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IRRIGATION SYSTEM AND RELIGIOUS INTERPRETATION OF THE LOCAL ENVIRONMENT AMONG THE HANIS IN YUNNAN

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Pascal BOUCHERY

It is generally acknowledged that the ways societies give shape to their environments by transforming them materially are, to a large extent, the products of cultural preconceptions. Reconsidering this particular aspect of the dichotomy between "material culture" and "symbolism", the purpose of this article is to examine the validity of the converse proposition, i.e. the process by which a specific shaping of the environment impacts on the way this environment is culturally constructed. I argue that, in the particular case of the Hani society of Yunnan, the cosmological conceptualization of the local environment is grounded in a practical experience of wet rice agriculture and the management of irrigation. The principles on which the irrigation system is based provide a conceptual framework facilitating various analogical transfers from which each village community constructs a religious interpretation of the surrounding landscape.

The Hanis, who number about a million and a half, are mountain-dwellers speaking languages of the Tibeto-Burman family. They are scattered over a wide mountainous area along the Southwestern frontier of China stretching from Southern Yunnan as far as the foothills bordering the upper Chaophraya basin in Thailand, and from Kengtung State in Myanmar to Lai Chau Province in Vietnam. Groups living in the Ailao Range flanking the southern bank of the Red River (called *Honghe* in

Chinese) in Yunnan have carved an impressive landscape of staggered rice-terraces along the slopes of their mountains, on a scale that can be compared to other elaborate systems of waterworks and farming devices in Nepal, the Central Cordillera of Luzon in the Philippines, or the island of Bali. Ancient Chinese sources such as the *Book of Southern Barbarians (Manshu)*, a geographical report written at the end of the Tang era, suggest that rice-terrace agriculture in this area may date as far back as the 8th century.¹ That possibly makes the rice cropping system, which the ethnic minorities of central Yunnan practise, one of the oldest forms of terraced agriculture in the world.²

A few empirical studies have been carried out on the Hanis' rice-cropping technology (BOUCHERY, 1996; HUANG 2000; LI 2000; LI and CHEN 2000; MAO 1991; WANG 1999), the most recent one being Adachi SHIMPEI's interesting presentation of the agro-ecological aspects (2007). However, few studies have yet attempted to establish a link between terraced-rice cultivation and the Hani

¹ More detailed information appears in written chronicles of the Ming era, with a description of irrigation channel construction and the method of opening new terraced field.

² It is still unclear whether the Hanis brought their terracing system along with them when they first moved into the area coming from the northern bank of the Red River, or whether it was later developed *in situ*. Representatives of the Halo group in central Yuanyang, whose ancestors certainly were among the first settlers to rely on terraced cultivation in the Ailao range, say that their ancestors only grow dry crops at the time of their arrival in the region, and that terraces were absent. Interestingly enough, no mention is made of rice in the first part of their epic poem *Aphö tsopo-po* recounting their ancestral migrations. In *Numa-ame*, the original mythical settlement, they are said to have cultivated maize (*tsedu*), millet (*tseçi*), sorghum (*sulo*) and buckwheat (*hwale*), all species which are more specific of northern Yunnan and western Sichuan where most probably the Hani originated. Millet in particular (*Panicum* ssp.) was of great importance in central Yuanyang prior to the introduction of maize. According to the same oral tradition rice was grown by the Hanis before they settled in the Ailao range, and rice-terraces were first introduced in an unidentified site called *Rero*. Halo informants estimate that terracing first took place in their region at the time of their ancestor *Sumodzo*, from whom they can count 44 generations. Ancient bronze ware has also been discovered which depicts the ploughing techniques and folk customs of the local inhabitants. Whatever credit can be accorded to the oral tradition, it is likely that the Hanis' terracing system is at least a thousand years old.

system of beliefs, although in the case of the neighbouring Yis of Yuanyang, who also rely on the same mode of subsistence, FORMOSO (2006) has shown that the terrace and the terraced landscape are significant symbols used as traditional motifs on the women costumes.

A brief presentation of the traditional rice-cropping system is necessary here in order to provide the basis for understanding the nature of its relationship with the religious interpretation of landscape. The Hani terms appearing in the text pertain to the language spoken by the Halo subgroup which is spoken around the Yuanyang township of the Honghe Autonomous Prefecture; they differ significantly from those reported by SHIMPEI (2007) from Shalatuo Township area which are of unidentified origin.

The rice-cropping system

The Hanis' agricultural system is one of mixed farming including management of pond-field cultivation of rice, swidden cultivation of rice and maize, multiple cropping of domesticated plants and raising of livestock. Despite the number of cultivated species³, as well as the fact that wet and dry farming is closely associated everywhere, primary economic and cultural focus is on paddy. On the slopes of the Ailao range wet rice is almost exclusively cultivated in terraced pond-fields, and similarly all terraced irrigated parcels are primarily devoted to paddy cultivation. Save for rice, the Hanis of Honghe never grow in their pond-fields anything other than Taro (*Colocasia esculenta*) , Arrowhead (*Sagittaria*

³ A rapid survey of cultivated plants in Yuanyang in areas ranging from 800 to 1,500 m in altitude indicates that as many as 150 different species (most of them traditional) are locally cultivated in terraced irrigated parcels, dry fields (terraced or not), swiddens, gardens or surrounding forests. In addition, several cultural varieties have been developed for the major plant species.

sagitifolia) and Water dropwort (*Oenanthe javanica*), never in pure stands but always associated with paddy. The lack of sources of water as well as poor soils locally account for the absence of terraced cultivation in some areas of the Ailao range, as for instance in Laomeng circle of Yuanyang District. But wherever clayey soils are available in large quantities and the area is rather densely populated -as in the mountain range bordering the southern bank of the Red River in Honghe, Yuanyang and Jinping districts- most of the space is devoted to terraced paddy-fields and farmers attention primarily focuses on inundated terraced parcels and the various waterworks involved. There may be as many as 200 graduated levels and 3,000 terraces on a single slope.⁴

