Chapter 3
Lanna Mueang Fai and Mae Sa river basin

The study on Lanna Mueang Fai System (Irrigation Systen in Lanna Style) focuses on Mueang Fai system, organization, rules and regulations, agreements, and relationships between Mueang Fais and agricultural fields. The area selected to be the studied area is Mae Sa River Basin in Mae Rim District, Chang Mai Province, which covers 4 sub-districts, namely, Pong Yaeng Sub - district, Mae Raem Sub - district, Mae Sa Sub - district and Rim Tai Sub - district. This study uses observation, in - depth interviews, focus group discussions and participation into rites that are related to Mueang Fai System. The informants are administrators of Mae Saem Sub-district Municipality, administrators and heads of Mae Raem sub-district and villages in the sub-district, agricultural workers and farmers who use water, administrators and staff members of Doi Suthep – Pui National Park, entrepreneurs and owners of shops and tourism businesses, and related authorities in the area. The findings from the study are as follows

3.1 Attributes of Lanna Mueang Fais

A Mueang Fai is the congregation of local people in order to manage water for their cultivation. Each Fai (weir) is built in accordance with the climate and terrain features. For instance, on a plain at the basement of a hill or a river basin, a Fai is built with bamboos or rocks. A Fai is built to block, slow down and retain water by forcing water to flow along the 2 – 3 main ditches (Lam Mueang Luang or Mueang Lak) of each Fai, and distribute water to minor ditches (Mueang Soi or Mueang Sai Kai) which deliver water to rice fields. A Fai can serve many hundreds members and covers at least 1,600,000 sq. ms of area. Members of a Mueang Fai are farmers in the same river basin, and will select representatives to be the leader (Hua Na Mueang Fai), the inspector (Phu Truat Kan Nam) and information distributors, in order that the water distribution is fair. Members work together to dredge the ditches and repair the weir (Long Mueang Ti Fai, and hold at the annual right to worship the guardian spirits of water (Phi Khun Nam) and weir (Phi Fai). They strictly adhere to rules and regulations and share water with one another. The major principle of Mueang Fai System is to direct water into and out of rice fields. The excessive water will be vented out at the end of the ditch (Thai Mueang) to

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the river. Thus, a Mueang Fai allows farmers in a river basin to use water and slows down water current in a rainy season by directing water into and out of rice fields of members, village by village, so that members can cultivate in a dry season. The socio-cultural relationship from Mueang Fai is related to the village system, the membership of a river basin, the relative-like social system and religious beliefs. The congregation that is the water management system of Mueang Fai links all members who share benefits as a say 'to drink water from the same river' (Phonphilai Loetwicha, 2009: 45).

The relative-like relationships among members of a Mueang Fai and the possession of land and rice fields of the cultural group of people who eat sticky rice occur through the maternal relatives who believe in the ancestral spirits of the families. This leads to the relationships within a village or across villages, but within the same river basin. Interaction through traditions, rites and beliefs such as Poi Luang (Northern Thai Buddhist Ceremony) Ceremony or the celebration of Sana of the Temple of a community (to offer foods to Buddhist monks and to listen to sermons). In such rites, community members will invite their relatives from other villages to attend the rituals to make merits called 'Ruam Kin RuamThan' or to offer foods to ancestral spirits. Relatives will bring foods to be offered to monks and ancestral spirits. This is the reinforcement of the relative-relationships through traditions and beliefs related to Mueang Fai Culture, which is not only the water use but also the main structure of a Lanna village.

Types of Fais (Weirs)

Fais can be classified into 2 types, namely, bamboo or hardwood Fais and rock Fais.

1. Bamboo and Hardwood Fais

A bamboo and hardwood Fai is built to block a water stream to force water to run along the ditches to designated agricultural fields. A bamboo and hard wood Fai is built with bamboo sticks and hardwood sticks such as teak wood sticks and padauk wood sticks hammered in the river in multiple layers as the cores (Lak Fai or Lak Lo), some of which are hammered to be piled up as the ridge for water to flow over (San Fai), with a channel for water to run down (Thong Fai). Pieces of wood, pebbles and sand are stuffed into the space between the cores and bamboo sticks or hardwood sticks are attached in the horizontal alignment on the cores to block the water stream. Bamboo cores have to be punctured in the middle in order that they can be held together with small

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pieces of wood whilst hardwood cores are crossed with hardwood sticks. A Fai (weir) is built in this way whether it is built as a small one in a water pond or a big one in a big river.

Figure 3.1 Bamboo Fai to Direct Water to Agricultural Fields in Village Level

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Figure 3.2 Hardwood Fai to Block Water Stream, with Cores Held Together with Crossed Wood Sticks

2. Rock Fai

A rock Fai (Fai Hin or Fai Hin Thing) is built with rocks that are put together in a long line to block a water stream. The ridge of the Fai is high in order to direct water to run over the Fai and to ditches that deliver water to agricultural fields. A rock Fai is advantageous for its ability to slow down a strong water stream, especially a water stream on a high place such as on the mountain slope or a big river.

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Figure 3.3 Rock Fai to Block Strong Water Stream

3.2 Mueang (Irrigation Ditch)

A Mueang is a ditch that is dug from a natural water source, such as a river or a pond, in order to direct water to agricultural fields. A main ditch, called 'Mueang Luang', having appropriate width, directs water from the river on the northern side of the Fai to the agricultural fields. A system can have 2 – 3 main ditches depending on the number of agricultural fields that the system serves. From a main ditch, farmers will use bamboo sticks as a fence (Tae) to deviate the water flow to their fields. This area is called the inlet area (Pak Mueang) which is the area where water is directed to a minor ditch (Mueang Soi). From a minor ditch, a farmer will dig a water way to direct water to their fields. This inlet is called 'Pak Tang' (Phonphilai Loetwicha, 2003: 80).

Water will nourish all the agricultural fields in the system. During a rainy season, water current on a plain on the basement of a mountain is very strong and the amount of water is high, farmers have to dig drainage ways to vent excessive water out of their fields. Such drainage ways, called 'Mueang Sia' or 'Mueang Long', slow down the water current and vent the excessive water from the fields to main ditches and the river.

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Figure 3.4 Minor Ditch (Mueang Soi or Mueang Sai Kai) to Direct Water to Each Agricultural Field

Figure 3.5 Drainage Ways (Mueang Long) to Vent Water from Agricultural Fields to River

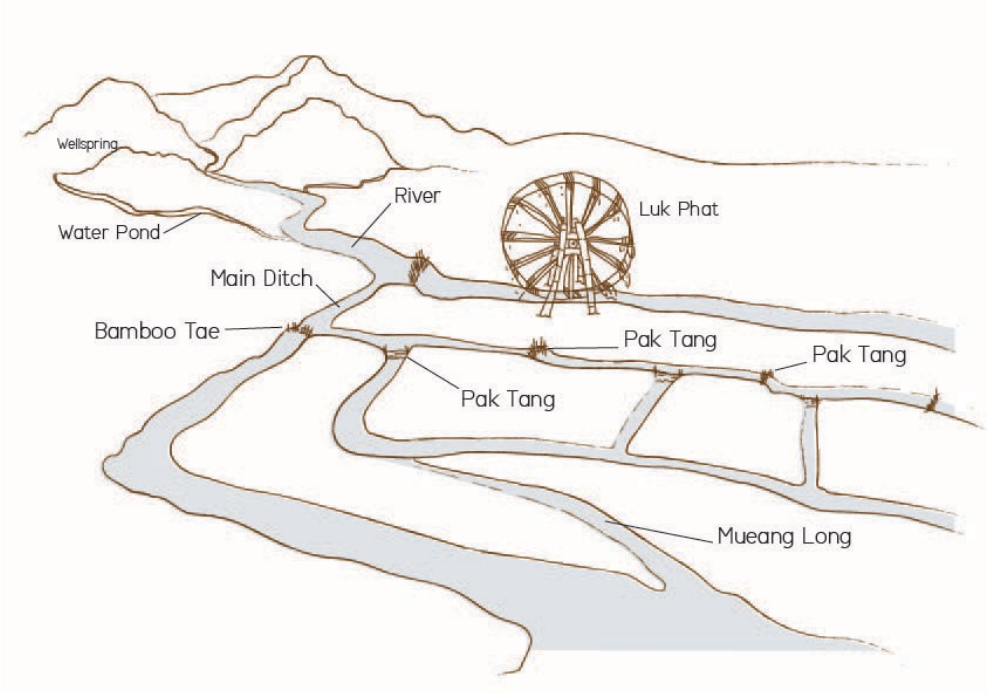

Figure 3.6 Model of Lanna 'Mueang Fai' System

As for some fields that ditches cannot deliver water to, farmers will use mills (Luk Phat) to scoop water into the fields. Such a field is called a 'Na Luk', which is on a plain by the riverside, but the place on which it is located is a highland such as a high river bank. Thus, water is directed into the field with a mill, which is a round bamboo wheel, the diameter of which is around 5 – 6 meters. The mill is installed in the river, by the riverbank. The mill is spun with the water current and scoop water from the river to the fields. The building of mills is a domestic wisdom which has been passed on from generation to generation for thousand years by Lua people who have known how to build Mueang Fai systems since the past, as seen in the Legend of Phra Chao (King/ Lord) Yeap Lok as follows.

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> *...the King went to Raming River (Ping River)*
> *...and saw a Lua man building a mill to scoop water*
> *into his rice field that is an out-seasonal one*
> *(Na Do or Na Chiang)...* (Singkha Wannasai, 1975: 1).

The farmer of a Na Luk (rice field that uses mill) can use water freely, independent from any Mueang Fai group or system. Na Luk farmers may gather together, in a small number, in order to assist one another to repair and maintain the mill on the yearly basis. A mill can direct water to a few rice fields, compared with a Fai. Farmers work together to build a mill (Luk) in accordance with their capability, and have a fair water management system as a Mueang Fai group does.

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Figure 3.7 Water Mill or Luk Phat

3.3 Dredging of Fai (Long Mueang Ti Fai) and Rite to Offer Food to Guardian Spirits of Fai (Liang Phi Fai)

Long Mueang Ti Fai (Dredging and Repair) Rite is a tradition whereby members of a Mueang Fai help one another to dredge and clean the ditches to be free from mud, soil and weeds in order to facilitate water flow. The Long Mueang Rite is held annually

and is the joint responsibility of all members of the Mueang Fai. Mueang Fai Committee, consisting of Kae Fai, Lam Nam and Liap Nam, is mainly responsible for managing the Mueang Fai by inspecting the weir and ditches in the system and supervise the annual dredging, and preparing the materials, utensils and gathered money for worshiping the guardian spirits of Mueang Fai (Phi Fai). Each year, there will be a meeting to determine the schedule for the Long Mueang Ti Fai Rite. Lam Nam (announcer) will invite all members to attend the meeting which is very strict. All attendants have to sign in to the meeting and sign to approve the resolutions of the quorum, which are considered as the agreements of Mueang Fai. Committees and members have to sign to approve all agreements. A member who does not attend or send a representative to attend a meeting will be considered to have no right to use water in accordance with the punishments in the rules of Mueang Fai.

On the day scheduled for the Long Mueang Ti Fai Rite, all members will gather together since six o'clock in the morning. No member is allowed to be late. Any member that cannot attend the rite must send a representative. The rules for the Long Mueang Ti Fai Rite are strict because they are related to the joint right of all members to use water together. If a member fails to adhere to any rule, a negative effect might be caused on crops. The rules also cover the control over the mobilization of workforces, utensils, and starting and ending time, as well as the area of the responsibility of each member. The dredging for multiple ditches consumes different amounts of time. Some ditches can be dredged within one day whilst some others are many kilometers long and take 8 – 10 days to be dredged. To Long Mueang is to dredge and maintain the ditches in order to prevent collapse during a water season.

