

Water Conflicts

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About the authors

Scott R. Christensen

Research Analyst & Economist, Jardine Fleming Thanakom Securities Ltd. B.A. in Political Science and History, St. Olaf College; M.A., Ph.D. in Political Science, University of Wisconsin-Madison. Former Institution Fellow, TDRI. Former Research Fellow, Pacific Basin Research Center, Harvard University, 1992-1993. Former Fulbright-Hays Scholar, Faculty of Political Science, Chulalongkorn University.

Frank Flatters

Queen's/TDRI Project Director. B.A. (Hons.) in Economics, Carleton University; M.A. in Economics, University of Western Ontario; Ph.D. in Political Economy, The Johns Hopkins University. Professor of Economics and Associate Director, John Deutsch Institute for the Study of Economic Policy, Department of Economics, Queen's University, Kingston, Canada. Former Visiting Professor and Post-doctoral Fellow, University of Chicago. Former Visiting Fellow, University of Essex, University College London, and London School of Economics. Consultant to Economic Council of Canada, Harvard Institute for International Development, World Bank, UNDP.

Amnat Wongbandit

Assistant Professor of Environmental Law and International Law, Faculty of Law, Thammasat University. LL.B. (Hons.), Thammasat University; Barrister-at-Law, Thai Bar Association; LL.M., New York University; D. Jur., Osgoode Hall Law School, York University, Canada.

Tanet Charoenmuang

Lecturer, Department of Political Science, Chiang Mai University. B.A.(Government), Chulalongkorn University; M.A. (Russian Area Studies) Georgetown University; Ph.D. (Comparative Politics and International Political Economy) Northern Illinois University, U.S.A.

Thitinan Pongsudhirak

Lecturer in the Department of International Relations, Chulalongkorn University. B.A. (Honors) in Political Science, University of California; M.A. in International Relations, The Johns Hopkins University.

Theodore M. Horbulyk

Professional Agrologist (P.Ag.), Province of Alberta, Canada. Associate Professor, Department of Economics, The University of Calgary. B.Sc.(Agr.) Honours in Agricultural Economics, University of British Columbia; M.A. in Economics, Queen's University; Ph.D. in Economics, Queen's University. 1995 Norman A. Berg Fellow in Public Conservation Policy, Soil and Water Conservation Society. Former Head, Research Division, ARDA Branch, British Columbia Ministry of Agriculture and Food.

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Introduction

With rapid industrial development and economic growth, conflicts over the use and allocation of water have been increasing in Thailand. At the same time, government institutions have been ill-prepared to cope with this growing scarcity and degradation of Thailand's water supply. Whereas such conflicts used to be locally based, technology and infrastructure development has spread competition for water across regions and provinces, enlarging the problems of water allocation to the national level.

The Thailand Development Research Institute (TDRI), with funding from the Canadian International Development Agency (CIDA), supported a series of three case studies of water conflicts around the country, as well as three papers analyzing the institutional, legal and economic frameworks in which these conflicts occur. The three summary papers are presented before the case studies to provide some theoretical background to the reader. However, each contains reference to the case studies that follow, and in some instances refer to other summary papers.

The first paper, by Frank Flatters and Ted Horbulyk, presents an economic perspective of water conflict. The authors argue that insufficient use of economic instruments in the regulation of water use has caused waste and inequities. The current policy of "open access" has meant that more water (and the associated rents from its use) go to those with greater wealth and power. Competition for these rents will aggravate social conflict and increase economic waste.

The second paper, by Scott Christensen, argues that institutional failures that have led to the politicization of the water resource problems. The lack of appropriate public policies for managing resource allocation has meant that interest group competition and political negotiation have become more important than a well-informed technical analysis in determining the outcome of resource conflicts.

A legal overview of the North and Central region case studies is presented in the third paper by Amnat Wongbandit. The author provides a synopsis of the law as it relates to water resource allocation, and examines its applicability and appropriateness to the actual conflicts which have occurred. His conclusion is that the existing laws lack the clarity necessary to provide clear guidance in the administration of water conflicts. The vague and sometimes conflicting laws force disputants to resort to other measures to resolve the problems at hand.

The case studies that follow are taken from three of the country's four regions: the North, Central, and Northeast. The issues that arise with water allocation are based on a few "generic" types of conflict that are illustrated in the case studies.

Conflicts Over Quantities of Water

The central region study by Thitinan examines conflicts within and between river basins. They are of two types: a) conflicts over water from a single, or interconnected supply source, and b) inter-basin conflicts arising from the possibility of linking different supply sources, at some cost. The Chao Phraya basin, where the capital city, Bangkok, is located, serves many users, including farmers, urban industries, and the Electricity Generating Authority of Thailand (EGAT). Growing industrial and urban demands throughout the basin have led to water shortages during the dry season. This requires allocation choices between the north and central regions, and among uses in the central region. Diversions of water from the Mae Klong, an adjacent basin to the Chao Phraya, have been used as part of the solution, causing vociferous protests from residents of the Mae Klong basin.

The study provides an overview of the conflicting demands for water in the Chao Phraya basin. It then focusses on disputes among villagers which were mediated with varying degrees of success within the local community, and on the diversion of water from the Tha Chin and Mae Klong to the Chao Phraya basin. Economic growth and accompanying social change have accelerated the incidence of conflict over water use, and have increased the strains on traditional mechanisms for resolving disputes. Absence of market mechanisms or adequate legal or administrative alternatives have thrown more of these conflicts into the

political arena which often highlights rather than mediates conflict, and which seems incapable of devising fair or efficient solutions to important problems of resource allocation.

The ease with which village level conflicts are mediated seems to depend on such factors as the moral authority of the village headman, Unauthorized diversions of water in lined canals are clearly a violation of state property under the law, while there is ambiguity about the legal status of the same actions in unlined canals, and even on the means of communication with village residents available to the local authority. In addition it depend on whether the irrigation canal in line or unlined. Traditional usage patterns rather than economic criteria related to fairness or the value of water in alternate uses seem to be the primary basis for resolving conflicts when they arise; in other words, dispute resolution seemed to be primarily over issues related to common property rights. As is illustrated in cases studied in the northern region (see below), changes in local communities arising from rapid economic change are likely to put increased pressure on traditional mechanisms for conflict resolution.

The Mae Klong diversion issue illustrates a kind of institutional weakness that could lead to major conflicts and allocation failures in the future, as inter-basin transfers are looked upon as an option for dealing with interregional imbalances in water demand and supply. The current system for dealing with inter-basin transfers is highly centralized. But the authorities do not seem to base decisions on the economic value of water in the different basins, and there are no clear rules or means for payment by and/or compensation of affected groups. The clear constitution of some kind of basin water authorities, with the ability and the power to discuss and negotiate water transfers from lower to higher valued uses, is an alternative which would prevent interregional conflicts from becoming increasingly acrimonious and decreasingly amenable to satisfactory solutions.

The northern region study by Thanet Charoenmuang also examines water conflict in irrigation systems. Issues here concern both the allocation of water among competing users and the maintenance of the systems themselves. Conflicts have been increased by rapid demand growth, and by the entry of non-traditional users into the system. Rapid urban development in highland Chiang-Mai has led to increased upstream use of water which feeds into agricultural irrigation systems, with no apparent legal or administrative mechanism for

resolving conflicts or for evaluating the value of water in competing uses. Pricing has rarely been a major means of allocating water in systems administered by the Royal Irrigation Department (RID). Weaknesses and ambiguities in the legal framework, which have become more apparent as shortages become more acute, have thrown conflict resolution into the political arena, with little success in achieving fair or efficient solutions. The spread of non-resident ownership of agricultural land has also led to breakdowns in traditional mechanisms for maintaining and contributing to the upkeep of *muang fai* or traditional irrigation systems in the Chiang Mai area. As traditional allocation mechanisms break down with rapid economic and social change, new systems will have to be found. Without this, conflict will escalate and water allocations will become increasingly inefficient.

Allocations often tend to be inefficient because means do not exist for prioritizing water uses according to their contribution to the country's economic needs. Systems of "first grab" rights or allocations according to political influence often mean that water gets allocated to relatively low valued uses while much higher valued uses are unmet. Absence of mechanisms for inducing users to take account of behavior which reduces the value of water to others means that insufficient attention is given to reducing pollution, and excessive allocations of water go to "pollution-intensive" activities.

As shortages of surface water increase, so do conflicts over the use of groundwater. The central region study documents how rice cultivators have turned increasingly to groundwater pumping as a means of relieving dry season shortages. Encouraged by subsidies from the Department of Mineral Resources, farmers have been induced to sink shallow wells. While this seems to make sense for any individual farmer, the unfortunate consequence when it is done by many farmers is that underground aquifers are depleted and wells need to be dug deeper, resulting in an escalating and increasingly costly "pumping race". Subsidies given to poorer farmers for shallow wells are wasted, since richer farmers are able to sink deeper wells. The same thing is happening in urban areas where many users, to avoid dependence on unreliable and "high-priced" piped water, are sinking wells to tap underground sources.

The lack of proper regulation or pricing of groundwater encourages excessive pumping. Farmers complain that wells that were initially deep enough are no longer sufficient,

and they are being forced to sink ever deeper and increasingly expensive wells. The combined effects of the pumping of *all* farmers depletes the aquifer and depletes the water table. In Bangkok, excessive pumping of groundwater has had a similar effect and is causing the ground to sink. This causes damage to buildings and other structures, and increases the risks of flooding. Furthermore, substantial volumes of naturally provided "free" underground water storage facilities are being destroyed.

Conflicts Over Water Quality

Conflicts over water use often arise not just over *access* to water, but also over the uses that are made of it. This happens when one party's use affects the quality of the water available to others. A significant part of the water that is used by factories, farmers and households is not actually used up; rather it is returned for further use by others. The problem is that the water's characteristics are often changed so as to reduce its value to other users.

A classic example from the case studies is the conflict between, on the one hand, salt miners and on the other, farmers, fishermen and household water users in the Nam Siaw basin in Northeastern Thailand. Salt mining involves the evaporation of brine. Surrounding water supplies are affected by deliberate discharge of heavily salinized water during this process, seepage of salt from sludge or from evaporation pits, and/or washing away of salt as a result of flooding during the rainy season. This increases the salinity of neighboring water sources and sharply reduces yields from fishing and/or agriculture.

The costs imposed by salt mining on fishers and farmers need not be incurred by the salt miners themselves, and there is no legal mechanism for the "victims" to force or induce them to do so. The result is excessive salt mining and insufficient attention to even low cost methods of reducing discharges of saline contaminants. What was essentially a local problem eventually became an explosive national issue. The government response was, for some time, to do nothing, and then to impose a total ban on salt mining. A mining ban is a very crude instrument and was probably even more costly in economic terms than ignoring the problem. When the cost of the ban became apparent, and it became increasingly difficult to enforce, the policy was changed to one of selective bans in certain regions, and regulation of salt mine

production in the remaining regions. Implementation of these discretionary policies seemed arbitrary and was generally unrelated to economic criteria.

The same kinds of generic problems are illustrated by other cases. The northeast region study looked at the effects of industrial pollution on the Nam Pong River, with cases of recurring water discharges by a pulp mill, and "catastrophic" accidents at a sugar mill and a particle board factory.

A major pollution catastrophe in the Nam Pong in 1992 went undetected for almost two weeks by government officials. When noticed, the damage was initially attributed to a fire at a particle board factory, and the government responded by closing the factory, long after the damage had been done. When it was later determined that the damage was due to ongoing leakages at a sugar mill, the mill was instructed to repair the leaks, but there was no immediate attempt to regulate output or emissions of pollutants in the meantime. The mill was later closed for 3 months while repairs were made.

The Phoenix pulp and paper mill was closed twice by the provincial governor, once in 1992 and once in 1993, due to complaints that its emissions were causing serious damage to downstream water users. The mill was asked and agreed to improve its waste water treatment facilities. It also undertook measures to assist downstream users by making treated waste water available for tree plantation uses. As explained in the case study, conflicts over the extent and effects of downstream pollution from the mill continue. NGO, downstream users and academics continue to document and draw attention to effluent levels and resulting damages, while the mill and Ministry of Industry officials stress the employment and income opportunities that would be lost through any curtailment of output at the mill. While awareness of the issues related to the mill's emissions has certainly increased, little headway seems to have been made in determining the magnitudes of the economic trade offs involved in the conflicts between upstream and downstream users.

Policy Implications

Conflicts over water use arise because water is still treated as a free and open access resource, when it is clear that, in an economic sense, it certainly is and should not be free.

Traditional mechanisms for resolving local conflicts are becoming less reliable, especially in regions undergoing rapid social and economic change. And means for dealing with regional and national allocation issues, which are becoming increasingly important in Thailand, are woefully inadequate. Absence of other resolution mechanisms means that disputes become increasingly politicized.

Economic criteria, whose use might ensure that water is allocated efficiently, are seldom even alluded to, yet alone employed. The result is enormous and increasing waste in the use of one of Thailand's essential resources. Rent-seeking behavior increases this waste as potential users compete in the political arena, where political influence dominates economic consequences as a criterion for conflict resolution. Fairness is mentioned more frequently than economic criteria. Unfortunately, this is usually a smokescreen, and decisions that are made on this basis more often favor the rich and powerful rather than the weak and the poor. This is not surprising when decisions are made primarily on the basis of political clout.

Laws and regulations concerning water use need to be improved so that economic criteria are consistently employed. Administrative capabilities of regulatory and enforcement agencies need to be enhanced so that laws are effectively implemented. But there are limits to the ability of conflicts over water use to be resolved through administrative/legal means alone. If water is to be allocated by instruments of "command and control," then the relevant authorities need considerable information about the value of water in its different uses. Without this information, it is impossible to allocate water efficiently. When water is free, administrative decisions will have enormous implications for the allocation of economic rents. In these circumstances, regulatory mechanisms are subjected to great political pressures. Information from competing water users about the value of water, which is necessary for making informed decisions, is highly suspect and unreliable in these circumstances.

An alternative, and in some circumstances a useful complement, to command and control allocation mechanisms is the creation of markets, or pseudo-markets, where water users are motivated by self-interest to forgo low-valued uses in favor of higher valued uses by others. There is no question that Thailand would benefit by relying less on command and

control and making greater use of "economic instruments" for the resolution of water use conflicts.

Where possible, water should be priced at a level that reflects its value in alternative uses. This will ensure that water goes to its highest valued uses, that users have an incentive to curb more "frivolous", or socially harmful demands for water, and that the costs of maintaining and improving water supplies are covered. Effective water supplies will be enhanced as water is released from low valued uses.

If rights to water can be clarified and/or established in the legal framework, then markets will tend to emerge naturally. Relevant rights can be vested in individuals, with respect to both gross intakes of water and to the quantities and quality of the water that is discharged following its use. And rights could also be vested in groups of individuals, for instance through water authorities with responsibilities for overall use within a river basin. Many of the current conflicts over water arise from differences over claims to such rights. Clarification of these rights would reduce the need for prices to be set administratively, thus removing these contentious issues from the political arena, and reducing the burdens placed on regulatory agencies.

The case studies show that the means for dealing with conflicts over water in Thailand are inadequate. Existing mechanisms are ineffective in dealing with the allocation questions, and are increasingly *unfair*. Policy discussions focus on the issue of fairness, with insufficient understanding of the (un)fairness of the existing patchwork of allocation mechanisms or of the net social gains to be realized from increases in the efficiency in water use. Greater use of economic instruments would lessen conflict and improve the efficiency and equity of water use.

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Water and Resource Conflicts in Thailand: An Economic Perspective

Frank Flatters and Theodore M. Horbulyk

1. Introduction

A keynote presentation at TDRI's 1993 Year End Conference on social, cultural and political change in Thailand was introduced with an anecdote about water.¹ Dr. Akin Rabibhadana recounted a childhood visit to Europe, where he observed the strange phenomenon of people selling ordinary drinking water. To a child from Thailand, where water was the epitome of a "free good," this was very difficult to comprehend. It was explained to him by his uncle that this was simply one of the many major differences between the countries and peoples of Europe and of Southeast Asia. In Thailand people would never think of buying or selling water, since it is available "everywhere."

Water has become scarce and is no longer a free good in Thailand. During the dry season especially, many important uses and regions have to compete for water. And throughout the year, concerns rise about the general quality of water supplies, which have become increasingly degraded by many forms of pollutants.

As part of a project on Water and Resource Conflict, TDRI has commissioned researchers from a number of social sciences to examine and document incidents of conflict over use of water in Thailand. The resulting studies cover several regions of the country and a variety of types of conflicts. They have documented successes and failures in dealing with these conflicts.

¹ See Rabibhadana (1993) p.2 for a brief summary of this anecdote and of its broader social significance for Thailand.

The purpose of this paper is to provide an economic perspective on problems of conflict over water use in Thailand, and for thinking about solutions. Problems in the allocation of scarce resources are the starting point of economics, which can be thought of as the science of mechanisms for resolving conflict. When resources are scarce, issues of waste (or inefficiency) and equity become important. A caricature of the "economic solution" to any resource allocation problem is to say "Let the market work." The case of water takes us very quickly beyond this simple mantra. Economic analysis must be employed to weigh the merits, not only of different patterns of resource use, but also of different institutional mechanisms for achieving the goals of efficiency and equity in resource allocation. The case studies prepared for the TDRJ project provide a rich variety of examples which help to illustrate this point.

This study does not attempt to provide solutions to the problems of water use in Thailand. The goal is much more modest. By providing an economic perspective on the other studies, this paper is intended to characterize the important issues, and to outline some of the data and research needs that must be met in order to deal with the increasingly critical problems of water and resource conflict in Thailand.

2. "The Water Problem" in Thailand: Cases and Examples

The case studies provide a wide range of examples of the resource allocation issues that arise in connection with water use in Thailand. In this section we select a number of these examples in order to explain some of the basic economic issues that arise in dealing with water allocation.

Conflicts Over Quantities of Water: Intra- and Inter-Basin

The first case study in the central region study (Pongsudhirak (1994)) examines conflict within and between river basins. The conflicts there are of two types: a) interregional conflicts over the use of the resources from a single or at least interconnected supply source (north versus central region), and b) inter-basin conflicts within a region when supply sources can be connected, at some cost (Tha Chin and Mae Klong versus Chao Phraya).

The Chao Phraya basin which serves users, including farmers in the central plain, urban industrial users, and the Electricity Generating Authority of Thailand (EGAT), is connected, *via* the Chao Phraya River, to Northern Thailand. Rapidly growing demands in both the north and the central region have lead to water shortages during the dry season. This requires allocation choices between the north and central regions, and among different uses in the central region.

As shortages have become more acutely felt in the Chao Phraya basin, it has become increasingly clear that demands cannot be met through greater flows from the north. One alternative that has been put forward has been diversions of water from the Tha Chin and Mae Klong basins. This could be accomplished by piping water from the latter basins to the Chao Phraya.

The economic issues in both of these cases are more or less the same. The only real difference lies in the infrastructure costs (building and operating a piping system) in the second example. In both cases, the economic issues relate to questions of efficiency and of equity, or fairness.

We illustrate these economic issues by making some gross simplifications, which abstract from many of the important features of the real-world problems, but which permit us to focus on the questions at their simplest level. The greatest and most powerful simplification is to assume that there is only one user of water in each competing group. We also assume that the total amount of water available during the time period under consideration is fixed and known.

Each user has a demand for water which depends on the characteristics of the user and of the uses he/she has for the water, and on the price he/she has to pay for the use of the water. Any user's demand can be summarized graphically by a demand curve, which relates the amount of water the he/she would want to use (per period of time) and the price of that water. If the water is used as an input into some other activity (agriculture, manufacturing), then the height of the demand curve at any point represents the value of the extra agricultural or manufacturing output made possible by a little extra water in one of those uses. And if the water is used for final consumption purposes (washing, drinking) then the height of the demand curve represents the marginal benefit derived by the user, in terms of willingness to forgo other forms of consumption. In either case, it is assumed that the demand curves are downward sloping -- willingness to pay for

additional water diminishes as the amount of water consumed increases. Even where no direct price is charged for the water used, firms and individuals might incur other costs (such as for pumping, storing or conveying water), and the demand curve shows the maximum that these agents would be willing to pay to obtain various amounts of water per period.

Consider first the north/central allocation issue. Here we have two users of water, N and C , both wanting to make use of the water available from a single common source -- the Chao Phraya river and its tributaries. Under current conditions in Thailand, the aggregate demand for water at a zero price exceeds the total supply of water during the dry season. In Figure 1, the total amount of water available during the dry season is given by the length of the horizontal axis, OW . The demand curves of C and N , measured from the left and right sides of the figure respectively, are given by D_C and D_N . At a zero price, the total demand, OC_0 plus WN_0 exceeds the total amount available by N_0C_0 . Since these demands cannot be met, conflict is inevitable and some mechanism must be found for allocating the scarce water.

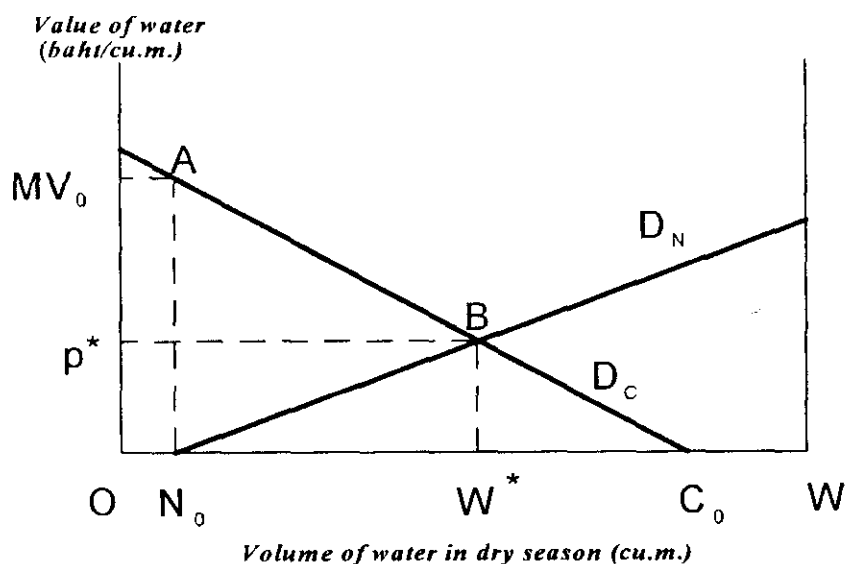


Figure 1

Many mechanisms and allocations are possible. For the sake of illustration, suppose that N , by virtue of being upstream of C , simply takes all the water N wants, and leaves the remainder to C . In this case, the final allocation will be at N_0 , with N consuming WN_0 and C consuming the remainder, ON_0 . Is this an efficient allocation of water? It is clearly not, since the marginal value of water to C , MV_0 , exceeds the marginal value of water to N , which is 0. A small reallocation of water from N to C would yield a net economic gain of MV_0 .²

The efficient solution is where water is allocated such that the marginal value of water to the two users is equalized. At that point, W^* , there is no further economic gain available by reallocating water between the two users. If there were a well functioning market for water, this allocation would be achieved "automatically", with the market-clearing price being determined as p^* . At that price, total quantity demanded would equal total quantity supplied, and the marginal value of water would be equalized across users.

