

FARMER IRRIGATION ASSOCIATIONS
AND FARMER COOPERATION

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A brief history of farmer irrigation organizations in Thailand and a description of the Lam Pra Plerng Irrigation Project provide explanation and background for evaluating Water User Associations in Northeast Thailand. Conditions affecting the achievement of goals established for the Water User Associations are described. Factors examined include the 1) history of the irrigation project and the physical environment as these factors influence farmer willingness to adopt new agricultural and water management practices, 2) relationship between the dependence of farmers on irrigation and the ability of Water User Associations to attract members, 3) ability of Water User Associations to exert leadership among farmers, and 4) impact of meetings of Water User Association's on the agricultural and water management practices of farmers.

INTRODUCTION

Minimizing the public cost of operating and maintaining irrigation systems is a goal of government irrigation agencies. To achieve this goal, agencies in many countries expect farmers to conserve water, obey water schedules, maintain farm ditches, and eventually finance the administration and maintenance of the system. Farmer organizations are an instrument for achieving these objectives.

In Thailand, the Royal Irrigation Department (RID) emphasizes two types of farmer organizations: the Peoples' Irrigation Associations (PIA) and the Water User Associations (WUA). The organizational structure of PIAs and WUAs is based on that of the traditional irrigation associations which evolved among farmers in northern Thailand decades ago. In 1965, the Thai Ministry of Interior tried duplicating the success of the traditional associations in organizing farmers to operate and maintain irrigation systems through its RID projects. The Ministry extended legal recognition to the traditional associations and named them PIAs. New PIAs were then established within the framework of RID projects. In 1967, RID similarly established WUAs in Northeast Thailand.

The basic difference between the two organizations is that the PIAs are legally independent of the government whereas the WUAs are under the legal control of RID. Nonetheless RID has the same objectives for both associations. They are: 1) to provide the means whereby farmer members can learn yield increasing techniques, water conservation methods and

of maintaining the system; and 2) to serve as a forum for exchanging information on irrigation and agricultural practices.

In 1963, RID began constructing the Lam Pra Plerng Irrigation Project in Northeast Thailand (Map 1). The project is an open-channel, gravity-flow irrigation system designed to supply water for increased agricultural production and to alleviate a severe domestic water shortage. Four WUAs, Kaset Samakee, Wan Waree Wong, Amphoe Choke Chai and Amphoe Muang have been organized in the system area to aid farmers in realizing the maximum potential of the system.

The purpose of this paper is to evaluate the extent to which the WUAs at Lam Pra Plerng have attained the goals they were envisioned to accomplish. First, a brief description of the Lam Pra Plerng Irrigation Project is given. Second, the WUAs are evaluated by examining 1) elements of the physical environment and project history that affect farmer attitudes toward the WUAs; 2) how selected elements of the physical environment affect the WUAs' ability to attract members; 3) the effect of leadership; and 4) the effect of WUA meetings on the attainment of WUA goals.¹

THE LAM PRA PLERNG IRRIGATION PROJECT

The inadequacy and seasonal distribution of rainfall create major problems for farmers in Northeast Thailand. The monsoon climate has a distinct wet season that generally lasts from late May to late October. However, most rainfall is lost to the farmers for it quickly percolates through the sandy soil. In the dry season, evapotranspiration is intense and water for both agricultural and domestic use is scarce.

The Lam Pra Plerng Irrigation Project which encompasses 12,000 hectares, was built by RID to help improve the economic and living conditions of farmers. During the 1973 wet season, 7,500 hectares were cultivated, representing an increase of 2,400 hectares in the total area cultivated owing to project water deliveries. Dry season cultivation increased from virtually nothing to about 1,100 hectares in the same year. In addition, the project provides year-round domestic water for more than 25,000 residents.

¹This paper is based on personal interviews conducted at Lam Pra Plerng with RID personnel, WUA presidents and farmers and on the results of a questionnaire administered to 151 (3 per cent) of the farmers using irrigation water in the project. The interviews and the questionnaire survey were conducted by the author in 1973.

Traditionally, farmers in the Pra Plerng River Valley, as in other Northeast valleys, did not have a system of water management for maximizing everyone's yield when water was scarce. Nor did they engage in sustained efforts to obtain water cooperatively. The only form of cooperative water control was evident prior to the wet season when groups of two or three farmers would build small diversion dams in the river to increase the probability that the stream would overflow its banks and floodwater would reach their fields. If enough water overflowed from the river, everyone received sufficient water for their fields; otherwise, only those nearest the stream received an adequate supply. No cooperative action was undertaken to distribute floodwater in a way that all farmers could obtain maximum yield from at least a portion of their land. Instead, the water was allowed to flow *naturally* even if only a few of the fields received enough to irrigate a crop.