Rice (*Oryza sativa*) is by far the most important of all cultigens, followed by soya and maize. Paddy is cultivated in pond-fields up to 2,000 m. Double-cropping is possible below 800 m, but the location of the vast majority of Hani terraced fields between 1,200 and 1,600 m rather makes the entire region a single cropping area. Among the ten varieties of rice annually grown in terraced-pond-fields of one village of Shencun administrative circle, eight are traditional and belong to the temperate race of *O. sativa* L. var. *Japonica* (*keng* in chinese) characterized by round grain, while about one third of varieties are glutinous (*honyao*).⁵

⁴ At first sight the impressive size of the terraced landscapes in the Ailao Mountains may give a casual observer the impression that the Hani farmer possesses vast surfaces of land and that rice is abundant everywhere. This is not the case, for in central Yuanyang a household of five people manages an average joint holding of 0,25 ha of cultivated land (5 to 8 parcels), out of which 75 or 80 per cent are specifically devoted to paddy cultivation. Yields most often ranging from 2 to 5 t./ha, combined with the fact that a single annual cropping is only possible in most areas, often permit the members of one household to be self-sufficient in rice for only nine months of the year. For the three remaining months, selling vegetables and eggs at the markets of Yuanyang township or off season employment outside the village had become a necessity in 1995, as well as the only way for supplying farmers with a little cash.

⁵ All the traditional non glutinous varieties grown in central Yuanyang District produce grains with a red pedicarp.

The terrace

The terraced field (*shade, desha*) is the basic element of cultivated landscapes in the Ailao Mountains. The Hani irrigated terrace consists of a portion of soil (*habe*) comprising a flat inundated enclosure (*çlaodao*), a low retaining dike or bund (*sha-gogae*), two dike walls simply called "walls" (*dabosi*) uphill and downhill, sometimes reinforced by stones, a shallow cut (*öhae, hetü*) into a dike to allow the inflow of water, another cut (*çlokhae*) into the retaining dike to remove the excess water and a drainage conduit used to dry up the field if necessary or to prevent an overflowing of spillways after storms. The level enclosure, the dike and the adjacent dike wall altogether form a unit in terms of ownership.

Repairs and new constructions of terraces usually take place in winter during the dry season. Slope terracing may proceed either upward or downward, depending on the natural inclination of the slope and soil quality. The most common soils found in the Ailao Mountains are yellow or brown clayey soils originating from metamorphic rock formed in the Paleozoic Era.⁶ The steeper the slope, the more multiple cuts are needed in its surface. Ideally a new terraced field should be built up only over an old one -i. e. one in which the soil has already become hard and compact. For this reason and also in order to enrich the soil with nitrogen, the Hanis of Yuanyang cultivate dry crops in their new terraces for the first three or five years before filling them with water, mainly maize (*tsedu*) and soya (*nüçi*), either associated or alternated. Yields are very low during this period compared to the sum of work involved for the construction itself. In the past, in order to strengthen the stability of terraces, wooden logs were sometimes planted horizontally into the ground at each extremity of one parcel and later covered in earth. This

⁶ *Yuanyang Xianchi Bianxe Weiyuanhui*, 1990: 44. See also Adachi SHIMPEI, 2007: 174.

practice has now died out as a result of both deforestation and government restrictions.

At the time of the construction of a new terrace no rough gravel fill is laid at the bottom of the parcel to provide for drainage. In most areas, once inundated the parcel should ideally remain under water permanently, otherwise soil hardness is said to limit the growth of plant roots. On the other hand, a soil constantly kept under water becomes silty and unadapted to ploughing or harrowing by water buffalo. The problem is solved either by a periodical removal of all water from the pond-field or by filling the bottom layer every year at the time the field is made with a mixture of tree branches and sand.

Traditionally, the soil is enriched only by using animal (*dzekhü*) and green manure. In Yuanyang, chemical fertilizers are still hardly used, partly because of their cost and partly because natural manure once spread in the field is said to benefit the soil longer, usually for 2 or 3 years. Green manure consists mostly of paddy stalks and soya grown in and around the pond-field, left in place after the harvest and later buried in the ground. For this reason a long and narrow parcel is highly valued, for the soya plants cultivated on the enclosure dike supplies more natural fertilizers than a large round shaped pond-field. Animal manure is mixed with water and then carried and distributed over the inundated terraces, not directly but through an irrigation channel from a place located above the first field to be enriched.

Agricultural equipment

The tools used by Hanis for centuries for "carving" their slopes and farming their mountainous territory are remarkably simple: hoes, ploughs without wheels, harrow, levelling rakes, sickles and metal wedges. Tools specifically linked with wet-field terraced agriculture chiefly include the hoe (*tsae*,

tsö), the plough (*nyuchae*) and the wooden harrow (*nyuka*), the last two being pulled by a water buffalo. Each parcel is ploughed and harrowed three to five times every year. The hoe (*tsu*, as in Yunnanese) is the universal basic tool for building and repairing terraces. The Hanis of Yuanyang use two main types of steel or iron flat-bladed hoes, one in paddy-fields with a concave edge and another with a straight edge in dry fields. Hoes serve for all types of work: digging, earth packing and smoothing, cutting clods, ploughing the corners of fields, water sluicing as well as weeding. Levelling down and smoothing the surface layer are done with a large wooden flat rake. Stones are extracted from the paddy-field with a pick axe (*yankhan*), while boulders are dug out with metal wedges used as levers (*sodu*), then split and broken into pieces with a hammer (*djipu*) and later used to consolidate the dike walls. Two types of long-bladed sickles (*ye*) are used, one (*yehu*) for weeding and paddy reaping, another smooth edge type (*yema*) is of everyday use to cut vegetables in gardens and at home. All-purposes billhooks are also found in large quantities.