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Figure 3.8 Mueang Fai Members Dredging a Ditch (Long Mueang)

Figure 3.9 Dredged Ditch

Figure 3.10 Maintenance of Ditch too Prevent Collapse

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At the same time, the Ti Fai Rite is another rite to annually repair the ditches. Each year, Kae Fai and the committee will inspect the damage of the weir and ditch in order to determine the amounts of materials and utensils used for repairing them. The committees will discuss and determine the amounts of materials and utensils, which will be informed to the quorum of a Mueang Fai meeting. Main materials used for repairing the weir are the cores of the weir (Lak Fai) which are hardwood or bamboo sticks, prepared by members of each Fai (weir), Chakhae or a line of rocks covered with small and thin bamboo sticks with both ends of each rock tied like a sausage line, 2 – 3 meters long

bamboo sticks or hays and prongs. As for utensils, they are Khon Na Waen (a round hammer) to hammer the cores because it is not too hard, Khon Hang Kang which is another type of hammer the handle of which is molded from the hammer, hoes, knives, and small basket woven for bamboo sticks used for carrying rocks to be dumped into the water to build the weir.

The day for the Ti Fai Rite has to be determined and announced to all members. On the appointed day, all members will gather together. Kae Fai will check whether all members are present or not. Afterwards, members will fix all the spots of the weir that need be repaired due to the water current that destroys some part of the weir. Old woof cores and tightening materials are replaced with new ones. The cores of the weir are hammered from the ridge to the lower part (Thong Fai) to prevent the weir from being carried away by water current in a rainy season. Each weir in the system will be repaired once a year unless it is damaged by water current.

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Figure 3.11 Ti Fai Rite to Direct Water to Ditches, and the Repair and Maintenance of Water Gate on Yearly Basis

The Celebration to Offer Foods to Mueang Fai Guardian Spirits (Liang Phi Fai Celebration) is the rite held after the repair of Mueang Fai is completed. Kae Fai and all members will gather money together to buy 1 pig to be offered to Mueang Fai guardian spirits. Some Fais may use pigs' heads or pork and pop rice, flowers, candles, joss sticks, Siamese vodka, rice and assorted desserts for offering to Phi Fai. Some villages build Ho Phi Fai (Chambers of Mueang Fai Guardian Spirits) or eye-level shrines as the residences

for Mueang Fai guardian spirits. Generally, the Liang Phi Fai Rite is held during the period of the Ninth Month (for the Northern People of Thailand) Custom or from the end of May to the beginning of June, which is called the period of 'Duean Paet Khao Kao Ok (Month of the Eight-in and Nine-out)'. The Liang Phi Fai Rite is held on a night with waxing moon which is an auspicious day for offering foods to the spirits. The Liang Phi Fai right is held directly after the Ti Fai Rite is over. Kae Fai will chant words to worship Mueang Fai spirits in order to invite the spirits to receive the offerings prepared by Mueang Fai members who also pray to ask the spirits to bless them with sufficient rain water throughout a cultivation season, to protect their crops from draught, and to bless them with peace and happiness. After the Liang Phi Fai Rite is over, Mueang Fai members will eat the offerings. The pork will be cooked as spicy salad or boiled. Members will have a party to relax themselves and chitchat with one another in the ambience of harmony among Mueang Fai members.

The significant implication hidden in the Liang Phi Fai Rite is the harmonious actions to show respect and gratitude to water and forests. Each year members of a Mueang Fai System will have a chance to gather together in the Long Mueang Ti Fai and Liang Phi Fai Rites which are spirits of the communities, which reflect the respect to the nature and the harmony of people in agricultural society. Currently, such spirits are being dissolved together with the changes in Mueang Fai System, from bamboo weirs to permanent concrete ones. If all the aforementioned rites are forgotten, Mueang Fai members will forget the significance of Mueang Fai System and might rely on violent actions when having quarrels over water. They will not share water with one another and forget the concept that they are "brethren drinking water from the same river." Thus, this power of harmony manifests the be beliefs in water and Mueang Fai System.

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Figure 3.12 Mueang Fai Members Preparing Pork as Offering to Mueang Fai Guardian Spirits

Figure 3.13 Liang Phi Fai Rite with Offerings as Flowers, Candles, Joss Sticks and Other Items

Figure 3.14 Party of Mueang Fai Members

3.4 Mueang Fai Organization: From Tradition to Modern Era

A Mueang Fai organization is the congregation of a group of people using water from the same river. It has members and a system to select representatives to distribute water in a fair manner. A Mueang Fai organization is a form of mobilization that has been existing fr many hundreds years since the ancient time. It emerged together with the emergence of Mueang Fai system in the traditional agricultural societies. A Mueang Fai organization consists of Kae Fai (the leader), Lam Fai, Liap Nam and Luk Fai (members).

Kae Fai

Kae Fai is the leader of a Mueang Fai organization. Selected by members, a Kae Fai is responsible for water management. Generally, a Kae Fai must be devote himself to his work and have honesty and justice. He must also be paid respect by all members in the entire area of a river basin. A Mueang Fai system may serve people in more than 1 sub- district; thus, all the aforementioned characteristics enable an individual to be selected as a Kae Fai. A Kae Fai has no specific work term. The term depends on the satisfaction of the Kae Fai and all members. Main responsibilities of a Kae Fai include to enforce the 'Mueang Fai Agreement' and to fairly distribute water. Sometimes, a Kae Fai has to punish a member who violates the tradition of water use or agreement. On the contrary, if the water management is inefficient or ineffective, members may request for the election of a new Kae Fai.

A Kae Fai is entitled to manage all members. Members whose rice fields are at the upstream side of the river (Na Hua Fai/ upstream rice field) will have the right to use water first, followed by those with midstream rice fields (Na Don) and downstream rice fields (Na Thai Fai). According to the traditions and norms, water users in communities have the right to participate in water management. A member who does not help others repair weirs or dredge ditches will have to pay money or give rice to the group as penalty (Aroonrut Wichienkeeo, 2003: 126). Some sub-districts have great numbers of members; thus, the punishments are more severe such as to charge 32 baht penalty, which has to pay to Kae Fai in the flesh 1 baht per day. In the past, there was no automobile or good road; thus, the punished member had to walk to Kae Fai through different villages, where the villagers would gossip him/her, in order to pay 1 baht, which was embarrassing. Therefore, this penalty has inserted the societal punishment as well. The most severe punishment for a member who does not help others repair weirs and dredge ditches at the

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beginning of a rainy season is to prohibit him/her from using the water from the system to run his/her rice field.

In order to show gratitude to Kae Fai, after the harvest, members will give to Kae Fai and committees some rice that Kae Fai and committees have devoted their time and efforts to manage water for. Members will pour their paddies in the storage site of Kae Fai as the 'water fee' or 'Khao Nam Lo'. Nam means the remuneration for the water that members use for running their rice fields. Lo means paddies that members give to Kae Fai and committees. In some villages, members may give money instead of paddies. This is the generosity and justice among members and committees (Aroonrut Wichienkeeo, 2003: 126).

Lam Fai

A Lam Fai is responsible for announcing all activities to all members such as the mobilization of workforces and preparation of materials and utensils for repairing weirs and ditches, and the 'Lang Nam' schedule or the schedule of water distribution to rice fields. A Lam Fai is appointed by the Kae Fai to coordinate and synchronize with Kae Fai's works, and to comply with resolutions and agreements of Mueang Fai in each tear,. A Lam Fai is a Mueang Fai committee who dedicate himself/herself to work and has rhetoric skills.

Liap Nam

A Liap Nam is a Mueang Fai committee. Appointed by the Kae Fai, a Liap Nam is responsible for ensuring the fair distribution of water into rice fields, checking the water flow and making sure that no member is stealing water from others. The Liap Nam will report any incident, such as water stealth, to the Kae Fai who will determine the punishment in accordance with the agreement, such as penalty charge or omission of water distribution to a rice field. Some members who violate the rights of other members such as excreting into a ditch, an area where water is directed to rice fields, or another member's rice field, will have to pay penalties. The Liap Nam has to monitor all activities to prevent such violations and to ensure mutual respect among members.

Luk Fai

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Luk Fais or members of a Mueang Fai organization are referred to as ‘Luk Mueang Luk Fai’ or ‘Luk Phjua Luk Seam’. Numbers of members of different Mueang Fai systems vary. For instances, Fai Chom Thong has 2,000 households whilst Fai Mae Chaem has 140 households. Members are significant elements in water use. They set out regulations and gather together as workforces (Phonphilai Loetwicha, 2009: 69).

A Mueang Fai committee which consists of Kae Fai, Lam Nam, Liap Nam and Luk Fai is a Lanna social structure that has existed for a long period of time. Some Mueang Fai organizations have committees that consist of more than three committees as mentioned before because of great numbers of members. Thus, more committees, such as assistants of Kae Fai and Lam Nam, are needed so that they can assist the water management. Some Mueang Fai committees may work with ‘Kae Ban’and ‘Khwaen’, or heads of villages and heads of sub-districts, respectively. These people can facilitate the fair water distribution. Thus, roles and responsibilities of a Mueang Fai committee are parallel to those of a village committee and a temple committee; however, they do not interfere with one another. Responsibilities are clearly defined. The social structure of a village consists of a Mueang Fai committee as a center of community in addition to the community leader and the temple. This structure has deeply implanted into the society for a long period of time. At present, the structure is adjusted to suit the administrative and governance system of Thailand, with heads of villages and sub-districts playing joint roles with other governmental agencies such as the Royal Irrigation Department, Royal Forest Department and sub-district municipalities.

The beginning of the change from local water management to the one by the government is in 1939 when the Royal irrigation Department regulated the ‘Local Irrigation’ Act to allow groups of local people to establish local irrigation groups. However, as for the North of Thailand, the groups of people who registered were the old Mueang Fai groups that had been established before, with the heads of villages and sub-districts added to the Mueang Fai committees. The operation of local irrigation group back then was seen as the ‘development of the country’ with the project to build permanent Mueang Fai. Most contractors to construct the weirs and ditches were heads of villages and sub-districts who could propose the projects to the government. The local irrigation groups had operated for a while until there was the establishment of the Local Irrigation Association in every district. In 1978, the Department of Local Administration

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allocated budgets to assist the associations in the forms of loans for farmers. However, the project failed and the Department of Local Administration could not clear the debts incurred by the Local Irrigation Associations (Vanpen Surarerks, 1985: 186 – 187). The aforementioned issue partly led to the collapse of local Mueang Fai organizations and the water management by the Royal Irrigation Department which consists of the governmental irrigation projects and huge dams to manage water and generate electricity in the North of Thailand. Traditional Mueang Fais were seen as improper and wasteful means of water management. Thus, the Royal Irrigation Department intervened and set up modern irrigation system. Concrete weirs, water gates and water delivery systems were built. Consequently, water management power completely belongs to governmental authorities.

From the aforementioned phenomenon, it can be said that water management by traditional Mueang Fai organizations has been changed due to the policies by the government. Permanent weirs replace bamboo and rock weirs built by the locals. Harmony and collaborations in managing and maintaining weir and water management systems through local organizations were fading away. Thus, Mueang Fai committees work with heads of villages and sub-districts. In areas of most river basins, especially areas of water source forests, officials from Royal Forest Department and sub-district municipalities take major roles of forest conservation, rehabilitation and forestation. One of problems that Mueang Fai committees cannot handle is the enforcement of rules and regulations in upstream areas. Thus, the officials of Royal Forest Department have to be responsible for such duties. As for the current roles of water users, farmers nowadays tend to change their careers and sell their agricultural land. Thus, the congregation of water users decreases. The water use in a Mueang Fai system changes from old contexts. There is the production of pipe water in village ad district levels, and the need for water rises, so do the amounts of residences and populations. Local authorities take parts in water management not only for farmers. Therefore, traditional Mueang Fai organizations become smaller societal units and there are many other organizations to involve in managing rivers. Foundations from the water management network by Mueang Fai organizations partly deliver water to people of all levels in modern society and are inevitably related to people's way of life.