On the other hand, farmers in northern Thailand not only built diversion dams, but also constructed a network of canals and farm ditches. These traditional farmer-built-and-operated, gravity-flow irrigation systems are physically more complex. Hence, an intricate social organization evolved which allocated among farmers the tasks necessary for the maintenance of the network.

In these traditional systems, equitable distribution of water is achieved by placing structures in the channels which divert water to the fields in proportion to the amount of land to be irrigated (Frutchey 1969). The social organization governing the irrigation system is based on the concept of continuous water distribution.² All farmers receive sufficient water only when enough is available for all fields at once. Otherwise only those near the water source may receive sufficient water. In essence, this distribution pattern is similar to that obtained where no distribution network is built, and the demands made on the farmers with regard to water-sharing are the same.

An important feature of modern irrigation systems is that the flow of water to all fields is often not continuous. To achieve maximum productivity within the system when water is scarce, water delivery is rotated among fields. Distribution is equitable only when groups of farmers take water for specified periods of time. They must stop taking water on schedule, even if they have received only enough to irrigate a part of their fields, in order that farmers downstream may have enough to irrigate a similar portion of their land.

The practice of rotational irrigation implies that farmers within modern irrigation systems must be organized not only to constantly maintain the system -- an accomplishment of traditional systems -- but also

²Continuous distribution of water is also a feature of traditional irrigation systems on Bali (Geertz 1972: 27-28) and in the Bicol Region, Luzon (VanderMeer 1973).

to use water in a radically different manner. This presents the supervisors of modern irrigation systems with a problem that is not faced in traditional systems.

At the Lam Pra Plerng Irrigation Project, RID distributes water to the primary water delivery unit, called the water zone, on a rotational basis (Table 1 and map pp. 10,11). The distribution schedule is based on the availability of river water. Zone One receives water continuously since the land is too high to be flooded. The other zones receive flood-water in addition to project water. Zones Five, Six, and Seven are entitled to irrigation water for a longer period of time because they are farthest from the dam. Less irrigation water reaches these regions due to delivery losses.

TABLE 1
WATER DELIVERY SCHEDULE

<u>Zone</u>	<u>Times Available</u>
One	Continuously
Two	1 P.M. Friday to 12 A.M. Sunday
Three	1 P.M. Friday to 12 A.M. Sunday
Four	1 P.M. Friday to 12 A.M. Sunday
Five	12 A.M. Sunday to 1 P.M. Friday
Six	12 A.M. Sunday to 1 P.M. Friday
Seven	12 A.M. Sunday to 1 P.M. Friday

RID is responsible for ensuring that the water is delivered to the farm-turn-outs in each water zone. Once the irrigation water flows through the farm-turn-out into the main farm ditch, its distribution is viewed as the farmers' responsibility. Each water zone is divided into areal subunits called chaeks, the area served by a farm-turn-out and main farm ditch. The farmers within each chaek decide whether or not they want to take water according to a schedule. In practice, water distribution within the water zones is subject to RID approval and if water is scarce, RID can impose schedules.

Farmer adjustment to these new methods of water delivery, to new cultivation techniques and farm ditch maintenance is a slow process. Government irrigation agencies alone can not spontaneously win the farmer cooperation necessary to ensure efficient and effective implementation of new methods, practices and techniques. The WUAs were established with a view to helping the farmers adjust to these types of changes.

THE PROJECT PHYSICAL ENVIRONMENT AND HISTORY

The physical environment and history of any irrigation project potentially influences farmer willingness to adopt new agricultural and water management techniques and to assume such responsibilities as digging and cleaning farm ditches. At Lam Pra Plerng, the main elements of the project history and physical environment which were found to influence farmer willingness to adopt new techniques and responsibilities include: 1) the time of WUA establishment relative to the time of initial water delivery; 2) the areal coverage of the water zone; 3) the distance from the water zone to the project headquarters and dam; and 4) the topography.

Establishing the WUAs prior to the initial delivery of irrigation water enables the WUAs to begin educating the farmers in new agricultural and water management techniques before they become accustomed to using traditional methods in the new situation. The size of the water zone determines the number of farmers that the zoneman must supervise and educate. The distance of the water zone from the project headquarters and the dam affects the extent of government extension effort and amount of water a zone receives. Topography determines the degree to which an area is dependent on irrigation water.