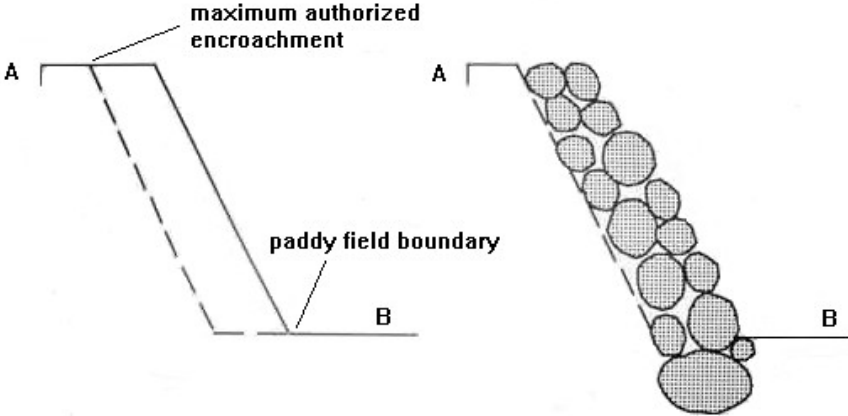


Fig. 1: Method used for stone walling

Irrigation and drainage system

Hani irrigation is based mostly on the principle of continuous flow and fixed proportional water division. The irrigation system consists of diverting water from the numerous mountain streams and springs and channelling it to the fields through a series of bifurcations of the main flow. Irrigation segments are of two types: major irrigation channels (*laoga-gama*) and secondary channels (*laoga-gaza*). The first ones, carrying water from the main sources at the head of channels supply it to the highest paddy-fields in such a way to encompass the entire irrigated area of one village. Therefore a *laoga-gama* is often several kilometers long and requires constant maintenance. Main channels are frequently paved with stones, especially in the section which passes through the village. Whenever a point is reached above a cluster of fields receiving water from a main channel, a piece of wood with most often two or three notched cuts (*adzo doma laoga*) is placed across the channel and used as a weir to divide the flow into several parts. Most dividers found in the Ailao Mountains are made of logs, though a few have been carved out of stone and may be as much as five centuries old. The water then either goes to a first pond-field and flows from higher to lower plots by means of inter-plot spillways, or goes to a secondary irrigation channel passing through terraced areas and following the natural inclination of the slope, before it is deviated to a first parcel further down. At lower levels of the irrigation network simple earth weirs are used as flow dividers. At the end of it excess water is transferred from one of the lowest pond-fields into a drainage channel. All combinations of these three basic irrigation and drainage types are possible depending on the shape of the slope and accessibility to water. The flow can first be diverted from a main channel to higher fields, then be transferred by means of a spillway into a drainage channel, and again reach another

cluster of parcels downhill until it is finally poured into the lowest drainage channel.

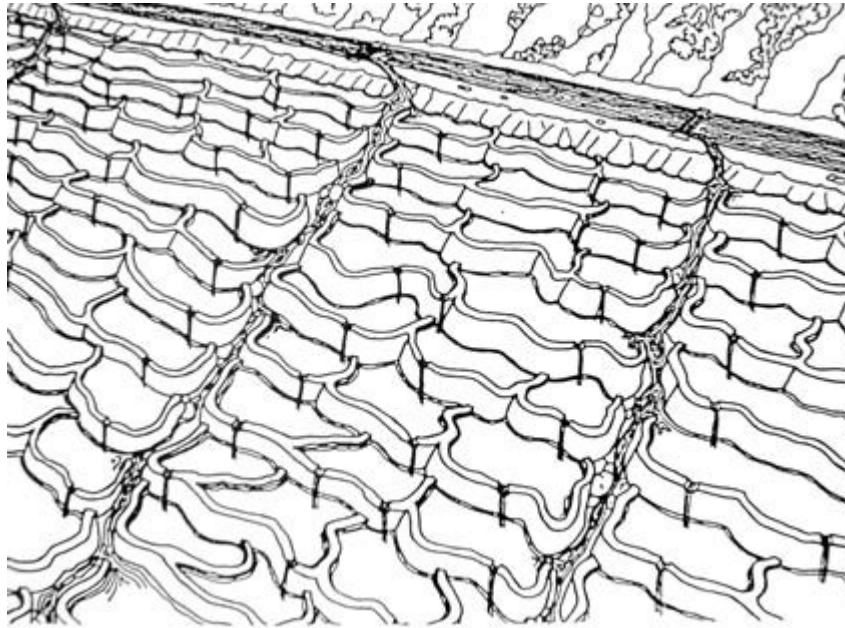


Fig. 2 - The irrigation network

Ideally the uppermost layer of terrace soil is maintained in a wet muddy condition through all seasons, so terraced pond-fields require meticulous care in the regulation of water throughout the year. The irrigation system is used to carry water but also some fertilizing elements. Animal or green manure is not deposited directly in the fields as elsewhere in China, but mixed with water in a place located above the first field to be enriched and then distributed over the terraces.