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Societal Organizations and Water Management through Mueang Fai System		Governmental Agencies
Mueang Fai Organization (From the Past to the Present)	**Heads of Villages**	1. Province 2. District 3. Royal Irrigation Department 4. National Park and Royal Forest Department 5. Office of Natural Resource and Environment 6. Sub-district Municipality
1. Kae Fai 2. Lam Nam 3. Liap Nam 4. Luk Fai	1. Head of Sub- district (Khwaen) 2. Head of Village (Kae Ban) 3. Village Committee	

Table 3.1 Mueang Fai Organizations from Traditional One to the Joint Management with Governmental Agencies

3.5 Mueang Fai Rules and Regulations

The use of common assets by Lanna people, called 'Khong Na Mu', is governed by some traditions, rules and regulations in order to ensure fairness and justice. The use of public rivers and Mueang Fais are also governed with traditions, rules and regulations that are based on ancient rules. All Mueang Fai members are responsible for maintaining Mueang Fai systems and none of them is allowed to violate such rules or destroy Mueang Fais. There are also agreements on punishments most of which are penalties in high rates in the ancient time. Details of the violations of rules and regulations are as follows.

i. Destruction of Mueang Fai

Destruction of Mueang Fai was mentioned in the Laws of King Mangrai (Mangrayasat) which stated that whoever destroyed a Pak Mueang (Mueang Fai) causing water to leak, in any part or the entire Mueang Fai, must repair the Mueang Fai to be good. Failing to fix the Mueang Fai, that individual must pay penalty, which was 330 silver coins for a big Mueang Fai or 110 silver coins for a small one. If the one destroying the Mueang Fai did not have any money, he/ she had to be put behind bars. Anyone wanting to help that individual must pay the penalty instead. If no one bailed that individual out, he/she had to be imprisoned for 1 month.

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…whoever destroys a Pak Mueang (Mueang Fai) causing water to leak, in any part or the entire Mueang Fai, must repair the Mueang Fai to be good. Failing to fix the Mueang Fai, that individual must pay penalty, which is 330 silver coins for a big Mueang Fai or 110 silver coins for a small one. If the one destroying the Mueang Fai does not have any money, he/she has to be put behind bars. Anyone wanting to help that individual must pay the penalty instead. If no one bails that individual out, he/she has to be imprisoned for 1 month…
(The Laws of King Mangrai of Chaiyasathan Temple, sited in Aroonrut Wichienkeeo, 2003: 132)

3.5.2 To Hit a Fai with a Raft or Boat

The Laws of King Mangrai prescribed the punishment and penalty for a case where an individual directed a raft to hit a weir (Fai) until it was damaged that anyone directing a raft or a boat to hit a weir (Fai) had to hastily fix the weir. Failing to fix the weir, the person directing the raft or boat to hit the weir had to pay penalty, which was 110 silver coins for a big Mueang Fai or 52 silver coins for a small one. In case where anyone directed a raft or boat to hit the weir without any intention due to the current that was so strong that he/she could not control the raft or boat, he/she had to pay the remuneration to fix the weir, which was 52 silver coins for a big weir or 32 silver coins for a small weir. This was because he/she did not intend to damage the weir, as follows.

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…anyone directs a raft or boat to hit the weir without any intention due to the current that is so strong that he/she could not control the raft or boat, he/she has to pay the remuneration to fix the weir, which is 52 silver coins for a big weir or 32 silver coins for a small weir. This is because he/she does not intend to damage the weir…
(The Laws of King Mangrai of Chaiyasathan Temple, sited in Aroonrut Wichienkeeo, 2003: 133)"

3.5.3 Destruction of Thae Na (Tae Na)

The Laws of King Mangrai prescribed the punishment and penalty for a case where an individual damages a Tae Na or a barrage that blocks water in a city or irrigation ditch of a weir or dam in order to direct water to 'Thang (an irrigation ditch)' that delivers water to rice fields that anyone damaging a Tae Na must be fined in accordance with the size of the Tae Na, which meant 52 silver coins for a big Tae Na and 11 silver coins for a small one. The penalty rates vary in different law versions. The Laws of King Mangrai Version prescribed the penalty to be 110 silver coins for a big Tae Na and 52 silver coins for a small one whilst the Laws of King Mangrai for Chiang Man Version prescribed the penalty to be 100 baht for a big Tae Na and 50 fueang for a small one (Aroonrut Wichienkeeo, 2003: 134).

3.5.4 Blockage of Water in Irrigation Ditch

As for a blockage of water in an irrigation ditch, which could damage rice in the fields, The Laws of King Mangrai prescribed the punishment that anyone blocking water in an irrigation ditch that delivered water into the fields in order to catch fish, until there was a little amount of water running to the fields causing the rice in the fields to die, the owner of each affected rice field had to hit that person until his head was wounded and release that person without charging any penalty. If the owner did not hit that person's head, the owner would have to seize that person' s fishing equipment or bring him to the leader to be condemned because that individual had 'violated the rights' to receive water of the owners of rice fields, who were entitled to 'protect their rights' as follows.

…anyone block the waterway to catch fish must
be hit at the head or seized all the fishing tools
or brought to the leader to be condemned…
(Aroonrut Wichienkeeo, 2003: 134 – 135)"

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In case where anyone drained water out from a rice field in order to catch fish until rice plants of were damaged, the one violating others' rights had to fix the barrage and remunerate for the damaged rice. In case where the owner of the damaged rice field met with the one draining the water out of the field and had a quarrel together, the owner of the rice field had the 'right' to hit that person at his/her head or charge 100 silver coins from him/her, as follows.

…anyone draining water out from a rice field

to catch fish must fix the barrage. If not and the rice plants are damaged, that person must remunerate for the damaged plants and crops. If that person argues with the owner of the field, the owner can hit that person's head or charge 100 silver coins…
(Aroonrut Wichienkeeo, 2003: 135)

Concerning a case where a person drained water out to catch fish in a pond or a water, The Laws of King Mangrai of Chaiyasathan Temple Version prescribed that the penalty was in accordance with the fishing tools; for instances, a bamboo fish trap (Sai) subjected to 1 silver coin and a fishing rod subjected to money. If the person did not use any trap or fishing rod, but used other tools instead, the penalty was related to total weight of all the caught fish. If the fish weighed 1,000 Nam, the penalty would be 2 silver coins. The punishment was like the one for the case of stealth.

…anyone blocking water to catch fish, if using a Sai (trap), must be charged for 1 silver coins, if using a fishing rod, must be charged for money, if using other tools, must be charged for 2 silver coins, as penalty…
(Aroonrut Wichienkeeo, 2003: 135 – 136)

3.5.5 Water Stealth

Water stealth always took place in a Mueang Fai group that had a great number of members. Some members did not help others. Rather, they stole water from other members' Mueangs or rice fields, which subjected to severe punishment. The Laws of King Mangrai of Chaiyasathan Temple Version prescribed that if a member stole water by blocking a waterway or deviating water from another member's field in order to direct water to his/ her field, that member would be fined for 110 silver coins, or the member who own the affected field could kill the stealing person without any guilt. The laws allowed the owner of water to reserve his/her own rights by hitting the water thief, and if the thief kept on stealing water, the owner of water could kill the thief without any guilt as follows.

…anyone stealing water from another member

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must be hit at the head by the owner; if not,
that thief will be fined for 100 silver coins.
If the thief keeps stealing water,
he/she must be killed… (Aroonrut Wichienkeeo, 2003: 136)

In case where two farmers had rice fields adjacent to each other. A farmer told the other to dig a ditch as a waterway to direct water into their fields, but the other did not work but just deviated water from the ditch to his field, the farmer who dug the ditch was entitled to kill the water thief without any guilt. If the farmer did not kill the thief, he was entitled to charge 111,000 shells, as follows.

…two farmers have rice fields adjacent to each other.
A farmer tells the other to dig a ditch as a waterway
to direct water into their fields, but the other
does not work but just deviates water from the ditch to
his field, the farmer who has dug the ditch is entitled
to kill the water thief without any guilt. If the farmer
does not kill the thief, he is entitled to charge 111,000 shells…
(Aroonrut Wichienkeeo, 2003: 137)

In case of a farmer who had been told by others to work in order to direct water to his field but did not do as told, The Laws of King Mangrai of *No Tong* Version stated that if a farmer had been told to direct water into his field but just did not do it but later tried to steal water from others' fields, the owners of the water were entitled to kill the thief. However, if the thief killed an owner of water, the thief would have to pay 'compensation' for the killed water owner in the amount of 330,000 shells, as follows.

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…a farmer who has been told by others to work
in order to direct water to his field but does not
do as told, and later tries to steal water from others' fields,

the owners of the water are entitled to kill the thief.
However, if the thief kills an owner of water,
the thief will have to pay compensation for the killed
water owner in the amount of 330,000 shells…
(Aroonrut Wichienkeeo, 2003: 137)

As for anyone who was afraid of nobody else and had intention to dig a waterway to deviate water from others' fields in the location where the waterway should have never been dug until rice or rice fields of other people were damaged, he/she had to pay 80 silver coins. The farmers who were impudent and damaged a pole of a weir had to be fined for 33,000 shells (Aroonrut Wichienkeeo, 2003: 138).

3.5.6 Water Stealth to Cause Death to Rice

In The Laws of King Mangrai of Chaiyasathan Temple Version, there was a case of water stealth that caused the death of rice plants of others mentioned that there were two families growing rice and helping each other build weir and irrigation ditches. However, one of the two became greedy and took two or three times more water than the other. The other farmer had asked him but he did not listen. Consequently, the other farmer's rice field ran out of water and rice crops died. The one taking the water had to compensate for all the damaged crops but need not pay the penalty.

In case where the farmer who took more water than the friend condemned or assaulted the friend but there was no physical assault, just threatening, the penalty was 130 silver coins, but if there was a physical assault but there was no bleeding, the penalty was 150 silver coins. If the owner of the water assaulted the one taking water, the water owner was not guilty. In case where the two farmers asked the authority (such as a Kae Mueang Kae Fai) and the authority had divided water fairly, but the farmers did not adhere to the verdict, one farmer was still stealing water, the other farmer had to see the incident first and bring the other farmer to the authority, and charged 110 silver coins. If the one stealing water had a weapon and retaliated to the friend, the water owner was allowed to kill the water thief without any guilt. If the water owner had a weapon but did not kill the water thief, the thief had to pay 330 silver coins as the penalty.

"*…there are two families growing rice and helping*
each other build weir and irrigation ditches. However,

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one of the two becomes greedy and takes two or three times more water than the other. The other farmer has asked him but he does not listen. Consequently, the other farmer's rice field runs out of water and rice crops die. The one taking the water has to compensate for all the damaged crops but need not pay the penalty.