For a market solution to work, there must be some clearly defined property rights to water (i.e. a definition of legal rights to buy or sell the water in question), and some mechanism for the owners of water to sell to others. In the case at hand, it might be thought that the geographic location of the upstream users would convey a right to sell water that flows through the north on its way to the central region. Unfortunately, while the upstream location provides a "first claim" to water in the Chao Phraya system, there is still no mechanism for the users in the north to sell unused water to users in the central region. Therefore, there is no monetary incentive for them to reduce water use when there are higher valued uses for the same water elsewhere. However, if either C or N were given clear property rights to the water, and they were able to market the rights to the use of the water, they would be able to, and indeed would tend to, allocate the water between themselves efficiently. As long as marginal value of water was higher to one than the other, each would be willing to trade with the other, and this would continue to occur until the marginal values were equalized.

² A common definition of an efficient state is one in which no further reallocation exists which would cause at least one party to benefit without harming some other party.

In the absence of a market mechanism, or any other system for achieving efficient allocations of water, there is potential for considerable economic waste. In the example in Figure 1, where N had first claim on the water in the basin, the total economic waste arising from the inefficient allocation of water is indicated by the area N_0AB . This is a measure of the loss in economic output arising from the allocation of water to uses where, at the margin, its contribution to economic output is less than in others.

A market is only one type of allocation mechanism. The "first grab" system, whereby N has a first claim on the water, is another. In general, the available water will be allocated by one means or another, and there will not be more water used than is available. The economic problem is not simply to resolve the conflict among competing uses, but to resolve it in a way that is efficient. For a non-market mechanism to succeed in doing this, it is necessary for the decision maker(s) to have information about the marginal value of water in its different competing uses. With this information it would be possible for a water rationing authority to allocate water in an efficient manner.

Non-market allocation mechanisms depend on the allocating authority having a considerable amount of economic information concerning the marginal value of water in alternative uses. This information might not be very easily obtained. In the case studies for this project there is scarcely any reference to the use of this sort of information in making allocation decisions. In addition, non-market mechanisms are subject to manipulation. Consider again the case illustrated in Figure 1, where, as a result of N 's "first grab" rights, the resulting allocation is at N_0 . To achieve efficiency, the water authority would have to change the allocation to W^* , by reducing N 's consumption and increasing C 's. Compared with the initial allocation, this results in a considerable economic gain to C and a large loss to N . There is a loss of economic rents to N depicted by the area BW^*N_0 in Figure 1; and a gain to C of $ABWN_0$.³ In these situations, the changes in economic rents can be considerable. In light of this, it is not difficult to imagine that the interested parties would be willing to invest considerable amounts of real resources to manipulate the decisions of the

³ This assumes that the water continues to be made available at a zero price and without other private pumping and storage costs. If the reallocation were achieved by introducing a pricing mechanism, the sizes of the gains and losses could be substantially different, depending on the party in whom the property rights to the water were vested.

water authority. The dissipation of rents through such processes could be very large, and could dwarf any efficiency gains that might arise from improved allocations. And the rent-seeking process might lead to very inefficient water allocations as well.

In summary, non-market allocation mechanisms can lead to inefficiency and waste in water allocation due to: a) the information demands placed upon the regulatory agency(ies), and b) the possibilities of manipulation and rent-seeking behavior. It is not surprising to discover from the case studies that administrative allocation mechanisms are often ineffective, overburdened and result in outcomes that are inefficient.

The discussion so far has centered on the issue of economic *efficiency*. We now turn to a brief discussion of *fairness* as a criterion for water allocation. Fairness can be thought of in terms of either the *process* or the *outcomes* of decisions. As a very crude kind of distinction, political scientists tend to concentrate on the former, and economists on the latter. Factors relevant to the fairness of allocation processes would include openness, so that all relevant parties have an input into decisions, and respect of pre-existing property rights. With two very large caveats -- unacceptable inequalities in the initial distribution of wealth and incomes, and conditions leading to the existence of monopolies -- markets are relatively fair allocation mechanisms. Fairness in these senses is often much more difficult to achieve in bureaucratic and political allocation processes.

Looking solely at the outcomes of allocation decisions, how might an equitable solution differ from an efficient one? A fair solution would differ from an efficient solution if, according to some criterion of social equity, different users have different social weights (i.e. some are seen as more or less important and/or more or less deserving of any benefits that society can provide). If, for example, *N* were a very poor farmer, and *C* were a rich urban industrialist or golfer, a fair allocation of water might be one in which *N* paid a lower amount at the margin than was *C*. The extent of this divergence would, of course, depend on the differences in the social welfare weights attached to *N* and *C*. In the "fair" solution, however, *N* would get to consume more water, and *C* less, relative to the efficient solution. In terms of Figure 1, the fair solution could be determined by shifting *N*'s market demand curve upward by an amount reflecting the excess of *N*'s relative to *C*'s

social welfare weights.⁴ This would move the optimal solution, W^{**} , to the left of W^* , the efficient solution. The fair solution could be achieved in a market setting if one group were subsidized or taxed relative to the other, for example.

In order to achieve a fair outcome by a non-market mechanism, the decision maker(s) would have to have all the information required to achieve an efficient solution (i.e. information about the value of the output made possible by additional water in its different uses), and also the relative social welfare weights attached to the use of water by the different users.

What we have been considering so far has been an example of intra-basin conflict. The two consumers, N and C , are in two geographically separate parts of the same basin, with one lying upstream of the other. Consider now the case of the conflict between, on the one hand, the Chao Phraya (CP for short), and, on the other, the Tha Chin and Mae Klong basins (MK for short). As long as these basins remain separate, the only real manifestation of conflict can be either in the form of envy of the (relatively) water abundant basin(s) by the other(s), or migration of people and/or economic activity from the water-scarce to the water-abundant basins. However, the conflict that has arisen recently as a result of rapid growth of water demand in the Chao Phraya relative to the other two basins is over a proposal to divert water from the other two basins to the Chao Phraya. This would turn several basins into one, with the total amount of water pooled into a single source for allocation purposes.

As commonly viewed, the situation can be depicted in terms of the diagram in Figure 2. The total water supply available from the pooled basins is given by the horizontal axis. The demand curve by users in the Chao Phraya basin is drawn from the left and is shown as D_{CP} , while the demand curve from the other two basins is drawn from the right and shown as D_{MK} . The allocation before pooling is at a point like W_0 , where, because of the greater relative scarcity in the Chao Phraya, the marginal value of water is higher than in the Tha Chin/Mae Klong.

⁴ Such a shift would be consistent with redefining the demand curves, D_N and D_C , to represent the (relative) social marginal benefit of N 's and C 's water use, whereas previously, with equal social welfare weights, the curves would have represented the private and social marginal benefits of water use by each.

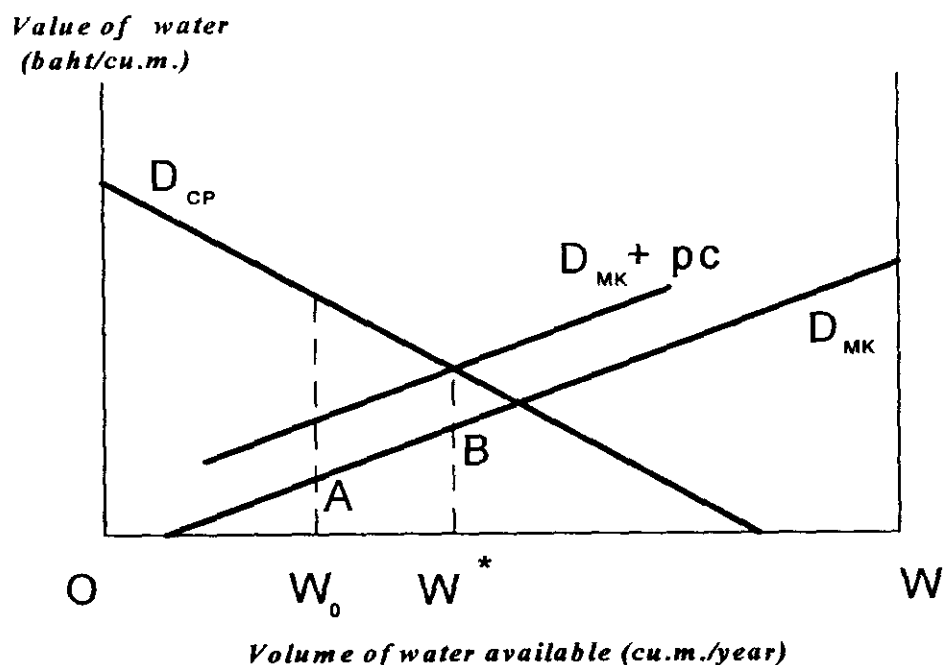


Figure 2

When the water sources are connected through the construction of a piping system, water can be diverted from *MK* to *CP*. The opportunity cost of such a transfer is the sum of a) the marginal value of the water to *MK* and b) the cost of piping the water. The efficient solution is not where the marginal value product of water is equalized across the basins, but where the marginal value in *CP* is equal to its marginal value in *MK* plus the cost of piping. This is shown in Figure 2 as the point W^* where D_{CP} intersects a line representing the height of D_{MK} plus piping costs, pc .⁵ This efficient solution could be achieved by a market mechanism as long as piping costs were included in the price paid by *CP*. If the property rights to the *MK* waters were vested in their initial

⁵ Of course, if piping costs exceeded the difference between the marginal values of water in the two basins, construction of the piping system would be a waste of money, and there would be no net efficiency gain from joining the two basins. Another efficiency argument for connecting the basins could be made in terms of uncertainties about changes in supply and/or demand in each of the basins over time. If supply and/or demand fluctuates in the two basins, and if these fluctuations are not perfectly correlated, then the pipeline might be justified even if, on average, the marginal value of water was more or less equal between the two. Water might be pumped in either direction, depending on the relative scarcities of water in the two basins.

users, then both *MK* and *CP* would gain from the introduction of a market for allocating water across the basins.

As in the previous case, the efficient allocation also could be achieved through some sort of a centralized (non-market) allocation process. However, if the process did not include a mechanism to compensate *MK* for the loss of water usage, implementation of the efficient allocation would mean net gains to *CP* and net losses to *MK*. The unequal distribution of the gains would be a source of conflict, and would very likely lead to large economic losses through unproductive rent-seeking and/or rent-protecting behavior.

Suppose, for instance, that *CP* water demand was expected to grow faster than in *MS*. This can be seen in Figure 2 by imagining D_{CP} to shift to the right over time, thus moving the efficient allocation, W^* , further and further to the right. In this scenario, *MK* would experience a steadily rising loss of rents as a result of (uncompensated) inter-basin water transfers. The area ABW^*W_0 , representing *MK* rent loss, would grow over time. It would be in the interest of *MK* to devote considerable resources to forestall or, better still, to prevent the construction of the piping system. Under another scenario, *MK* might perceive the political allocation system to be biased in favor of *CP*. In that case, *MK* might fear that a) after construction of the piping system the centrally chosen allocation might be to the right of W^* , and b) there would be no compensation given to *MK*. Once again, this would give a strong incentive to invest in activities that would prevent any connection of the water basins. In either of these scenarios, the costs of the rent-seeking and/or rent-protecting behavior might far outweigh the efficiency implications of moving to (or not moving to) an efficient allocation of water. An effect of such behavior might be an outcome other than the efficient solution, W^* .

Use of Water in Irrigation Systems

A number of the case studies dealt with conflicts over water use in an irrigation system. The sorts of problems that arose were of the upstream/downstream type already discussed above (see Pongsudhirak (1994) and Charoenmuang (1994)), or were caused by the entry of new users of the system (see especially the cases discussed by Charoenmuang (1994)). The new users were often not of the traditional type – rather than being small long time resident farmers, they were often either new industrial or commercial firms, or absentee landowners. The entry of these new users often meant that traditional methods of dispute settlement and of cooperative resource management broke down. The new users also brought an increase in total demand for water from the system, thus putting an additional burden on allocation decisions regardless of whether traditional systems continued to "work." The economic issue in all of these cases is to find a solution to the water allocation problem that is efficient. There is little indication in any of the cases described that data required to determine efficient solutions are systematically used in either traditional or "modern" systems. What is clear from many of the cases, however, is that there are considerable rent distribution implications of different allocation decisions. The entry of new users, with the resulting increase in demand for water, makes the potential rents even greater. As would be expected, bureaucratic or administrative decision making in these circumstances is subject to many types of rent-creating and/or rent-protecting behavior. This can have serious implications for the efficiency and fairness of water allocation.

Agricultural and Industrial Pollution

Conflicts over water use often arise not just over *access* to water, but also over the uses that are made of it. This happens when one party's use affects the quality of the water available to others. A significant part of the water that is "used" by factories, farmers and households is not actually used up; rather it is returned for further use by others. The problem that often arises is that the water's characteristics have been changed in a manner which reduces its value to other users. A number of the case studies reviewed in the project illustrate the sorts of problems that arise.

A classic case is that of the conflict between, on the one hand, salt miners and on the other, farmers, fishermen and household water users in the Nam Siaw basin in Northeastern Thailand (Wongbandit (1994)). The salt mining process involves the evaporation of brine. Surrounding water supplies can be affected through a) deliberate discharge of heavily salinized water during this process, b) seepage of salt from sludge or from evaporation pits, or c) washing away of salt as a result of flooding during the rainy season. In all of these cases the result is increased salinity of neighboring water sources, to the point where rivers, reservoirs and irrigation systems are too salty to support fish life or provide irrigation water of suitable quality for agriculture. The result is sharply reduced yields from fishing and agriculture.

In economics this is a classic externality problem. Salt mining imposes external costs on fishers and farmers. These are real economic costs; but, since they are not incurred by the salt miners themselves, they are not taken into account in salt production decisions. These decisions relate to the amount of salt production, location of mines, and methods of production. The situation is illustrated graphically in Figure 3, where D is the market demand curve for salt, and PMC represents the private marginal cost of salt production -- i.e. the costs facing salt producers, exclusive of external costs imposed on farmers and fishers. In the absence of any external intervention, total salt production will be at the point S_0 , and the market price of salt will be P_0 . At that point price equals (private) marginal cost.

This is inefficient because at S_0 the *social* cost of salt production exceeds the market price. The difference between the social and private cost is the external cost imposed on farmers and fishers by the salt mining. It could be measured by the value of the reduced rice and fish yields as a result of the mining activity. In order to calculate this, it would be necessary to determine the amount by which these yields are reduced. If the external costs are given by E , then the social marginal cost is shown by $SMC (= PMC + E)$ in Figure 3, and the efficient level of salt production would be given by S^* . Forcing salt producers to take account of the external cost imposed on fishers and farmers would raise their costs to SMC and would induce them to produce at the efficient level. However, it would also impose an aggregate loss on salt consumers and producers equal, in financial terms, to the area $ABCFE$ in Figure 3. However, the offsetting gains to farmers

and fishers (and possibly as well to consumers of their products) would exceed that amount by BCG .

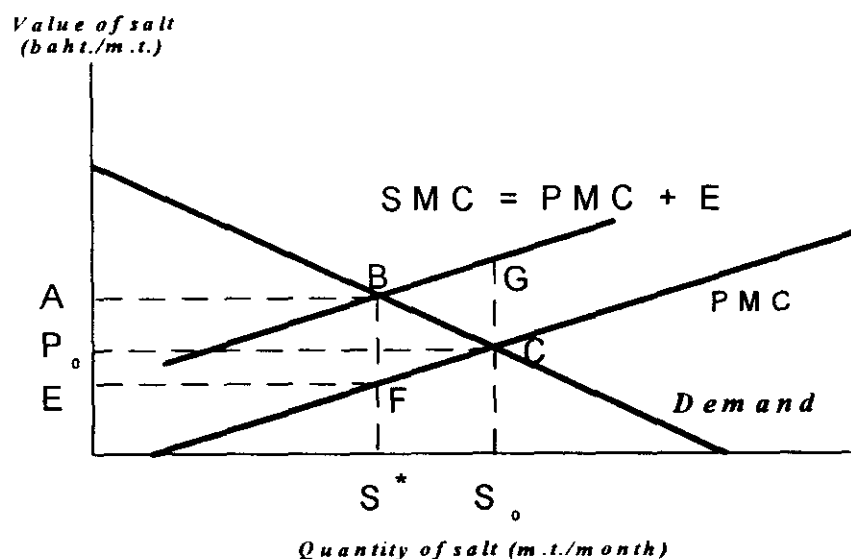


Figure 3

One way to force the salt producers to "internalize the externalities" imposed on others would be to charge them for these costs. In other words, salt miners would be charged according to estimates of the amount of salt discharged from their production areas. If such charges were imposed, salt miners would be induced to a) reduce production, and b) find ways to reduce salt discharges from their operations. The latter could be achieved, at least to some extent, through relatively low cost measures such as a) eliminating intentional discharges of water, b) building dikes and ditches to contain runoff and seepage, and c) building impermeable evaporation tanks to prevent seepage. A great attraction of this sort of pricing scheme is that it would provide a natural inducement to find the lowest cost ways of reducing the externality (thus benefitting farmers and fishers) and thus potentially reducing the disruption or additional cost to mine operators.

As described in the case study of the Nam Siaw basin (Wongbandit (1994)), the government response to this externality problem was, for some time, to do nothing, and then to impose a total ban on salt mining. This solution (the ban) would very likely be even more costly (less efficient) than ignoring the externality. It is certainly a very crude instrument relative to most conceivable alternatives. After a period of time, when the cost of the ban became apparent, and as a result it became increasingly difficult to enforce, the policy was changed to one of selective bans in certain regions, and regulation of salt mine production in the remaining regions to attempt to reduce the size of the externality. In order to evaluate this policy, it would be necessary to have information about external costs, costs of abatement as required by the regulations, and salt production costs and revenues in each of the regions affected by the policy.

The salt mining example is only one of several water-related externality issues illustrated by the case studies. Another, also in the Northeast (Wongbandit (1994)), concerned the effects of industrial pollution on the Nam Pong River. The particular cases discussed related to ongoing water discharges by a pulp mill, and some "catastrophic" accidents at a sugar mill and a particle board factory. Each one of these involves the effects of external costs imposed on other water users by industrial users of the same water, and the basic economic issues are similar to those encountered in the salt mining case. These particular cases highlight a few other interesting points. One is the issue of uncertainty about the sources and effects of various types of emissions. In the case of the sugar mill accident, the government was faced for some time with an apparent absence of information about the source of the emissions. And in the case of the pulp mill, there is ongoing uncertainty about the types of emissions and their effects.

Water Pumping Races

Water can be obtained from sources on the surface or beneath the surface. Sub-surface water, or groundwater, is accessed by digging wells and pumping from underground water sources. These natural aquifers provide a "free" form of natural storage, and as such are much less expensive than man-made dams and reservoirs. In addition, these aquifers may flow laterally, acting as would an underground river to move water from one area to another at lower cost than a comparable pipeline or diversion constructed on the earth's surface. In the face of increasing scarcity of water from other sources, Thailand's water users have turned increasingly to

groundwater in recent years. Due to unreliability and unavailability of piped water from local water authorities and partly due to its cost, industrial and commercial water users in Bangkok have always relied quite heavily on groundwater.

The case study of the central plain region (Pongsudhirak (1994)), documents how rice farmers have increased their reliance on groundwater to deal with dry season shortages of irrigation water. They have been encouraged to do this by one of two conflicting government policies. On the one hand, the government has encouraged rice farmers to switch to less water-intensive crops during the dry season in light of the inability of the Royal Irrigation Department (RID) to guarantee sufficient water for rice-growing. On the other, farmers have also been subsidized to sink shallow wells as an alternate water source.

In the case of both urban and rural use, it has become apparent that there is a significant divergence between private and social costs of water pumping. This divergence arises partly due to the incentive effects of government pricing and subsidy policies. Groundwater pumped in the Bangkok area is theoretically subject to a minimal fee, which is less than that charged for piped water. In practice the fee for groundwater pumping is seldom levied at all. The subsidy for well construction in the central plain has a similar effect for farmers who receive it. The other reasons for the divergence between social and private cost are that a) groundwater is scarce, and pumping by one user reduces the amount available to others, and b) excessive removal of groundwater imposes broader social costs on others.

The lack of proper pricing of groundwater encourages users to pump more than is socially optimal. In the central plain, farmers complain that wells that were initially thought to be deep enough to meet their water needs are no longer sufficient, and farmers are being forced to sink ever deeper and increasingly expensive wells in order to meet their water needs. The reason is that the combined effects of the pumping of *all* farmers depletes the aquifer and lowers the level of the water table. In the Bangkok urban area, excessive pumping of groundwater has had a similar effect and is causing the ground to sink. The sinking of large areas of Bangkok is causing considerable social costs in terms of damage to buildings and other structures, and increased risks of flooding. Furthermore, the process is also destroying substantial volumes of "free" underground water storage facilities provided by nature.

In order to maintain the natural storage facilities and to guarantee a sustainable source of water, groundwater pumping cannot exceed the rate at which the natural aquifers can replenish themselves. This requires restricting water use to levels below those that obtain with unrestricted pumping. This could be done in a manner which "overdraws" the storage in the dry season (when surface waters are especially scarce) and then "underdraws" in the wet season to ensure complete recharging of the aquifer and utilization of its complete storage capacity for some months of the year.

Some Generalizations: The Nature of the Problem(s) and the Economic Issues

The general observations that emerge from the case studies of conflict in water allocation can be summarized briefly as follows.