WUA Establishment and Water Delivery

At Lam Pra Plerng, RID did not organize the WUAs until after water deliveries had begun (Table 2). The WUAs were thus not available to

TABLE 2

DATES OF ASSOCIATION ESTABLISHMENT AND WATER DELIVERY

<u>Association</u>	<u>Date Established</u>	<u>Zone</u>	<u>Date Water Delivered</u>
Kaset Samakee	1969	1	1967
Wan Waree Wong	1970	2	1967
		3	1967
Amphoe Choke Chai	1970	4	1969
		5	1970
Amphoe Muang	1971	6	1970
		7	1970

help farmers learn the cooperative behavior and implement the techniques necessary to effectively use and maintain their new irrigation system. The period of initial water delivery is a significant time for farmers to modify their behavior and adopt new techniques. The farmers are less resistant to modifying old practices because the new situation conceivably

calls for corresponding innovations in behavior. If farmers continue using traditional techniques and find that they suffice, the WUAs have greater difficulty persuading them to adopt new techniques at a later time.

Water Zone Coverage

The areal coverage of the water zone determines the number of contacts the zoneman has with individual farmers (Table 3). The Lam Pra Plerng Irrigation Project is divided into seven water zones. A zoneman, a full time RID employee, is responsible for maintaining the canals and laterals, as well as helping farmers solve their water problems and plan

TABLE 3
POPULATIONS AND AREAS OF WUAs AND WATER ZONES

<u>Association</u>	<u>Water Zone</u>	<u>Number of Farm Households</u>	<u>Area (Hectares)</u>
Kaset Samakee	1	837	690
	subtotal	837	690
Wan Waree Wong	2	824	2,045
	3	1,056	2,020
	subtotal	1,880	4,065
Amphoe Choke Chai	4	583	1,890
	5	950	1,580
	subtotal	1,533	3,470
Amphoe Muang	6	463	2,050
	7	819	1,740
	subtotal	1,282	3,790
TOTAL		5,532	12,015

cropping patterns for better water management. The zoneman's ability to help farmers largely depends on the extent to which he can interact with each individual farmer on a periodic basis. The greater the number of contacts between the zoneman and individual farmers the greater the chance that the farmers will adopt new methods (Roling 1970: 1). The larger the zone, the greater the distances that the zoneman has to cover; similarly, the more farmers he must supervise and contact, the less time he can spend with each farmer to satisfactorily deal with their problems.

At Lam Pra Plerng, more farmers know of the zoneman and have contact with him in Zone One, the smallest zone, than in Zone Three, one of the largest zones.

Distance From Project Headquarters and Topography

Distance from the project headquarters determines the amount of extension aid provided farmers. Most extension activity takes place in Zone One because it is nearest the project headquarters and thus easiest for extension personnel to reach. Assuming that extension activity is positively related to farmer willingness to learn, the effect is likely to be felt most in Zone One.

Distance from the dam determines the amount of irrigation water that farmers receive. The greater the distance, the less water remains available to farmers due to evaporation, seepage, and misuse. Topography likewise determines the amount of flood water that farmers receive, and consequently the extent of their dependence on project irrigation water.

Before project irrigation water was made available, only Zones Two, Three, and Four received adequate water from the river through flooding. Much of the land in Zones Five, Six, and Seven is either too high to be flooded conveniently or too low to prevent a crop from drowning. Most of Zone One is too high to be flooded. Because the soil in Zone One is also too porous to retain rain water, it was either uncultivated or planted in dryland crops.

With the introduction of the new irrigation system, Zone One received a dependable supply of water. The farmers took advantage of this and began planting paddy. The higher incidence in Zone One of farmers cleaning their farm ditches when water is scarce may therefore be related to their comparative dependence on irrigation water, since they have no alternative sources. Moreover, the generally porous nature of the soil necessitates the distribution of water as quickly as possible, for the longer it takes to distribute the water the more is lost by seepage. If water can not flow easily through the ditches because of silt or weeds, the farmers are compelled to keep them clean.

Distance from the dam and topography also influence farmer willingness to build farm ditches. RID prefers that farmers build their own farm ditches. However, to encourage farmers to begin using irrigation water as quickly as possible, RID designed and built farm ditches in each zone. The scope of each network was based on the availability of flood water. The sparsest networks were built in Zones Two, Three, Four, and Five; denser ones in Zones Six and Seven; and the densest in Zone One.