... if the farmer who takes more water than the friend condemns or assaults the friend but there is no physical assault, just threatening, the penalty is 130 silver coins, but if there is a physical assault but there was no bleeding, the penalty is 150 silver coins. In case where the two farmers ask the authority and the authority has divided water fairly, but the farmers do not adhere to the verdict, one farmer is still stealing water; the other farmer has to see the incident first and bring the other farmer to the authority, and charges 110 silver coins. If the one stealing water has a weapon and retaliates to the friend, the water owner is allowed to kill the water thief without any guilt. If the water owner has a weapon but does not kill the water thief, the thief has to pay 330 silver coins as the penalt (The Laws of King Mangrai of Chaiyasathan Temple, cited in Aroonrut Wichienkeeo, 2003: 139)

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There were many ways to steal water and the amounts of water stolen vary in accordance with the techniques. The laws mentioned the rights of water owner that anyone stealing water from a Mueang Fai had to be fined for 2,000 shells. In case where farmers had built a proper barrage but the thief damaged the barrage and stole water, the penalty was increased to 11,000 shells. If the thief stole water by digging a ditch to deviate the water, the penalty was 22,000 baht (Thammasat Sapphason, cited in Aroonrut Wichienkeeo, 2003: 139).

3.5.7 Water Stealth Leading to the Rite to Ask for Forgiveness from Rice Field Guardian Spirits

Water stealth was deemed wrongful against the norm and regarded as the 'violation against the rights of guardian spirits' of the rice fields. The water thief had to apologize 'Rice Field Guardian Spirits (Phi Suea Na)' by offering chicken or pork to the owner of the rice field who would hold a rite to worship Phi Suea Na of his/her rice field. The animist belief like this reflects the ethical and moral system of the community. Even though to steal water during water season did not cause any loss or damage to the owner of a rice field, it was still wrongful because it was the violation against other people's rights. People might not mind but sacred spirits might become resentful. To mention sacred spirits was a way to punish an individual for violating other people's rights and to express respect to the rights of the rice field owner. If Phi Sua Na wanted chicken, the wrongdoer had to offer chicken. If the spirit wanted pork, the wrongdoer had to offer pork. Refusing to offer chicken or pork, the wrongdoer violated the norm and law of the community and had to be fined for 33,000 shells as follows.

> *…anyone stealing water from others' rice*
> *fields to his own rice field has to offer chicken*
> *or pork to the rice field owner. If not,*
> *the wrongdoer has to be fined for 33,000 shells…*
> (The Laws of King Mangrai of Chang Kham Temple
> Version, cited in Aroonrut Wichienkeeo, 2003: 140)

3.5.8 To Build Rice Field by Irrigation Ditch

A plot of land that is adjacent to a ditch and is wider than 5 meters was regarded as a public space of all members (Thi Din Na Mu) (from Case Study of Khan River Basin Communities by Aroonrut Wichienkeeo, 2001). A plot of land adjacent to a ditch of a rice field owner belonged to that rice field owner. Anyone having no land to grow rice or sufficient workforces to clear an unoccupied space to build his own rice field could ask the rice field owner for permission to him for growing rice by the side of the ditch adjacent to the land of the rice field owner (Na Khang Mueang). If that person ran his Na Khang Mueang and caused damage to the rice of the land owner, the person who ran the Na Khang Mueang had to help the land owner as much as he could such as to help the owner work. In case where the one who ran the Na Khang Mueang did not help the

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owner and could produce at least 5 Hap (a wide flat container) of rice, the owner could claim for the compensation for the damage as the rental for the space. In addition, the owner could ask the person who ran the Na Khang Mueang to divide the rice he harvested into 7 or 9 parts, one of which was given to the owner because he harvested rice from the field by the side of the owner' s rice field. However, if the produced rice was less than 5 Hap, the one who ran the Na Khang Mueang could offer a gift to show his gratitude to the land owner. If that person did not offer any gift to the owner, the owner was entitled to cancel the permission for that person to run the Na Khang Mueang.

If the owner of the land beside the ditch did not use water from the ditch and relied only water from the rain and the owner did not receive any damage from the plantation of rice beside the ditch, the owner had no right to obstruct any other people to grow rice beside the ditch because the owner' s rice field relied on rain water. The laws allowed people who owned no land to grow rice by the ditch without causing any trouble to the owner, which was a career support for farmers who had no chance to clear land for themselves, as in the following statements.

> *…anybody do not have any rice field can grow rice by the side of a ditch or by the outer side of a rice field, and has to help the owner as much as possible. If that person does not help the owner, he must divide his harvested cops into 7 portions and give 1 portion to the owner; or divide harvested crop into 9 portions and give one to the owner. This is just in case where the harvested crops are 5 Haps (wide and shallow baskets). If the crops are lower than 5 Haps, the person just give a gift to the owner. If that person does not do as stated here, he must not be allowed to grow rice. If the owner uses only rain water, the owner cannot get anything from or complain against the person…* (The Laws of King Mangrai of Sao Hai Temple Version, cited in Aroonrut Wichienkeeo, 2003: 142)

3.5.9 Digging of a Ditch across a Rice Field

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Concerning the digging of a ditch across a rice field, *Hattakam Winitchai yabalidikaromsmuttirat* (Guidelines for the Consideration of Activities) and The Laws of King Mangrai of Chiang Man Temple Version stated that anyone digging a ditch across a rice field causing damage to the rice filed of other people must pay compensation for all the damages for violating the right of other people, in the amount of 330 silver coins (Aroonrut Wichienkeeo, 2003: 142).

3.6 Relation between Mueang Fai System and Agricultural Fields

The relations between a Mueang Fai system and agricultural fields (i.e., Rai and Na) concurs with the people's settlement on a plain at the base of a hill with a big river nearby, which is an area appropriate for rice plantation whereby rice seedlings are put into the ground (Na Dam), and concurs with the physical features of a village-type community that is encompassed with mountains which is on a slope area of a hill, which is an area appropriate for rice plantation whereby rice seeds (paddies) are put into holes on the ground and grown by rain water (Rai). The area from a plain at the base of a hill to a river basin is good for rice plantation with the 'Na' method. Rice is planted once during its season (Na Pi) with water from Mueang Fai systems. Agricultural techniques, especially rice plantation technique, of Lanna people have been passed on from a generation to another for a long time, as reflected through a Lanna proverb, "Lua (people) do Rai (rice fields on a hill slope); Thai (people) do Na (rice fields on the plain), which manifest the long relations between the locals, i.e., the Lua people and the Thai Yuan people on land of Lanna Kingdom, based on the rice plantation on hill slopes and the rice plantation on river basins, which concur with the consideration of seasons, climates and weather appropriate for the agricultural works, as well as the creation of tools that Lanna people used for rice cultivation and harvest.

Rai (Hill Slope Rice Field) and Na (Plain Rice Field)

Rai (Hill Slope Rice Field)

A Rai is a rice field of Lanna people that is on a slope area of a hill. Lanna farmers started cultivating rice on Rais in the beginning of a rainy season which is in the Lanna 8^{th} – 9^{th} month or May – June. Rice plants cultivated on a hill slope grow with rain water and do not need water logged field like rice plants grown on a plain. Farmers will clear the field by getting rid of or burning the weeds in Lanna 5^{th} month or February to prepare

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the soil to be ready for the cultivation. Holes are made using a ‘ Tang Tu stick (a round-edged stick)’ which is stabbed into the soil to create a hole for the seeds (paddies). After the seeds are put into the holes, farmers will cover the holes with earth. No logged water is needed but moisture from rain water is vital for the growth of the seedlings, which will be during Lanna 8th and 12th months or from May to September. The ears of hill slope rice grow faster than the ear of rice grown on plains. The harvest can start around the waning moon of the Lanna 12th month or around the end of September.

Season for the cultivation of hill slope rice and plain rice is counted on the bases of the waning (Duean Dap) and Waxing (Dueang Pheng) Moons. Fields on hill slopes and plains depend on seasonal rain. Farmers grant that the rainy season starts from the waxing moon of Lanna 8th month or the 15th waxing moon of May. However, if the waxing moon comes before the rainy season, farmers will shift the commencement of the cultivation to after the waxing moon of Lanna 9th month or the 15th waxing moon of June and add another month off the waxing moon of Lanna 10th month or the 10th waxing moon of July into that year. Thus, that year is regarded to have two 10th months, which is the time when it rains heavily during a Buddhist lent (Samai Yot-in, 2012: 9).

Figure 3.15 Hill slope rice grown from seeds and nourished with rain water

Rice on Plain

Rice fields on plains will be established on the low areas around the bases of hills that are lower than areas of hill slope fields. The rice cultivation is on the annual basis

and relies on water management system called a Mueang Fai which gives water to nourish the rice fields throughout a year. Farmers' rice fields are divided into lots, big or small separated from one another with dikes which also serve to direct water into the fields. A separated rice field lot is called a Pan. However, when the government started to collect tax from rice fields, the unit used is a Rai or 400 sq. was or 1,600 sq. meters (Silao Ketphrom, 1998: 13).

From a slope of a hill to a plain on a river basin, farmers will grow rice in rice terraces which are called 'Na Lan Pap' which is called so because the terraces look like the folded paper (Pap Sa) from a higher place to a lower one. Rice fields on plains at the base of hills that encompass a village are called 'Na Dons'. Rice fields with mud as deep as the legs of farmers are called 'Na Pueng Wai'. Rice fields on river basins are 'Na Lums' which have Mueang Fai systems and Luk Phats or water mills to scoop water into the fields. Some rice fields that are on a syncline plain, which are lower than Na Lums, are called 'Na Hongs'. A rice field with mud as deep as the knee of farmers is called a 'Na Pong'. The levels of pitch start from the plain on a hill base to the plain on a river basin. Farmers use their agricultural wisdom by classifying areas and identifying the water management systems and types of plants to fit the areas and water systems.

Figure 3.16 Rice field on hill base plain, with rice plants grown from seedlings and nourished with water from Mueang Fai system

Figure 3.17 Minor ditch to deliver water to rice field to nourish rice seedlings during cultivation season

Figure 3.18 Rice fields from hill slope to plain on river basin

3.7 Water Sharing and Water Distribution in Mueang Fai System

Water Sharing

Water sharing or water allocation is carried out simultaneously with the clearing of the land to establish a rice field. The ditches are dug to deliver water to all rice fields in the network. The Tao Na or the entrance of water to a rice field is built from 3 – 4 bamboo sticks that are stabbed into the land around the Pak Tang Na (or the water gate for the rice field) in order to divide water to each rice field in the fair manner. In certain sub-districts, there are a great number of members. Thus, the committee must determine the width and height of 'Khon Tae' (bamboo sticks) in order to ensure fair water sharing. Water sharing can be divided into 2 types, namely, sharing by rice fields and sharing for the needs of Luk Fais (members of a Mueang Fai system).

1) Sharing of Water by Rice Field

This is the sharing of water on the basis of rice fields owned by each member. For instance, a Mueang Fai system might determine that a member who has one Rai of rice field (1,600 sq. m.) may have 1 Tang (unit) of water whilst a member who has 2 Rais (3,200 sq. m.) of rice fields may have 2 Tangs of water, but a member who owns more than 10 Rais of rice fields may have no more than 3 Tangs of water. This is the

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sharing of water by the proportion of land owned by each member in order to limit the amount of water lest any member has too much water.

2) Sharing by the Need of Member

This water sharing regime is practiced by a Mueang Fai system that has a great amount of water, is located at the base of a hill, and has few members. Thus, each member can have as much water as they want. The system is the same as those of big Fais. However, since the amount of available water is great, water can be allocated in accordance with each member's need.

Water sharing has to be fair and just. Sometimes, a Fai Lum (a Mueang Fai on a plain) may have insufficient water for the cultivation. Members can 'buy water, which is the way to allow members whose rice fields is in the areas that water cannot reach to get water. Mueang Fai committee has the right to allow water purchase because each committee member has more water than other members. Thus, the excessive water can be sold to requiring members. Thus some parts of the committees' revenues are incomes from water sale, as follows.