- Water is now a scarce commodity in Thailand, especially in the dry season.
- There is considerable and increasing incidence of pollution of water sources from agricultural, mineral extraction and industrial production.
- The allocation of water to some uses rather than others is an issue that is of growing importance and a source of increasing conflict in Thailand.
- The mechanisms for dealing with resource conflict in the case of water are generally acknowledged to be inadequate. Existing mechanisms are perceived as being ineffective in dealing with the allocation questions, and are also viewed as increasingly unfair. Discussions of alternatives focus a great deal on the issue of fairness, with maybe insufficient understanding of the (un)fairness of the existing patchwork of allocation mechanisms or of the net social gains to be realized from increases in the efficiency in water use.

From the economic perspective, these can be characterized as the following "generic" types of economic problems.

- The *free access* or *common property* problem exists internationally (e.g. Mekong), at a national level (e.g. the proposed Mae Klong diversion (Pongsudhirak (1994))), and within

regions (e.g. breakdown of the *muang fai* as described in Charoenmuang (1994) and the conflicts in irrigation systems in the central plain documented by Pongsudhirak (1994)). When water is no longer a free good (i.e. one for which everyone may take as much as is desired at a zero price), unrestricted free access leads to *inefficient* use of the resource

- The *externality* problem arises when an agent takes actions that have direct effects on other agents, some or all of which he is under no obligation to consider, through appropriate pricing of the actions or some other means. In the case of water use, these externalities generally take two forms: i) water discharges into common water sources are contaminated in a way that they cause harm to other (potential) users of the water pool (e.g. industrial pollution (Wongbandit (1994)); cabbage pesticide pollution (Charoenmuang (1994)); salt mining discharges (Wongbandit (1994))); ii) where, because of inappropriate pricing, the true cost of drawing water from alternative sources is not reflected in the incentives facing individual users (e.g. industrial/urban use of ground water versus surface or piped water, as described by Pongsudhirak (1994)). In the presence of such externalities, there is a discrepancy between private costs (which guide the actions of individual agents) and social costs (which are the proper guide to economically efficient allocation decisions) of the activities in question.
- The *equity* or *fairness* issue arises whenever allocation decisions impinge differentially on individuals or groups with varying economic or social characteristics. When scarce water is reallocated, say, from poor farmers to electricity generation or to urban industrial uses, this is perceived to be unfair. Similarly, when it is suggested that poor farmers should somehow be taxed or pay user charges for irrigation water in the dry season, this is also claimed to be unfair. In general, fairness tends to become a much more important issue whenever governments (rather than "impersonal" markets) are perceived as playing the primary role in allocation decisions.
- The *institutional/regulatory design* issue concerns the selection of policy instruments for dealing with these water allocation problems. As we shall see below, the main question relates to the appropriate mix of administrative and market-based instruments. The

choice depends on a number of factors, including the information needs, and monitoring and enforcement capabilities of different agents and institutions.

3. Policy Issues: The Goals of Water Policy

A "water policy", broadly defined, includes (i) the recognition or definition of the water problems that exist; (ii) a statement of goals or objectives to be pursued in addressing those problems; and, (iii) an approach or strategy to be followed. This section reviews the selection of water policy goals.

From an economic perspective, policy goals are usually grouped into those which relate to efficiency and those which are concerned with fairness or equity. Efficiency refers to using water in a way such that no one could be made better off by changing any aspect of water quantity or quality without at the same time making someone else worse off in the process. Fairness means using water to promote society's views for sharing the costs and the benefits from improved water use, or, even more broadly, for achieving general social equity goals. Finally, there might be other goals that are relevant in specific instances. For example, society might also be concerned with issues of procedural fairness or justice, and so might have goals for the method by which reform takes place as well as for the solution that is achieved.

Economic Efficiency: Reducing Waste

To achieve economic efficiency, policy should be directed, in the first instance, toward reducing water use practices that are "wasteful." These practices include using large quantities of water where smaller quantities would suffice; using a water course for the discharge or dilution of effluents, when other less costly treatments are readily available; and directing water at low valued uses when higher valued needs are left unmet.

Pursuit of all available efficiency gains will require comparing the relative costs and benefits to society of all competing water uses and finding ways to reallocate water use which increase the total value that society at large derives from it. Whether water is used as an input in a production process or is consumed directly, the quantities in each use should be adjusted until further changes in the distribution of water use would reduce society's benefits (or increase costs) by the same

amount for all users. As well, there should be reductions in all levels of use until the value (reduced benefit) of the last unit of water taken away equals the cost society would face to increase its water supply by one unit. If such an ideal distribution of water could be implemented, then no one could be made better off by any further changes in water quantity or quality without making someone else worse off -- that is, the pattern of water use would meet the definition of economic efficiency.

Two elements of this efficiency goal deserve special mention. First, for efficiency purposes, it is the comparison of relative costs and benefits from *society's* perspective that is important. Firms and individuals might not incur costs directly when they engage in wasteful practices; however, from the perspective of the nation these costs will be relevant to efficient water allocations all the same. Second, achieving the goal of efficient allocation of water at one point in time will not ensure that it will be continue to be met in future periods, especially as technology, prices, and incomes change, as has happened in the case of common-pool management in Northern Thailand. Thus, the goal of economic efficiency has both static and dynamic dimensions.

The goals and constraints of water policy would be different if one were setting up a system of water allocation and usage for the very first time, rather than in a case where patterns of use have evolved over time and where the intent is to change those use patterns and practices. This distinction is sometimes referred to as one between policy *design* and policy *reform*. A prudent policy reform exercise, will, among other things, recognize the costs that will have to be incurred to change from the current policy to the reformed one. In the water policy context, some users might be required to change technologies, locations, or times of water use at considerable resource cost to themselves. The policy exercise will trade off various costs to be incurred initially with the potential benefits from policy reform that might later be realized, perhaps continuing for long periods into the future. Depending on the applicable social discount rate, some future benefits will be discounted to the point where they cannot be justified. That is, policies that require costly reforms of an existing system may not proceed as far as would policies that provide a design for the initial access or use of a resource.

A distinguishing feature of economic efficiency as a water management goal is its dependence on evaluating and equating the social costs and benefits of alternate uses and sources of supply, often in monetary terms. This contrasts with other *ad hoc* or "operational goals" for

water use, such as increased "irrigation efficiency"⁶, increased "hydrologic (or run-off) efficiency"⁷, or using water to remove bottlenecks to continued economic growth.⁸ Sometimes, actions intended to pursue these alternative goals will be consistent with pursuing economic efficiency; but this need not be the case in general. Since these alternative goals do not consider explicitly the costs or the benefits of specific policy actions, there is, for example, no way to tell how far each should be pursued.

Equity

Water policy might also be used to promote fairness, by choosing policies that benefit certain groups at the expense of others. For example, there may be a societal preference for achieving a more equal distribution of wealth or of income, or for ensuring that the welfare of the least well off individuals is improved wherever possible. Alternatively, in choosing among alternative policy actions intended to promote economic efficiency, there may be a preference for those alternatives that do not "worsen" the existing distribution of income. Given the importance of water as an essential commodity for all, it is not surprising that equity concerns are often important in policy discussions about water regimes.

Whatever specific form the preference for equitable outcomes takes, there are certain general lessons of economic policy-making that should be borne in mind. It is often felt and claimed in public debate that there is an important trade-off between meeting the goals of equity and of economic efficiency. In other words, achieving equity goals is felt to be difficult and costly. This need not be the case. When resource allocation is inefficient, it is possible in principle to

⁶ Irrigation efficiency, expressed as a percentage, is a measure of the proportion of all water diverted or withdrawn for irrigation use that actually reaches the crop. Sethaputra et al. (1991b, p.2) claim irrigation efficiency in Thailand lies in the 15-30% range, well below the 50% level attained by Malaysia, Taiwan, and China. Differences in irrigation efficiency across countries may reflect differences in other factor intensities, and may be consistent with the countries facing unequal relative prices for labor and capital as well.

⁷ Run-off efficiency, expressed as a percentage, refers to the proportion of all precipitation falling in a drainage basin that leaves the basin via a (surface) water course, where evaporation and drainage into groundwater reduce this proportion.

⁸ Sethaputra et al. (1991b, p.61) state, "The basic objective of water management in the industrial sector is to ensure that water, as an important input in industrial production process and as a scarce resource of society, would not hinder the growth of the industrial sector."

make everyone better off by reducing waste. When inefficiencies are very great, which is often the case with water, there is even greater scope for achieving this.

Furthermore, there are many instances in economic policy reform where inefficient policies have been perpetuated by the myth that they help the poor. This is especially true in cases where "essential" goods and services, like water, are deliberately underpriced with this goal in mind. In many cases, the subsidized goods may be cheap, but because of supply shortages and the need for some other form of (non-price) rationing, they are not available to the those who, on equity grounds, are felt to need them more. In other words, policies designed to benefit one group unintentionally end up assisting others instead.

Concern has been expressed, for instance, about increasing water usage by golf courses, sometimes at the expense of paddy rice irrigation. Should this be discouraged on equity grounds even if it is well known that golf courses are a higher valued use in terms of their contribution to society's total income? To deal with this question, it is necessary to determine who actually benefits when owners of farm land continue to receive water that is denied to golf course operators. When benefits are directed to specific landowners the expected value of all future flows of these (water entitlement) benefits often becomes capitalized into the market value of the lands in question. Thus, most of the entire multi-year benefit from continuing use of the water might have already been captured as a windfall gain by a specific generation of retired or retiring land owners. See Repetto (1986) for more on this point. It is also necessary to examine whether there exist lower cost alternatives for assisting rural water users.

Policies that try to make water freely and abundantly available to all users may appear to promote equity objectives, especially if the are primarily poor farmers. However, these same policies may result in recurrent water shortages that impose high costs on those who are forced go without. Even on fairness grounds, these individuals might be better off under a policy that entitled them to use water at some higher cost, provided the water supply became reliable (i.e. they might actually prefer a price increase for the security of water supply it provides). Thus the pursuit of social equity or fairness -- normally a key argument in favor of free (unpriced) access to water -- could justify moving away from the status quo if, under the current arrangement, some water users are systematically denied access to water some of the time, and incur high costs as a result.

Arguments about rich versus poor and about rural versus urban, are questions of *vertical equity*, that is, about the relative effects that a policy will have on those whose social positions are, in some relevant sense, unequal. Another aspect of the equity argument concerns *horizontal equity*, which considers the effects of a policy on those whose prior positions are equal. Where water policy is concerned, there may be an important issue of horizontal inequity in the formulation of policies that provide selective assistance to farmers, especially when not all farmers live in areas with (equal) access to irrigation. Where projects provide low cost water to some regions and not to others, producers in the dryland area may be made worse off in both relative and absolute terms -- for instance, if their produce is less able to compete on local markets with that produced by users of irrigated land.

Other Goals

The concepts of efficiency and equity are usually at the centre of economic policy design and reform. But it is important to acknowledge several other objectives that have a legitimate, and sometimes crucial, role in forming public resource policies. Examples include social goals with respect to the policy process itself, and with respect to the role of culture, custom, and precedent.

All policy comparisons should be made with a view to the policies' administrative requirements, especially with respect to information and staffing (human capital) needs, and their enforceability. These factors may be viewed as constraints that would limit a policy's ability to achieve the intended efficiency and equity goals. This is an issue that will arise in our discussions below. Alternatively, some of these considerations may take on the dimension of goals themselves. For example, when choosing among alternative methods to achieve similar results, one may choose the options that are perceived to be simpler or to suit the available administrative capacity the best.

Issues such as procedural fairness⁹, constitutional correctness, political participation, and degree of decentralization of authority may also be important when choosing among alternative policies. It may be felt to be beneficial, for instance, to recognize and preserve specific local culture, customs, and precedent, even where this prevents the operation of a unified national system. In the case of water, this might include preservation of the *muang fai* institutions in some regions, and, in others, preservation of the traditional role of the village headman in water allocation decisions. Such measures might well be justified solely in terms of potential efficiency gains in resource allocation. But if not, some degree of local autonomy still might be valued in and of itself.

4. Policy Implications: The Range of Possible Solutions

Water allocation is a policy issue because a) water is currently treated as a "free" (or almost free) commodity when it is not -- i.e. it has been made a more or less as "open access resource" - and b) because some uses of water impose costs on other users of the same water. Generally speaking, there are two types of solutions to these problems. The first are administrative solutions, whereby some agency(ies) devises and imposes allocation rules upon users. This approach is often referred to as the "command and control" solution. Second, the government can rely on "economic instruments", generally in the form of pricing mechanisms or allocations of tradable rights to water uses.

Under certain (obviously hypothetical) conditions -- availability to government agencies of detailed information about the implications and productivity effects of alternative water uses, sufficient resources to monitor behavior of water users, authority and ability to enforce regulations -- the government would be able to achieve equity and efficiency goals through "command and control" methods. Similarly, under conditions of well-defined property rights and zero transactions costs, private markets could be relied upon to achieve the same goals. With water, as with other "open access" resources, these conditions do not hold. As a result, the "first-best" outcomes will

⁹ Some irrigators of paddy rice in Thailand feel, for instance, that they have earned, historically, an entitlement to use irrigation water without charges or restrictions, by virtue of export taxes levied on their crops over a period of years. The argument is that these taxes "paid for" the water rights the farmers now enjoy.

not generally be achievable. Therefore, the practical policy problem is to find a mix of policy strategies and instruments that will permit society to come as close as possible to the ideals of equity and efficiency. Any solution will almost certainly involve a mix of "command and control" and of economic instruments. The choice of instruments, as we shall see, is itself largely an economic question. A conclusion that seems to follow from the project case study materials is that Thailand currently uses command and control instruments in an inconsistent manner and makes insufficient use of economic instruments for the resolution of water allocation problems.

The next section examines more closely the features of policies that, in principle, would lead to so-called "first best" outcomes. The following one discusses why "second-best" policy outcomes are inevitable, and asks what they might look like.

"First-Best" Policies

Efficiency in the use of water resources requires choosing allocations of water that maximize the present value of the difference between all its future economic benefits and economic costs. Implementing this strategy will generally require within-year choices that equate the marginal social costs and social benefits of water's uses. In principle, these costs and benefits can be measured and compared in monetary terms.

On the benefit side, social benefits include: a) the value society places on a specific firm's or individual's consumptive uses of water, such as when irrigation water increases crop yields, and b) the value of water used to benefit large groups, such as when surface water is left in a river to enhance the fishery, to facilitate river navigation, and to provide other recreational, touristic, or aesthetic benefits that would be lessened if the water were withdrawn for private consumption.¹⁰ From the benefits to any user or group of users should be deducted any costs imposed on others

¹⁰ A practical observation when reforming the allocation of water use is that alternative uses of surface or groundwater will have different return flows associated with them. Some industrial uses (e.g. cooling, rinsing) will return almost all of any water withdrawn, whereas others (e.g. some domestic or irrigation uses) will return very little. These differences can be determined with a reasonable degree of accuracy, and will influence how much water is available for others when a specific user is permitted higher rates of withdrawal. Therefore, where practicable, implementation of formalized schemes should be based on the net quantities of water diverted.

(i.e. external costs) as a result of particular uses, such as pollution of water due to discharges of industrial wastes or agricultural chemicals.¹¹

On the supply side, a variety of costs may be incurred when additional water is to be provided for specific uses. Some examples of these costs include construction of storage and distribution infrastructure, facility operation and maintenance, water treatment, and land subsidence that occurs when groundwater aquifers are depleted.

A policy for efficient water use will allocate water so as to equate the marginal social costs and benefits from its use. It will do so by using the cheaper sources of water before more expensive ones, and by ensuring that requests for higher valued uses are met before fulfilling lower valued ones. If such a policy operates smoothly, there will never be a "water shortage" per se. Instead, what will be observed over time will be rises and falls in the amounts of water that are used, and corresponding changes in the marginal value (cost and benefit) of water. In a year of drought or low precipitation, for example, water will still be provided for most purposes – such that its marginal benefits and costs are equal – but this point will be reached at much lower water volumes than in a year with higher rainfall. The efficient levels of water consumption will be less than in other years, and the allocation of water to very low value uses might even go to zero. In a drought year, water will no longer be supplied for some uses since (temporarily) the benefits can no longer justify the costs.

Table 1 provides an illustrative list of the many potential sources of supply from which additional water volumes could be generated, albeit at higher and higher costs. It also suggests a number of uses or demands for water that could be reduced or curtailed, where the associated costs of any water "savings" are also expected to vary widely among the alternatives. All of these items represent so-called "margins of adjustment," or specific reallocations of supplies and demands by which inefficient patterns of water use could be rendered efficient. Efficient outcomes are, in general, attainable at lower cost, the larger the set of such adjustments, and the larger the scope for employing each specific type of adjustment.

¹¹ Another example of such external costs is the saline contamination of the urban water supply in Bangkok caused by reductions in the water flow in the Chao Phraya River as a result of high upstream demands during the dry season.

Table 1***Margins of Adjustment for Water Supply and Demand^a******1. Potential Sources of Water (Supply Expansion)^b***

- improve watershed management
- maintain storage capacity, by preventing land subsidence and (irreversible) diminution of aquifer capacity
- increase storage capacity (public or private) through new construction or expansion of dams, diversions (including inter-basin transfers), and storage structures, through dredging reservoirs and rehabilitating existing facilities, and through better management of existing storage and distribution systems
- invest in system reliability (as well as capacity) where this is important for the intended uses of the water
- desalinate water, such as seawater, salt marshes, or effluent from natural or man-made salt concentrations
- treat sewage and wastewater, such as for use as irrigation water, where the required standard or quality (and presumably treatment costs) would be lower than for industrial or residential use; this might include construction of wastewater collection systems to segregate "gray water" effluent that is usable for irrigation without costly treatment (consider an incentive scheme where either treated wastewater or "gray water" were made available for golf course irrigation that is otherwise discouraged)
- rationalize exploitation of groundwater, according to location, and/or depths, and/or season; optimize wellfield configurations, based on hydrology and intended uses, in order to increase the sustainable flows from given aquifers and prevent localized subsidence
- acquire water internationally from sale, barter, or treaty with Laos, Myanmar, Cambodia, China, and Vietnam, on an ongoing or contingent basis
- cloud seeding, and manipulation of precipitation levels

2. Potential Ways to Save Water (Demand Contraction)

- decrease water losses from storage and distribution structures, through:
 - (i) capital and design measures, such as lining storage facilities and canals to prevent leakage; using measures to decrease evaporative and other losses (e.g. clear vegetation, reduce surface area, pipeline versus canals and ditches); correct choice and location of pumps, materials, system components;
 - (ii) operational measures, such as improved maintenance and management of distribution networks ("just-in-time" versus "structured" versus "conservation" delivery systems)

Table 1, Cont'd

- decrease water use for agricultural crops, through:
 - (i) change of crop mix and increased use of drought-resistant varieties;
 - (ii) change of timing and volumes of supplementary water applied;
 - (iii) changed methods of water application (drip versus broadcast versus flood (sub-surface irrigation) versus "surge" methods versus paddy (surface flood) irrigation);
 - (iv) improved soil moisture retention, through the use of cover crops, improved tillage practices, increased soil organic matter, drainage controls
- decrease water use in industrial, urban, and residential uses, through:
 - (i) recycling and/or reusing water before discharging it;^c
 - (ii) changing the timing/frequency of water use for various purposes (reduce dry season withdrawals);
 - (iii) using water saving technologies and equipment;
 - (iv) restrict or prohibit certain uses or users of water (e.g., existing or new golf course development, industrial effluent dilution)

Notes:

- (a) The distinction here between increases in supply and decreases in demand is broadly based on whether the practice or adjustment occurs "upstream" of (supply) or "downstream" of efficiency-generating prices, but also to monitor actual water use and emissions. For some uses and users, metering need not be difficult or costly. But for others, it might be impossible. (demand) the point where water would leave a common surface or groundwater source or distribution system.
- (b) Excludes other "emergency" sources of (short-term) water, such as temporarily drawing down reservoirs, including those maintained for hydroelectric generation.
- (c) Some elements affect gross (not net) amount diverted such as encouraging the recycling of some effluent discharge. Without recycling, a factory might use water as a coolant, and might return 90% of all it diverts from a water course. With recycling of the discharge, there might be a commensurate decrease in intake (gross amount diverted) and discharge volumes, leaving the net volume diverted virtually unchanged.

What Table 1 shows is that Thailand appears to have considerable latitude for any water policy changes to operate. The country is unlikely to ever "run out of water" given the diverse supply options available. Using this conceptual framework, the (potential) problem of future water shortages has been, in essence, restated, as a (potential) shortage of resources or income necessary to exploit all of the most expensive water sources fully. One implication is that water usage cannot be increased without limit, and indeed, may have to be decreased.

In a first-best world, where governments have free access to information, and a full capability to monitor and enforce the many dimensions of water use, there is a wide range of policies capable of allocating water efficiently. Under the so-called "command and control" approach, the government directly dictates all water uses, through laws, regulations, quality standards (such as for emissions and/or ambient levels), water quantity entitlements (licenses or quotas) and so on. In order to determine the efficient amounts of all water uses (including discharges and effluents) the responsible agency(ies) would need to know the marginal social values and costs of these uses. As we have seen earlier, there are potentially very large rents that will end up being allocated by these decisions, especially when there are no user charges levied. This means that information from the users themselves would have to be treated with a great deal of skepticism. Furthermore, the *processes* of information gathering and decision-making might be very costly as a result of rent-seeking activities by water users. And even if correct information could be derived, and the efficient allocation decisions made, they would still have to be enforced, which would be an equally daunting task.

The alternatives to "command and control" for water allocation are market-based instruments, such as marketable permits, water options, water banking, and various schemes for pricing water use. Under a centrally determined pricing regime, prices to different users and regions would be set according to the marginal values and marginal costs of water at the efficient solution. And prices of discharges and other harmful uses of water would be set according to the costs of these activities. Facing these prices, firms, farmers and other users would adjust their own demands and pollution levels to the socially optimal (efficient) amounts. For such a scheme to work, the regulatory agency(ies) would have to be able not only to determine the magnitudes of

the social benefits and costs of each use at a particular allocation, but also how these benefits and costs would change as the allocation changed.

Under the other sort of "market instruments" system, i.e. a marketable permits or licensing scheme, initial allocations of quantities would be set by the government, and then self-interested trading among potential users would result in a set of efficient prices and allocations among them. Once again, of course, the overall quantities would have to be determined, and licenses would have to be enforceable. In some types of cases, a set of well-defined property rights could be enforced through the civil law.¹²

In a world of full and perfect information, and of zero transactions costs, these different approaches are equivalent in the sense that they are capable of allocating water efficiently. The same is not true when information is imperfect and transactions are costly. In addition different systems may differ in their fairness or equity effects.