By adding their own farm ditches to the network, farmers can improve their access to irrigation water. Farmers will do this where they are dependent on irrigation water and where the supply is reliable. At Lam Pra Plerng, these conditions occur in the zones with the denser RID built networks. The farmers in Zone One are dependent on irrigation water and

thus realize the advantage of improving their access to the system. Moreover, being near the dam site, their area has a reliable supply of irrigation water, therefore ditch digging offers immediate rewards and would not be the wasted effort that it would apparently be if the supply of irrigation water was erratic or limited. In Zones Six and Seven where farmers are also dependent on irrigation water but where the supply reaching them is erratic and limited, fewer farm ditches were added. In Zones Two, Three, Four, and Five farmers installed very few farm ditches because they have little reason for doing so. They usually receive sufficient water from the natural flooding of rivers and are not as dependent on project water from the irrigation system.

Through their effect on the availability of water, distance and topography likewise influence farmer willingness to observe irrigation schedules and to make informal agreements on the distribution of water. RID would like farmers to take irrigation water according to a schedule, since scheduling conserves water and maximizes the area that can be irrigated. At Lam Pra Plerng, less than one-fourth of the farmers use irrigation water according to a schedule. Most of those who do are in Zone One. This concentration of farmers who adhere to the schedule, may be due to the availability of water in Zone One where farmers need not worry about getting enough water within the allotted time.

Where farmers do not have formal water schedules, they often make informal agreements on how to distribute water. The agreements generally concern getting water through farmers' fields rather than sharing it sequentially among groups of fields along a ditch or canal. Because these agreements are usually made where there are no farm ditches to carry water directly to all fields, they indicate that it is not always necessary to build a dense and costly farm ditch system in order for farmers to work together to equitably distribute water. One disadvantage of having water flow through many fields, however, is that it increases the probability of farmer conflict over water. A policy decision must thus be made as to whether the amount of money saved and the amount of farmer cooperation generated by building a sparse field ditch system outweighs the potential for farmer conflict.

ATTRACTING MEMBERS

Regular membership within the WUAs is limited to persons whose main occupation is farming within the irrigation project area and who pay a membership fee. To be truly successful, WUAs must ultimately attract as regular members all or nearly all farmers within their jurisdiction. Achieving this is difficult because of irregularities in water distribution within WUA areas. Farmers with fields located where water is difficult but not impossible to obtain are more likely to perceive the need for working within a WUA whereas those who can easily obtain water generally do not. Nevertheless, it is necessary to obtain the cooperation of the latter group in conserving water and achieving the other objectives