> *…Kae Fai of Mueang Luang (Luang Mueang Fai System) in Om Koi District has received money from the 'sale of water' to two members, in the total amount of 8,000 baht…* (Phonphilai Loetwicha, 2009: 69)

Water Distribution

Water distribution is the thorough delivery of water from the beginning of Mueang Fai to the end. In general, in a water season, there is sufficient water for water sharing, but at the end of the rainy season and in a dry season, the amount of water decreases. Rice fields at the end of the Mueang Fai (the end of each irrigation ditch) will suffer from the lacking of water for their agricultural areas. Thus, members can request water distribution to the end off Mueang Fai. Kae Fai and the committee will have a meeting with all members to consider water provision called 'Pan Nam'. The quorum of the meeting will determine the day on which water will be distributed to areas that receive water from small ditches that are called 'Mueang Sai Kai' from the first Tae to the last one, or

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depending on Khon Taes (bamboo sticks) and the number of members, which must not be inferior to 10. Water distribution is the implementation of the principle of justice to provide water during a normal time and to solve problem of water shortage during a dry season. Sharing, mutual sympathy and assistance are included in the ideal concepts of water use in Mueang Fai system.

A request for water distribution will be considered by the quorum of a Mueang Fai meeting. All members will learn about the problem together at the same time that what villages are experiencing water shortage and how many days they want to get water. All attendants to the meeting will share ideas with one another. The members from areas at the end of the Mueang Fai will ask other villages to distribute water to the villages that do not have water. Once the quorum approves, the days of water distribution are determined and Kae Fai will assign Lam Nam to announce to all members. The announcement must be made 1 – 2 days before the water distribution so that members at the beginning of Nueang Fai will store water in their rice fields. On the day of water distribution, Kae Fai will close all Khon Taes and Pak Mueangs (water gates) of all the upstream ditches in order to direct water to the ditches that need water. Kae Fai will write announcements of water closure at all Khon Taes and all the water gates of all minor ditches to notify the day of water closure and the penalty rate against any one that steals water. The ditches that are closed but need water can notify Kae Fai. Such an announcement is called 'Bai Cha Laeng', as follows.

> …"*7th October 2006, for this Tae, the Leader and Assistant will let the water run through from 7th to 10th October 2006. If there is any question, please ask the Leader. Violation subjects to 500 baht fine*… (Phonphilai Loetwicha, 2009: 69).

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Water distribution is a way to reduce conflict, solve water shortage problems, and promote fairness in water management. Even though it cannot completely eliminate water shortage problems, it encourages members who are farmers using the same water source to help one another on the bases of fairness and equality of the Mueang Fai system, which promote peacefulness and generosity among members.

3.8 Mueang Fai Contract

A Mueang Fai Contract is a document that records the agreements on water use of a Mueang Fai organization, containing rules, regulations and codes of conducts, voluntarily agreed between the committee and members of the Mueang Fai in order to control the use of water in the Mueang Fai system. Thus, the Mueang Fai Contract serves as the set of regulations that all members have to adhere to. Even though the contract has no legal effects, it has to be complied with in a strict manner. It incorporates provisions related to punishments in all levels, from warning, reconciliation and settlement, to penalty or prohibition from water use for severe violation.

A Mueang Fai Contract is written by copying rules, regulations and agreements in former contracts that are documents recorded with Lanna Dhamma Alphabets (alphabets of Lanna, used in formal occasions), with some changes of the names of Mueang Fai Committee members such as Kae Fai, Lam Nam and Liap Nam, and rates of penalties. Contents of a Mueang Fai Contract are concurrent to societal and economic changes in the temporary periods, which reflect the conservation of conventional conducts from generation to generation and the retention of the form of the organization and rules and regulations that focus on fairness and equality. At the same time, a Mueang Fai Contract has some drawbacks. First, it is not enforceable to people who are no members of that Mueang Fai. Secondly, a Mueang Fai Contract has become a tool for negotiating the benefits with people who are no members of the Mueang Fai, such as the group of people who live in the upstream area on a high mountain, and business groups in midstream areas and downstream areas, which also benefit from Mueang Fai, such as the following example about the drafting of agreements in a Mueang Fai Contract:

1. Agreement on the appointments of Kae Fai, Kae Fai's Assistant, Lam Nam, Treasurer and Other Committees;
2. Agreement on the Determination of Terms of Kae Fai and Mueang Fai Committee;

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3. Agreement on Acceptance of Powers and Responsibilities of Kae Fai and Mueang Fai Committee and the Dissolution of Disputes among Members and between Members and Committee;
4. Agreement on Remunerations for Kae Fai, Kae Fai's Assistant and Other Committees;
5. Agreement on Annual Mueang Fai Meeting;
6. Agreement on Days, Time and Workloads for Repair and Maintenance Works of Weirs, Dikes and Other Compositions of Mueang Fai;
7. Agreement on Application for Memberships and Membership Fee;
8. Agreement on Water Purchase;
9. Agreement on Exceptions for Ill Members Who Cannot Work;
10. Agreement on Penalties for Members Not Doing Mueang Fai Works, such as Cleaning, Dredging, Repairing and Other Works Requested by Kae Fai and Committee, and Penalties for Kae Fai and Committee Failing to Perform Tasks;
11. Agreement on Penalty for Member Not Presenting in Mueang Fai Meeting;
12. Agreement on Penalties for Member Not Bringing Mueang Fai Repair Tool;
13. Agreement on Penalty for Water Stealth;
14. Agreement on Price of Water Bought from Kae Fai;
15. Agreement on Rules for Water Distribution such as water distribution must be requested by 10 or more farmers or there must be the distribution of water queue tickets in case of water shortage;
16. Agreement on Penalty for Intruder into Ditch or People Damaging a Ditch; and
17. Agreement on the Ceremony to Offer Foods to Phi Fai Concerning Date, Time, Offerings and Expenses, such as to offer 2 pigs, one of which is white and the other is black, and 12 chickens, and each member has to pay 30 baht (Phonphilao Loetwicha, 2009: 96 – 97).

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3.9 Mae Sa River Basin and Mueang Fai System

Mae Sa River is a branch river of Ping River. Located in the northern side of Ping River, this bending river has many branch water streams that flow to many ponds and pools around the bases of hills in the northern side off Mae Sa River. Mae Sa River Basin is in the center between Samoeng District and Mae Rim District in Chiang Mai Province. The nortern part is adjacent to Mae Rim River, the southern part is adjacent to Doi Suthep – Pui Mountain Line, the eastern side is adjacent to Mae Rim District and the western side is adjacent to a mountain line in Samoeng District. Mae Sa River runs through 4 districts, namely, Pong Yaeng, Mae Raem, Mae Sa and Don Kaeo, covering 22 villages in total. The coordinates of the river basin in the 1:5,000 map is 47461, covering the space to receive rain water around 142.30 sq. km. or around 86,737 Rais (Land Development Department, 2003: 5).

The geographic attributes of this river basin are complicated mountainous ranges the heights of which range between 340 to 1,460 meters, with the pitch of the area being around 29%. Most of the space is on Mae Sa Noi Hill, Mon Khwam Long Hill and Pa Kha Hill; and there are also small spaces of the basin that are a plain on the base of a hill in Pong Yaeng Sub-districts and a plain at the downstream area of Mae Sa River which is the location of communities in Mae Rim District. Most space of the basin is covered with forest in the area of Doi Suthep – Pui National Park with various kinds of forest and local flora such as mountainous jungles, deciduous dipterocrap forests, mixed deciduous forests and grasslands. The terrain features of Mae Sa River Basin are slope land, wavy land, valleys and waterways. The earth features are sandy loam in grey colour with capability of holding and absorbing water. The areas hat are the apexes of mountains are covered with mountainous jungles with the soil that has moderate levels of acidity and high ratios of organic matters and low agglomerate rates of soil particles. Such soil is vulnerable to washing and landslides. On the mountain slopes, the soil is laterite in reddish brown colour with low fertility and moderate rates of collapse. The soil on the plains is highly fertile but contains a high amount of pebbles on the surface due to strong water current (Land Development Department, 2003: 6).

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Mae Sa River is originated from Nam Sa Mountain and runs from the west to the east, from Ban Kong Hae Village, to Ban Pong Yaeng Nai Village and Ban Pong Yaeng Nok Village in Pong Yaeng Sub-district, Ban Mae Mae Village, Ban Nam Tok Mae Sa Village, Ban Pa Muang Village and Ban Huai Cho Village in Mae Raem Sub-district, Ban Tha Khrai Village, Mae Sa Noi Village and Mae Sa Luang Village in Mae Sa Sub-district, until it meets Ping River at Ban Sop Sa Village, Mae Sa Sub-district, Mae Rim District, Chiang Mai Province. The width of the river is around 3 – 6 meters and the length is around 24 kilometers. The river has 20 branch streams that run to many ponds, as follows:

(1) Suwan Stream
(2) Na Lieu Stream
(3) Me Cha Stream
(4) Mae Na Phra Stream
(5) Mae La Mun Stream
(6) Pong Khrai Stream
(7) Than Stream
(8) Nong Hoi Stream
(9) Pha Ta Stream
(10) Di Mi Stream
(11) Tat Stream
(12) Na Wai Stream
(13) Mae Sa Noi Stream
(14) Phan Si Stream
(15) Mae Mae Stream
(16) Mae Luat Stream
(17) Mae Nai Stream
(18) Rin Stream
(19) Mae Sa Roi Stream
(20) Lower Mae Sa Stream

Branch streams that flow to Mae Sa River are short; thus, when it rains, the water floods very fast. The main Mae Sa River has the average pitch of 5.16%, but in the upstream area, the average pitch is as high as 14.54%, and the downstream area has the average pitch of 0.64%. The water current is strong (Land Development Department, 2003: 6 – 7).

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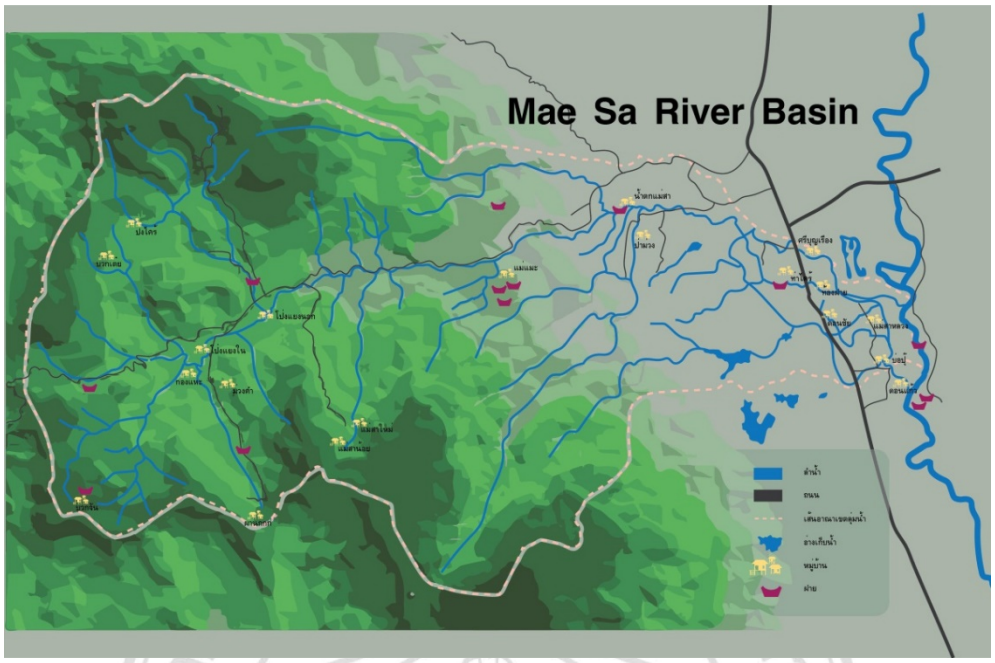