Springs, irrigation and drainage channels are all collectively managed in the village and are never owned or appropriated privately, even when they occur in, or cross, pond-field property. Fields are owned and managed on a household basis. In Yuanyang, farmers are not allowed to manipulate the flow, as fixed proportional flow division structures are set up to guarantee an equitable share of water

for everyone. The maintenance of the irrigation network is entrusted to a specialist called *laoga-laepha* (literally "guardian of channels"), who is selected by the village representatives. His first duty is to act on behalf of the whole community by daily checking and maintaining the main channel (*laoga-gama*), mostly by taking out fallen leaves, mud or stones that have accumulated there and may disrupt the general distribution of the flow. In coordination with the village administrative head and the traditional council (*tsomo-dama*) he also organizes and is in charge of the collective repairing of the main channel (*phulao-laoga-do*) that usually takes place every year after the harvest. In addition the *laoga-laepha* is responsible for keeping the markers which testify to the amount of water allotted to the main channels. Once initially fixed by the village council, all measures of various weirs are identified by a series of woodcut marks of corresponding lengths that are kept safe in the *laoga-laepha*'s house. From then on, any modification to the irrigation network and the subsequent allocation of water can only be collectively decided by the village assembly and the village headman. Should a dispute arise regarding access to water, the *laoga-laepha* would immediately be able to check whether someone has attempted to modify the cut of a wooden board by comparing with his own set of woodcut marks. The water allocation, and thus the width of the open cut, is calculated according to crop water requirements, not to the surface of the fields to be irrigated, hence the key-variable for re-allocation is the amount of grain usually harvested in one given area.

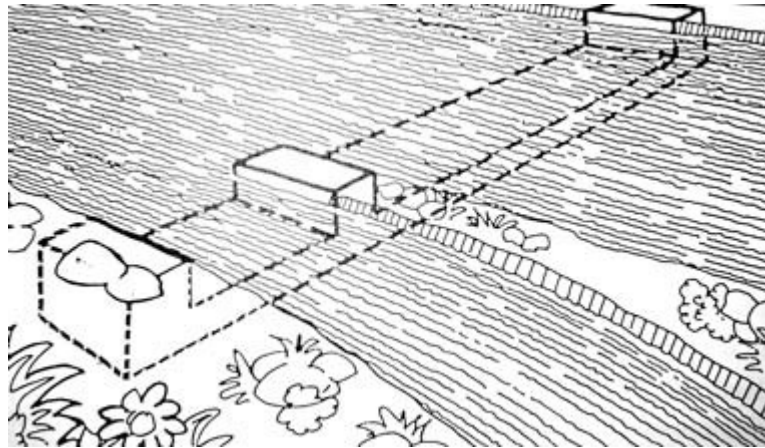


Fig. 3: Hand-notched log used as flow divider

Constraints and rules related to the management of water

The general maintenance of the irrigation system requires constant attention and a series of mutual obligations as the allocation of water is strictly determined by customary rules. Most important among them is the rule stipulating that the flow of water must remain undisturbed from the source to the drainage channels. Hence repairs accompanied by the complete evacuation of water from one pond-field call for an irrigation channel to be dug which encircles the cultivated parcel in order to maintain an uninterrupted flow of water. This very simple rule gives the farmers the flexibility to deal with problems related to irrigation water on a day-to-day basis, as illustrated below:

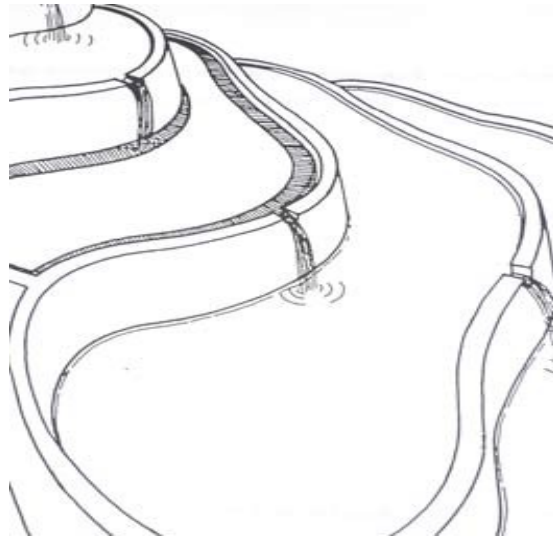


Fig. 4: Method adopted for a temporary drying out of field without interrupting the irrigation flow

If a dike collapses and is not repaired within days large areas can be lost, therefore the owner of an irrigated parcel is held responsible for all damage caused by runoff, silting, and slippage occasioned in the field situated immediately below his own parcel, regardless of whether the former depends on the latter for his water supply. In the event of neglect, a fine in grain may be required by the owner of the damaged field as compensation for the estimated grain loss. For the same reason no one is allowed to retain water in his field or divert water from his field if it modifies the flow normally poured into the parcels situated downslope. In particular, any attempt during the dry season to reduce the amount of water flowing downwards is considered as "water stealing" (*utshü-ko*) and leads to a substantial fine. Similarly any attempt to expand the water inlet by enlarging the spillway intake located immediately above one's fields is punished by a fine in grain or cash imposed by the village council. Damage may occur as well during the rainy season if a dike happens to overflow and the excess water heavily falls under the crops of the parcel located immediately downhill. For that reason, owners are held responsible for their ability to contain the

regular flow in their pond-field, that is to control a proper transfer of the flow in excess to the drainage canal, and therefore any attempt to enlarge one's own outflow spillway at that time is also liable to a fine.

The second basic constraint is that any modification of the water system due to an extension of the irrigated surface requires consent from all field owners whose water supply may be affected by the change. Fig. 5 gives an example of such situations that may involve complex negotiations.