In a first-best world, equity objectives may be pursued and satisfied directly, concurrently with the enactment of water policies to promote efficiency. Equity goals are to be achieved by undertaking whatever redistribution of wealth or income society sees as appropriate once the distributional effects of the water allocation policies are considered. Thus, a water policy that increased income inequality (by charging or otherwise penalizing low income farmers, for example) could be accompanied by a series of redistributive grants or transfers to the low income group.

Some countries' water policies use a system of rights, licenses, or entitlements as a means to regulate withdrawals of surface water and groundwater for consumptive uses. These rights may take on a market value of their own, or may increase the value of the land to which they apply. If the rights are transferable, the end uses of water can be equally efficient, independently of the method by which the rights are assigned initially. That is, any newly-created rights can be sold or given, temporarily or in perpetuity, with varying effects on the incomes of water users. In principle, some form of income distribution policy, such as a system of taxes and transfers, could undo any adverse distributional effects of assigning these rights, and could return all parties at least

¹² Wongbandit (1994) describes some of the difficulties in enforcing such rights under current law.

to their initial income levels. Alternatively, the initial distribution of rights could be designed to achieve distributional as well as efficiency goals.

As an aside, it is important to note that giving away the initial rights may cause their value to be capitalized into the value of fixed assets -- most often land -- with which the water rights are associated. For instance, the value of irrigation water might be capitalized immediately into the value of the land for which the right is given. The effect, therefore, will be the receipt of a one-time windfall or capital gain by those who own land when the policy is announced. If markets are competitive, subsequent generations of landowners will purchase the lands and entitlements in question (for a correspondingly higher price) and may be made no better off than if the entitlements had never been granted.

When equity issues are a major concern, an important task for policy analysts is to document the distributional consequences of policy alternatives. For example, if water is reallocated away from certain irrigated crops' areas and toward others, the effects could extend beyond water users *per se*. Suppose, for instance, that a change in water allocation causes dry season paddy production to be discontinued in certain areas. In addition to affecting the farmers directly, there may be indirect effects on neighbors and farm laborers who previously benefitted from paddy production. If the local community raises revenue by taxes or levies based on land values, and if land values fall when less water is made available, then there will be a loss of tax revenues to the local community.

To recap, in a first-best world (i.e. especially under conditions of full information, costless monitoring, and low transactions costs among potential water users) a water policy might choose from among a variety of policy instruments to achieve an efficient distribution of the resource. The outcomes attained might differ significantly in their distributional effects, but specific income policies could also be used to redistribute income as appropriate. Under these assumptions, the pricing and marketing of various water rights in competitive markets can lead to an efficient outcome, but pricing and transferability are, in principle, neither necessary nor sufficient to ensure efficient and equitable use of the resource.

If, as will generally be the case, the success of a new allocation scheme depends on individual cooperation or participation to succeed, then it is important to provide people with

economic incentives to opt in. For example, in an area with recurrent shortages, participants who opt in could be promised (a qualified guarantee) some level of service provision for an initial period (e.g. five years) subject to proportional reduction or increase in the event of drought or surplus. Alternatively, subsidies might be offered to undertake water conservation, provided these were also good investments from society's perspective. Those who do not opt in might be offered some variant of the status quo that leaves them more vulnerable to unpredictable shortages.

"Second-Best" Policies

It is abundantly clear from the experience of Thailand and other countries that the conditions describing the idealized, first-best world cannot be satisfied with open access resources such as water. The wide variety of sources, uses and users, and their geographical dispersion make centralized monitoring and information gathering costly and difficult. High transaction costs often hinder the operation of market-based policy instruments. Markets for tradable water rights, in some circumstances, might be very "thin" and result in the emergence of some agents who behave in a monopolistic or monopsonistic fashion. When present, these impediments to a first-best outcome are part of the economic landscape, and they become a defining characteristic of a "second-best" policy environment.

In this second-best environment, the equivalences between different types of policy instruments disappear, and the achievement of "first-best" solutions is no longer possible. Choices among policy instruments become more interesting, more difficult, and more important. The strengths and weaknesses of institutions -- such as markets, bureaucracies, governments and community organizations -- must be taken into account when making policy choices. Otherwise, apparently sensible and efficient policies can turn out to be wasteful and misguided. Irrigation system designs that might make good sense from a technical viewpoint and also from an economic perspective in a world of smooth-running implementing institutions, can fail miserably when institutional fallibilities are taken into account.¹³ The choice of policies extends beyond the choice of prices and quantities to the consideration of different institutional mechanisms for dealing with water allocation. And policies will evolve, not only with shifts in demands, supplies and

¹³ We have been given to understand that this is one of the conclusions of recent World Bank reviews of investments in irrigation systems in South and Southeast Asia.

technologies, but also as information and institutional capabilities change. A strategy for seeking and developing improvements in these institutions should itself be a part of the policy design process.

As water shortages affect a greater share of the Thai population, and as deterioration of water quality becomes of increasing concern, the government is being asked to find solutions. How should decisions be made to resolve these problems? The response so far has been in large part to look for "technical" solutions, or to impose rather arbitrary rationing schemes. Rice farmers are encouraged to sink more tube wells. At the same time as the government encourages this by providing subsidies to well construction, it also tries to persuade farmers to plant less rice and substitute less water-intensive crops. Bangkokians seek to obtain more water at the micro level by tapping into groundwater sources and the macro level by seeking higher flow levels from the upper part of the Chao Phraya river basin and diversions from other basins. The problem of salinization of water supplies as a result of salt mining has been met by combinations of absolute bans on salt mining and regulation of the methods by which it is carried out.

The command and control approach focuses on technical instructions a) whose economic bases are often not readily apparent, and b) which are often very difficult to monitor and enforce. Furthermore, the general thrust is more often to seek new sources of supply rather than to attempt to encourage conservation of demand.

A general theme of recent policy discussions in resource and environmental economics is that market-based policy instruments are often preferred to command and control instruments in situations with costly monitoring and enforcement. Market-based approaches may succeed because a) they impose much smaller information burdens on implementing agencies and b) they provide firms and individuals with private incentives to act efficiently.

Under a water pricing regime, once a price has been set, the government does not have to instruct individual users on how much water to use. In times of water scarcity, prices can be raised and consumption will fall. The government only has to be concerned with raising the price sufficiently to achieve the required reduction in aggregate use. There is no need to decide by how much to ration the uses of individual users. Furthermore, under a pricing regime, the reductions in use will be allocated among users in a manner which is much more efficient than could be achieved,

with the information available to a government agency, through rationing of individual users. The same general observations apply with respect to the control of harmful discharges into water. Faced with prices which impose costs on these actions, firms and individuals will have an incentive to reduce discharges in a cost efficient manner.

The same conclusion holds when markets are created through the issuing of tradable permits for the use of water. Unlike a command and control situation in which users will have an incentive to increase use, regardless of the value of water to them relative to other users, they will have an incentive to sell their rights to others whenever others are willing to pay more for the use of the right than it is worth to the holder of the permit. Once again, the main burden on the government will be to set overall use (or emission) levels, and to leave it to the market to determine their allocation among different agents.

Where they are feasible, market-type allocation mechanisms have an additional virtue deriving from the fact that they are more likely to be viewed as being "impersonal" and beyond influence. When important allocation and distribution decisions are made by agencies and bureaucrats, especially when they are made on the basis of incomplete or uncertain information, and/or according to vague or uncertain criteria, affected groups and individuals will tend to feel that they can lobby for changes that improve their allocations. This is especially true, as we saw earlier, when there are no user charges for water. The resources that end up being devoted to such lobbying can very easily exceed the economic costs that arise from misallocations of water from high valued to low valued uses. In addition, the whole lobbying process often serves to diminish rather than improve the quality and reliability of information available to decision-makers.

The principal market-based schemes involve using some system of entitlements, permits, or licenses to assign the rights to use water in various ways, where these permits or licenses are tradable (often within prescribed limits). Without the ability to trade these rights, the system would be no different from one of command and control. The greater are the restrictions on transferability, the closer does the system come to one of command and control. Some schemes feature, in addition or instead, pricing of the flows of resource services provided. In other words, a license is granted to use a certain amount of water, at a certain price. In principle, licenses and pricing can be complementary or substitute policies for efficient water management.

The prices and permitted uses might vary, for example, according to the season and location of use, the minimum and maximum volumes that must be purchased or traded, the reliability of service (which, in turn, may depend on whether the user is accorded any particular seniority or priority of use relative to others), and the quality of the water for an intended use. The value of a water license in trade will depend on these restrictions and conditions in relatively obvious ways as well.

The reason for introducing these distinctions and imposing corresponding restrictions is that the marginal economic cost and value of water depend on these and many other dimensions of its use. With perfect information and costless monitoring and enforceability, all of these factors would be taken into account in issuing permits and/or setting prices. With imperfect information and monitoring, some of the finer distinctions will be impossible to make or to take into account. Increases in information and monitoring costs would outweigh any economic gains resulting from improved (more efficient) allocations. The sorts of distinctions that are worth making will depend on the quality of information and of monitoring and enforcement that are possible.

Of course, if the government had all the information needed to make even the finest distinctions, the case for the use of market instruments would disappear. At a minimum, however, one would expect any price charged for water to be higher in the dry season than the wet season, and to be higher in dry years than in average years.¹⁴ More elaborate schemes for determining and differentiating these prices might be described in the standard economics literature on peak load pricing and demand-side management. When fully implemented, the prices generated under such schemes will encourage users to shift their consumptive uses to lower cost times and places. The maximum willingness to pay for water in peak periods can also provide a signal about whether and when additional water capacity expansion is justified.

The prospect of a policy that increases users' costs of water may immediately raise public concerns about the welfare of those current water users who are least well off in terms of income or wealth. Moreover, there may be few convenient policy instruments for addressing these equity concerns directly, and so pricing strategies might also be adapted to play this role. For example,

¹⁴ See Sethaputra et al (1990b) for a discussion of the sorts of water pricing schemes that might be employed in Thailand.

various forms of price discrimination, such as between residential and institutional users, might provide one method of income redistribution when water usage is priced.

Since the purpose of charging a price for water use would be to help identify and encourage the appropriate levels of usage, and not necessarily to raise revenue *per se*, any pricing scheme that generates revenue can be viewed as a potential source of funds to redress equity concerns. A crude example of this would be a water pricing scheme that was "revenue neutral" from the perspective of the government. Consider a scheme where water users held (quantitative) licenses and were charged prices on all consumptive uses made under that license. All revenues could be redistributed to licensees as rebates, with individual payments made in proportion to each licensee's maximum allowable use (i.e. in a lump-sum manner). This scheme would retain the individual's incentive to conserve water at the margin.¹⁵

When tradable entitlements or other types of market instruments are employed to allocate private uses of water, some mechanisms have to be developed to safeguard "public good" (non-rivalrous) uses of water, such as for navigation, fisheries, and other in-stream flow needs. One approach is to license all uses except these, and to leave sufficient volumes unlicensed for these purposes. Another is to license these uses directly. If a public agency acquires and holds water rights for in-stream flow purposes, for example, then that agency's role becomes one of trustee, with a responsibility to manage its portfolio of rights in a way that responds to evolving public valuations and interests.

Systems of tradable rights could be confined spatially, as a means of reallocating the consumptive uses of water within a specific river basin, or along specific reaches of a river. Alternatively, they might be unrestricted and provide a basis for proceeding with inter-basin transfers of various sorts. For example, water users in the Chao Phraya River basin (the receiving basin) might propose to purchase the rights to use water from the Mae Klong River basin (the exporting basin). In this case, the proposed transfer would enhance efficiency if the higher private willingness to pay of those in the receiving basin is an accurate signal that the social value of the

¹⁵ *Users with relatively low value water uses will have an incentive to withdraw less water than the maximum permitted by their licenses, since their rebates are based on the allowable use levels whereas the prices are charged on the amounts actually used. In the extreme, some might stop using water all together but retain their licenses, thereby retaining the right to collect rebates.*

water is higher there too. The flow of money to the exporting basin might be seen as compensation for the resources they have given up. Conversely, following a California example, the revenue might finance investments in the conservation of additional water in the exporting basin (such as through lining canals or through other measures listed in Table 1) so that water continues to be used in a beneficial manner in each basin.¹⁶

Although water pricing might have adverse equity implications, it is also worth emphasizing that the current system can also involve high costs to water users. When water is free, it is sometimes allocated on the basis of power and influence rather than on the basis of economic efficiency or of need. This usually means that it is the poor and powerless that bear the major burdens of water shortages. The costs incurred when individual users cannot be assured of secure access to water can be very high. The looming threat, or physical presence, of water shortage may cause individuals to reduce crop output, or to change cropping patterns and cropping methods. They might employ methods that are less profitable but more drought tolerant. These people may currently face restricted access to credit and loans due to unreliable access to irrigation water, so that profitable investments cannot be made. In the extreme, individuals may bear all the risk of "catastrophic" financial losses, whereby in periods of extreme water shortage they are forced to sell their land and other assets. While periods of increased water scarcity cannot be avoided, systems can be improved to ensure that adjustments are made in a manner which is fair and which minimizes economic waste. The beneficiaries of such systems improvements, even if they include the introduction of water pricing, will almost certainly include many of the poor and disadvantaged.

Pricing could also be used to provide other forms of incentives, such as to encourage risk-taking or inventiveness where various market failures are responsible for too little of this on the part of water users. For example, some water users may be reluctant to try out new water conserving technologies and methods, even where these have a high likelihood of reducing their water usage and costs in the long run. This activity could be promoted by offering a lower rate structure to innovators for some period of time.

¹⁶ *The Metropolitan Water District in California (the "importing basin") has a 35 year contract to pay for conservation projects in the Imperial Valley (the "exporting basin") in exchange for (temporary) use of the water conserved. The exporting basin retains the water rights, in this example, and suffers no reduction in levels of water use (Postel (1992), p.173).*

It has also been recognized that pricing, and the associated revenue flows, can have important incentive effects for implementing agencies and departments of government. That is, where operation of revised water policies requires the effective participation of various government officials and agencies, this participation might be easier to secure if the agencies can link it to, or identify it with, revenue flows passing to the those agencies or to the country's general revenue accounts *via* those agencies. Even in the absence of corruption or malfeasance, the route that such funding follows to its ultimate destination could possibly have significant allocative effects in the implementing bureaucracies.

Experience with the operation of irrigation systems, however, seems to indicate that pricing alone is not sufficient to secure increased efficiency. In the case of irrigation systems, water pricing has been viewed as a means to ration water use, and more importantly, to raise revenues and provide incentives for operating agencies to provide good service and to operate and maintain the systems. Recent reviews of actual experience, however, have found that there is no simple correlation between pricing and operations and maintenance (O&M) service. The additional element that is crucial in determining the success of irrigation systems in this regard is the design and capabilities of the irrigation organizations themselves. There is now a large and growing literature on the determinants of institutional success and failure in the provision of irrigation services.¹⁷ This literature focuses on the importance of devolution of authority and fiscal responsibility to local management organizations, and the structuring of these organizations so that (market-based) incentive systems can operate effectively.

Several general messages emerge from this economic perspective on water and resource conflicts in a "second-best" world. The first is that, while the application of economic criteria is more difficult than in a hypothetical "first-best" world, their use is no less important in achieving efficiency and fairness in the allocation of water. Second, the "technical issues" of allocating scarce water among competing uses in such an environment must be solved through mechanisms that provide incentives for agents to be largely self-regulating. This requires some reliance, and certainly more than is the case now, on economic instruments rather than on mechanisms of centralized command and control. Thirdly, the choice of policy instruments is also an economic

¹⁷ See Ostrom (1992 and 1993) for instance.

decision which depends on organizational capabilities, and information, monitoring and enforcement capabilities. In all likelihood, the optimal solution at any point in time will be a combination of different instruments for different levels and types of allocation decisions.

5. Conclusions and Some Recommendations

The purpose of this paper is not to provide specific recommendations to solve Thailand's water problems. However, in the course of providing an economic perspective on these problems, a number of conclusions emerge. Among the more striking general conclusions are the following. First, from the case studies examined in this project, there is surprisingly little reference to or use of economic criteria in resolving conflicts over water use. Second, even the most basic economic data -- about the broad allocations of water to different uses, and the marginal value of water in these uses -- is grossly deficient.¹⁸ And third, despite the widespread dissatisfaction with the results of administrative "command and control" mechanisms for resolving conflicts, there is very little use made of self-regulating "economic instruments" in dealing with water allocation problems in Thailand. When water is scarce and unpriced or under-priced, centralized water allocation decisions can have considerable implications for the distribution of economic rents. The consequent rent-seeking activity that is encouraged by this can distort the decision-making process and lead to significant economic waste and inequities. Thailand does not appear to be an exception.

The solutions to Thailand's water problems will not be found and implemented overnight. This is something that will have to take place over a period of time, and will involve experimentation and continual improvement as information is acquired and lessons are learned about the effects of different approaches and mechanisms. However, deliberate and immediate attention to these problems is required now. Without such actions, the costs of these problems will escalate, and solutions will become more costly and difficult to achieve.

¹⁸ From what we have been able to determine, there is only one estimate available about the allocation of water between agricultural, industrial, urban and rural uses. This was collected as part of a UN study published in 1991 (United Nations (1991)), and does not even provide information about seasonal variations in the division of uses.

The following are a few specific recommendations that follow from the TDRI case studies.

- The over-exploitation of groundwater should be controlled to ensure that water is withdrawn at rates that are sustainable and which do not cause an irreparable reduction in the capacity of specific aquifers. The premise here is that at current rates of use, at least some groundwater will be shown to have the highest marginal social cost. In addition to costly land subsidence, the costs or loss to society includes the destruction of a natural underground storage and distribution "facility" in a country where such facilities are scarce and costly to construct.
- The discharges of toxic effluents should be restricted, especially for those that are suspected of accumulating in the (freshwater or saltwater) ecosystem and of causing significant damage that is costly or irreversible.
- Any low cost remedies should be exploited. For example, a project could identify and control effluent discharges that are the least costly to curtail or the most costly to allow to continue, as rated in terms of downstream clean-up costs or downstream costs inflicted upon others (by virtue of their ambient concentrations or toxicity.)
- Any supply expansions, inter-basin transfers, or storage enhancements should exploit the cheapest sources of supply first, where these "sources" include the options to reduce, reuse, and recycle. To aid in this task, it would be useful to compile a set of rationalized expansion plans that enumerates sources in terms of increasing (social) costs of supply, explicitly incorporating consideration of such issues as scale, timing, location, and so on.
- A general requirement for any improvements in water allocation and conflict resolution mechanisms are improvements in the quantity and quality of information about water use in Thailand. In addition to basic data on the allocation of water use across different types of users, and on the types and qualities of water emissions, it is necessary to get measures of the social costs and benefits of these uses. The sort of basic economic data needed would include estimates of critical costs, values, or elasticities for the demand (social marginal benefit) and supply (social marginal cost) curves for water in specific regions, uses and seasons.

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Water Allocation Conflicts in Thailand: An Analysis of Government Failure

Scott R. Christensen

1. Toward a Framework for Analyzing Political and Institutional Aspects of Water Allocation Conflicts

Providing suitable policy solutions to water allocation problems requires a careful diagnosis of the nature of the problems the institutions are meant to solve. Thai water management generally suffers from a shortage of appropriate laws and administrative resources for managing water allocation problems effectively (Christensen and Boon-Long, 1994). This has been the pretext for numerous proposals for the reform of Thailand's water policy regime. Ambiguities and quirks in the law, duplication of administrative responsibilities, enforcement problems, and frequent lack of knowledge and expertise in the relevant water agencies all diminish the effectiveness and efficiency of the state bureaucracy's role in resolving the increasing competition for water resources in Thailand. Many conflicts that arise are not dealt with adequately in the view of the public, and often the conflicts are driven into the political arena where they are resolved by politicians, lobbyists, and mobs. Moreover, many features of the law and the state administration encourage political resolutions. Although many of these conflicts are indeed resolved (to varying degrees of success), the political nature of the decisions often raise further problems of political consistency, accountability, and, ultimately, stability.

Market Failure and Government Failure

The field of political economy provides two explanations for conflicts over natural resources -- market failure and government failure. Although the focus of this discussion will be government failures in particular, it must be noted that government failures are often the result of inappropriate management of market failures.

The market is a mechanism which couples the desire for a good with the user's willingness to pay for its use, and the lack of a socially acceptable market may cause conflict, even when resources are not scarce. Market failure refers to the lack of a market for goods which are difficult to price due to externalities or "free rider" problems. Common pool or "open access" resources such as water qualify in this category of goods. The absence of a market for water stems from a situation in which property rights are not well defined, excludable, and enforced. Market failure also results from the possibility of negative externalities, or spillover effects, from one user group to another. For example, upstream users have no incentive to economize in their use of water or to avoid degrading the quality of the water. These users pass the costs of their behavior onto downstream user groups. Moreover, because the number of downstream users is potentially large, the costs for individuals to organize a system of private incentives and enforcement may exceed the benefits of such a system which would accrue to an individual (Olson, 1965). The market fails, in these instances, because it does not create an appropriate constellation of incentives for an efficient allocation of water. The lack of a market in turn gives rise to conflict among user groups, among communities in different locales, and among whole sectors in the national economy when scarcity is on the rise.

Market failures precipitate social conflict as resources become more and more scarce. They also serve as the rationale for third party intervention to specify property rights and resolve conflict. Solutions to resource conflicts may require enforcement by local communities, if they choose or can afford to organize, or they may require state intervention. State interventions will be in demand when the benefits to individuals or communities of organizing and enforcing property rights do not exceed the costs of providing those solutions. When local communities do have an incentive to organize, their capacity to do so may depend on existing social relationships and prevailing concepts about water allocation priorities or community interests.

A market therefore might not necessarily create the right incentives for managing water allocation problems effectively. Moreover, the shift to a market-based allocation system requires certain institutional requisites (Fredericksen, 1992; World Bank, 1993). Indeed, the very introduction and viability of markets require institutions -- meaning laws, enforcement mechanisms, and a system of property rights -- which can coordinate the allocation of water in line with market criteria. Because of human error, political pressures, and the lack of appropriate information about a water allocation issues, the right matrix of institutions might not always be supplied. Furthermore, these institutions, if they are supplied, are likely to be shaped by existing cultural, social, and political aspects of a society.