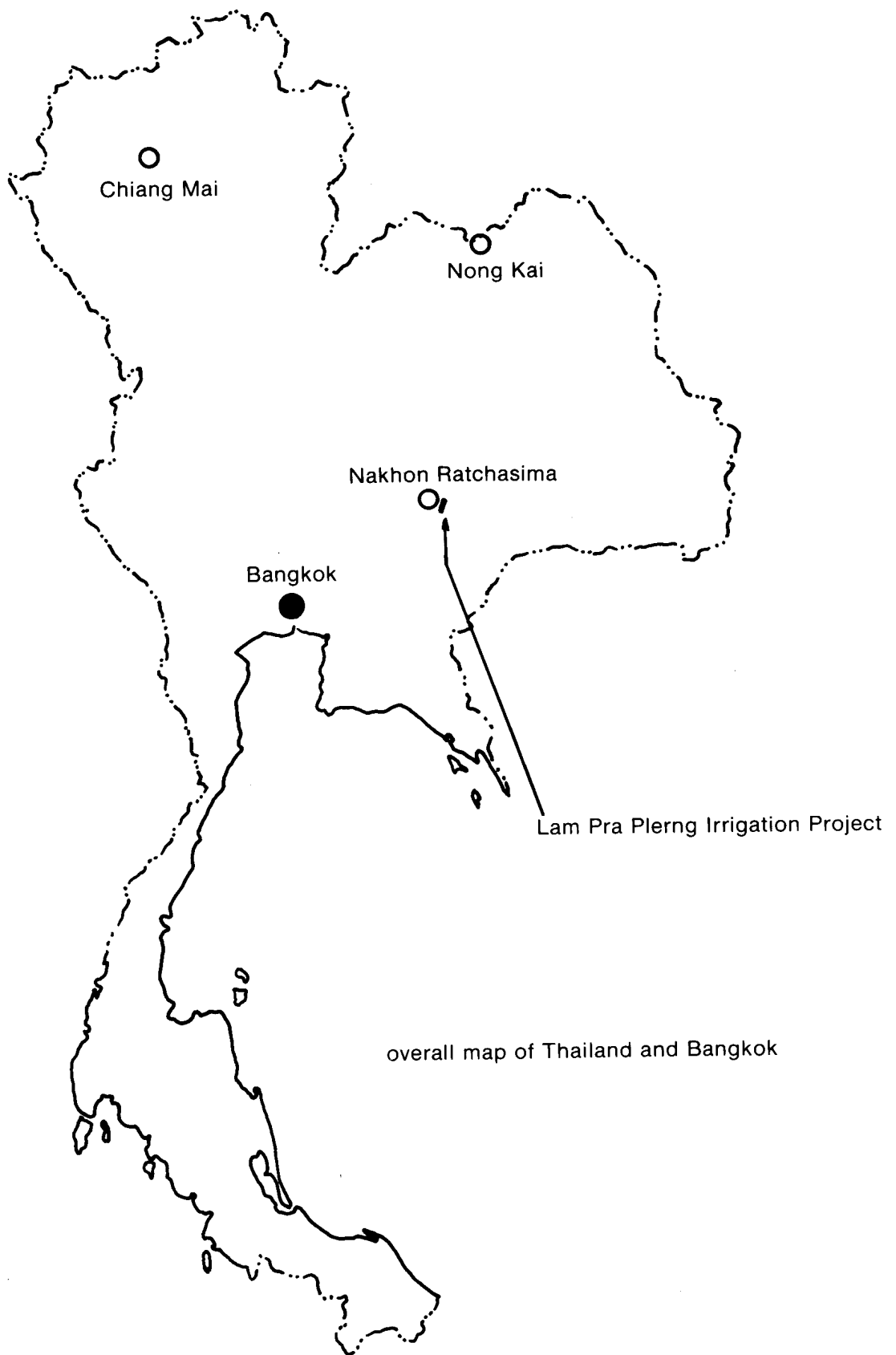
of the association. One possible means of encouraging farmers to work with the WUA is for the WUA or RID to establish a system of rewards and punishments.

At Lam Pra Plerng, WUAs try to attract as many members as possible by offering member farmers preferential access to water. The farmers are skeptical of this promise however, since there is no practical way that the WUA or RID can prevent a non-member from breaching an earthen farm ditch and diverting water to his field before the water reaches a member's field down-ditch.

Given the physical state of the irrigation system, it is unlikely that the WUA can offer any rewards that directly derive from water management. To achieve its objectives, the WUA must, however, convince the farmers to join or to cooperate. The WUA can accomplish this by convincing the farmer that 1) he needs irrigation water to grow his crop; 2) he will receive enough irrigation water if the other farmers cooperate; 3) other members will join with him to persuade non-members and errant members to cooperate; and 4) if farmers do not cooperate and ignore the social pressures of their peers, a set of legally enforceable punishments can and will be used against them.

The efficacy of such a system of rewards and punishments has been demonstrated at Lam Pra Plerng. Although all WUAs use the same inducement of preferential water delivery, the ratio of members to non-member farmers is highest within the jurisdiction of Association Kaset Samakee, possibly for three reasons. First, it is the only area where farmers have been punished for not maintaining the farm ditches. The Project Manager has withheld irrigation from certain main ditches until the affected farmers cleaned their farm ditches. Second, this action was particularly effective because the farmers had no alternative source of water. Third, the supply of water to farmers in the area is so dependable that farmers know they will all get enough water if they do not misuse it.

Such a system of environmental constraints combined with moral and legal pressures should enable the WUAs to achieve their objectives of persuading farmers to conserve water and clean farm ditches, even if initially only a minority of the farmers become members. The member farmers would decide on water delivery and farm ditch cleaning schedules. Cooperation in implementing these decisions would be ensured by the constraints and pressures. The cooperating but non-member farmers could then opt either to remain outside the decision-making process or join the WUA and help make the decisions. Hence, voluntary membership could proceed naturally from each farmer's awareness of the need to work with others in order to adequately irrigate his fields.



overall map of Thailand and Bangkok

LEADERSHIP

If water users are to work together to achieve WUA objectives, leadership is needed among the small group of farmers who cultivate land within irrigation subunits of WUA areas. Leaders are needed to provide water management training for farmers, to devise water schedules, and to organize farm ditch maintenance. Currently, leadership within WUA areas at Lam Pra Plerng is expected to come from members of the WUA Administrative Committee and from the common irrigators who are responsible for the distribution of water within the chaeks.

