is the signal of coming prolonged drought.

Hmông people think that, in spring, if the peach, pear, plum fully flower, then there will be good crop. Otherwise, if the flowers are sporadic (flowering from top down, ones flowering early, the others late), then the crop will be poor due to much rain.

In Thai people's opinion, if the bachang mango (*mã muôm*) give much fruits, then in that year there will be high rain and storm, and when the fruits are ripe there will be the moment of typhoon (that is the typhoon of May or June).

Mường people also think that when the bachang mango give much fruits, then in that year there will be much big storms. If in the beginning of year, the wasps make nest at lower places (at the foots of tree, the brushes), then there will be great typhoons. This was verified as exact in 1986, 2005, 2013.

Otherwise, in perception of natural changes, people base themselves not only on the system of plants but also on the combination of changes of features in animals and other natural phenomena, thence proposing the rather exact predictions for weather and climate.

#### *2. Making knowledge by animal system*

Dao people also base themselves on the features of animals to predict the weather. They have the habit to observe the beehive to predict the weather of the year. From January to April, if the bees make nest at lower brushes, then in that year there will be big storms and rains that harm the productivity of crops. If in March - the month of tiger - or April - the month of cat - there are many white butterflies flying at stream, in the road or around the house, then there will surely be drought from one to two months.

In the year, if the *nọ còng quét* (a species of forest bird having slightly black colour) often cry at morning and evening in spring and summer in flying up to mountain, then there will surely be the sunny time. And in the sunny time, if these birds fly down from the mountain, then it will rain. This species of bird forecasts quite exactly the weather, so the Dao people in several localities call them the rain calling bird (*nọ txìng bjúng*).

Hmông people believe that in the rainy season or in autumn, if the ants around the house move the nest (bringing the eggs together), then it is the signal that there will rain several days long, especially if the ants at the stream move the nest, then there will be big flood. At the streams, rivers or fields that have many living crabs, if the crabs crawl out on the roads

for forest, then there will be high rains and floods, because the crabs run to evade the flood in order not to be swept away by the flood waters.

Khơ Mú people make also forecasts of coming weather phenomena in short time such as rain, flood and drought. For example, in a long sunny time, if the deer cry or yellow ants move the nest, then it is the signal that the rain and flood are to come soon. Annually, in March and April (by Khơ Mú calendar), when the white butterflies much appear flying along the dry streams, it is the signal for the prolonged drought.

Thái people in the North-West region can foresee the weather based on the actions of insects: the cry of locusts signals the shift from sunny to rainy time; the ants climbing on the high place signal the rain.

Tày and Nùng peoples also base themselves on animal features to forecast the weather like that:

- Muntjacs cry that signals the sun;
- Deer cry that means the rain.

According to above predictions, population know the rainfall or storm level in the year. Although they are not absolutely exact, but they help considerably with planning the production and protection of animals and crops (Phạm Quang Hoan, Hùng Đình Quý, 1999: 331).

### *3. Making knowledges by other natural manifestations*

Previously, when there were not information of national weather forecast, periodically in the last day of year, Dao people have the custom of putting a bottle of stream water for forecasting the rain. They first weigh the water bottle, then put it near the wall under the ancestor altar. In

the first day of the new year, they put again the bottle on the scale, if it weighs as the same as in previous day, then it means that in the new year the rainfall will be as the same as in the last year, if the bottle weighs more, the rainfall of the new year will be higher and vice versa.

To verify the results of predictions by weighing stream water, people also count the dates from the first to 12<sup>th</sup>. In these 12 days, if the dragon day is on the first and second day, especially the first one, then in the new year it will be high rain; the dragon day is between the third and fifth, it will be normal rain, sufficiently for agricultural production; and if the dragon days are between the 6<sup>th</sup> and 12<sup>th</sup>, then there will be lower rain and the agricultural producers must have the plan of making ditches to cope with possible drought for saving crops (Phạm Quang Hoan, Hùng Đình Quý, 1999: 330).

By the experiences of generations, Hmông people base themselves only on the wind direction to forecast the weather. For example, the wind blowing from the South to the North signals the big sun, otherwise in the inverse direction it will be rain.

At the beginning of summer, if there are long hot days (before sub-chronic flooding about two months) when the white cloud suddenly goes down to surround the sun and the black cloud comes quickly, Khơ Mú people hurry to tidy up their things because it will be the whirlwind accompanied by hail.