Figure 3.19 Branch stream running to Mae Sa River

Therefore, it is necessary that the construction of a weir to slow down the water current and to deliver water to farmers must be at an area that suits the pitch of the terrain features. Chao Dara Rasami Weir and Ditches were built at an area on the base of a hill the address of which is Village 1 Mae Raem Sub-district, which has become an attraction for tourists who want to visit Mae Sa Waterfall. This ancient weir distributes water agricultural fields in 4 villages, namely, Ban Name Tok Mae Sa Village, Ban Pa Muang Village, Tha Khrai Village and Ban Rim Tai Village, covering the area of around 5,000 Rai. This Mueang Fai was built in 1933 as a bamboo weir to block Mae Sa River, and relying on the waterfall rocks as buffers to absorb the force from water current that runs through the slope area. With many branch streams that meet and merge with one another, this Mueang Fai has a great amount of water during the rainy season. This Mueang Fai covers three waterways, namely, Mae sa River, Mueang Chao Ditch and Khong Ditch. The river and the two ditchs are curvy along the contour and height of agricultural fields and villages. Water in a ditch is divided with Puns or Taes that are Watergates made from bamboo sticks to block the water in the ditch so that the water level is higher until the water spills to minor ditches which deliver water to each rice field. In the past, this Mueang Fai system had members from 3 villages who gathered together to form a Mueang Fai organization with Kae Fai, Lam Nam, Liap Nam and members as typical ancient Mueang Fai organizations, clear rules and regulations that are strict, and customs to repair and fix Mueang Fai on the annual basis (Long Mueang Ti Fai). At present, each village has around 5 -6 farmers who use water because others have changed their

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careers to become workers. Rice fields have been turned into housing estates, resorts and hotels. Long Mueang Ti Fai custom is forgotten. In addition, water from the upstream is used for tourism, and provision of pipe water in residences and hotels. Rules and regulations of Mueang Fai are not enforceable to people who are no members of Mueang Fai. There is unfair use of water throughout the river. There are disputes over water during a dry season because branch streams run dry and there is insufficient water for agricultural works and production of pipe water. All the aforementioned problems and issues lead to the pursuance for ways to rehabilitate forest which will lead to the creation of water sources for communities through Mueang Fai – related wisdoms that have deeply rooted into the society and culture and can be applied to the building of the conscious of members of local communities so that they will love and treasure natural resources and water sources.

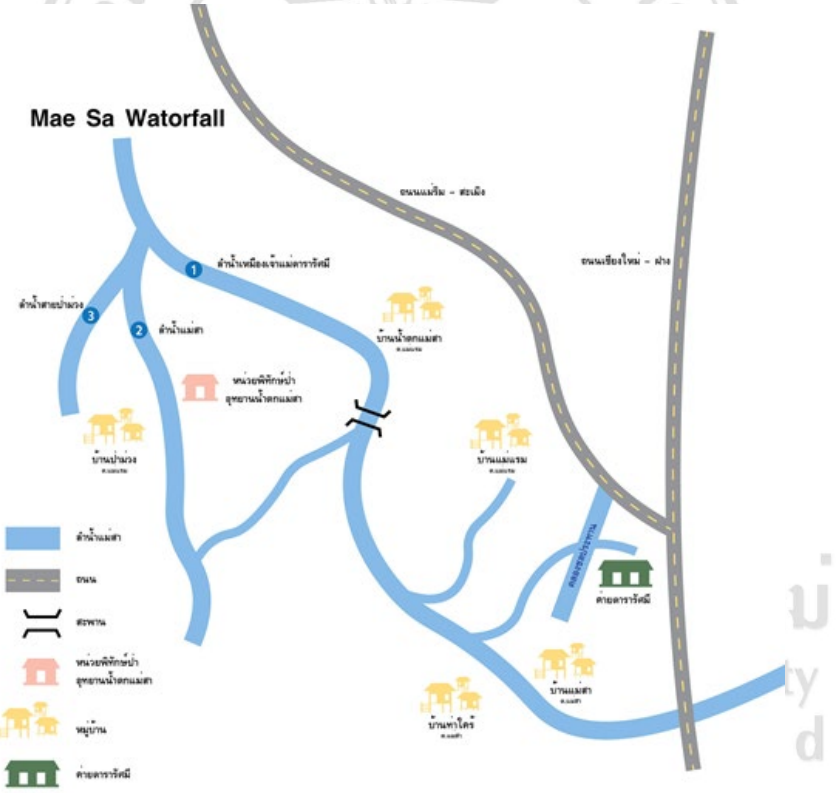

Figure 3.20 Chao Dara Rasami Mueang Fai with 3 Waterways, or Mueang Chao, Mae Sa River and Khong Stream

Figure 3.21 Current Conditions of Chao Dara Rasami Mueang Fai or Mueang Chao on Mae Sa River Basin

Figure 3.22 Amount of water at the ridge of a weir or over the weir during a dry season

Figure 3.23 Local farmers piling up sandbags as weir to direct water o their rice fields during the cultivation season

3.10 Community and Problems Concerning the Use of Water from Mae Sa River, from Upstream to Downstream

The problems related to water shortage during a dry season and the floods during a water season are mainly caused from the retention of water to be used in the agricultural fields and tourism businesses from upstream areas to midstream and downstream ones. The upstream forests are the origins of all water streams and rivers. There are water springs that create small streams along the slopes of mountains in the area of Pong Yaeng Sub-district, Mae Rim District, Chiang Mai Province, which include 9 villages that are the upstream forest communities of Mae Sa River. Such villages are Ban Pong Yaeng Nai, Ban Pong Yaeng Nok, Ban Mueang Kham, Ban Kong Hae, Ban Pong Khrai, Ban Buak Chan, Ban Pang Lung and Ban Pha Nok Kok Villages. There are no less than 13 water springs the water from which creates water streams that run to gather together to form Mae Sa River in Pong Yaeng Sub-district. People in such communities are local and hill tribe people. Most of them are farmers and owner of tourism-related businesses. The communities use water for agricultural purposes. In the past, most farmers were the locals who grew rice and few kinds of crops; but now, the water is used for commercial agriculture to grow a variety of crops such as cauliflowers, flowers, bell peppers, onions

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and strawberries. Such crops need a great deal of clean and high quality water. Thus, the farmers build pipelines to direct water from the springs and branch streams to their personal retention ponds or wells so that they can use water in their fields and orchards. This decreases the amount of water in the streams that are the origins of Mae Sa River. Hence, currently, there is less water in the river than in the past. In addition, such water retention by farmers is not governed under any rule, regulation or restriction; thus, the use of water has become disadvantageous since the level of the upstream forests.

Figure 3.24 Sap Huai Nam Un Spint at Ban Pong Khrai Village, Pong Yaeng Sub-district, Mae Rim District, Chiang Mai Province, a resourceful spring with water for the entire year, flowing to streams that flow to Mae Sae River

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Figure 3.25 The use of pipelines to direct water from the spring, there are a great number of pipelines in different sizes which reflect the absence of the agreements on water use, which is a cause of water shortage during a dry season

Problems concerning the retention of water from upstream forests lead to the decreasing amount of water at the midstream and downstream areas of 3 sub-districts, namely, Mae Raem Sub-district, Mae Sa Sub-district and Rim Tai Sub-district. The major issues are draught and floods, which cause problems to water users in midstream and downstream areas. In a dry season, there is insufficient water for agricultural activities or for the production of pipe water for villages and districts. For instance, there was a water shortage crisis in 2015 when farmers from Mae Sa River Basin had a dispute with Provincial Waterworks Authority of Mae Rim over the use of water during the summer when Mae Sa River had insufficient water for the non-seasonal rice cultivation (Na Prang) and crops and the waterworks authority could not supply water to al users. Such insufficiency led to the conflicts in the area of the river basin, which had never taken place before, which was affected from the increasing need for water each year.

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การประปาส่วนภูมิภาค
Provincial Waterworks Authority

ประกาศ

การประปาส่วนภูมิภาคสาขาแม่ริม

เรื่อง สถานการณ์ภัยแล้ง

ด้วยในปัจจุบัน การประปาส่วนภูมิภาคสาขาแม่ริม ประสบปัญหาปริมาณน้ำดิบในลำน้ำแม่สา มีปริมาณไม่เพียงพอต่อการผลิตจ่ายน้ำประปา สามารถสูบขึ้นมาผลิตได้น้อยมากเนื่องจากภาวะภัยแล้งฝนไม่ตกตามฤดูกาล ทำให้ในขณะนี้ กปภ.สาขาแม่ริม ต้องดำเนินการผันน้ำจากสถานีผลิตน้ำแม่ริม ๒ เข้ามาช่วยจ่ายในพื้นที่ฝั่งทางทิศตะวันตกของถนนโชตนา เริ่มตั้งแต่กองการสัตว์และเกษตรกรรมที่ ๓ ไปจนถึงถนนเส้นรด.หนองย่อ แต่เนื่องจากแรงดันน้ำจากสถานีผลิตสน้ำแม่ริม ๒ มีแรงดันน้ำน้อย จึงจะส่งผลกระทบให้น้ำประปาไหลอ่อน และอาจจะไม่ไหล ในบริเวณ ดังต่อไปนี้

- กองการสัตว์และเกษตรกรรม ที่ ๓ - กองพลทหารราบที่ ๗ - กองพันสัตว์ต่าง - หมู่บ้านธนารักษ์ และร้านค้าบริเวณห้วยตึงเฒ่า - ส่วนราชการที่อยู่ในบริเวณคันคลองชลประทาน – หมู่บ้านสวัสดิการทหาร - บ้านพักศูนย์ราชการจังหวัดเชียงใหม่ (๗๐๐ ปี) - ศูนย์ประชุมนานาชาติจังหวัดเชียงใหม่ - บ้านพักที่อยู่ในบริเวณศูนย์ราชการจังหวัดเชียงใหม่ - บ้านพักที่อยู่ในบริเวณถนน รด.หนองย่อทั้งหมด

ดังนั้น จึงขอให้ประชาสัมพันธ์ข่าวให้ลูกค้าได้ทราบถึงสถานการณ์ภัยแล้ง ที่คาดว่าจะมีระยะเวลายาวนานไปจนถึงเดือนกรกฎาคม ๒๕๕๘ และจึงขอให้ลูกค้าได้โปรดสำรองน้ำไว้ใช้ในช่วงที่น้ำประปายังไหลเป็นปกติ หรือไหลอ่อน หากสถานการณ์น้ำดิบเข้าขั้นภาวะวิกฤต กปภ.สาขาแม่ริม อาจจะต้องประกาศจ่ายน้ำเป็นช่วงเวลา ซึ่งในขณะนี้ยังถือได้ว่า**ไม่วิกฤต** แต่ต้องเฝ้าระวังน้ำดิบทุกชั่วโมง ลูกค้าสามารถติดตามสถานการณ์จากภัยแล้ง และติดต่อสอบถามข้อมูลเพิ่มเติมได้ที่หมายเลขโทรศัพท์ ๐-๕๓๒๙-๗๒๕๓ ,๐-๕๓๒๙-๗๗๗๖ หรือ Call Center ๑๖๖๒ และ www.facebook.com/prapamaerim

จึงเรียนมาเพื่อโปรดทราบ และขออภัยในความไม่สะดวกมา ณ โอกาสนี้เป็นอย่างสูง

(นายนพดล ปั้นรัตน์)

ผู้จัดการการประปาส่วนภูมิภาค

สาขาแม่ริม

Figure 3.26 Announcement of draught crisis in 1985 when Mae Rim Provincial Waterworks Authority could not provide sufficient or thorough water services in Mae Rim District and Chiang Mai Governmental Center

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On the contrary, in the rainy season, water from Mae Sa River floods over the area causing loss and damage to midstream and downstream areas, especially to households by the riversides and agricultural zones that are frequently flooded. Natural tourist attractions like Mae Sa Waterfall must be closed. Such problems occur every year, partly because of the abandonment of water and forest management and lacking of Mueang Fai systems that the ancestors had built. When there are draught and floods, people are in

troubles. Most people think that such problems are irrelevant to them, and that the government and in-charge authorities should be responsible for the problems. This is because people have overlooked the roots of Mueang Fai system which is based on harmony of the society of water users.