The Administrative Committee administers the affairs of the WUA but Committee members do not provide leadership to small groups of farmers. The manner of election and duties of Committee members are prescribed in the Rules and Regulations of Water User Associations, established and promulgated by RID. An evaluation of WUA leadership requires an examination of these rules and regulations in relation to actual practices at Lam Pra Plerng.

Administrative Committee members are elected by regular and ex-officio members of the WUA. Regular members can be elected to any office within the WUA. Ex-officio members include teachers, village headmen, commune committee members, and sanitation committee members within the project as well as province council members and RID officials within the province in which the WUA is located. Ex-officio members are eligible for election to all offices except that of president. In addition, a third category of members are invited to join because they have contributed to the advancement of the WUA. These are the Honorary Members.

In the Lam Pra Plerng WUAs, election procedures differ from those set forth in the Rules and Regulations. Members vote only for the president. The runner-up for the position of president becomes the vice-president. The president then appoints all other officers (Table 4).

The Rules and Regulations stipulate that WUA presidents must be elected from among the regular members who must be full-time farmers. The rationale behind this is the farmer's intimate knowledge of farming practices and problems, which ideally would enable him to help other farmers and to gain their cooperation. This view, however, tends to overlook the administrative aspect of a president's functions. Recognizing this discrepancy, the Project Manager at Lam Pra Plerng prefers the presidents to have administrative experience, gained through service as a teacher or as a government official. Unfortunately, this view misses the important need for the WUA to also provide other leaders who can gain farmers' support by working closely with small groups of farmers.

Without the support of such leaders, neither type of president, farmer or administrator, can effectively manage a WUA. To support this assumption, the presidents of Association Kaset Samakee, a farmer, and of Association Amphoe Choke Chai, a retired school teacher, are compared

TABLE 4
WUA OFFICERS AND
THEIR OCCUPATION

<u>ASSOCIATION</u>	<u>POSITION</u>	<u>OCCUPATION</u>
Kaset Samakee	President	Farmer
	Vice Presedent	Farmer
	Vice President	School Principal
	Secretary	Farmer
	Treasurer	Farmer
	Greeter	Farmer
	Registrar	Farmer
	Eight Committee Members	Farmers
Wan Waree Wong	President	Commune Headman
	Vice President	Commune Headman
	Vice President	Farmer
	Secretary	School Principal
	Assistant Secretary	Farmer
	Treasurer	Farmer
	Assistant Treasurer	Farmer
	Greeter	Farmer
	Registrar	Farmer
Amphoe Choke Chai	Assistant Registrar	Farmer
	Eight Committee Members	Farmers
	President	Retired School Teacher
	Vice President	Retired Government Worker
	Vice President	Village Headman
	Secretary	School Principal
	Treasurer	Retired Government Worker
	Greeter	School Teacher
	Registrar	School Principal
Amphoe Muang	One Committee Member	Village Headman
	Six Committee Members	Farmers
	President	School Principal
	Vice President	School Principal
	Vice President	Commune Headman
	Secretary	School Teacher
	Assistant Secretary	Village Headman
	Treasurer	School Teacher
	Assistant Treasurer	School Teacher
	Greeter	RID Employee
	Assistant Greeter	RID Employee
	Registrar	Assistant Village Headman
	Assistant Registrar	Farmer
	One Committee Member	Commune Headman
	One Committee Member	Village Headman
	Two Committee Members	Farmers

and evaluated on the basis of their WUA's 1) ability to collect fees, 2) disseminate information, and 3) organize farmers to maintain farm ditches.

Collection of Fees

The Rules and Regulations stipulate that WUAs are to collect an entrance fee and an annual membership fee from all regular members. This money serves as a revolving fund for improving the irrigation system and for the business expenses of the WUA. It requires good leadership and efficient water service to get the farmers to pay these fees since farmers, like everybody else, are not inclined to pay fees.

At Lam Pra Plerng, WUA members have paid only the 20 baht (US \$1.00) entrance fee but not the annual membership fee. The two WUA presidents do not differ in their ability to collect the annual membership fee -- neither collects it. Most members do not even know why the entrance fee was collected and are unwilling to pay more until they receive better water service - a requirement over which the WUA has no effective control.

Dissemination of Information

Teaching members how to conserve irrigation water and how to use it to obtain higher yields is a primary objective of the WUA. The president of Association Amphoe Choke Chai indicated that his association has organized a water management training program to achieve this objective. Compared to those in other associations, however, fewer farmers in his association say that they have received information on how to use irrigation water. On the other hand, the president of Association Kaset Samakee noted that his association has not undertaken a formal training program, but does disseminate water management information on an informal basis. His members tend to corroborate this assertion although they also might have acquired their information. Consideration must be given to the government's extension activities within the area, through which farmers might have acquired their information.