The folk experiences of Tày and Nùng population in forecasting weather by the changes of natural phenomena are also very rich, being expressed by such idioms as follows:

Fire burning tripod means the sun (*fây máy kiềng fạ đét*).

Fire licking pan signals the rain (*fây máy héc fạ phân*).

Meanwhile Hmông people remark on cloud: Close cloud means soon rain, Far cloud means late rain...

In some local places, Thái people even forecast the weather by the changes of the ring made from the thunder-sword. If the ring is shiny, it will be rainy or cloudy; and when the ring turns into dark brown, it signals the sun coming.

## II. Predicting crops by system of agricultural calendar of Vietnamese ethnic minorities

In livelihood, all ethnic groups have a calendar, whether “agricultural calendar” or “trade calendar” or “fishery calendar”. Each calendar expresses the level of awareness, the way of discovery and the most reasonable approach of people to nature in order to exist.

### 1. System of agricultural calendar for production of food crops

As for Dao people, their knowledges of forecasting crops are also very rich. Their experiences say that from the late month of tiger (March) to early month of dragon (May), if we hear the cry of a forest bird like the hawk (*kéng ca lắc*), then there will be the warm time that is suitable for cultivation of maize and other cereals. Wild spinach (*xâu dòng phẫng*) flowering red signals the warm time and it is time to cultivate early rice. The chicken bowel tree (*chang cang pen*) flowering the first time means the time to cultivate early rice, flowering the second time signals the cultivation of winter rice, the third time of flowering will be too late for any

cultivation of rice. The cry of forest cicada (*kênh nhoi*) signals the cultivation season of winter mountain and water rice (Hoàng Hữu Bình, 1998: 167).

Hmông people also have the experiences in forecasting the weather based on bissextile in service of agricultural production. For example, in the bissextile year there is usually long-time sun, more lasting than in normal year, so the crop must be delayed one month. If the dew-berry tree (*txir plâuux đắngx*) begins to give flower-buds, or the banyan tree begins to drop leaves for three days, then it is good time to sow rice.

Experiences of Tày, Nùng peoples in forecasting the weather based on phenomena and features of plants are very rich too, helping the people to deal appropriately with agricultural production:

- “Flowers of abrasin drop, the maize goes down to soil”.

- “Oleaster fruits become red, the ditches must be repaired”.

- “*Baccaurea* fruits become as purple as ripe, it is time to cultivate rice”.

The work of farmers is usually related closely to winter solstice. “*Tung cây xo, co tình pò tý đậy; Tung cây nhì, co tấu tì tú dai*”. (That is if the winter solstice comes at the beginning of month, then in the next year the time will be favourable for the crops; and if it comes at the end of month, in the next year there will be high drought, the crops will be lost.)

Thái people also draw the experiences in crops from generations, based on natural phenomena such as:

When banyan fruits ripe, it’s time to sow rice; when bishop wood fruits ripe, it’s time to cultivate rice in the fields (*mák hay súc ván cả mák há súc đăm na*).

According to Khơ Mú calendar, after drizzling rain from the beginning to the middle of June, the cry of *pipero* (a species of brown and small as a fist bird) signals the good time to sow the early maize; if until the end of June, the bird named *tà* cries when the sowing is not finished, then the cultivated maize will not give the harvest. In early August, when the *ka ra vang* (a species of bird that is bigger than cicada and having red plumage, eager for ripe fruits) cries intermittently, then it is time to hurry to harvest the maize and to make field for sowing bean. When the *man rơ* tree flowers (its flowers are red like the silk cotton tree), then it is good time to cultivate the early rice (Institute for Ethnology, 1999: 316).

Hmông people also have many experiences in production based on observing natural phenomena. During year time, when plum flowers flourish, it is not the time to sow the maize, because if we sow it too early, the maize will wither due to the big sun. But if the plum fruits are as big as little finger, then it is late to sow the maize, if still being cultivated in that time, the maize will slowly grow, meeting much rain and will make flat grains. It is best time to cultivate maize when the plum fruits are as big as seed corn, then the maize will fast and vigorously grow, giving firm grains.

As for the mountain ethnic groups who live essentially by mountain field cultivation, their solutions for crops must be suitable to natural conditions. They have a particular agricultural calendar, a most preeminent one for themselves in order to maintain the life by their labour through a closed maize monoculture, and other economic activities are only auxiliary.