In these instances the state may assume a role. But government intervention may not always be conducted wisely. *Government failure* can impede the development of socially acceptable markets or the settlement of disputes over water allocation. Government failures can increase, diminish, or mitigate social conflict over water allocation and consumption.

Aspects of Government Failures:

Institutional Failures and Policy Failures

We will be concerned with two broad aspects of government failure in the analysis of water allocation conflicts. The first might broadly be illustrated as institutional failure, referred to elsewhere as institutional stress (Wade, 1988b). Simply stated, institutional failures occur when the prevailing laws, organizations, or allocation rules which are applied to a specific allocation problem are inappropriate. This is not to say that institutions are not supplied. A casual glance at the long litany of government departments, divisions, and committees, (both permanent and ad hoc) in Thailand which have been created to address a number of national issues will at once bring to the attention of any observer that there is no shortage of official attention to these various issues or institutions invented to deal with them. Rather the failure aspect highlighted here is that, while many institutions have been supplied, a large number of them simply are not suitable to the policy requirements of a modern industrial economy. We need not recite the historical origins and consequences of this condition which have been addressed elsewhere (Christensen and Siamwalla, 1993), but suffice it to note here that the inadequacies of a government's institutions become more

sharply defined when the demands on a country's natural resources increase, as they have in Thailand since manufacturing growth gained rapid momentum in the mid-1980s.

Because many of Thailand's water-related agencies are inadequately designed to mitigate to the kinds of water allocation problems Thailand is now experiencing, they typically give rise to higher levels of social and/or political conflict. In the cases referred to below, latent conflicts of interest among different water users often are manifested in the form of overt social or political conflicts.

Moreover, these forms of government failure usually arise when the resource in question for long has been in abundance but the depletion of the resource quickly brings into question the utility of the existing institutional framework. This certainly is the case with regard not only to water in Thailand, but also to forest and land resources (Christensen and Rabibhadana, 1994).

The second aspect of government failure can be termed policy or decision-making failure. This failure occurs when the actual process of policy-making is fragmented, ad hoc, or not governed by a single, coherent set of public policy objectives. It becomes apparent when the government decision-making process gets bogged down in a permanent state of gridlock, fails to reach consensus over policy objectives, and suffers from an absence of a clear specification of administrative responsibilities so that specific officials, committees, and agencies are applied to corresponding problems in a manner which could lead to optimal or at least second-best public policy choices. The closest example of this form of failure in Thai water management is the debate and process surrounding the introduction of new water legislation since 1993. This example has been treated in more detail elsewhere (Christensen and Boon-Long, 1994), and summary of that analysis will be presented where relevant in the following pages.

Manifestations of Government Failures

Because the institutions which manage water allocation are outdated, or because they are not designed appropriately, or because the laws do not adequately clarify an individual's or group's rights to water, many water allocation problems are driven into the political arena. Although many of these problems do get resolved, the political nature of the decision-making process means that

not always are the same criteria applied, and this can raise further problems of political consistency and accountability.

Government failures in Thai water management are manifested in a variety of ways. They aggravate water conflicts, and they inhibit the effective management of water allocation to different activities which compete for scarce supplies of water. First, local or national interventions could be politically biased, for example when water turn-outs or reservoirs are located in areas which favor specific user groups, or by directing the flow of water to the benefit of specific user groups. The Agriculture Ministry's reduction of water available for dry-season rice cropping in the Central Plain is a prime example. Secondly, a situation of conflict may call for an intervention, but local third parties, or the state, choose to refrain from intervening effectively, or to conduct a short-term, ad hoc solution and allow nature, in effect, to heal the wounds. The Nam Pong sugar mill incident provides a key illustration, as government measures focused on cleaning up the effects of an industrial accident rather than taking measures to allocate water resources in a more socially optimal manner. Rock salt mining in the Northeast also fits in this category. As mining continued to release salt into a waterstream which was used downstream for agricultural purposes, Cabinet ministers often provided short-term measures to appease farmer grievances, but no effective legal remedies were provided to rectify the cause of the problem. Thirdly, a divergence in perceptions of appropriate property rights between the state and user groups could lead to socially unacceptable state interventions and provoke new conflicts. An illustration taken from the forestry case is the ongoing dispute between farmers and a prominent political family over the Huay Kaew forest in Chiang Mai (Christensen and Rabibhadana, 1994).

Fourthly, government failures can occur when there is a market mechanism already developed, but the state chooses to intervene by enforcing rules exogenously which worsen the outcome, perhaps inadvertently. In some instances, local communities have defined water boundaries and made collective investments in mechanisms which specify property rights to the water. A classic example is the "Muang Fai," or community reservoirs, prevalent in Northern Thailand. Community members in this case pay for maintenance costs with voluntary labor (in kind), and a partial market is thus developed. State intervention in the form of free, open access irrigation facilities, however, encroaches upon the community boundaries which create the basis for the partial market and encourages widespread inefficiency in water use. As environmental

degradation reduces the water flow in irrigation canals, state intervention of this form may help to sharpen conflict among communities and does very little to resolve disputes.

Finally, government failures occur when the lines of accountability are ill-defined, or when a clear distinction between public and private interests is lacking. In these instances officials choose not to enact policies that reflect a socially optimal solution for the public at large. Officials might be persuaded not to enact socially optimal measures by powerful social constituents who influence government decisions to their benefit. Institutional failures result from faulty management and organization, poor communication, and imperfect information on the part of the state (Sah, 1991). Political and institutional problems are related. A highly fallible institutional framework can discourage officials from discerning good policies from less optimal ones, and thereby increase the likelihood that political distortions will pervade decision making.

Legal and Institutional Aspects

Government failures in Thailand arise due to at least four features of the state bureaucracy: lack of specificity in the law; the concentration of power in the bureaucracy and the absence of accountability mechanisms; absence of an effective judicial mechanism which encourages informal versus formal litigation of civil disputes; and the existence of too many agencies with overlapping policy mandates, but no clear lines of jurisdiction.

• *Broad administrative discretion, lacking in policy content*

At the foundation of Thailand's legal system are Acts or Codes, which are broad pieces of legislation defining which government agencies have authority over which resources or public policy domains. These Acts must be endorsed by the parliament, but indeed most legislation on the books in Thailand has been drafted by civil servants and passed into law by appointed legislatures (Christensen and Siamwalla, 1993: 15-16).

Typically these legal Acts are lacking any trace of policy content. Instead the most important function they perform is to assign discretion over the relevant policy issues to a designated agency or official. Moreover, the civil code assigns enormous power to the various subordinate legislation under the discretion of administrators and ministers, and these subordinate laws do not require any scrutiny or passage by the parliament. It should be noted as well that these

Acts assign discretion over the subordinate legislation to the various departments of the bureaucracy, not the ministries per se. Power is actually concentrated in the hands of Department chiefs who have the authority to issue rules and regulations under their administrative mandates.

This has two consequences with regard to water management. Firstly, the law often defines the conditions under which individuals can use water resources, but at the same time fails to specify how the limits on each user's volume of consumption are to be determined. Using the example of the Private Irrigation Act of 1939, the law defines broadly that a riparian land owner is "not entitled to draw more water than is necessary for his reasonable needs to the prejudice of any other piece of land on the water way...". But the law does not specify how "reasonable needs" and "prejudice" are to be determined. Note that the law need not state how much water can be consumed by any one user, but rather that it should at least specify how the rights of the consumers are to be defined or determined. The law as is simply leaves it to administrators to determine whether a given water user has or has not already used up his or her "equitable" share. Discretion rests with the state administration, and user rights are not defined in the law. Secondly, administrators are empowered with roles as both law makers and law enforcers in Thailand. As noted above, civil servants participate in drafting legislation, interpreting how it is to be applied, and in enforcing legislation at all levels of government. In any political system, this can lead at times to selective and ad hoc enforcement of the law. Moreover, even if it is only the perception that there is selective enforcement of the law in a given case of conflict, flaws in the legal system such as this can create social unrest and political conflict. The lack of consistent enforcement of the law, especially if there is a lack of transparency, can diminish the effectiveness of formal-legal solutions to a water management problem. This is clearly one source of motivation for the mobs and protests that are common to the Thai countryside, and not just with regard to water issues.

These mandates are very broad, sweeping, and lacking in specificity, in that they empower administrators and ministers with vast discretion to interpret the various codes and promulgate regulations to enforce them. Yet this centralization of the law adjudication process curiously makes many legal Acts very narrow, grossly outdated, and incomplete, so that some pieces of water legislation pertain to only specific aspects of water allocation but leave other related activities completely out of their realm. An example is that the Ground Water Act of 1977 applies only to water at an underground depth of below 15 meters, while the Civil and Commercial Code, which

otherwise pertains to water in the domain public, does not cover the use of water resources down to the depth of 15 meters.

Because both the Ground Water Act and the Irrigation Act are incomplete, there are no effective mechanisms for managing ground water use in rural areas. One example from the Central Plain case research which illustrates this point is the case of ground water pumping in Chaksri Tambon in the province of Singburi (Pongsudhirak, 1994). Although the Royal Irrigation Department (RID) had warned farmers not to grow a dry-season rice crop, farmers largely ignored the pronouncements and, after planting their crops, found there was not enough water allocated in the irrigation canals. Farmers then resorted to ground water pumping. Since the RID had no legal mandate over ground water, and since the Ground Water Act of 1977 did not pertain to domains outside of the Bangkok metropolitan area, farmers essentially had an open ticket to deplete ground water reserves to suit their needs. Moreover, the Department of Mineral Resources, which is mandated to govern ground water extraction, was called in to assist the farmers with extraction. Thus, while the prevailing order of the day was to conserve and restrict water consumption in the Central Plain, the lack of a specific legal framework enabled -- and in fact encouraged -- farmers to deplete ground water reserves, in this case at the behest of the Department of Mineral Resources. In effect what has happened in this case is that because irrigation management was effectively so centralized, with sweeping allocation mandates coming down from higher levels in government, unrestricted ground water use became a sort of safety valve which enabled farmers to cope with water rationing in the irrigation system. And because ground water is the domain of an entirely different law with a corresponding agency, there is no comprehensive management of rural water use. The result in this case was the rapid depletion of ground water wells in Singburi province during 1994.

- *Formal power is concentrated in the highest offices of the bureaucracy*

Administrative power is often concentrated in high offices, when water issues might otherwise be better managed by officials or agencies located at a closer proximity to the water allocation conflict at hand. Ministers have authority over resource allocation issues in their power to promulgate administrative rules, regulations, and notifications which often have an impact at the lowest levels, though senior officials may have only limited technical knowledge regarding the

problems at hand. Moreover, although administrators in the relevant ministries are the ones who both draft and enforce legislation, staff training and skills are often not suited to the requirements of effectively implementing water legislation. This is perhaps most obvious in the area of water quality enforcement. Case research from the Northeast, summarized below, found that local-level officials in the Department of Industrial Works often were not aware of the relevant legislation and regulations that had been passed in their functional policy area. They were thus inadequately informed and unable to carry out their enforcement duties appropriately.

It should be noted, too, that although the parliament as an institution plays a very minimal role in law-making, individual politicians assume a very prominent role, since many of them become ministers. But it is primarily through the Cabinet that they derive and exercise their power, not the parliament. The implication is that discretion tends to be concentrated in the executive branch. Thus, while voters elect their representatives to sit in parliament, it is not through electoral bodies per se that policy decisions are formulated. Representative institutions, such as the parliament, are really a vehicle to capture administrative power, but democratization has not effectively changed the nature of that administrative power. Politicians instead become relevant players in how they act as brokers or mediators between water users and officials, including both local and central government officials.

- *Informal compromise preferred over litigation*

In this legal framework, the application of rules becomes somewhat unpredictable, and often ad hoc. Administrative discretion enables officials to negotiate deals with select interest groups, and public suspicion is sometimes aroused as a result. Consequently, individuals often view their rights as a function of their relationship with the enforcement authorities. Moreover, for a variety of reasons – low official salaries, poor public services, lack of an ideological consensus regarding the utility of formal-legal procedures, and the ease with which officials can be bribed – enforcers of the law have done virtually everything but enforce the law consistently. The ad hoc nature of the formal law then adds to an inherent lack of public trust and confidence which tends to be harbored by a good portion of the population, particularly in the rural areas where contact with officialdom is more frequent, often daily. Indeed, historically rural Thais have displayed an

impressive penchant for avoiding official channels in the arbitration of disputes. A thoughtful passage by a noted legal scholar is pertinent here, and worth quoting in entirety:

"The villagers follow custom; the authorities, however sporadically, enforce the law... [Villagers] do not, for the most part, have an appreciation of the social, economic and scientific rationales and justifications underlying such laws. There is also an element of winning a battle of wits with officialdom... It is a game villagers have been playing from time immemorial; how to successfully evade the laws, orders, and burdens perceived as arbitrary and imposed upon them by those in power" (Klausner, 1987: 227).

- **Administrative structure**

The administrative framework for water in Thailand is complex and fragmented. Water issues are managed by some 24 different government agencies and state-owned enterprises spanning eight ministries, which causes inconsistencies and confusion in the government's response to conflicts over water. This issue has been addressed elsewhere and the reader is referred to Christensen and Boon-Long (1994) for further discussion.

2. Impact of Legal and Administrative Frameworks on Water Allocation Conflicts

The legal and administrative frameworks shape the substance and outcome of water allocation conflicts in Thailand in several ways. These frameworks shape the way in which water users perceive the value of water and the cost of its consumption, and they affect the way in which water is distributed. Moreover, because these frameworks do not appropriately address market failures and resultant allocation conflicts, many conflicts are driven into the political arena where interest group lobbying and political bargains dominate allocation decisions.

Our case studies suggest that political bargains and compromises work best at resolving local-level disputes which involve simple water allocation technologies, but they work less well at resolving national-level disputes which involve more technologically demanding solutions. Moreover, local-level settlements may be less than optimal if the outcome enables water users to further deplete water resources in a major catchment area upstream, and thus water supplies further downstream are depleted. Local settlements which enable water users to further deplete supplies in the Mae Taeng project area in Chiang Mai, and in areas of the Central Plain irrigation system, often

downstream are depleted. Local settlements which enable water users to further deplete supplies in the Mae Taeng project area in Chiang Mai, and in areas of the Central Plain irrigation system, often result in the depletion of water in the entire catchment area which then creates an implicit conflict between upstream catchment areas and downstream catchment areas. The case studies suggest there is a dire need for administrative and legal mechanisms for managing resources in an entire basin, and which could facilitate management of allocation conflicts *between* river basins. The clearest case in point is the ongoing debate over the diversion of water from the Mae Klong basin to the Chao Phraya basin, presented in the Central region case studies (Pongsudhirak, 1994).

Below we present our conclusions regarding the successes and failures of the political system's management of water allocation conflicts, but first we summarize briefly the case materials at hand and the institutional failures which contributed to political conflicts.

Summary of the Case Studies

• Upstream-downstream conflicts in the Upper North

Case studies from the Upper North (Charoenmuang, 1994) entailed upstream-downstream disputes. Two areas where conflicts were examined – in Doi Saket District and Chom Thong District – involved disputes between rural water users and between water users and officials. Two others – the Mae Taeng irrigation project and Saraphi District -- involved conflicts among rural users, between farmers and officials, as well as conflicts between rural users and urban groups in the municipality of Chiang Mai.

Doi Saket Cases: The Doi Saket case studies were small-scale conflicts among farmers and between farmers and officials. In the former case farmers were able to settle conflicts among themselves since most lived in the same village and conflicts even occurred among kin. Moreover, Wongbandit in the companion report notes in his analysis that the settlement of this particular intra-village conflict was helped by the fact that farmers illegally drew water from an Irrigation watercourse to supplement supplies. In the case where farmers were in conflict with officials over the release of water from the Mae Kuang Dam, the case illustrates that irrigation officials have ultimate discretion over irrigation water allocation at the village level. Since these officials are empowered by the law to allocate water on what they perceive to be a "fair" and "equitable" basis

at their own discretion, villagers often agitate for these officials to release water into canals. Local irrigation officials are thus often subject to intense lobbying, and technical criteria in water allocation decisions may not play that important of a role in instances where local irrigation officials may come under considerable political pressure.

Chom Thong Case: The Chom Thong District case involves the deterioration of water supplies in upland areas due to consumption and pollution by hilltribe villages, whose practices result in soil erosion and pollution in the case examined. Complaints filed by downstream water users did not result in an improvement in the quantity or quality of water. The ambiguous legal status of hilltribes people in this case limited the ability of officials to enforce existing pollution legislation. Moreover, as pointed out by Wongbandit (1993), the lack of specificity in the law regarding individual responsibility for deterioration of water supplies makes enforcement all the more difficult in this case, since law enforcement is politically problematic in hilltribe areas anyway. The case illustrates the near meaninglessness of existing laws in certain upland areas at the headwaters of a major catchment area. It also suggests one reason for the creation of legal and administrative institutions for the management of an entire catchment or basin area -- in this case new frameworks could help fill in where existing laws are not effectively specified or enforced.

Saraphi Cases: Four cases of conflict were documented in the Saraphi District of Chiang Mai, which is located just at the rim of the municipal district of the city of Chiang Mai along the Ping River. The district is the site of several *muang fai*, or community irrigation canals drawing water from a main source (in this case the Ping River). Agricultural development and population growth in the area over time has resulted in a greater number of water users competing for a water source which has been depleted by irrigation development and urbanization upstream. Moreover, urbanization in and near Saraphi District has brought agriculturists into direct conflict with urban consumers and municipal officials seeking to develop more modern infrastructure in the area. In one instance new urban consumers upstream came into conflict with members of an existing community organization downstream because they used water for different purposes (fruit plantations, restaurants) and refused to recognize the (legally ambiguous) claims of the community downstream.

One case of upstream-downstream conflict in an area where a *muang fai* was in operation was not resolved, in part because there was no application of any water use laws whatsoever. A legal interpretation of the conflict suggests this was because the legal status of the *muang fai* was not specified. As a technically private entity, conflicts in a traditional *muang fai* do not require the involvement of local Interior Ministry officials such as village heads or district officials, whereas conflicts over waterways specified as "Peoples Irrigation" in the Private Irrigation Act of 1939 would involve arbitration by local officials. This case thus was characterized by anarchy. In particular, downstream users had little or no legal recourse against upstream users. Moreover, the political process was not relevant to this specific case either. The lack of a legal framework resulted in villagers talking matters into their own hands, so to speak.

In another case farmers came into conflict with the municipality of Chiang Mai when the construction of a bridge authorized by the mayor of the city caused water shortages downstream. Although it would have been difficult to prove any wrongdoing in a court of law, because legally the city was empowered to build the bridge, partial blockage of the Ping River was removed due to lobbying efforts by a local politician and by farmers agitating on their own. In this case, the law was not an effective mechanism for settling the dispute, since in fact the law gave authority to the municipality to construct the bridge and did not specify possible compensation for damages caused to water users downstream. Instead, probably because the conflict became such a high-profile public issue, a political compromise was reached which seemed in the interest of the politician involved, the municipality, and perhaps the mayor himself, resulting in a settlement which dispelled the conflict.

Mae Taeng Cases: The hydrological demands of allocating scarce water supplies throughout a network of 23 sub-canals, extending across 75 kilometers, among both rural and urban consumers, provide the basis for the water allocation conflicts in these cases. The system must coordinate water allocation in a rotation schedule between upstream and downstream farmers. It must also ensure that enough water supplies flow through the municipality of Chiang Mai, since part of the city's tap water supplies are drawn from the Mae Taeng canal. Because this is legally an irrigation project, irrigation officials have become the key actors in allocating water and arbitrating disputes.

Upstream-downstream allocation problems arise from two factors -- first, and simply, insufficient supplies to be able to fulfill the rotation schedule in the project's sub-canals, and second, overuse by farmers upstream. Both problems deplete water supplies downstream. Farmers in the last of the canals at the tail end of the system frequently did not receive sufficient water supplies. During the period of this study, the case research documented several instances in which water was illegally withdrawn upstream, but irrigation officials were unable or unwilling to enforce the law and prevent such action. Because this is a government project, downstream users could not legally file suit against users upstream, since the matter is deemed a dispute between upstream users and irrigation officials. Irrigators who stepped out of turn were therefore not violating any water use law, they were simply not complying with the RID project rules. Violation of the rotation schedule meant that, at worst, irrigators were destroying state property (irrigation equipment) if the water structures were altered. Irrigation officials are legally responsible in these instances to ensure that non-rotation withdrawals do not occur in the project's canals. The result of these disputes was for downstream farmers to protest and allege that officials upstream took bribes from upstream farmers in return for not enforcing the law.

In the Mae Taeng cases, upstream-downstream conflicts were amplified by the need to provide the city of Chiang Mai with sufficient water supplies. The law governing irrigation waterways does not specify a priority allocation scheme, and thus, curiously, there, there is no legal mandate stating that irrigation facilities must supply water to agriculturists as a first priority. Allocation priorities are simply left to the discretion of irrigation officials. Because the Mae Taeng irrigation officials are empowered by law to determine allocation priorities, they inevitably come under political pressure to deliver water to those who prevail in the political arena. While in our case research we were unable to document the precise political bargains made behind closed doors, the outcome of interest group competition in this case was that farmers downstream from Chiang Mai municipality fared worst. First priority went to upstream farmers and the municipality over downstream farmers.

- ***Surface water allocation conflicts in the Central region***

The Central region case studies focus primarily on allocation conflicts during the 1994 dry season which resulted from the severe water shortage of that year. The case materials cover both

micro-level disputes and one of the most important national-level issues, namely the possible diversion of water from the Mae Klong river basin to the Chao Phraya river basin. The legal and administrative frameworks relevant to the Central region's allocation systems have been discussed elsewhere (Christensen and Boon-Long, 1994), and this discussion will build on that where relevant.

Conflicts in the Central region during 1994 epitomize the lack of consistency and clarity in Thailand's existing water regime. Many of the conflicts of that year were rooted in one of the most glaring inconsistencies to date in the area of Thai water management. During the course of this research the government had launched the largest rice paddy-pledging program in the country's history. Yet the period during which this program was implemented coincided with the tightest dry-season water supplies ever in the Central Plain. The government was at one and the same time restricting surface water allocation in the Central Plains irrigation system at record extremes, while conducting a paddy-pledging rice price support scheme which was subsidizing farmers to grow rice, the most water-intensive of all crops grown in Thailand. The Cabinet was providing strong incentives for farmers to grow rice, while at the same time instructing the Royal Irrigation Department to restrict water supplies in the major rice-growing area in order to maximize water delivery to Bangkok residents. This was the same government which was trying to build up support among both urban and rural voters. Political priorities came into conflict with common sense, making public policy inconsistent and ultimately unenforceable.