Maintenance of Farm Ditches

The task of maintaining farm ditches requires dynamic leadership if it is to be done cooperatively. No farmer indicated having received supervision from the president or any other WUA official with regard to farm ditch maintenance. For the farmers at Lam Pra Plerng, leadership in water management and maintaining farm ditches does not emanate from the leader of the WUA, regardless of his administrative or farming background. If leadership comes from anyone at all, it comes from the common irrigator who has no official connection with the WUA.

Water distribution within each chaek is the responsibility of one or two common irrigators, presently employed by RID (Table 5). The common irrigator is a farmer with fields within the chaek. His main duties are to supervise the distribution of water within the chaek, arrange water and maintenance schedules and relay RID instructions to farmers.

TABLE 5
CHAEK STATISTICS

Association	Zone	Number of <u>Chaeks</u>	Avg size of <u>Chaek</u>	Number of Common Irrigators per zone
Kaset Samakee	1	24	28.7	14
Wan Waree Wong	2	16	127.9	11
	3	31	65.2	9
Amphoe Choke Chai	4	16	118.0	12
	5	12	131.2	12
Amphoe Muang	6	12	170.9	13
	7	18	112.5	19

The extent of farmer-common irrigator interaction is limited by virtue of the common irrigator's role as a representative primarily of RID rather than of the farmers. RID pays the common irrigator's stipend. By law, the farmers should pay it. In practice, they do not, and government policy is to do nothing about the situation. RID also takes an active part in the selection of the common irrigator although the farmers are supposed to choose him independently from among themselves.

At Lam Pra Plerng, the first selections of common irrigators were in 1972. The Project Manager believed farmers did not have the experience to choose a competent common irrigator. He therefore, nominated the common irrigator and farmers only ratified his decision by their vote. In 1973, the Project Manager dissociated himself from the election process, leaving it up to zonemen and farmers. In most cases, because the farmers were not used to independently selecting the common irrigator, they re-elected the man originally nominated by the Project Manager. According to the farmers, they did so whether or not they felt he did his job well, for they had no interest in who held the position.

The size of the chaek affects the frequency of farmer-common irrigator contact. The average number of farmers for whom a common irrigator is responsible ranges from 10 in Association Kaset Samakee to 60 in Association Amphoe Choke Chai. The fewer farmers in his chaek the more contacts he can have with each. It is hardly surprising, therefore, that farmers know the common irrigator in Association Kaset Samakee best and the common irrigator in Association Amphoe Choke Chai least. Throughout the project, members of WUAs meet him more commonly than non-members.

The relation between WUA membership and frequency of interaction with the common irrigator indicates that the common irrigator could function as the link among RID, WUA, and the farmers were he an official of the WUA. With the formal support of the association, he would have more authority behind his decisions. He should be able to obtain greater

compliance with his requests. Currently, the common irrigator's success depends to a large extent on his personal rapport with farmers since he has no legal powers. Should a situation arise requiring legal action, he must refer it to the zoneman. As an official representative of the WUA, the common irrigator would have farmer member peer pressure to help him obtain compliance with his decisions.

Farmer leadership is not provided by the presidents of the WUA. Regardless of their background, they are primarily administrators rather than leaders of small groups of farmers. The common irrigators have the greatest potential for providing farmer leadership, especially if they are integrated into the WUA and assigned a manageable number of 10 to 15 farmers to work with.

WUA MEETINGS

WUA meetings could be important sources of information on agricultural and water management techniques. Meetings could also provide members with an opportunity to share and exchange experiences. To educate farmers and provide them with a forum, WUA meetings should be held 1) often, 2) regularly, and 3) in places easily accessible to the members. Meetings should also maintain farmer interest by dealing with topics and problems that the members perceive as important.

At Lam Pra Plerng, the WUAs hold two types of meetings, Administrative Committee Meetings and General Meetings. Neither meeting meets the above criteria.

Administrative Committee Meetings are open to committee members only. The meetings provide committee members with a forum to discuss WUA problems. RID officials, extension agents, and agricultural credit officials are often invited to attend and provide information on water management, cropping techniques, and agricultural credit.