## 2. Counting time and defining the seasons of ethnic groups

Besides cultivation, the other activities such as cattle-breeding, poultry-farming, weave, gathering forest products and hunting are the production that bring the not small income for household economic life. But these production are always conditioned by weather seasons in the populated area. Usually our Vietnamese weather is divided into clear two seasons: the rainy season and the dry season. But in the North, the two seasons are characterized also by the cold dry season and the hot rainy season. The dry season lasts from the end of October to April, and the rainy season lasts from the end of May to October by lunar calendar, meanwhile the floods usually happen in June and July. The early rains from the middle of April to the beginning of May are the most propitious moment for cultivation of cereal seeds. When the rice and maize are one or two months old, then there will be many high rains. Now the crops are more stably resistant. This is enough to see that the husbandry is fully dependent on specific nature, weather and climate of each area. Other work like cultivating maize and bean, reaping, harvesting, first rice-eating ceremony,... are all dependent on weather cycle. However, to divide reasonably time for the work in each season of year, one needs more two other factors such as the system of number counting and understanding of universe. Calendar was born firstly due to the needs of production, and next it is to facilitate the activities and life, so calendar itself reflects vividly the production affairs, the social life and traditional rituals of communities.

System of counting the time intervals like date, month, year, season by Khơ Mú calendar always conforms to certain rule. This rule is based on the natural cycles, the movement of sun and moon in the starry sky that men observe from the earth. Although these weather factors are conditioned by the sun, but they are impacted not less by the moon. Khơ Mú calendar is a lunar one, dividing the year into 12 months, the month into 30 days. In comparison with other lunar calendars, the Khơ Mú calendar is sooner two months, but later four months than the Thai calendar (Institute for Ethnology, 1999: 306-307).

Season	Kinh calendar	Thái calendar	Khơ Mú calendar
Spring	January	July	March
	February	August	April
	March	September	May
Summer	April	October	June
	May	November	July
	June	December	August
Autumn	July	January	September
	August	February	October
	September	March	November
Winter	October	April	December
	November	May	January
	December	June	February

Understanding and conception of Khơ Mú people about the universe are manifested by their astronomic knowledges of counting month time. While other calendars count the seasons according to weather cycles and natural phenomena based on the movement of the sun, the Khơ Mú calendar counts the

month time according to the movement and influence of the moon. Based on observation of changing cycle of the moon, Khơ Mú people divide a month into three intervals: *mông khuron*, *mông phênh* and *mông loách* (new moon, full moon and declining moon). *Mông khuron* begins from the first date to 13<sup>th</sup>, it is the interval of rising moon. In that time, the trees that have the itching agent produce itching resin more than in other time of month. According to experiences of people, in the beginning days of month, we should avoid harvesting the vegetable leaves and tubers, the soft plants, the taros, the wild taros... *Mông phênh* begins from the 14<sup>th</sup> to 16<sup>th</sup> of month, this is the fullest and most shining moon. In this interval, the trees produce less itching resin than in *mông khuron* days. *Mông loách* is the interval between 17<sup>th</sup> date to 30<sup>th</sup> when the moon is declining, the trees that have itching agent begin to produce increasing itching resin.

Like Khơ Mú calendar, Thái calendar is also based on natural phenomena and weather manifestations in order to divide the conventional time that changes only in three months in a year. Thái people think that the changes of universe are repeated after 12 cycles of moon, that is after 354 days (for normal year) and 355 days (for bissextile). Besides the production affairs, the understanding of weather and seasons is also associated with the New Year festival and other important festivities in a year. If counting from the beginning to the end of year, the order of seasons by Thái calendar is as follows: autumn, winter, spring, summer (Institute for Ethnology, 1977: 488).

Thus, seasons are important question that interests people very much. Because the

season question is related to the adjustment of adequate crops according to weather in the year in order to have good harvest. Weather in mountains and valleys has less storms and floods than in the deltas at lowland, but it often has whirlwind with hail which harms not less the crops and harvest. Therefore, in bissextile by lunar calendar, Tày and Nùng peoples pay much attention to adjustment of cultivation schedule in order to avoid the changeable weather which could harm the crops. In technique and season of traditional wet rice cultivation, Tày and Nùng peoples have a generalized saying: “first is time, second is skill”. This means that, in traditional agricultural production, technique and season are two factors associated with each other, if paying attention only to technique and having not experiences in seasons, then the loss of harvest would be possible. “*Buon slam ván chá, buon há đăm nà*” (Sowing rice seeds in March, cultivating rice in May). The principal rice season often is cultivated in late summer and early autumn, being cultivated in dry season as auxiliary crop is winter rice. At winter solstice, the cultivated rice often is the glutinous rice, but by then there is still very cold, unsuitable to rice seeds, so only the water enough fields could allow winter crop.