Upstream-downstream conflicts: A case in Tambon Chakri, Singburi province, provides a story similar to the upstream-downstream conflicts among irrigators recorded in Chiang Mai. A conflict emerged when upstream farmers blocked a dirt-lined canal to divert water to their fields, thus depleting the flow downstream. The conflict was settled by the intervention of a village headman, though legally this should have been the task of irrigation officials since the conflict occurred within an Irrigation Department project. Lax enforcement of existing laws was surely evident. The case research notes how both irrigation officials and farmers did not follow the letter of the law simply because the canals were not lined with concrete. Had they been lined with concrete, irrigation officials would have taken more time and care to intervene in the dispute, and legal action would perhaps have been brought against the violators upstream, since they would have been tampering with government property. Although they were still tampering with an

irrigation facility in this case, irrigation officials refrained from involvement and it became incumbent upon the local headman to negotiate an informal compromise. An important footnote to draw from this case is that the headman involved suggested the canals be modernized and lined with concrete, because that may have discouraged the upstream farmers from obstructing the water flow in the first instance.

Ground water depletion: Another case involved an implicit conflict, namely a conflict for underground water consumption in the Central Plain. As water supplies in the irrigation canals dwindled in 1994, farmers did not hesitate growing rice, in part because they were encouraged by government subsidies to continue planting paddy. Water shortages led many farmers to deplete ground water wells to flood their fields. Because the Ground Water Act of 1977 does not apply to areas outside the Bangkok metropolitan area, farmers were free to deplete resources at their own discretion. Moreover, officials from the Mineral Resources Department came to the assistance of the farmers. As part of their mandate to monitor the extraction of ground water they provided both technical and financial assistance. Although this case did not involve overt conflicts among water users, or any immediate environment damage, it is clear that a more comprehensive legal framework is needed, since continued ground water pumping is likely to be the wave of the future if water supplies in the Central Plain continue to dwindle.

Diversion of water from the Mae Klong and Tha Chin basins: The case study focused on the current debates among government officials and between user groups and the government over the possible diversion of water from these river basins to the Chao Phraya basin. There currently is no legal framework whatsoever for managing the diversion of water from one basin to another. Clearly the diversion implies that, if the interests of water users in these two basins were compromised, there should be due compensation from the beneficiaries. However, there is no legal framework to define who are the beneficiaries and who are not, nor is there any water tariff scheme in place which could effectively result in the purchase of water from one basin to another. Existing law defines the water as the property of the "phaendin," or country, which the government is mandated to oversee. The existing legal framework does not allow for a clear specification of the owners of the water, or of those water users who would win or lose from the diversion of water in order to form the basis for devising compensation for those users who would give up water. As noted above, the Civil and Commercial Code cannot be used to judge if any user's rights in these

two basins would be violated, since it does not specify what those rights are, or how to determine them.

- ***Water quality conflicts in the Northeast***

The deterioration of water quality resulting from rapid industrialization has caused a number of conflicts in the Northeast region. Two conflicts documented in this study are the deterioration of water quality in the Nam Siew river basin due to rock salt mining, and the effects of factory discharges into the Nam Pong river basin. In both instances the lack of legal clarity regarding who caused the pollution, the lack of a sufficient information base on the part of the relevant government agencies, lax law enforcement, and political influence in the form of lobbying and bribery all helped raise the level of conflict in each case. Each case also illustrates that overlapping authority between the Ministry of Industry and the Ministry of Interior in the enforcement of the law led to confusion and inconsistent enforcement. In each case water quality continued to decline, as no effective pollution abatement measures were taken. Government failures also prevented effective resolution of the conflicts at hand. Each conflict was driven into the political arena and thereby forced upon national-level politicians, who, because of the many and powerful interests involved in each case, were often reluctant to take effective action.

Rock salt mining in the Nam Siew river basin: This is perhaps the clearest case among all the case studies where government attempts to manage negative externalities ended in absolute and unmitigated failure. Since the early 1970s rising prices of rock salt had stimulated more intensive rock salt mining. The mining generated negative externalities in the form of saline leakage into the water stream. Government policies which promoted rock salt production, the lack of any legislation to address the externalities, ineffective monitoring and enforcement of what few laws there were, and corruption both at the local and national levels prevented the government from reversing the deterioration of water quality in the Nam Siew basin for a decade. Committees were formed at the Ministry of Interior, and various Prime Minister Orders were enacted which called for limits on salt production, but they contained loopholes or were not consistently enforced. In most of these instances political and administrative measures imposed from above were ineffective and only loosely enforced, and failed to counter the market forces which sustained high demand for rock salt produced in the Nam Siew basin.

It could be argued that in this case, lack of effective management of water quality resulted from the diffuse nature of the externalities that were created, and by the high transaction costs of all the water users affected to organize, petition, or otherwise tackle the problem. What the case study emphasizes, however, is that there was government action taken in response to the problem, but that poor laws, institutions, and decisions resulted in egregious government failure.

Problems in the legal framework began with the Department of Mineral Resource's interpretation of the government's broad policy to promote industrialization – the Department concluded that the policy gave it discretion to promote the rock salt industry as it deemed appropriate, yet there were no specific laws governing either rock salt mining or its environmental impacts. There was never any single piece of legislation governing the effects of rock salt mining, only guidelines adjudicated by the Department of Mineral Resources on the setting up of salt mines. The Department believed that successive ministerial orders were sufficient to deal with the problem. There was no legislative framework which would allow a party to prove that salt mining caused them damage, much less provide a means for obtaining appropriate compensation.

A second problem was poor monitoring and enforcement capacities of the local bureaucracy. Neither the Department of Mineral Resources nor the Department of Industrial Works had sufficient local staff (or information capacities) to effectively monitor the problem and recommend appropriate action. Several officials even complained to the project researchers that they were often *unaware of the ministerial orders and measures that were instituted from Bangkok*.

Moreover, loopholes in the law left these local officials confused when the laws were communicated down to the local level. For example, a Prime Minister's Order in 1980, based on the Environmental Act of 1975, called for emergency limits on salt mining. A major loophole, however, was that this order did not cover brine water pumpers, only salt producers. Certainly brine water pumpers could produce salt from the water they pumped to the surface, and the result was that, even when the Order was enforced, it was not able to stop salt production. Moreover, penalties called for in this Prime Minister Order and others were not prohibitive, meaning that the gains in the marketplace of continued salt production far outweighed any penalties that may or may not have been imposed. An additional problem, of course, was that leading salt mining companies were financiers of the Chart Thai Party, which was a leading coalition partner in most every

government formed during the 1980s. As a result the Cabinet was reluctant for some time to "take sides" in the issue.

An additional problem was unsuitable standards, and this continues to be a problem even after the promulgation of the new Environment Act in 1992. The standards imposed by the Department of Mineral Resources prior to 1992 were inadequate. The enforcement of standards therefore did not constitute an act of "good governance" so to speak. An administrative control mentality prevailed which inclined many officials to perceive that the enforcement of existing rules was equal to good management of the problem. Since 1992 the Department of Pollution Control has been revising water quality standards, but still much more needs to be done to work with the Department of Industrial Works, the key enforcement agency, and make these standards known to officials and to develop an appropriate enforcement mechanism.

Furthermore, a key administrative problem remains – the 1992 Environment Act does not allocate authority to local government, *yet the Provincial Administration Act allows governors to take authority in the area of pollution control*. Local Interior Ministry officials can legally act upon pollution control issues, even though may have no training or knowledge in the technical aspects of water quality. Moreover, there is still no guarantee that local Interior Ministry officials understand the Environmental Act of 1992, or are aware of the standards and related administrative measures instituted by the Department of Pollution Control in the Ministry of Science, Technology, and Environment.

Nam Pong river basin: The case of water quality deterioration in the Nam Pong basin suffered from many of the same afflictions as the Nam Siew case. In this case conflicts emerged over the alleged emission of effluent into the Nam Pong River from the Phoenix Pulp and Paper factory in Khon Kaen province, and also from a sugar mill that had leaked molasses into the water stream. In the Phoenix case, disputes centered on whether, and how much, Phoenix had actually polluted the water stream, and also on the ad hoc response of the relevant government agencies to the problem. Phoenix emphatically denied ever releasing chemicals into the water stream which could damage water quality and kill fish, as alleged by local politicians. Local farmers fell on both sides of the dispute. Those who relied on water from the river protested, while those who were employed by Phoenix did not.

Whatever the truth of Phoenix's claims, it is clear that government failure was at least partly responsible for making this a hot political issue. The lack of sufficient technical and monitoring capacities on the part of local Department of Industrial Works officials rendered the government unable to prove that Phoenix was responsible. Insufficient technical evaluation capacities among local officials and a fragmented local government response made the case a political football, while the problem of deteriorating water quality was not resolved. Another problem was that penalties and other legislative sanctions bore no correspondence with the nature of the externalities, just as in the Nam Siew case. A fine of 10,000 baht was imposed on polluters, and even if it were enforced, the value and method of applying the sanction were not determined on the basis of compensating for damages caused. Moreover, as in the Nam Siew case, politically-motivated action was taken by the authorities. The Phoenix plant was shut down and bullied to appease an angry public before the facts were actually determined.

The case of the sugar mill illustrates how existing law does not provide legal recourse for all parties concerned in a dispute. Although the Provincial Waterworks Authority was able to bring a suit against the sugar mill which had emitted pollutants, the law did not allow farmers to take civil action against the sugar mill.

Conclusions about the Political Process

The chief consequence of these features of the formal-legal system is that water allocation conflicts -- like other resource disputes -- tend to be driven into the political arena. In summary, we find there are four specific reasons for this in Thailand.

- ***Lack of clarity over rights to resource use***

While Thai water laws usually define ownership over water resources (e.g. the state versus "common" or public) they generally do not clarify the specific rights to the use of the water. This lack of clarity makes particularly ambiguous how much water individuals and groups are allowed to draw from rivers, streams, or irrigation waterways. It also makes ambiguous the permitted quantity of ground water pumping outside of Bangkok, where the Ground Water Act currently in force does not apply, and also the diversion of water from one river basin to another. This lack of

specificity in the law encourages water users to rely on their elected representatives to resolve the ambiguities, often leading to an impassioned political debate.

● *Local bargains and compromises call for politicians*

Many water conflicts in Thailand are managed and resolved daily at the local level, as demonstrated by case studies from the Northern and Central regions. These resolutions usually take the form of informal bargains and compromises, as the formal-legal process -- in particular the courts -- is typically avoided at almost all costs. (More to the point -- the costs of litigating a dispute in court almost without exception exceed the costs of avoidance, compromise, or incurring damages.) Local conflicts that are arbitrated by local politicians (municipal or provincial) or village headmen by law are those occurring in waterways under the Private Irrigation Act of 1939. Even so, conflicts occurring in public waterways such as irrigation projects also often involve village headmen, who can act as representatives for user groups and negotiate with irrigation officials on their behalf.

It is not so much the legal specification of the role of these local officials that matters so much in the successful settlement of conflicts, however. Although the legal framework is important in shaping how the conflict arises and is addressed, formal laws are not consistently enforced, and the lack of clarity in the law makes it difficult to use formal rules ascribed as a reliable guide to projecting an outcome. Instead, it seems that conflicts that are settled relatively effectively are those in which the possibilities for "exit," to use Hirschman's notion, are limited. These possibilities apply to the water users, who may have no other water resources to rely upon and hence the incentives for a collective solution are high, as well as to the politicians or the headmen, who because they are elected by the locality have no other basis to turn to for electoral support. The absence of an effective judicial mechanism makes water users rely upon local headmen and politicians as the principal actors in addressing local disputes. Put another way, politicians help to facilitate "voice" where exit options are limited, and where "loyalty" is diminished (or precluded) by an unresponsive, unaccountable, or inefficient formal-legal process. If this exit-voice analogy is in fact a more consistent rule of thumb than the formal roles of the actors as defined in the law, it implies that as water supplies deteriorate, political conflict will increase so

long as the degree of "loyalty" remains low. This strengthens the case for devising an alternative legal framework.

Politicians can also help to facilitate collective action. It is not true that community groups always engage in collective action to fend off a common threat to their livelihood, as suggested by the Phya Kham case study in Chiang Mai where the district Muang Fai had deteriorated as the number of users had increased over time. On balance, however, the case studies do not provide clear-cut patterns for collective action. In some instances in the North, time-honored community organizations have challenged the intrusion of a declared "public" waterway to defend a collective resource; in other instances traditional muang fai groups have atrophied and allowed their community water allocation systems to deteriorate. Politicians have proved useful in motivating collective action especially when they can provide the necessary incentives or inducements exogenously (e.g. monetary compensation for time spent, funds for maintenance of infrastructure) to motivate organized maintenance of water allocation systems.

These kinds of political solutions to allocation problems can indeed work to the advantage of the small-scale water user, thereby facilitating -- though probably to a small degree -- an element of equity in the resolution of disputes. The nature of the legal and political process as outlined above indeed can often work to promote the interests of small-scale users. To expound upon the point made above, small-scale users and groups have two general alternatives in a dispute. First, resources permitting, they can pursue the "exit" option by exploiting loopholes and ambiguities in the law to deplete available resources through alternative means. Examples in our case studies include unrestricted ground water pumping in the Central plain during last year's dry season cropping, and the diversion of water supplies from dirt-lined irrigation canals using obstructive devices, again in the Central region last year. Second, individuals and groups can turn to their local or national politicians. Although Thailand's political system is *highly centralized*, it is not in fact true that local politicians or officials have no power to address local issues. Again, the utility of the local elected officials seems to depend on the extent to which the politicians rely upon the water users as their sole or primary basis of political support, as well as other informal factors such as the politicians' relationships with municipal governments, local irrigation officials, the local sheriff, etc. However, conflicts that involve national-level politicians, such as rock salt mining in Northeastern Thailand, are more difficult to resolve, owing in part to the national MPs' allegiance to both farmers

and businessmen for electoral support. Urban-rural allocation conflicts also tend to work in favor of the urban constituencies which are more wealthy and more politically powerful. Clearly the utility of politics is variable, and political lobbying cannot be relied upon as a rule of thumb. For the economist seeking a "second best" solution here, the cases suggest that purely political decisions are likely to favor clout over efficiency or equity. It just so happens that local mobs can form enough clout to press even the most stubborn of local bureaucrats into action, as case studies from Chiang Mai suggest.

- *Weak bureaucracy diminishes quality of public policy*

The capacities of local administration, in particular relating to irrigation maintenance and enforcement of water quality standards, are woefully weak, and the relevant agencies are inappropriately staffed. Moreover, in instances when qualified local administrators are present, these officials often lack the necessary authority to carry out duties under their jurisdiction. Power is, however, concentrated in the highest offices of the ministries, which makes the upper tiers of the bureaucracy and also the Cabinet the central arena for many water disputes. Political and administrative powers at the top echelons of government are often used to address local or regional issues. Weak local capacities, and the centralization of political power in the capital city, often turn local and regional matters into national issues. Further, inadequate local administration often encourages mobs to form in hopes of motivating national-level authorities into action.

For many local-level disputes, such as the conflict in Phya Kham district in Chiang Mai, an ill-equipped local bureaucracy was evidently not a major constraint, probably because the water allocation problem at hand required little in the way of complex technology to resolve. But where the problem demands a higher degree of engineering or hydrological skill, such as in a more advanced irrigation project like the Mae Taeng project, political intervention and compromise may not be all that is required. In absence of a sophisticated public bureaucracy able to diagnose market failures and offer creative remedies, it may be more difficult to rely on political bargains to find appropriate solutions. Political cunning is no substitute for effective public policy.

Weak bureaucratic capacities are not simply an administrative problem. The technical sophistication of a public water allocation system is an additional ingredient of effective management. The sophistication level of the water allocation system helps to determine the

efficiency of distribution and potential for conflicts. Modernized, sophisticated irrigation systems, characterized, for example, by items such as gates installed down to the farm level, with allocation times determined by computer models, provide great certainty in water delivery and consumption. In a more advanced system, irrigation authorities are able to make efficient use of a limited resource, because the allocation system itself wastes little water. This type of system is found as well in South Korea and Japan (Wade, 1988b). In Thailand it exists in the Lam Nam Oon system (Dolinsky, 1992), but most of the remainder of the public irrigation facilities is not designed in this fashion. Most of Thailand's irrigation infrastructure is still rudimentary. It is dominated by either the old "Conservation System," characterized by large canals which act as reservoirs to contain rain run-off, and dirt-lined main and secondary canal systems in which large lumps of water are delivered and left to be drained out by farmers using low-lift pumps. The main and secondary system is said to waste water because farmers are encouraged to pump large quantities at a time, and while they are doing so, water seeps from the canals into the soil.

Poor organization, combined with rudimentary irrigation structures, helped fuel upstream-downstream allocation conflicts between villages in the Central region in particular. In this case the irrigation infrastructure was in such rudimentary condition that farmers were able to install makeshift structures and divert water from downstream users. Emergent conflicts were almost always mediated by the village headman, given there was no relevant legal framework available to pursue a more formal solution. Conflicts were resolved temporarily when village headmen were able to lobby to have new concrete structures built that could not be tampered with as easily by hand to suit the immediate consumption needs of any one farmer.

More advanced water infrastructure, however, requires a more technically competent bureaucracy to maintain it. The more complex irrigation structures noted above demand constant maintenance and attention to water users' consumption patterns and needs. The success of the Lam Nam Oon system (Dolinsky, 1992), was rooted in constant communication between irrigation officials and farmers. This, too, is the hallmark of the South Korean irrigation regime, in which operations and maintenance officials make almost daily visits to farmers and are aware of the allocation needs for an entire canal scheme. In contrast, in the Thai irrigation system there is no equivalent of the Korean "patrollers" described by Wade (1988b). Irrigation patrol officials are distant from farmers. Zonemen occupy offices in far away bureaus, usually at the district or

municipal centers of the provinces. Operations and maintenance officials are also scarcely found in the countryside. This system of only minimal maintenance simply compounds the problem of lax enforcement of the law and provides further incentives for water users to ignore the law and, in the case of many upstream farmers depicted in the case materials, to deplete water resources as they please.

- *Political compromise most effective at the local level, and least effective at the national level*

The case studies thus suggest the following conclusion. Politics is effective where the numbers of water users in a dispute are limited, where political relationships can quickly mobilize monetary and administrative resources, and where the water allocation problem requires only simple technology, if any. Local disputes tend to require only skilled negotiators and minimal administrative expertise. Local politicians thus fit the bill. But where the water allocation task involves a greater number of players, and requires engineering and hydrological skills, politics loses its utility. Regional and national disputes require more sophisticated water infrastructure and knowledge-intensive guidance and enforcement. Without appropriate information and policy instruments, there are severe limits to the utility of political bargains in resolving more technologically complex tasks. Moreover, at these levels political compromises are more difficult to strike. This is true even with regard to smaller-scale conflicts within modern irrigation facilities, such as the Chao Phraya basin, or the Mae Taeng project in Chiang Mai, where co-ordination of the water infrastructure demands some degree of engineering skill.

The major lesson derived from these points is that the political process as it exists today is perhaps best suited to address local disputes, in particular village-level disputes, but it is less well suited to managing many of the more technologically complex national-level issues that have arisen in recent years, because most of these problems demand a more sophisticated and skilled public bureaucracy. The political process works relatively well in facilitating local bargains and compromises, but it works less well at producing information-intensive public policies at the national or regional levels which are suitable for resolving the water allocation problems at hand.

Politics, however, can often obstruct legal or administrative solutions which otherwise might facilitate a superior outcome. Partly because of a lack of legal clarity, and partly because of

the pervasiveness of political criteria in resolving conflicts, many aspects of water allocation and water quality are simply kept outside of the formal-legal process and thus remain ambiguous. There are numerous laws on the books which call for punishment against polluters, but political considerations often prevent these laws from being enforced. The legal status of hill tribes which consume water upstream in many uplands areas of the Northern region is unclear, and as such the authorities are unable or unwilling to apply prevailing water quality laws in these areas. Downstream water users thus incur damages. Alternatively, some issues fully penetrate the political arena and are then extremely difficult to resolve in absence of extreme political will, or in absence of political autonomy of those in power. Damages incurred by rock salt mining in the Northeast went unresolved for years because senior politicians resorted to Cabinet resolutions as a delaying tactic to protect their financial supporters in the rock salt mining industry.

National political jockeying over certain water allocation issues has not proven effective for addressing national-level problems in absence of substantive reform in the laws and administration governing water use in Thailand's major rivers. The key example is the ongoing and inconclusive debate regarding the diversion of water from the Tha Chin and Mae Klong river basins to the Chao Phraya river basin. In absence of a legal framework which could specify rights to water in those basins, this debate can only become more charged and contentious, and a possible solution would lie that much further off. It is not possible in formal-legal terms to identify which parties have rights to what quantities of water when the law does not specify what precisely those rights are. This absence of a legal framework for inter-basin allocation issues is one of the biggest gaps in Thailand's water administration, and unless one is forged, this issue is likely to lead to vitriolic political conflict as water supplies dwindle in these river basins.

3. Resolving Allocation Problems Through Institutional Solutions

The simple conclusion to be reached from the above discussion is that government action on water management should focus less on trying to resolve political conflicts, and more on fixing the institutional and legal frameworks, since it is changes in these areas that could possibly lead to better policy decisions, and more appropriate management of Thailand's increasingly scarce water resources.

We are somewhat dubious of the proposal to amalgamate the various water-related agencies into a single water super-ministry. If it is intra-administrative conflicts that policy makers are trying to resolve, attention needs to focus on the ways in which the numerous laws assign discretion to differing ministries and departments. Without change in these laws, shrewd bureaucrats will simply have continued incentives to use the law to defend their turfs. This might create more order in decision making, but it may will not change the behavior of water consumers. Moreover, another intention behind the creation of this ministry seems to be to centralize the various political and administrative decisions associated with the current water regime without qualitatively changing the nature of those decisions or the decision-making process. This is something akin to putting the cart before the horse. It is our view that the legal principles behind the present-day practice of free access and state provision of water are the cause of much of the administrative duplication and ad hoc decisions which characterize water allocation priorities in Thailand. Creating a new ministry may help to reduce the degree of erratic decision making, but it is not likely to change the very behavior of water users which gives rise to the political turbulence. What we read out of the case studies is that it would make more sense to treat the fever than to fix the thermometer. Debate over water reform should go back to square one and address laws governing water use rights, followed by the development of policy instruments to facilitate those rights.