Because these meetings are closed to the general membership, information obtained during the meeting is expected to filter down to other farmers through the committee members. This method of disseminating information is unsatisfactory to farmers. They are not receptive to second-hand information which they are often unable to use. Since committee members are unable to adapt the information to each farmer's specific needs, they can only recount what they learned out of context, and the farmers wind up with disjointed bits of information that have no immediate relevance to their problems. The Administrative Committee Meetings, therefore, actually provide information only to a very small group of farmers.

General Meetings are held before the wet season once a year, not often enough for farmers to be kept informed of recent developments nor to reinforce previously acquired information. Meetings are held at one

location only. Many farmers do not attend because of the distance they have to walk, and they are not willing to spend extra money for transportation. In addition to these elements that hinder the flow of information, the meetings are only incidentally forums for exchange of information on agricultural and water management techniques.

The Rules and Regulations of Water User Associations stipulate that the General Meeting agenda must include an account of WUA activities for the past year, presentation of the fiscal report, and elections. After these are concluded, RID, extension, and agricultural credit officials present lectures. The officials keep their topics general, presenting salient points or informing the farmers of what is expected of them for the coming year. Although members can, in these general meetings, deal directly with the information sources, conditions are not conducive to interaction. With anywhere from 150 to 600 members attending the meetings, a farmer becomes part of the audience and has no opportunity to learn alternative methods for dealing with his field problems.

Neither the Administrative Committee Meetings nor the General Meetings, therefore, provide WUA members with a forum for discussing water management problems which in effect they have the capacity to control. Although the WUAs do not have the authority to enforce water delivery schedules, farm ditch cleaning, the building of farm ditches, or cropping patterns to conserve water, the farmers nevertheless do so under the supervision of RID. However, they need a better channel for cooperatively devising and implementing each program.

If small groups of WUA members were to meet once or twice a month, or more often if necessary to work on such problems, their interest could be enhanced and maintained. Each of the small groups should be composed of farmers with common water management problems. A group could comprise all farmers in one chaek or two chaeks, so long as they can meet in a location convenient to all and frequent enough to achieve concrete results. The farmers could then develop a sense of unity, achievement and purpose.

SUMMARY AND CONCLUSIONS

This report presented a historical and operational description of the four WUAs within the Lam Pra Plerng Irrigation Project. The conditions affecting the extent of WUA goal attainment were evaluated 1) by examining the main aspects of the project history and physical environment influencing farmer willingness to adopt new agricultural and water management techniques; 2) by determining how dependence on irrigation affects WUA ability to attract members; 3) by assessing the leadership roles available to the WUAs; and 4) by analyzing WUA meetings as a source of information on agricultural and water management techniques.

Data collected through interviews and a survey covering the main aspects of the project history and physical environment point to the following implications:

- In future irrigation projects, WUAs should be established prior to the initial delivery of irrigation water. This enables the WUAs to educate the farmers in new techniques before they become accustomed to using traditional methods in the new situation. Since the size of the water zone determines the number of farmers that the zoneman must supervise and educate, interaction between farmers and zoneman is likely to be more frequent in smaller zones. This increases the likelihood that the farmers will accept and adopt new techniques.

- The location of an area within the project plays an important role in determining WUA goal attainment. Distance from the dam largely determines the amount of irrigation water that an area receives. The nearer an area is to the dam the more water it receives and the more dependable the supply. Topography strongly influences the extent of farmers' dependence on irrigation water. Distance from the dam and topography eventually influence farmers' willingness to 1) build and clean farm ditches, 2) obey water delivery schedules, and 3) make informal agreements to distribute water.

- The availability of water affects WUA membership. It is easier to urge farmers to join and work together toward achieving the objectives of the WUA if they are dependent on irrigation water. A farmer can then be more easily convinced 1) that he needs irrigation water to grow his crops; 2) that he will receive enough water if other farmers cooperate; 3) that the other members of the WUA will join him to persuade non-members and errant members to cooperate; and 4) if farmers continue to be uncooperative, a set of legally enforceable punishments can and will be used against them.

- The WUAs need to provide a leader to small groups of farmers. The presidents of the WUAs cannot perform this role, for their function is to administer the association. The common irrigator is currently assuming this role. He can perform more effectively if he is officially connected with the WUAs. He can also serve as an information link among RID, the WUA, and the farmers.

- For WUA meetings to provide farmers with a forum for the exchange of information, the meetings should be held for small groups of farmers. They should be 1) held often and regularly, 2) at a site easily accessible to the farmers, and 3) designed to maintain farmers' interest by dealing with topics and problems that the farmers perceive as important and that they can easily solve.

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