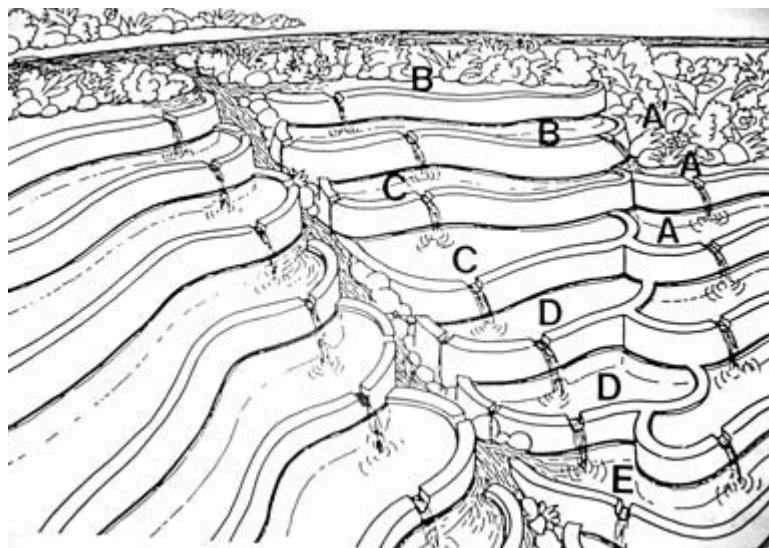


Fig. 5: Social constraints related to the expansion of terraced fields

The owner of fields A wishing to dig up new irrigated terraces in A' and draw water from B would first have to obtain an agreement from the owners of C and D parcels, as their fields do not have direct access to an irrigation channel and only depend for their own supply on water flowing from B. Permission is usually given without compensation if the amount of water proves to be sufficient during the dry season, otherwise it may be obtained in exchange for an annual payment in grain or cash, or simply refused. As a last resort, the case would be handled at an assembly by the village headman assisted by village representatives (*abo-tsomo*). In some cases

where access to the irrigation network is physically possible, drawing water from a channel is only authorised during the rainy season and prohibited in the fallow season when water is scarce (SHIMPEI, 2007: 180). A general reorganization of the irrigation network is a normal process in village life due to population growth and does take place from time to time, but this matter can only be decided by common agreement on the part of village representatives.

As an extension to this general rule, no new human settlement is allowed above an already existing village if it has to depend for its supply on water flowing from one of the sources owned by this village. This can lead to serious disputes, especially with regard to non-Hani groups such as Miao or Yao who, by tradition, tend to occupy upland areas.

The set of constraints and rules related to the management of water implies an almost daily check on pond-fields, a time-consuming activity whenever those fields are located some distance from the village. In order to minimize the risk of conflicts, fields owners always wish to have direct access to both a secondary irrigation channel and a drainage canal. However this ideal situation, represented in Fig. 5 by the location of parcels B, constitutes the exception rather than the rule. Regarding terrace expansion, people also have to balance their wish to acquire fields having direct access to the irrigation channels -often low yielding as they tend to be located on higher slopes- and their wish to obtain better yields from fields located at lower altitudes, i.e. also situated at the end of the irrigation network and therefore more exposed to water shortage during the dry season.

The cosmological interpretation of the environment

Since the pioneering works of sinologists such as GRANET (1929, 1934) and STEIN (1987) and also some more recent studies on Southeast Asia (e.g. HUTTERER, 1985) we know that the concept of "nature" in various agrarian societies of Southern China and its periphery is not based on a vague instinct or a sense of harmony, but on a constructed view of the environment rooted in religious beliefs. The local environment of farmers is rather conceived as a reduction of the macrocosm, a miniature universe which furthermore is not static but suggests movement. The Hani conception conforms to this general pattern. The Hanis consider their proximate environment as crossed by invisible energies or powers that emanates from spiritual entities. Not the revered gods of their celestial pantheon, but a myriad of terrestrial divinities mostly associated with some salient features of their surrounding landscapes such as mountains, cliffs, rocks, streams, lakes, caves as well as remarkable trees. Among them, spirits associated with mountains and water sources constitute a distinct category in the sense that they are not only supposed to use the element of landscape as their abode, but also to circulate along specific routes (*gama*) which are defined according to the local topography and hydrography. Besides, this general circulation of spiritual energy is conceived as a fertilizing flow which has the capability to concentrate at certain spots, where human beings attempt to capture them and use them to their own advantage.

Considering the mountains, the energy emanates from what the Hanis simply call an "owner/master of the mountain" (*labo-yoso*), and flows through a "mountain vein" (*mitsa-migu-mu*) that precisely matches the corresponding ridge line. The summit of the mountain is simply viewed as the abode of the divinity, the vein is said to be its road (*gama*) and is called *dzaela-khala-*

böla-gama, literally the "road from which cattle, crops and humans come". Therefore it is seen as a channel, a way, through which flows non material fertilizing power, a kind of vital principle. They also speak of a "road of prosperity" (*dzala-gama*). Originating from the mountain top it reaches the bottom of the valley following one of several ridges through a series of bifurcations depending on the local topography. As every mountain ridge is interconnected to a culminating summit in a given area, every god associated with a minor summit is connected to the mountain god of the culminating one and is conceived as dependent on this paramount master, helping him as an assistant in various ways. Thus the energy emanating from a major mountain peak flows from top to bottom, bifurcates into several branches according to the number of minor mountains that it encompasses, generating a pyramidal network. In a very similar way water sources are conceived as the abode of as many "water owners" (*utshü-yoso*). From the springs their powers circulate downwards to the valley bottom, following the lines of the hydrographic network, be it natural or human made in the case of an irrigation system. Thus mountain ridge lines and watercourses constitute the two main channels for the circulation of telluric flows.

There is a common perception amongst the Hanis that humans and their living dependants (domesticated animals, crops) can benefit from lengthy contact with these fertilizing energies, and so they seek to locate their settlements on the "roads of gods". By doing so, they believe that humans (*bī*), cattle (*dzae*) and crops (*kha*) will multiply in a very natural way, but if they choose to settle their villages or houses some distance from these routes they have little chance of prospering. Several configurations are said to be auspicious, as shown in Fig. 6:

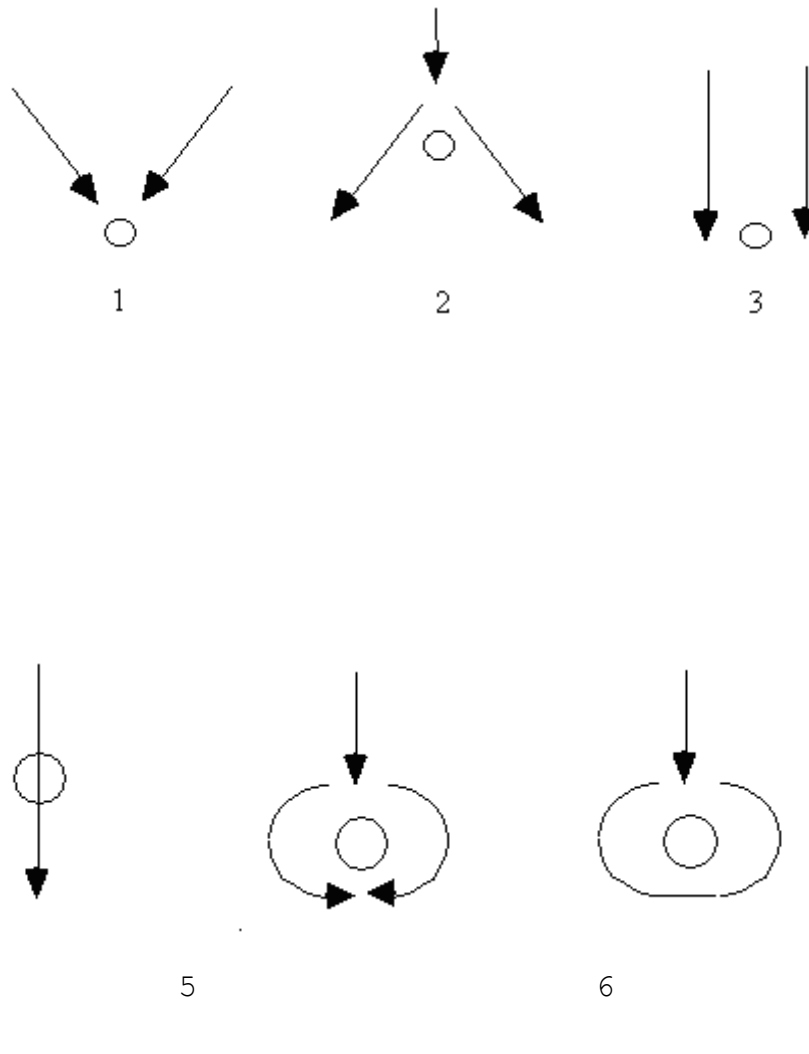


Fig. 6: Various auspicious village settings in relation to ridge line configurations

One of the best ones is on a relatively flat area, backed by the mountain, where one "vein" ends (*mitsamigu-zayela-po*) or, even better, at a place where two veins converge. The Hanis imagine these flat grounds as "a rest area for the gods" and say that it evokes "a table with plenty of food on it", because in such areas the energy concentrates and accumulates. The greater the number of mountain ridges that converge or are directly connected to the major summit, the more valuable the site is considered for human settlement. Similarly, the site is believed to be particularly auspicious if it includes a depression where water accumulates, such as a natural pond or a

channel in which the water flow is very slow, for it helps to establish contact with the fertilizing flow coming down from the mountain peak. The Hanis will not hesitate to artificially create such a channel, as the paved one that passes through Pukha village in the Shencun circle, which is of no use in their irrigation system and has only been dug out for that purpose.

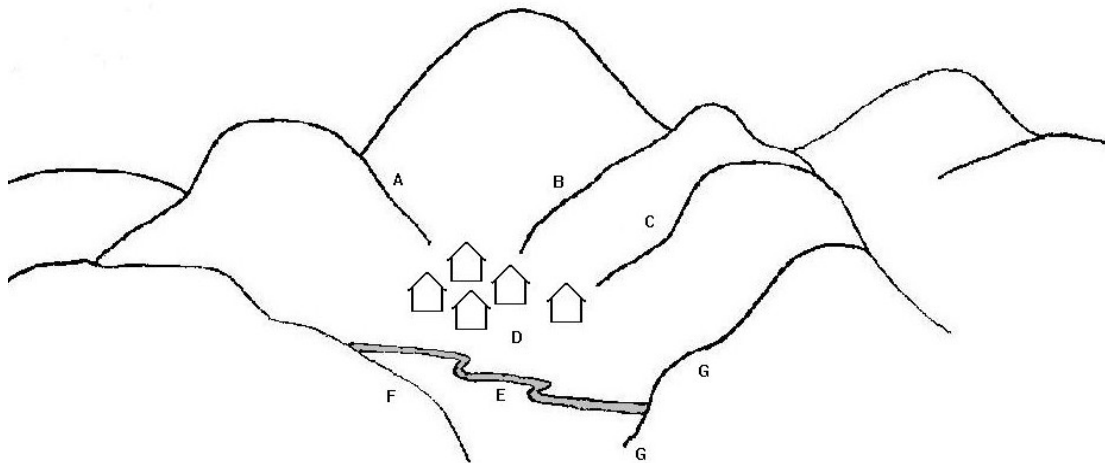


Fig. 7: An ideal village setting located at the junction of several veins (A, B, C), just above a flat area (D) crossed by a slow-flowing stream (E) and surrounded from all sides by mountains (A, B, C, F, G).

But nearness to a fast-running source of water is considered inauspicious, especially if it flows directly down towards the valley bottom, for it is believed that it may divert the flow emanating from the mountain vein and drive it off. In Phuka, for example, a bamboo hedgerow has been planted to obscure a nearby fast-flowing stream leading straight down to the valley. This was considered as a preventive measure against any possible outflow of the fertilizing energy into that stream. The Hanis say that access to the valley has been "blocked by the clump" (*hamae-adzo-shatsö*). Similar measures will be taken to conceal a rock with a shape that evokes some feared animal such as a tiger, especially if its mouth faces the village. One of the best configurations for a surrounding landscape is a

small mountain cirque, for it also helps to prevent energies from running off. In such a case, all roads of prosperity emanating from mountain peaks and springs ultimately converge towards the village and the fields. The Hanis apply the same principles to locating cemeteries which must be situated on the same vein as the village, some distance upslope. The protection that the living expect from their ancestors also partly depends on the ability of the latter to first capture for themselves the vital principles emanating from mountain gods.