In the meantime our case studies lead us to conclude that there are possible efficiency (and equity) gains to be realized from improving the management of Thailand's water infrastructure, in particular the irrigation system, and boosting the monitoring and enforcement capacities of the ground water and water quality bureaucracies. We define the tasks as follows:

Legal Adjustments

Tasks in the area of legal development are two fold: first, defining what the specific problems and externalities are and crafting laws and regulations to address these problems, and second, implementing new legislation in a manner which brings all the relevant officials into the process, educates them about the specific content of the legislation, and then defines how new regulations are to be enforced. The principal problem with the 1992 Environmental Act is that it was literally rammed through an appointed parliament and then delivered to an unsuspecting

bureaucracy which did not understand its contents. Moreover, the legislation needed a whole range of subordinate legislation to complete the details implied by the broad guidelines of the law and to define how the new law would be applied. As this was a very knowledge-intensive assignment, given the technical issues at hand, much of this framework is still not yet in place.

There is a dire need for a legal framework which applies specifically to the externalities involved in a given water allocation conflict. Clearly not any one piece of legislation can solve all water allocation problems. But through a careful crafting of subordinated legislation, based on case studies of specific problems, appropriate regulations could be established. It is important that these are comprehensive, yet do not simply serve to empower the central administration only. The more specific they are in their issuance, the less discretion is provided for administrators, and hence the less room there is for inconsistencies and selective enforcement. The laws must be comprehensive, because the risk of political intervention from above is great if existing laws are deemed inadequate. Yet they must at the same time be specific. At this point, this particular research project was unable to assess whether a more specific arrangement of subordinate legislation is at all possible under the existing Civil Law framework, and this should be a subject for future legal and policy research.

For this reason, the case research leads to the preliminary conclusion that regulations should be crafted that outline not only establishment, but also the precise methods of implementation, of market-based instruments. Effective market-based instruments could help to establish water use rights where the law is currently unable to do so. At present it is far more likely that market-based instruments would be implemented with regard to water quality problems than in the area of surface water allocation. First, the broad legislative framework for introducing market-based instruments to deal with water quality problems is already in place, in the form of the 1992 Environmental Act. Second, there is a long legacy of administrative-based allocation in the area of surface water (notably irrigation) which puts administrative and political constraints on the adoption of market-based solutions. The introduction of market-based instruments in the area of surface water allocation is of course a much more legally complex issue, and ultimately implies change in the management of the public irrigation system. Current irrigation laws call for charges to be imposed upon farmers, but they do not specify an framework for the introduction of market-based policy instruments. Such instruments would require a new legal Act, and this Act would

need to prevail over existing irrigation laws which currently give the Royal Irrigation Department discretion to determine water allocation priorities within public irrigation projects.

The legal framework appears to be evolving in the area of establishing penalties and defining standards, but the fragmentation of the Thai bureaucracy has restricted this progress to only some agencies and not others. It is unclear whether the regulations and measures produced by the Departments of Industrial Works or Mineral Resources bear any correspondence with the ongoing efforts of the Department of Pollution Control to develop specific legislation. As the various subordinated legislation are produced it is essential that the utmost coordination among these three agencies is achieved so that all officials involved understand that these efforts are part of rounding out a single piece of legislation and the policy purposes embodied in it, and are not simply representative of specific agency interests or mandates.

On a related note, the 1992 Environmental Act does not define how enforcement authority should be allocated to local governments, yet the Provincial Administrative Act permits Governors authority in the area of pollution control. Many local officials in the Ministry of Interior say they do not know or understand what the 1992 Act is all about. If the Department of Industrial Works is to continue on as the key enforcement agency, then overlapping authorities with the Ministry of Interior must be overcome.

Organizational and procedural adjustments

A framework for inter-basin transfers is completely absent from the litany of laws governing water allocation, though the prime minister's office frequently addresses the issue as if the organizational structures and laws are in place. An administrative solution to this issue clearly implies some coordination between the Ministry of Interior, the Irrigation Department, the Cabinet, and local government entities. Already the turf battles have sprung up. A market-based alternative would require a clearly-specified form of more decentralized management of each river basin, so that basin entities could bargain amongst themselves and establish a value of the water to be transferred, and then payment of compensation across basins would logically follow. As of now, the existing organizational framework is divided on a central-local basis. A departure from this command and control legacy would require a basin-basin relationship that clearly calls for the

creation of new organizations along the lines introduced in the draft Water Codes written by the Thammasat University law faculty, and by the National Research Council.

Market-based allocation systems at the local level will clearly require some reorganization of the RID and decentralization of the RID command system to the local level. Improvements in the RID's operations and maintenance (O & M) apparatus in particular are long overdue. Better O&M could help to improve the sophistication and efficiency of local irrigation systems, while more monitoring and communication with water users could help to smooth upstream-downstream disputes.

With regard to water quality, at least four issues stand out:

- The Department of Industrial Works is in dire need of more and better trained staff. Currently about 300 officials oversee 100,000 factories nation-wide.
- A system of public hearings would provide individual water users the opportunity to voice their case when transaction costs prevent them from using the courts to bring civil action against polluters. Public hearings are certainly no substitute for civil action, but they could relieve the tendency for water quality disputes to be driven into the political arena each time a problem arises.
- Still, where compensation for externalities is concerned, the 1992 Environmental Act is not a guarantee, since it confers more rights to compensation in court. Again, for many water users, the cost of taking a case to court exceeds the compensation, expected or otherwise, that may be forthcoming.
- Although the Water Quality Division of the Department of Pollution Control has been designated the authority to set standards, there is a great need for more trained personnel who have broad technical training in the other relevant agencies, namely in the Department of Industrial Works and the Department of Mineral Resources. Having trained personnel in these agencies would also help resolve some of the coordination problems observed, since these often arise because officials across agencies have little understanding of the issues at hand.

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Legal Perspectives of Water Allocation Problems in the Upper Northern and Central Regions^{*}

Amnat Wongbandit

Part One: Water Allocation in the Upper Northern Region

1. General Water Allocation Problems

Common water allocation problems in the upper northern region seem to be composed of two major issues; downstream and upstream water use conflicts, and underground water use conflicts.

Downstream and Upstream Water Use Conflicts

Downstream and upstream water use conflicts are typical water allocation problems in an area where water is insufficient. The conflicts may arise between the agricultural and non-agricultural sectors such as municipal, industrial and leisure uses which can be found, along the Fai Phya Kham in Saraphi District, and within the area of Mae Taeng Irrigation Project in Mae Taeng District, Chiang Mai. Conflicts also exist among water users within the same sector and along the Mae Kuang River in Doi Saket District and the Mae Soi River in Chom Thong District.

^{*} For references, see page 245-249

Water use conflicts appear in various forms. The downstream water users may suffer water shortages since the quantity of water used upstream increased which might be attributed to, for instance, population growth or change in the pattern of water use. The upstream users in this situation normally do not know that their activities caused damage downstream because each user may utilize only a small amount of water and therefore feel that such use is legally permissible. Sometime the conflict may be caused by blatant violation of law or agreement. For example, the upstream users may “steal” or illicitly withdraw water from a watercourse either by using electric pumps, opening water gates or blocking the watercourse. Plus the conflicts involve not only the quantity of water used but also the quality of water as people in the low land area often complain to officials that the water they use is polluted by toxic substances used on farms by hill tribes people.

Underground Water Use Conflicts

Since surface water sometimes is insufficient, some people alleviate their problems by digging wells to use underground water. Although conflicts arising from competition for underground water have been rarely reported in the upper northern region, this problem could become more common as the surface water supply is unable to meet the increasing water demand caused by expanding cities, economic development and population growth. A typical problem from underground water use is a conflict between neighboring well-owners who may accuse one another of exhausting the water in the well of the other as found in Ban Kudaeng, Nongfaek Sub-district, Saraphi District.

2. Legal Principles Governing Water Allocation

Before examining the legal aspects of the four case studies below, an overview of the legal principles governing water allocation should be mentioned. Such legal principles may be classified, according to the area of application, into three groups; those governing water allocation in the non-irrigated area, those for irrigated area, and those for underground water utilization.

Non-irrigated Area

For the purpose of examination of laws governing water allocation in the non-irrigated area, surface water will be divided into two categories; water in watercourses and runoff water.

The water in the first category is for common use as Section 1304 of the Civil and Commercial Code states, *inter alia*, that:

The domaine public of State includes every kind of State property which is in use for the public interest or reserved for the common benefit, such as:

(2) property for the common use of the people e.g., shorelines, waterways, highways, lakes;

The excerpt indicates that all persons, State and private individuals or entities alike, have the right to use water in watercourses and the State has no right to prohibit anyone from using such water unless it is specifically stated by law. There is no law clearly authorizing the State to comprehensively regulate the utilization of water in watercourses, particularly the withdrawal of water which has in part led to the legal failure of water allocation as will be seen later.

While Section 1304 establishes the right to use water in watercourses for all persons, Section 1355 defines the extent of the right to use water by riparian landowners which stipulates that:

The owner of a piece of land along or through which a water-way passes is not entitled to draw more water than is necessary for his reasonable needs to the detriment of any other piece of land on the waterway.

The legal principle adhered to by Section 1355 is sound and indispensable for water allocation since it prevents a riparian landowner from wastefully utilizing water and thereby causing injury to other riparian landowners downstream. The withdrawal of water should be in proportion to his needs. This provision seems to fit in a small agricultural community where water use activities are not that complicated and the number of water users is not that large. In these circumstances it could be relatively easy in identifying whether a particular use violates Section 1355.

When Section 1355 is considered in the present day context, it is obsolete and unable to handle water allocation problems properly for the following major reasons. First, reliance upon the “needs” of riparian landowner as a test cannot solve the current water allocation problems and protect the rights of water users downstream because certain activities on a particular piece of land

may need more water than that in another. This means that a riparian landowner using much more water than other riparian landowners and thereby exhausting the water supply downstream might not be held liable if such use corresponds to his needs.¹ This is a real problem faced by some downstream water users who do not know how to deal with golf courses exhausting water upstream.²

The second reason that Section 1355 is obsolete is its inapplicability to a case of water use conflict where a large number of water users are involved. In this case, it is very difficult to identify a particular user who exhausts the water supply of a watercourse or causes injury to downstream users since the exhaustion of water or injury may be caused by the combined actions of users, and adverse effects from a single user could in fact be minimal and probably would be acceptable by law. Downstream users could suffer damage from legitimate use of water upstream without legal remedy.³ One alternative for this problem is to regulate the use of water in watercourses which could be implemented by introducing a water permit system which requires that anyone wanting to use water would have to apply for a water permit. This concept would be able to handle the water allocation problems properly because all necessary conditions for utilizing water would be set up in the water permit.⁴ For instance, a water permit might require the reduction of amount of water withdrawn from watercourses during the dry season.

¹ Amnat Wongbandit, *Revision of Water Resources Law*, paper distributed at Seminar on the Preparation of Laws Concerning Water Resources Utilization and Conservation, organized by the National Research Council, 2 May 1992, at Faculty of Law, Chulalongkorn University, 4-5.

² The Council of Minister on 9 October 1990 issued a resolution prohibiting golf courses from using water from "Irrigation Watercourses" and State reservoirs for watering their trees and lawn.

Nawarat Krairapanond and Assadaporn Krairapanond, *Golf Courses and Environment*, 65, 1993.

In this writer's view, the prohibition by the Council of Ministers is not able to remove all conflicts between golf courses and other water users since water in watercourses not designated as "Irrigation Watercourse" can be freely withdrawn under a very vague existing legal principle.

³ Amnat Wongbandit, *supra* not 1, *id.*

⁴ For more details, see Amnat Wongbandit et al., *Research Project on the Compilation and Revision of Water Resources Laws*, a research paper prepared for the Pollution Control Department, Ministry of Science, Technology and Environment, 1993.

Please note here that provisions of the Civil and Commercial Code apply to the use of water from watercourses in general. If such water is used for agriculture, it will be also subject to the Private Irrigation Act 1939, which governs the operation of private irrigation system and divides it into three; Personal Irrigation, People Irrigation and Commercial Irrigation. Any person operating a private irrigation system needs to have permission from the authorities concerned. The Private Irrigation Act has an appropriate legal mechanism for allocating water to private water users as the government agencies concerned are vested with powers to supervise and control the operation of this irrigation.⁵ In practice, the Act is not able to resolve the water allocation problems for many reasons.

First, the scope of application of the Private Irrigation Act is limited to agricultural use of water only.⁶ It means that non-agricultural use is not subject to this Act, and as a result the provisions of the Civil and Commercial Code will come into play which certainly cannot effectively handle the water allocation problems.

Second, when the agricultural use of water is examined, the scope of application of the Private Irrigation Act is also limited since it does not be apply to an irrigation area of not more than 200 rai, or non-permanent irrigation which does not block public watercourses or cause damage to other people.⁷ According to these exemptions, people are still able to withdraw water from public watercourses by using electric pumps.

Third, the Act does not provide a legal mechanism for specifying the scope of right to utilize water of each irrigation operator and other water users so that water use conflicts could be avoided or be easily settled.

Fourth, some officials or government agencies responsible for issuing permission for the operation of private irrigation may have very little knowledge on water allocation or management,

⁵ *Private Irrigation Act, 1939, Sections 4, 7, 9 and 21.*

⁶ *According to Section 4 of the Private Irrigation Act, 1939, "irrigation" means "a project set up by any person for delivering water from waterways or other water sources such as rivers, streams, brooks, swamps, canals and lagoons for agriculture. This includes a water-related project for protecting agriculture from damage".*

⁷ *Private Irrigation Act, 1939, Section 7.*

and such permits could be issued without paying serious attention to adverse effects inflicted upon other water users outside their jurisdiction. For example, an irrigation scheme for an area of not more than 500 rai requires permission from the Sheriff who (generally) knows nothing about water allocation or management.⁸

Finally, the Private Irrigation Act has not been actively enforced or applied by the authorities concerned.

Apart from the water allocation problems in watercourses, attention should also be given to the legal means of governing the utilization of runoff water. Section 1339 of the Civil and Commercial Code states as follows:

The owner of a piece of land is bound to take the water that flows naturally on to it from higher land.

Water that flows naturally on to lower land and is necessary to such land may be retained by the owner of the higher land only to an such extent as is indispensable for his use.

Section 1339 seems to suggest that the amount of water that can be retained by higher landowners depend upon that land's "need". This provision is not able to handle the water allocation problems as faced by Section 1355 since the available water supply cannot satisfy all the "need" of all landowners and consequently a higher landowner may retain all runoff water running through his land to satisfy his need without breaking any law. This kind of conflict usually occurs between golf courses and lower landowners as all water passing through the golf courses is collected by their large reservoirs which cause damage to lower landowners who used to receive such runoff in the past. This is the reason why the introduction of a water permit system is needed to tackle the water allocation problems.

Irrigated Area

Within an irrigated area where water is derived from a government irrigation project, all kinds of water use are governed by the Royal Irrigation Act 1942. Although the Act does not specify how much water each person or riparian landowner is entitled to use, the Royal Irrigation

⁸ *Id.*

Department (RID) and its officials are equipped with powers under Sections 16 and 35 to allow or not to allow any user to utilize the water of "Irrigation Watercourses" as well as to set up any relevant conditions for such a user to comply with. The water of in the Irrigation Watercourses is legally under the control or management of the RID.

The government is legally able to regulate not only the utilization of water within an irrigated area, but also impose fees upon water users under Section 8 through the issuance of ministerial regulation to that effect. This provision also sets a maximum charge for agricultural use which shall not be higher than five baht per rai and non-agricultural uses not higher than 0.50 baht per cubic meter. This measure to a certain extent will be able to force most water users to economically utilize the water if it is properly implemented. In practice however, a fee has been charged for non-agricultural uses only⁹ which might be in part attributed to the fact that most farmers are poor and politicians are afraid of losing support from the farmers who are the major voters in the country.

Apart from the provisions mentioned above, the Royal Irrigation Act has some provisions prohibiting certain activities which could hamper water allocation and the irrigation system. Section 23 prohibits the construction of any thing in as well as the encroachment of an Irrigation Watercourses without permission from the officials concerned. Unauthorized obstruction of such Watercourses is a direct violation of Section 25. Without authorization from the officials concerned, no one under Section 26 is allowed to connect any watercourse or waterway to an Irrigation Watercourses or cause them to leak.

Despite all the provisions for protecting and managing water in Irrigation Watercourses under the Royal Irrigation Act, the problems of water allocation still exist in irrigated areas.

⁹ However, among non-agricultural water users, there are some exemptions from water charge such as those whose monthly average use is not more than 1,000 cubic meters or those who use water for public purpose with written permission from the RID's Director General.

Ministerial Regulation (of Ministry of Agriculture and Cooperatives) No. 11 (1975).

Underground Water

The extraction and utilization of underground water under the control of the Underground Water Act 1977, requires that anyone undertaking such activities must obtain a license from the Mineral Resources Department (MRD). The license is transferable provided that an approval from the officials concerned is obtained. The Act authorizes the Minister of Industry to issue ministerial regulations and notifications describing the water fees and rates as well as how the underground water should be extracted, used and re-filled. In addition, the extraction of underground water may be prohibited by the Minister in an area where such an extraction would cause damage to aquifers, natural resources, property and people, or induce pollution and land subsidence.¹⁰

Despite the existence of the Underground Water Act, the problem of underground water extraction and utilization is not totally clear or understandable for the following reasons.

First, the scope of application of this Act is rather limited as it applies to underground water with at least 15 meters depth from the surface soil. The Act applies only to an area designated by the Minister as "Underground Water Area" which so far has included Ayutthaya, Bangkok, Nonthaburi, Patumthani, Samut Prakarn and Samut Sakhon.¹¹ This means that underground water with less than 15 meters depth within the Bangkok Metropolitan areas and underground water in other provinces are not subject to the control of the Underground Water Act. One may ask what kind of law then governs the extraction and utilization of such underground water. The answer is very unclear since the Civil and Commercial Code is also silent on this issue. This problem must be rectified.

Second, the Underground Water Act does not address the relations between neighbouring landowners who may compete for underground water from the same aquifer. For the time being, once any person obtains a licence, he, in spite of the depletion of the aquifer of the neighbouring land, is able to extract underground water as described in the licence. If such a person is outside the Underground Water Area, he is legally able to extract underground water as much as possible.

¹⁰ *Underground Water Act, 1977, Sections 5, 6, 16 and 21 bis.*

¹¹ *Ministerial Notification (of Ministry of Industry) No. 1 (1978).*

Finally, the Underground Water Act does not govern activities other than drilling and utilization of underground water even though they may harm or pollute the aquifers. For example, the excavation of land with no intention of extracting or utilizing underground water is not regulated by the Underground Water Act.

3. Laws Governing Water Pollution

When the problem of water allocation is mentioned, it is inevitable to touch upon the issue of water pollution. This study is supposed to deal with the former problem, laws concerning pollution in watercourses will be briefly discussed.¹²

Any person polluting a watercourse may be subject to punishment. It could be an offence under Sections 119 and 119 *bis* of the Navigation in Thai Waters Act 1913, and Section 19 of the Fishery Act, 1947. If such a watercourse is designated as an Irrigation Watercourse, the polluter will be punished by Section 28 of the Royal Irrigation Act 1942. The polluter is subject to not only criminal sanctions but also civil liabilities as stated in Section 96 of the Enhancement and Conservation of National Environmental Quality Act 1992, states that the owner or possessor of the pollution source shall make compensation for loss and/or damage caused by such pollution. Compensation also includes all clean-up costs in removing the pollution.

Apart from special provisions of the law for the protection of watercourses and the environment in general, some laws have been enacted to control specific kinds of pollution. For example, the Factory Act 1992, is used to regulate the operation of factories, particularly the issuance of effluent standards. The Building Control Act, 1979 contains a provision which authorizes the Minister of Interior to issue ministerial regulations concerning, effluent standards for wastewater discharged from buildings.¹³ The laws under discussion introduce measures, especially effluent standards, for preventing possible environmental damage. This approach is different from

¹² Amnat Wongbandit, *Water Use Conflicts Management in the Northeast: Case Studies of Nam Siaw and Nam Pong*, research paper presented to the Natural Resources and Environment Program, Thailand Development Research Institute, 1994.

See also Amnat Wongbandit et al., *supra* note 4, *id.*, at 21-41.

¹³ For more details, see Amnat Wongbandit, *Law Concerning Wastewater Treatment*, a research paper prepared for the National Research Council (1992).

the laws in the previous paragraph as they come into play only after the occurrence of damage which may be irreparable.

4. Case Studies of Water Allocation in the Upper Northern Region

Before going into the legal examination of water the allocation problems in the North, please note that such an examination should be based on all necessary facts but this condition cannot be totally met. This analysis is based on facts and conclusions prepared for non-legal purposes and by non-lawyers. With such constraints, the analysis of this study may sometime be made on presumed facts as understood at this time.

The study of water allocation problems in the North covers four Districts in Chiang Mai, Saraphi District, Doi Saket District, Mae Taeng District and Chom Thong District.

Saraphi District

In Saraphi District, water allocation problems along the Fai Phya Kham are composed of four water use conflicts as follows;

- ***Farmers and Municipality***

A water use conflict arose from the construction of Kua Lek Bridge by the Chiang Mai Municipality which partially blocked the flow of Mae Ping River and consequently caused water shortage at Fai Phya Kham. It is very difficult to hold the Chiang Mai Municipality responsible for causing damage to farmers along the Fai Phya Kham since the Municipality had the right to construct the bridge and partial blockage of river was inevitable. If however, the construction was unprofessionally carried out and thereby caused severe water shortage downstream, the Municipality would theoretically have to make compensation for its wrongful acts or omissions to the farmers under the Civil and Commercial Code but in practice it was very difficult for the farmers to prove such it in court. Fortunately, the conflict ended outside the court due to pressure exerted by the affected farmers and some local politicians.