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Figure 3.27 Strong current of Mae Sa River in rainy season causing the closure of tourist attractions and problems related to floods over agricultural zones

Figure 3.28 Community leaders, officials of Royal Forest Department and officials of Environment Office of Chiang Mai Province discussing the problems and solutions to the water use crisis on 7th July 2016 Mae Sa Waterfall, Mae Raem Sub-district, Mae Rim District, Chiang Mai Province

3.11 Application of Mueang Fai Wisdom to Building Water Sources for Communities

As for problems related to the abandonment of Mueang Fai and water crises that the communities face with, there are two solutions as follows:

(1) To build small weirs to retain water and slow down water current; and

(2) To hold rites to urge community members to be conscious for rehabilitating the water sources.

3.11.1. The build small weirs around the forest can retain water in minor streams during dry season and slow down the water current during water season. Since Mae Sa River Basin is an area of upstream forest with Mueang Fai (weirs and ditches) systems of communities and natural tourist attractions, communities, governmental

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authorities, Buddhist monks, schools and people from outside the area work together to solve problems concerning water sources for local communities. The main principle of the construction of weirs is to slow down water current in several intervals in a stream using bamboo sticks, wood, rocks and concrete to build small weirs. The activity to build weirs begins with the survey on the area where minor streams meet with one another and flow into Mae Sa River. In the area, there are small weirs that have been built long time ago, but those weirs are in bad conditions. Hence, to repair existing weirs and to build new ones are important activities for the rehabilitation of Mueang Fai system. Local people, community leaders and officials of Royal Forest Department will work together in order to conclude the number of weirs to be repaired, the required tools and materials, and the appointed date and time for the repair of Mueang Fai, which should be at the beginning of the rainy season. The repair of weirs is the replacement of old wood that has worn out by the weather and environs with new ones. Rocks are piled up to block a stream; and then, around 1 – 1.20 meters long sticks are hammered into the ground as poles along the two sides of rock pile before being crossed with hard wood sticks at the ridge and the bottom of the weir. Afterwards, bamboo sticks will be hammered with a hard wood hammer into the ground for the depth of around 70 – 80 centimeters. The lengths of the built small weirs rank between 3 and 5 meters/ weir. There are around 60 – 100 villagers and youths who attend each weir repair project. After the weirs (Fai) are repaired, the stream will be dredged with hoes. The scooped earth is put in cans and dumped in areas around the weir. Afterwards, villagers and all workers will eat foods that they have prepared with one another. Thus, this can be granted as an activity to promote harmony.

The management of water sources of communities with Mueang Fai wisdom is to build small weirs to slow down water current and too store water in minor stream with natural materials in the local areas, in order to solve problems about draught and strong water current. Weirs around minor streams, the spillage of water, the difference of heights of weirs and the manipulation of water directions into and out of weirs and back to the stream are elements of the wisdom emerging from traditional Mueang Fai system, which ensures the sufficient amount of water for the use throughout a year.

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Farmer in the river basin, who use traditional weirs can run their agricultural fields and share water with other water users.

Figure 3.29 Repair of small weirs in branch stream around Mae Sa Waterfall, Mae Raem Sub-district, Mae Rim District, Chiang Mai Province, for retaining water and slowing down the water current on 21st August 2016

Figure 3.30 Dredging of mud around the ridge of weir to be dumped in an area around the weir, called Kaem Fai (the cheeks (sides) of weir) on 21st August 2016

Figure 3.31 After repair, weir can retain water and slow down water current in minor stream

Figure 3.32 Water retention by rock weir after dredging, and the capability of slowing down water current of minor stream on slope

The activity to rehabilitate Mueang Fai wisdom relies on the mobilization in the form of a Mueang Fai organization, which promotes the harmony and mutual assistance in managing water sources of communities, maintaining Mueang Fai, steams and river of the communities in order to have water for using in the entire year, and supporting one another with labor, materials and tools, and foods, all of which are the activities that reflect harmony in the villages. In addition, youths, governmental agencies and external private organizations also participate in the activities, which creates a new social space between villages and natural public facilities through traditions of communities and new forms of activities with the root of Lanna culture. The public facilities or assets are called 'Khong Na Mu', and have the implications of the consciousness, morality, respect to nature, beliefs and societal values, justice, sharing, and sacrifice of labour, tools and money, all of which are collectively called 'Khong Na Mu' in Lanna.

(2) To hold rites to urge community members to be conscious for rehabilitating the water sources

(2.1) Feast for Phi Khon Nam (Food Offering Rite for Water Guardian Spirits) and Rite to Consecrate Water (Suep Chata Nam) are the implementation of Lanna beliefs in Phi Khun Nam (water guardian spirits) and rain evocation that are linked to Mueang Fai systems. Yot Santasombat (1999) proposed that the feasts for Phi Khon Huai (guardian spirits of water sources) , water consecration rites and tree ordination rite (Buat Pa) are tactics for building people' s consciousness and promoting the mobilization of communities to conserve forest and to understand the linkage among earth, water and forest, all of which have effects on one another. This is especially true in case of the beliefs in Phi Khon Nam which symbolize the power that conserve forests and the harmony and mobilization of community members to conserve their forests. Norms, traditions and sacredness are foundations for systematizing the relationships among individuals, communities and natural resources. Beliefs in sacred beings in the forests lead to the respect to forest and awareness of good things that forests provide to human beings. Thus, Mueang Fai organizations work on water management and act as media with moral implications between the conservation of upstream forests and the promotion of sustainability in the livings of members in communities. The relations between upstream forests and

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production systems of communities lead to authoritarian idealism to manage the relationships between communities and upstream forests through the beliefs in Phi Khon Nam. Communities will worship Phi Khon Nam on yearly basis in order to express their gratitude to Phi Khon Nam for guarding upstream forests and providing water for the productions by communities. The relations to upstream forests have turned Mueang Fai groups that are responsible for guarding upstream forests into communal organizations that have strength and power to have political negotiation in the communities in high levels (Yot Santasambat, 1999: 153 – 154).

The locals of Mae Sa River Basin use the area of Mae Sa Waterfall as the place to hold the ceremony to feast Phi Khon Nam and to consecrate water. People will listen to the sermon about the story of the King of Bullet-Headed (Snake-Headed) Fish (Matcha Phraya Pla Chon). The arrangement starts with the preparation of the site for the ceremony, and (1) the step to feast Phi Khon Nam whereby containers (most of which are made from banana leaves) are prepared for containing Siamese vodka, a pair of chickens, rice, flowers, and candles and joss sticks; and (2) the step of water consecration whereby the ceremonial materials and tools are placed on the river and linked to Buddha images and Buddhist monks at the site with sacred threads, which are also woven to have many dangling parts so that all attendants can wear them around their heads while the monks are chanting. Wood is carved to be a pair of bullet-headed (snake-headed) fish to be placed in the stream while the monks are giving sermon about the King of Bullet-Headed (Snake-Headed) Fish (Matcha Phraya Pla Chon).

The ceremony begins with the worship of the four gods that guard the four directions of the world in order to summon the angels to bless the merit making ceremony. Afterwards, there is the rite to give offerings to Phi Khon Nam, such as a small jar of local spirit, a pair of chickens, betel nuts and cigarettes. Lua people and Thai (urban people) people in Lanna have worshipped Phi Khon Nam (water guardian spirits) and Phi Khun Huai (water stream guardian spirits) for a long period of time, and believe that Phi Khon Nam are retaining are releasing water from mountains to rivers and water streams so that farmers can use water to run their agricultural fields. Farmers who use water from Ping River and branch streams will pray for water from Khon Luang Balankha or Wilankha who was a King of Lua Tribe

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in Raming City thousand years ago, whom farmers regard as a Phi Khon Nam and ancestral spirit. The worship will chant (Ham Ha) to Khon Luang Balankha with the following words.

> *…Khon Luang Balankha Rat Chao, please come to receive the offered foods and eat them. From this moment, this day, this month, this year to the future, please bless us.* ***Please grant us water and rain so that people can plough their fields and grow rice and crops. Please do not let our crops die due to the heat and draught.*** *Please keep all the dangers away from the town. Khon Luang Balankha, please come to drink the spirit and eat foods…*
> (Duangkaew Saninat, 2005: 6).

After the chanting to invite Phi Khon Nam, people will place offerings for Phi Khon Nam by the river bank; and there are 9 monks to chant the verse to consecrate water. From the altar, there are sacred threads that link Buddha images to monks to the marquee (Khong Chata) in the stream and the altar. The marquee is built with three big poles, 108 small poles, one ladder and 1 pair of wooden ladders each of which is around 2 meters long. The top of all the components are tied together until the components spread out at the end in the shape of a tent. The marquee is surrounded with a light fence, with trunks of banana plants, sugarcane plants and reeds tied at the four corners. The marquee contains the materials used in the ceremony, which are betel nuts and cigarettes that are threaded with 3 silver threads and 3 golden threads to the marquee, white fabric, red fabric, a mat, a pillow, shoots and seedlings of banana, sugarcane, coconut and reed, a pot, 108 lights, a thread as long as a human height soaked with resin for to be lit (Si Sai Khi Phueng Kha Khing), a vertical fabric flag as long as a human height (Tung Kha Khing), 108 water containers and 108 sand containers, 1 bowl of paddies and 1 bowl of milled rice grains, 1 bunch of coconuts and 1 bunch of bananas. The top of the marquee is tied with 108 bunches of flags. The materials in the marquee are the offerings for angels to bless the attendants with the longevity of life. The verse chanted in the consecration is Unnahassawichaiyakhatha which is a chapter of Lanna blessing verse mentioning the incident when Lord Buddha went to Daowaduengsa Heaven to bless his mother by

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chanting the sermon of 7 doctrines, and there was an angel whose name is Supatitathita who had been in the Daowaduengsa Heaven for a long time but in the next 7 days, he would have to die from the heaven to be reborn in hell where he would suffered the punishments for hundred thousand years. After the life in hell, he would be reborn as 7 kinds of animals for 500 lives for each kind. The angel was very worried about the visions that his angel friends had about Supatitathita, with 4 omens, namely, the withering of heavenly flowers, the dull aura of his body, the dullness of his costumes and the uncomfortable feelings when he put on the costumes. Thus, Supatitathita went to see Indhra God and asked him to extend his life in heaven but the god said that he could not change the destiny. Therefore, Supatitathita went to Lord Buddha who chanted the Unnahassawichaiyakhatha to the angel. With Lord Buddha' s power, Supatitathita regained his aura, youthness and long life until he died from the heaven and was reborn as a human being and eventually became Maitreya (Udom Rungrueangsi, 1999: 7977 – 7978).