However ideal the village setting may be, this remains the case provided that the general circuit is not disrupted, or, as the Hanis say, that the "roads of prosperity are not blocked" (*dzala-gama-matotsö*). The flow emanating from the mountain is supposed to circulate under the ground at such a depth that ordinary agricultural activities (including slope terracing) will not affect it. But other excavating works, such as road building, are believed to intercept the flow and to sluice it into their own circuits. In 1956, the villagers of Pukha opposed a government project of opening an unpaved road just above their village, for fear that it would "cut" their main vein and hence drive away a major source of prosperity for the village. The digging of a large artificial canal around the mountain such as those built during the Great Leap Forward (1958-1960) are reported to have had the same devastating effect by capturing and diverting the telluric flows in an unexpected way. For the same reason, Hani villagers strongly oppose the establishment of human settlements upslope on one of the ridge lines to which their villages are connected. Nowadays the problem most often arises with Miao and Yao immigrants who traditionally favour the higher uplands for establishing their dwellings and practising dry land cultivation.

Clearly, this general system of orientations based on local topography and a religious interpretation of the landscape brings to mind the Chinese theory of earth winds or telluric breaths (*qi*) serving as a foundation for a set of beliefs which have come to be called "geomancy" (*fengshui*, literally "wind and water"). A similar set of ideas underlies the general relationship between man and nature: humans are not thought as separate from the landscape in which they live, and the landscape is seen and used as a medium between men and natural or cosmological forces. As in the Chinese model, the whole physical environment is an expression of hidden forces, of a cosmology, and the surrounding landscape is a microcosm centered upon a central spot, which constitutes the site as a miniature universe. This universe is in flux, in continuous change, but patterns of change are discernable to knowledgeable people, and various types of knowledge about topomantic or geomantic nature help men to situate themselves in the landscape where they may most benefit from natural forces. As in the Chinese tradition, the salient features of a landscape are those that can be traced as lines - mountain ridges, water courses and thoroughfares - and those that have definite shapes and outlines, such as mountain peaks, boulders, ponds and pools. By observing these patterns and by understanding the natural laws which they manifest, people can diagnose the prevalence of good and bad influences at any spot on the ground. Therefore great store is set by placing landscape features correctly around the site at appropriate points, like the proper placing of areas of human "dwellings" (villages, cemeteries, houses, beds, etc.). Common landscape features and symbols (networks of veins or lines of influence, plant or animal symbolism, interpretations of shapes based on resemblances) constitute a common way of making geomantic diagnosis according to the lie of the land, indicating an

eminently visual way of thinking that also constitutes the virtual basis of geomancy elsewhere in China.

Although undoubtedly influenced to some extent by the Han system, the topomancy developed by the Hanis nevertheless exhibits some striking differences which are worth noting here:

- First it completely lacks any reference to some most basic elements of the Chinese tradition such as the life-breaths conception (*qi*), the theory of Five Elements (*wuxing*), the yin/yang principles, the Eight Trigrams, the use of a compass or even such a basic concept as the North-South cardinal axis.

- Secondly, in this universe in motion the Hanis, unlike the Hans, do not conceive this energy as a mere natural force but as an individualized power associated with some specific divinity. Nor do they conceive the circulating flows as "breaths" but as "roads" or "ways" (*gama*).

- Thirdly, some basic principles associated with these energies in movement do not so much evoke the Chinese system of geomancy and the associated notion of telluric breaths as their most familiar environment, i.e. the rice-cropping sphere.

And though the Hanis do not explicitly say that these flows are liquid flows, some of their beliefs or practices tend to indicate this:

- As water, the vital principle is always conceived as flowing from top to bottom and faster on steep slopes. And like water, wherever the ground is flat it stagnates and accumulates.

- On a symbolic level, mountain peaks play a role analogous to springs in the irrigation system, both being considered as

sources of fertility. Just as Hani settlements are invariably located downhill from a major irrigation water source, the site encircled by a channel network stemming from that source, for their village settlements the Hanis seek a place located below a major mountain peak to which they are nevertheless connected through the ridge line, and surrounding mountains that constitute a similar network connected to the main ridge line. The village sites are then connected both materially to a water source and symbolically to the mountain top through a topographical "vein". The similarity between mountains and rivers or channels is very well exemplified by the mythology where mountain caves, as well as sub-water levels, are inhabited by ophidian-looking creatures watching over treasures. Even the mythical abode of the ancestors, from where primeval humanity is said to have emerged, is conceived as a mountain cave.

One may also note that the structure of this network of vital principles is reminiscent of the basic structure of an irrigation network. In both cases, lines stemming from one point diverge through a series of bifurcations, and in the interpretation of the local topography each minor summit is conceived as a branch point, as represented below:

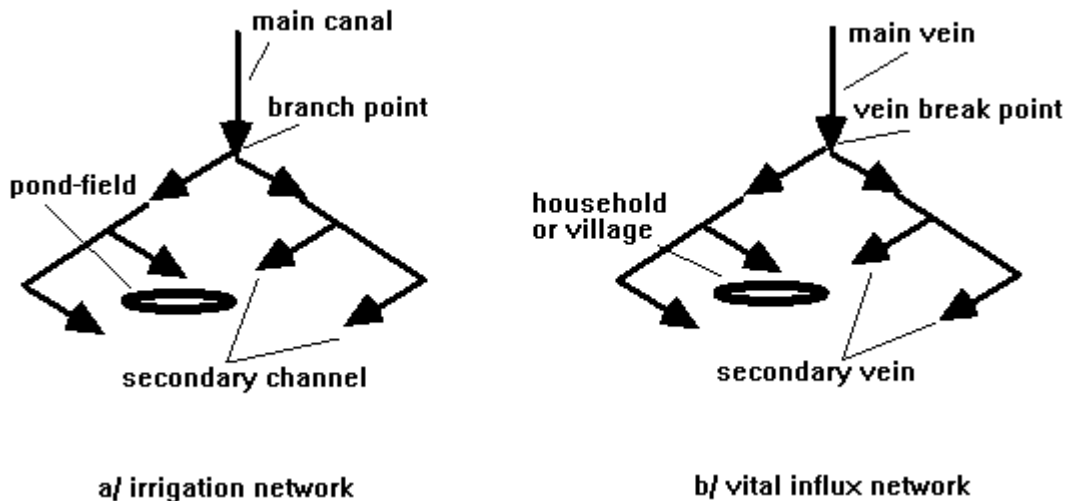


Fig. 8. Irrigation and vital influx networks

As a matter of fact, by observing and interpreting the landscape around them the Hanis mentally extract from the contours the terrain's skeleton lines just as a cartographer would do to produce a topographic map; on the one hand, the valley lines that connect the deepest point of valleys, on the other hand the ridge-lines that connect the highest points of ridges. Whether extracted from a natural drainage network (streams), an artificial drainage network (irrigation channels) or a mountain topographic network (ridge-lines), the required geometric structure is the same and corresponds to the general model of a simple tree structure; a node-link diagram that connect nodes together with line segments as represented above.

Besides, the way the energy of the mountain flows through a network of lines and dispatches its fertilizing power among living creatures by prolonged contact parallels the popular belief of the fertilizing power of water in the context of rice-cropping. For the Hanis traditionally believe that water - not the nutriments contained in the soil - is responsible for plant growth. This assumption is partly true if we consider soil pedogenic processes, such as podzolization

(bleaching), which are likely to occur in permanently inundated soils and result in partial auto-regeneration of nutrients derived from soil.⁷ One must also remember that the only traditional method of fertilizing pond-fields is to mix water with animal and green manure, i.e. to drag a fertilizing flow towards the parcel by using the irrigation network. Similarly, water in the rice-ponds is almost stagnant, and fast-running water is said to impoverish the yield; another assumption confirmed by agricultural empirism, especially at planting and transplanting when running water is said to not be conducive to the growth of rice. Thus the religious idea of benefiting from a continuous and slow fertilizing flow appears to be rooted in the agricultural sphere.

The same remark can be made if one considers that the Hanis establish their villages in conformity with some of the general principles that also prevail in their agricultural practices, in the sense that they select flat ground connected to a network of supposedly fertilizing power situated uphill. Flat areas are valued in their symbolic system in the same way that terraced-fields are always more valued than sloping fields in which a level of fertility does not accumulate and is rapidly washed away by rains. For the Hanis, a good field is always a parcel which is both a terraced plot (*shahao*) and an inundated plot (*ösha*); a low, flat ridge of earth built across the slope in which fertilizing elements from water, vegetal and animal manure can concentrate. In a similar manner a good location for a human settlement on the mountain slope

⁷ Water also provides nutrients by circulating through the fields and by permitting small aquatic animals to live in it, as decaying aquatic life is an additional source of soil nutrients. See also GEERTZ (1963), who argues that the stability and the productivity of the wet rice-cropping systems lie in water management. According to him, the most "striking feature of the [wet rice] ecosystem (...) is its extraordinary stability or durability, the degree to which it can produce, year after year, and often twice in one year, a virtually undiminished yield (...) The answer to this puzzle almost certainly lies in the paramount role played by water in the dynamics of the rice terrace."

is on a relatively flat area encircled by mountains towards which fertilizing flows converge and accumulate. Also, just as every pond-field has an inlet to draw the water into the plots from the irrigation channel, every Hani village has an upper gate erected across one of the main paths leading to the village, at which annual rituals for village welfare are performed. Conversely, reminiscent of the function of the rice-field outlet used for a regulated removal of runoff water, a yearly ritual purification is performed at the village lower gate, which consists in throwing ashes collected from each household over the wooden porch. At both levels - agricultural and symbolic- measures are taken to prevent fast-flowing water, overflow and unwanted derivations. And in the same way as inlets and outlets are repaired each year before paddy is sowed, the upper village gate is ritually renewed on a yearly basis at the time of the *Hamatu* festival, which also takes place just before -and actually gives the signal for- sowing activities.

Lastly, the rule that forbids any human settlement on the same mountain vein above an existing village clearly parallels the customary rule forbidding anyone to draw water from a channel without getting prior consent from all owners of the fields located downslope which depend on the same channel for their water supply. Here also vital influxes, such as water, tend to be assimilated with goods over which individuals or groups claim specific rights.

Thus the Hani geo-dynamic conception of the local environment and their interpretation of the landscape stem from a series of identifications forming a system in which religious and technical conceptions of space management are closely related. The irrigation system, its logical workings as well as

the social rules associated with it, provide both a conceptual framework and a set of principles that give a specific religious sense to the perception of the local environment. In the symbolic sphere the village functions as a rice-pond, mountain peaks as water sources, and mountain ridges on the model of a giant irrigation network. In this particular case, symbolism operates by means of analogical transfers from both the technological and social domain associated with wet rice-cropping, in order to elaborate a coherent system in the religious sphere. More specifically, it uses a simple mental scheme - the irrigation network scheme and its tree structure - to classify and organize the divinities associated with the two most culturally salient features of their local environment, i.e. mountains and springs. At the same time the tree structure provides an organizing principle by which the hierarchical relationships between them are defined. This case-study focuses on the fact that we are not merely contemplating a society giving shape to its environment according to its own set of already established cultural values. Here we are also witnessing the reverse process by which a subsistence technique serves as a model for elaborating a specific core of religious beliefs applied to landscape interpretation.

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