### *3. Identifying the good and bad days and the taboos related to agricultural production*

In conception of Dao people, bissextile is a bad year, in which there often happen unfavourablenesses, harvest being often lost or livestock being diseased, people being sick... Like Kinh people, Dao

people count date, month and year by 60 years cycle, consisting of 10 celestial stems and 12 terrestrial branches, taking the mouse as symbol of the first branch (some population takes the tiger as first symbol. Among 12 hours, 12 days and 12 months, people identify the good and bad hours, days, and months. As for the counting way, in the case of independence of their fate, people can base themselves on the celestial stem and terrestrial branch of date, month and year with symbol animal to find the good or bad hour, day or month. For example, to identify the good month in a year, first of all one must look up to know the symbol animal of this year, and then find the month with the name as the same name of year, so this month is the best one. To identify the good days in a month, one must know its symbol animal name and then look up the symbol animal names of those days that have the same name of month to identify them as good days. Those days that have the animal name conflicting with the animal name of month are the bad days. For example, January is the month of tiger, so the tiger days of the month are good days, besides that, the chicken days are good days too, because chickens live on the trees and have wings to fly, not conflicting with tiger for foods and not fighting with each other; and the dog days are bad days because dog conflicts with tiger and chicken. February is the month of cat, so the cat days of month are good days, and chicken days are bad days... With this identifying way, one can easy find the good hours in a day if knowing the name of the first hour and find the good days in a year.

In conception of Hmông people, in March, when hearing the first thunder, they abstain from sowing rice seeds. They think that in the day having the first thunder of year it will make fire to burn everything, so sowing and cultivating in this day will be completely lost.

The calendar of Black Thái (or Tai Dam) in the North-West region is based on the changes of moon, a changing cycle of moon means a month. The first date of month is a day with the new moon, the end of month is the day with no moon (*bờn đấ*). This counting way existed long ago, because Thái people have folk-songs about full moon and crescent moon.

The ancient writings and folk-songs that Thái people use to denote weather and climate are as follows:

In January it rains unceasingly (*Bờn Chiềng phồn liú li*);

In February it rains here and not there (*Bờn Nhi ti phồn ti báu*);

In March water comes fully in river (*Bờn Xàm nặm dàm ta*);

In April water scarcely runs in ditches (*Bờn Xi nặm hí kôn*);

In May rain gives goodbye to the reed (*Bờn Hả phồn xắng lău*);

In June thunder makes ice-cold (*Bờn Hóc phạ lắng lạnh kỡm nào*);

In July wind whirls and blows in (*Bờn Chết lổm chệt lổm chu*);

In August it is cold and dry (*Bờn Pét đét lạnh hương lổm òn*);

In September weather is dull with cold wind (*Bờn Kẩu phạ xẩu hương mốn mùa*);

In October the “píp” flowers flourish in forest (*Bờn Xíp bók píp hua nău đờng*);

In November it rains with flood (*Bờn Xíp ết nặm nờng*);

In December water inundates the land (*Bờn Xíp xờng nặm mả*).

(Mr Điều Văn Minh of Thái people in Mường Giàng commune, Quỳnh Nhai district, Sơn La province, collected and provided these information to the author).

By observing the natural phenomena and plants around, Thái people have the most classic way of making calendar. This is the most ancient basis for people now to make calendar in service of their life. Calendar and other cultural values of Black Thái in the North-West region make up the identity of an ethnic group that is worth respecting and preservation.

### III. Conclusions

Way of forecasting the weather and seasons by ethnic minorities is accumulated from generation to generation. In service of production and life, now the ethnic population know to associate folk knowledges with scientific knowledges related to forecasting the weather. They observe the natural phenomena and consult the weather and season bulletin on media in order to make the life adaptable to complicated changes of natural mountain environment.

The creation of calendar and agricultural calendar expresses the understanding of universe, astronomy, natural phenomena, weather and climate. The scientists have demonstrated that calendar is born due first to the request of agricultural production. Like some East-Asian countries, Vietnam often uses the lunar calendar that in certain writings is called traditional calendar. This calendar is almost identified with 12 animal designation, or it is called stem and branch calendar. This calendar is also popular with Tày, Nùng, Thái, Khơ mú...peoples long

before and they still use it to observe the astronomic and weather phenomena, to plan the seasons for cultivation, to identify the date and month for doing the important events of community, of family or even of every individual □

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