The consecration ceremony and the materials and tools used in the ceremony are the imitation of the sacredness nd power of the chanting in order to bless the water. After the chanting, monks will give the sermon on Matcha Phraya Pla Chon (King of Snake-Headed Fish), which is believed to evoke the rain and to solve the draught-related problems with Buddhist verses. The altar is set up and a piece of wood carved as two snake-headed fish (some areas may use clay molded in the shapes of two snake-headed fish) surrounded by sculptures of hawks, herons, crows and vultures. The monks chant Mahasamai Sutta verse 12 times to evoke the rain before giving the sermon on Matcha Praya Pla Chon. After the sermon, monks chant Sukho Bddha Sutta verse (Bunkhit Watcharasat, n. d. : 11) . Afterwards, Pu Achan (Makkhathayok – the manager of the temple chants the verse to praise the snake-headed fish and prays for the rain in order to prevent draught and ensure sufficient water. After giving offerings to the monks, the monk will bless all the attendants and all attendants receive blessing and pour water onto the earth. The principal monk sprinkles sacred water upon all attendants, and the attendant release fish into the river to end the ceremony.

According to Jataka, Lord Buddha, before reborn as Lord Buddha, used to be reborn as a King of Snake-Headed Fish living in a pond. Once, there was

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serious draught and all crops died. Water in the pond was dried off and fish and all creatures living in the pond was eaten by vultures, hawks, crows and herons. The King of Snake-Headed Fish looked up into the sky and prayed that even though he was carnivorous, he had never caused troubles to any other animal. The seat off Indhra God then became hard and heated, so Indhra God ordered Walahok Angel to sprinkle the rain all over the land (Silao Ketphrom, 1998: 98 – 104). Therefore, the Jataka of Matcha Phraya Pla Chon has become the verse chanted to evoke rain.

The ceremonies and rites to feast Phi Khon Nam, to consecrate water and to chant the Matcha Phraya Pla Chon Verse, are arranged in order to make the locals show respect to the nature in order to solve the draught-related problems. For the locals, rites and ceremonies are significant because they make them become aware of the conservation of forest and water sources, build harmony and create the 'common' space for the socio-cultural interactions.

figure 3.33 The fest for Phi Khon Nam of Mae Sa River at Mae Sa Waterfall, Mae Raem Sub-district, Mae Rim District, Chiang Mai Province, on 7th July 2016

Figure 3.34 “Marquee on Mae Sa River” at the place for the ceremony of water consecration, 7th July 2016

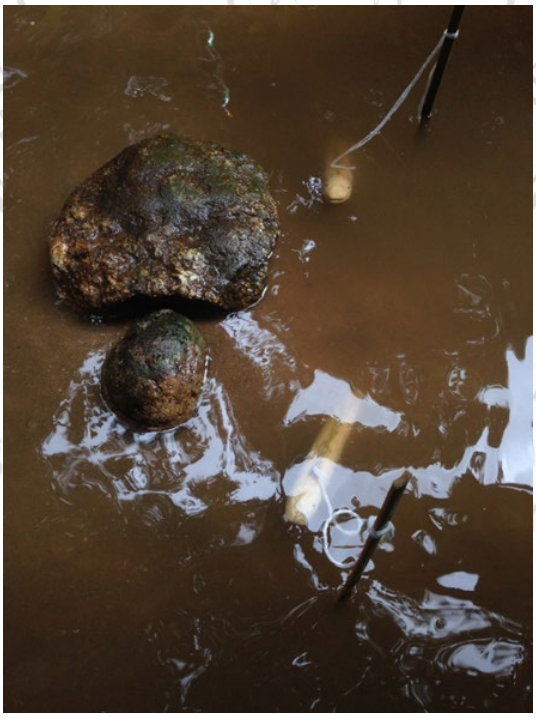

Figure 3.35 Wood carved a snake-headed fish to be released into water in order to imitate the place where the sermon on Phraya Pla Chon is given

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3.11.2 The ceremony to offer trees to monks in order to turn deforested areas into upstream forests has the rationale to offer some plants as common resources under the Buddhist religion. Nobody owns these resources. It is believed that these trees and plants will be cherished with the power of Lord Buddha and protected by monks lest anyone destroy these plants and trees and the entire forests. This ceremony is like the ordination ceremony for trees where trees are regarded as ordained ones, but this ceremony grants that the trees and plants offered to monks and grown on the earth belong to Buddhist religion or the three gems of Buddhism.

This ceremony begins with the installation of a big fabric on which an image of Lord Buddha is painted on a big tree. The attendant will worship the three gems in Buddhism with flowers, candles and joss sticks, and the monks will chant. Afterwards, the attendants offer trees to monks and plant the trees in the forest area. Leaders of communities in Mae Sa River Basin, officials of the National Park and youths and students help one another plant trees, receive blessing and pour water onto the earth and the planted trees, and the ceremony is over. This ceremony to offer trees to monks reinforces the respect to forests and water, with reliance on the divinity of Lord Buddha, Lord Buddha's teaching and Buddhist monks which are believed to protect and sustain the forests. The respect to such divinity has protected forests, water and communities for a long time. The abandonment of Mueang Fai is related to the decline of the power of forests and water. Thus, it is necessary to apply the ceremonies that are based on local beliefs in order to promote the mutual supports and assistances among communities, water and forests, which will balance the user and resources, or forest and water, and communities in the ecological system.

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Figure 3.36 Ceremony to offer trees to monks, to be planted in the forest, on 21st August 2016

Figure 3.37 Youths and community members offering trees to be planted in the forest for forest rehabilitation on 21st August 2016

3.12 Conclusion of the Study on Lanna Mueang Fai Wisdom and Communities in Mae Sa River Basin, Mae Raem Sub- district, Mae Rim District, Chiang Mai Province

From the study on Lanna Mueang Fai wisdom and communities in Mae Sa River Basin, Mae Raem Sub-district, Mae Rim District, Chiang Mai Province, 9 new bodies of knowledge on Lanna Mueang Fai wisdom are discovered, namely, (1) forms of weirs, (2) ditches, (3) dredging and maintenance for weirs and ditches and ceremony to feast Phi Fai (guardian spirits of irrigation weirs and ditches), (4) Mueang Fai organization, (5) rules and regulations about the use of Mueang Fai, (6) relations between Mueang Fai systems and rice fields on hill slopes and plains, (7) water sharing and water distribution in Mueang Fai systems, (8) Mueang Fai agreement, and (9) case of the rehabilitation of Mueang Fai wisdom in Mae Sa River Basin, Mae Raem Sub- district, Mae Rim District, Chiang Mai Province. The details are as follows.

3.12.1 The principle of water management with Mueang Fai system is to build weirs that suit the geographic features, such as the those of the plain areas on the base of a mountain or the plain areas on a river basin, with the reliance on the leverage of the terrains to manipulate water into – out of rice fields and to distribute water to all members. Water is shared among upstream, midstream and downstream users, from the plains on bases of the hills to the plains on the river basin; and the excessive water is discharged into the river. Weirs are built in 3 different forms, namely, bamboo weirs, hardwood weirs and rock weirs, depending on the suitability with the area. For instances, on a plain on the base of a hill, the amount of water is great but the water current is not strong, so people will build weirs with bamboos and hardwood, but in a stream with strong water current in rainy season, the weir will be built with rocks in order to be capable of slowing down the strong water current.

3.12.2 Delivering water to rice fields, weirs will force water to the designated ditches in order to deliver water through the ditches which are used for managing water for all members. A ditch includes several sub ditches that direct water to each rice field in the fair manner. The excessive water is released to the major ditches and river. Thus, Mueang Fai system is like a 'network' to expand waterways to areas of several villages and sub- districts, building relationships and bonds among members of a Mueang Fai system.

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3.12.3 The dredging and maintenance of weirs and ditches and the ceremony to feast Phi Fai are the ceremonies and rites that are related to the use of water by all member. The dredging (Long Mueang) of the ditches will facilitate water flow. The maintenance of weirs (Ti Fai) is the repair of weirs with the mobilized materials and tools once a year. After the ceremony of Long Mueang Ti Fai, members will hold a ceremony to feast Phi Fai to pray for sufficient water. The ceremonies of Long Mueang Ti Fai and the Feast for Phi Fai are the harmony of people with beliefs and respect to the nature.

3.12.4 A Mueang Fai organization is a group of water users, which is established in order to manage water on the basis of the principles of fairness and justice. Members have to select a leader and committee members, each of which has a specific work term. Members work together to determined rules and regulations for using water together. The committee is responsible for distributing water to all members, prevent the violation against each member's rights, and punish a member who has violated others with different measures, from light ones to the one related to the elimination of the right to use water. The Mueang Fai organization concept has existed from the past to the present, with the development in terms of the committees from traditional ones to the ones working with governmental authorities on water management. This local organization is flexible to the local farmers who use water. However, some Mueang Fai organizations might have caused the loss of the structure of water management by communities or the complete delegation of the water management tasks to governmental agencies. Thus, the maintenance of weirs and ditches decreases, so does the relationships among farmers who use water from the same sources.

3.12.5 Rules and regulations for use of Mueang Fai, which have been implemented since the ancient time, serve as traditional laws that have been legislated for water management and protection for the rights of water users. Thus, rules and regulations on the use of Mueang Fai are examples of ancient laws that have been passed on to people of new generation, in the forms of written records or memoranda of agreements on water sharing. Regulations and rules have to be strictly adhered to. In the past, the punishments for offences ranked from light to severe ones. Since the number of water users was great, there had to be rules and regulations that were the agreements on water use among members of a Mueang Fai group, which was in the form of Mueang Fai Contract.

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3.12.6 Relations between Mueang Fai system and rice fields on hill slopes and plains are what a group of water users face with n accordance with the systems and types of their rice fields. Cultivation areas on a plain on a hill base and n a river basin can receive water from Mueang Fai system which directs water to the fields, nourishing the crops and supporting the lives of aquatic creatures. Also, climate conditions affect the water management with Mueang Fai system as well.

3.12.7 Water sharing and water distribution in Mueang Fai system are effective forms of water management that concurs with the systems of the rice fields and the needs for water. In water season, there is sufficient water. On the contrary, at the end of the rainy season or in a dry season, some areas may have insufficient water and request for water for their fields, a Mueang Fai system can assist members through the activities of water sharing and water distribution which reflect the generosity among members of a Mueang Fai system.

3.12.8 A Mueang Fai contract us a document that records the agreements on water use among all members of a Mueang Fai system, drafted by members and enforced to all members. A Mueang Fai contract of a Mueang Fai system has effects on members of that system. It reflects the water management by local communities and generosity among water users.

3.12.9 The case of rehabilitation of Mueang Fai wisdom in Mae Sa River Basin, Mae Raem Sub-district, Mae Rim District, Chiang Mai Province, focuses on the problems related to the abandonment of Mueang Fai and the solutions to the water crisis faced by local communities. From the study, it is discovered that there are 2 ways to solve the crisis, with the collaboration from community members, namely, (1) to build small weirs to retain water and to slow down water current, and (2) to use ceremonies and rites to build consciousness of community members in water source rehabilitation.

The study on and the implementation of Mueang Fai wisdom leads to the arrangement of activities to build local people's consciousness on water use in the future. The built weirs retain water for forests and give water to users. In rainy season, weirs can slow down water current and in a dry season, weirs enable people to have water for their consumption. The activities studied in this project promote harmony between people of older generations and those of new generations, and build interactions between members of local communities and people from several outside organizations and agencies.

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As for the use of rites for urging the consciousness of community members on water source rehabilitation through the restoration of Mueang Fai system, such as the feast for Phi Khon Nam (water guardian spirits), the consecration of water and the offering of trees to the forests, they create the gratitude to forests and rivers, respect to the nature and harmony among members of communities.

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