• *Upstream and Downstream Farmers*

A conflict between upstream and downstream water users is a typical one when water is insufficient. In the case of Fai Phya Kham, the downstream farmers accused their upstream counterparts of stealing water from the Muang-Fai by raising wood or materials for blocking the water flow. In deciding what rights and duties of those water users along the Muang-Fai were, legal status of the Fai Phya Kham should be clarified. According to the available data, the Fai Phya Kam had not been designated as an Irrigation Watercourse under the Royal Irrigation Act. It was unclear whether the Fai Phya Kham was regarded as People Irrigation under the Private Irrigation Act 1939, or was it just an ordinary watercourse. It will be assume that it did not fall under the People Irrigation category since there was no clear involvement of village and Tambon heads as well as government officials in conflict management as required by the Private Irrigation Act. The organization responsible for the operation of this Muang-Fai was therefore, considered as a private group organized by local people.

Since the Fai Phya Kham was regarded as an ordinary watercourse, the right of riparian landowners to use water from this Muang-Fai was subject to Section 1355 of the Civil and Commercial Code which has difficulty in defining the rights to use water. As a result, the farmers downstream could not bring an action against their upstream counterparts who claimed that their withdrawal of water corresponded to their needs. However, the obstruction of water flow in watercourse for common use which caused damage to other people was an offence under Section 228 of the Criminal Code.

Suppose that Fai Phya Kham was designated as People Irrigation under the Private Irrigation Act. The allocation of water in this area would supposedly carried out by heads of Tambon, villages, and irrigation districts or their assistants under Section 21 of the Act. In the the case of unresolved conflict(s), the meeting of Sheriff and heads of Tambon, villages and irrigation district officials could be convened to decide the matter. Non-compliance with the decision of the meeting would be as an offence under Section 38 with imprisonment not exceeding one month or a fine not exceeding one thousand Baht, or both.

- ***Mud-filled Canal***

Since the Muang-Fai or canal in Ban Chan Kerng and Ban Pakgong was filled with mud, it was no longer able to convey water for irrigation. In the past the canal had been dredged up by the Fai Phya Kham organization but in recent years this organization was non functioning. Even though most villagers wanted to receive water from the canal, no one seemed to be very active in organizing people to clean up the canal. Who were supposed to do the job of cleaning the canal? If Fai Phya Kham was an ordinary watercourse for common use, it would be subject to the discretion of the government agencies whether to clean it up. If Fai Phya Kham was classified as People Irrigation, villagers receiving benefit from the irrigation under the supervision of the sheriff, heads of Tambon, villages and irrigation district officers were supposed to clean the canal under Sections 14 and 18 of the Private Irrigation Act. Failure to perform such a duty was an offence under Section 38.

Fortunately, the canal was finally cleaned when one local politician organized people for undertaking this task with a budget from Chiang Mai province. The attempt to clean the canal did not go smoothly as it was opposed by those who encroached upon the canal's banks because they did not want to lose such land when the canal was cleaned and widened. Such encroachment is an offence under Section 9 of the Land Code.

- ***Local Farmers and New Comers***

Due to the rapid urbanization of Chiang Mai and its nearby areas in recent years, some people moved to areas receiving water from the Fai Phya Kham. These newcomers used water upstream for growing longan trees, running restaurants and developing real estate refused to accept the role of the Fai Phya Kham organization in regulating the utilization of water. This organization was not legally able to force the newcomers to comply with the rules since the Fai Phya Kham, is a watercourse for common use, not for just farmers belonging to the organization. One thing which the farmers did was to make a demonstration or informed the officials concerned to arrest the newcomers who violated the law by illegally blocking the canal. This implied that the concept of "Muang-Fai Organization" was effective only within a small and simple community where most people knew each other.

The newcomers took not only water from the canal from the local farmers but also exhausted underground water of neighbouring landowners. This conflict occurred when a construction firm dug up soil to the level that was deeper than a well of a neighbouring land which consequently dried up. A legal question may be raised whether the construction firm was liable for the exhaustion of underground water from the adjacent land. This case was not subject to the application of the Underground Water Act since it did not occur within the Underground Water Area. Also, it was difficult to hold such a firm responsible since there was no specific law dealing with underground water in this case. The construction firm decided to stop its activities because it seemed to be frightened by the farmers' demonstration.

Doi Saket District

A water allocation problem in Doi Saket District, used as case a study, happened in an area receiving water from the Mae Kuang Dam. Since the study did not specify the legal status of the canal under study, it will be assume that it was an Irrigation Watercourse as it received water from the Dam.

The first conflict occurred between villagers and officials from the RDI because the officials stopped delivering water to the canal when asked by villagers who no longer needed water for their crops. The officials were later complained to by a farmer downstream who still needed water for his crops. Legally, water allocation within the irrigated area is, according to the Royal Irrigation Act, subject to the discretion of RID officials. The villager downstream in this conflict was therefore not able to get the officials to allocate water as he needed. The officials in practice were supposed to allocate water on an equitable and fair basis.

The second type of conflict was between villagers themselves when water upstream was overdrawn. The study mentioned that because most villagers were relatives and knew each other since they were young, their conflicts were peacefully settled. Please note that illegal withdrawal of water from an Irrigation Watercourse was in fact an offence under the Royal Irrigation Act but it seemed that this provision was not seriously enforced.

Mae Taeng District

The Mae Taeng Irrigation Project is run by the government to support agriculture in large areas of Hangdong, Mae Rim, Mae Taeng, Muang and Sanpatong Districts with a length of 74.56 kilometers and 23 sub-canals. In this area, four types of water allocation problem arose; conflicts between downstream and upstream farmers, officials and farmers, villagers and city dwellers, and villagers in the same locality.

• *Downstream and Upstream Farmers*

A conflict occurred between farmers in the upper part of the irrigation canal and their counterparts downstream especially during the dry season. Since this irrigation project is run by the government, it is under the Royal Irrigation Act which means that the water in the canal is allocated by the RID officials. Due to water shortage and the increased water demand in recent years, farmers downstream, especially at sub-canal No. 23, complained to the officials that they received no water when their turn came as the water was illegally withdrawn upstream, particularly by farmers at sub-canal No. 7. Such withdrawal was in fact an offence but the officials failed to enforce the law. Can the downstream farmers bring an action against their upstream counterparts for illegal blocking and withdrawing the water? The answer seems to be negative since it was a matter between the officials and the upstream farmers despite the adverse effects downstream.¹⁴ Also, the downstream farmers had no right to demand water from the officials because this irrigation canal was run by the government who had discretion in allocating water in the canal. This problem illustrates why water rights of people should be clearly defined. A water permit system should be introduced. Once the water right is clear, the discretion of the official(s) will automatically become limited as it could not infringe upon the rights of individual water users. For the time being, the best thing for the downstream water users to do is to exert political pressure upon the officials concerned as utilized by downstream farmers.

¹⁴ One resolution for this problem is to revise the law concerning "standing to sue". See Amnat Wongbandit *supra* note 13, *id.* at 57-62, and also Amnat Wongbandit *et al.*, *supra* note 4, *id.* at 39-41.

- *Officials and Farmers*

When the farmers at sub-canal No. 23 did not get water from the canal on their turn, they went upstream to find out who took the water. After finding out that the water was withdrawn by farmers at sub-canal No. 7, the downstream farmers asked the Mae Taeng Project officials to close the water gate and punish the culprits. Since such officials took no action, the downstream farmers alleged that the officials received bribery from the farmers at sub-canal No. 7, and also practiced nepotism by allocating water among their families and relatives, and later they brought a complaint to the superior of those officials. This is a classic example of how water allocation problems had been caused by government officials which could not be solved by the existing laws as the court would (not for the time being) question the discretion of such officials unless their decisions clearly violated the law. This conflict also reflected the failure of law enforcement which should be rectified by allowing people to have more part in the law enforcement process. The downstream farmers adversely affected by the illegal withdrawal of water upstream should have the right to bring a criminal action against the culprit(s).¹⁵

- *Villagers and City Dwellers*

The downstream farmers had conflicts with not only their upstream counterparts but also with those who used water for non-agricultural purposes in the city. The latter group of water users included: restaurants, hotels, hospitals, private firms, factories, resorts, golf courses, Chiang Mai University, Umong Waterworks Authority as well as other government agencies. Because the Royal Irrigation Act which governs the canal does not set up a priority of water use from Irrigation Watercourses, the downstream farmers were not able to claim that their right to use water would have to be protected against that of non-agricultural water users. In fact, the officials concerned were legally able to allocate water in such a way as they saw fit. As a result, the farmers who had little bargaining power, compared with those in the city, were always the losers.

- *Villagers in the Same Locality*

Villagers in the same locality also had conflicts over water when there was a water shortage. The usual type of conflict was usually "water stealing" along sub-canal as happened

¹⁵ *Id.*

between the upstream and downstream farmers. The conflicts along the sub-canals were relatively easy to settle and did not need the government's intervention as most disputing parties were relatives and neighbours.

Chom Thong District

The water allocation conflict in Chom Thong District under study was between hilltribes people living on the headwaters areas of Mae Soi River and Mae Tia River and the villagers living on the lowlands of Tambon Mae Soi, Tambon Doi Kaew, and Tambon Khun Klang. The hilltribes were accused of destroying the forest for growing cabbage which caused (it was believed) soil erosion, water flow reduction and pollution downstream. The villagers in the lowlands asked the government agencies concerned to evacuate these highland people to other places. From the facts given, it is very difficult to determine whether the hilltribes have the right to live in such headwater areas since it was not known when they first arrived.¹⁶

Suppose the hilltribes encroached on the headwaters. It was not easy in practice to move them out because the government had difficulty in finding new places for them since most of denuded land is occupied by other people.

When the issues of water flow reduction and water pollution are considered, legally it is difficult to hold the hilltribes liable or punish them as the affected villagers on the lowlands might not be able to prove in court the linkage between water flow reduction, pollution and the activities carried out by a particular hilltribe group. To solve this problem, preventive measures would have to be imposed upon the hilltribes. The harshest measure would be evacuation which in most cases has been politically and socially undesirable. One proper preventive measure would be to control of activities causing the destruction of forest and water pollution. The villagers in this conflict seemed to take the law into their own hands by fencing around the headwaters to prevent further encroachment since the government agencies were not able to remove the villagers' grievances.

¹⁶ *There are three principal pieces of legislation which may be used to determine the legal status of people living in the headwaters area. The National Forest Reserve Act, 1964 is supposed to regulate the exploitation and conservation of natural resources in forest reserves where encroachment is an offence. If any part of forest should be preserved as national park or wild-life protected area where human settlement is prohibited, it will be done through a process described by the National Park Act, 1961, or the Wide-life Protection and Conservation Act, 1992 respectively but an area under private ownership or possession cannot be designated as national park or wild-life protected area.*

Part Two: Water Allocation in the Central Region

1. Water Allocation Conflicts in General

As in the Northern Region with the economy of the Central Region growing, the need for a water supply inevitably increases. This phenomenon occurred not only within the industrial sector but also in other sectors such as agriculture, domestic consumption and tourism. This has given rise to water allocation conflicts particularly during the dry season water users upstream and those downstream. The conflicts exist among water users from different sectors: agriculture, industry, domestic and municipal consumption, navigation, hydropower and tourism. Sometimes it happens between water users in the same sector.

The water allocation conflicts are not limited only to people in the same basin but from time to time exist between water users from different basins as seen in the case study of Tha Chin and Mae Klong diversion plan. In addition, the water allocation conflicts happen not only for the use of surface water but also for the extraction of underground water as the insufficiency of runoff water forces some water users to search for new sources underground.

This study will concentrate on three principal case studies of water allocation conflicts; Tha Chin and Mae Klong diversion projects, upstream and downstream conflicts, and competition for underground water use.

2. Relevant Legislation

Laws concerning water allocation conflicts in the Central Region are mostly similar to that in the Northern Region. When the analysis of some cases requires more extensive discussion of certain legal issues, it will be done in the context of the particular example being discussed.

3. Tha Chin and Mae Klong Diversion

It is generally known that the water supply in the Chin Phraya basin is not able to satisfy all needs of water users in the basin during the dry season as shown by the government's effort to control water demand in all sectors from late 1993 to the hot season in 1994, when the water level

in the two biggest dams in the North, Bhumipol and Sirikit Dams, were unusually low. During that period, farmers in the Central Region were encouraged not to grow a second rice crop, and water pressure in the Bangkok Metropolitan Area was reduced by the Metropolitan Waterworks Authority (MWA).

Parallel to the occasional water control in the dry season, the government, through the MWA, has tried to secure a water supply for the Bangkok Metropolitan Area by proposing a plan to divert water from the Tha Chin and Mae Klong basins which would cause an inter-basin conflicts. While the MWA and RID (which would be the agency (ies) implementing the project) viewed that the proposed diversion was justified, people in the Mae Klong basin opposed it. Is such a diversion legally permissible? This would require the discussion of following questions:

1. Would the diversion infringe upon the rights of local individuals to use water in the Tha Chin and Mae Klong basins?
2. Would the diversion deprive the local communities of their right to use water?
3. Do the MWA and RID have the right or power to divert the water?

With regard to the first question, Section 1304 of the Civil and Commercial Code is applicable. It clearly states that water in watercourses is for common use which means that all people, no matter where they live, have the same right to use such water. The law does not clarify the extent of such a right. It is not known how much water each person is entitled to use. According to this legal principle, it is hard to claim that the diversion of water from the Tha Chin and Mae Klong basins would violate the right to use water of local individuals. The proposed diversion would include only the surplus water in the two river basins and may not effect the amount of water required for local use. As a result, the local water users cannot legally block the diversion or demand compensation.

The second question on diversion could injure the right to use water of the local communities, not individuals. This question has no legal basis in the Thai law because it has never been established by law that water in a particular river basin belongs to or is subject to the sole control of any organization of local people, let alone the question of water rights. The objection

to the diversion plan voiced by the provincial Chamber of Commerce from Kanchanaburi, Rajburi and Samut Sonkram is therefore not legally tenable.

When the third question is considered, it is found that the MWA and RID or the government are not prohibited by law to launch the diversion project as it would not infringe upon the right to use the water of any person or entity. In addition, it has long been established that the government through its relevant agencies on behalf of the people are supposed to take care of and manage properly for the common use, and that the government as "provider" has the power to decide which water project is good for its people and where it should be located. All these arguments certainly boost the government's stance on the diversion plan.

All answers given, favour the government's side since the concept of water rights is not clear and the State has been vested with managing the water resources. The conferment of wide power to the State, particularly the central government, for administering the country may be necessary when the majority of people still do not have proper education or are not able to help themselves. This approach is no longer appropriate in Thailand where the private sector has become much stronger than before. The government should decentralize its powers especially the right to manage water resources, to the local people since they know best their own needs and problems, and should determine their own future.

Coupled with the decentralization of power, the concept of water rights must be clarified. A legal mechanism to define the right to use water of each user and local community should be introduced. Once the water right is clearly defined, the concept that a wealthy community could buy surplus water from its neighbouring poor communities would be implemented. At this time, the persons benefiting the most from the lack of clarity of the existing laws in the water allocation conflicts are those who are economically, socially and politically stronger (such as people in Bangkok).

Once the diversion project is not prohibited by law, implementation could begin. Since the construction of a canal or a pipeline system could adversely affect the environment, this kind of project needs an environmental impact assessment (EIA) report prior to the construction under Section 46 of the Enhancement and Conservation of the National Environment Act 1992. This provision authorizes the Minister of Science, Technology and Environment with the approval the

National Environment Board to announce in the Royal Gazette the types and sizes of project implementation that requires the preparation of EIA report. Such an announcement has listed a number of projects but it does not seem to include the diversion of water. The types and sizes of projects that come close to the water diversion; are dams, reservoirs and irrigation. However, the diversion would not involve the construction of dams or reservoirs, and it is not intended for an irrigation project. The diversion project does not therefore need the preparation of an EPA report.

This word was used by Thitinan Pongsudhirak in his case studies of Water Allocation Conflict in the Central Region, 20,

4. Upstream and Downstream Conflicts

The water use conflict occurred in the Village No. 2 of Tambon Chaksri, Muang District Singburi, when two upstream farmers who needed water for their second rice crop in the dry season blocked the flow of water in the RID's canal and diverted it to their land without authorization. This prompted farmers downstream to demand the clearance of the obstruction and later take the matters, after their demand was ignored, to the village Chief who decided to make the clearance himself.

It could be assumed that the blocked canal was a designated Irrigated Watercourse under the Royal Irrigation Act. The unauthorized blockage in this canal violated Section 34 of the Act which means that the obstructing object(s) could be removed by anyone. The downstream farmers did not remove such object(s) because they might not be aware of their right(s), and most of them were women who might not want to risk their life in fighting with the upstream male farmers. Fortunately the village Chief was able to use his personal ability to end the conflict peacefully. The conflict would not have been settled easily if it had involved a larger number of farmers from several villages or Tambons.

An interesting suggestion made by the village Chief was his belief that the illegal withdrawal and blockage of water from the canal could be reduced or even prevented if the canal was lined with concrete. Since the concrete-lined canal would become "State property" under direct control of the RID, and as a result no villager would dare to tamper with it. Legally speaking, there was no difference between the concrete-lined and dirt-lined canals once they were

designed as Irrigated Watercourses under the Royal Irrigation Act.. Blocking the water flow of either one of them is subject to the same penalties¹⁷. In reality, there might be some difference in respect to the law enforcement as the RID officials tend to pay more attention to the canals lined with concrete from its budget than that of dirt-lined canals.

Suppose that the canal blocked by two upstream farmers was not designated as an Irrigated Watercourse. The blockage of waterflow would be tantamount to committing a tort if the water downstream was exhausted as confirmed by the decision No. 31/2509 of the Supreme Court which ruled that even though such blockage could not be deemed as "withdrawal of water" under Section 1355 of the Civil and Commercial Code, it was a wrongful act under Section 420 of the same Code. As a result, the farmers downstream were entitled to compensation.

5. Competition for Underground Water Use

Competition for underground water use is emerging as a potential source of water allocation conflict as occurred in Tambon Chaksri,, Muang District, Singburi. The government warned people, particularly those in the irrigated areas of the Central Region, not to grow a second water-intensive crop during the dry season of 1993-1994 because water would be insufficient. There were some farmers who ignored such a warning and planted a second rice crop. Due to the non-delivery of water by the RID officials to those who did, had to find their own water for their crops.

One way to alleviate their problems was to pump underground water. In the village areas, all households seemed to have enough underground water for domestic consumption but it was another matter in the rice field where all farmers growing second crops had pumping devices to extract underground water for agriculture. Most farmers found that their wells were running dry. Some of them called for the regulation of underground water pumping. It should be looked into whether the extraction of underground water in Singburi is subject to any piece of legislation.

Although the land under discussion was irrigated by water from the RID's canal, the extraction of underground water in this area was not regulated by the Royal Irrigation Act since

¹⁷ 2 Royal Irrigation Act 1942, Sections 34 and 41

the Act controls only the surface water. This was the reason why the RID officials had not taken any action to intervene with such extraction and they sometimes even implicitly encouraged the farmers to dig wells.

To worsen the situation, officials from the Mineral Resources Department (MRD) which had been assigned to control the extraction of underground water had been very active in assisting financially and technologically the farmers in finding and pumping the the underground water. This raised questions of whether the Underground Water Act was in force in this particularly area. The Act would be applied only within the Underground Water Area designated by ministerial notification which so far has not included Singburi¹⁸. This was why the MRD officials were able to assist the farmers in exhausting the aquifers.

When the Underground Water Act, was not applicable to the extraction of underground water in Tambon Chaksri, what law should govern this case? Besides the Underground Water Act, no other laws including the Civil and Commercial Code addresses the utilization of underground water. We are tempted to conclude that all people are entitled to pump underground water as much as they

They want even though it would exhaust the aquifers. If the extraction caused damage to adjacent land such as land subsidence, it would be regarded as committing a wrongful act under Section 420 of the Civil and Commercial Code which entails compensation. The plaintiff or injured person has to prove by the defendant.

To prevent potential conflicts arising from the utilization of underground water, the application of the Underground Water Act should be extended to the areas where extraction is widespread and tends to cause problems to water users and the environment.

¹⁸ *Underground Water Act 1977, Section 5, and Ministerial Notification (Ministry of Industry) No. 1 (1979)*

Part Three: Conclusions

In recent years, it seemed that the water allocation problems occurred almost every dry season in the Northern and Central regions since the water supply could not keep pace with water demand which had been attributed to a number of factors: population growth, economic development, deforestation, meagre rainfall, and improper management of water resources. Problems typically arose between upstream and downstream water users such as agriculture, or from different sectors. When the water allocation conflicts occurred, a question was often asked whether the existing laws or legal mechanism were able to solve the conflicts.

The current laws concerning water allocation are not able to effectively cope with the existing water allocation conflicts. The crux of the problem is that water rights are unclear. All persons are entitled to use water in the watercourses for common use but the question of how much water can be used is not clearly defined. This is why some golf courses or other upstream water users are able to withdraw water for their own purposes quite freely. The Civil and Commercial Code has provisions defining the right to use surface water of riparian landowner and the right to retain water passing through higher land by its owner but the relevant legal principles are still vague and consequently in favour of upstream wealthy landowners.

When an irrigated area is considered, the concept of water rights is still ambiguous but the water allocation problem in theory should not have arisen since the use of water from Irrigation Watercourse is subject to the control of the Royal Irrigation Department. Some water users in practice illegally blocked Irrigation Watercourses to divert water into their land, or the water was unfairly allocated by the officials. This is the problem of law enforcement which should be handled by increasing the role of the people, particularly water users, in the law enforcement process.

Unlike surface water, the extraction and utilization of underground water is regulated by a specific law, the Underground Water Act, 1977. Unfortunately, this Act applies only to an area designated as Underground Water Area which does not include Singburi and Chiang Mai where underground water conflicts arose. A resolution for this is to extend the Underground Water Area to cover these two provinces.

A major legal problem for water allocation lies on the unclarity of water rights and the law enforcement mechanism which needs to be rectified through the introduction of a proper water management system which may include the requirement of a license for water use.

The Governance of Water Allocation Problems in Thailand

Four Case Studies from the Upper Northern Region

Tanet Charoenmuang

1. Introduction

Conflict is a ubiquitous occurrence in human organizations and frequently reaches high degrees in irrigation systems. Irrigation organizations are challenged continually, not to prevent conflict, but to contain and manage it within limits that allow satisfactory system performance. Numerous processes and procedures are available to settle disputes, prevent frictions, and avoid intense conflict.

In the context of Thai irrigation systems, there is need to identify conflict mangement processes and assess their suitability for successful system performance. Investigators should investigate a wide range of possible conflict management procedures including the use of technological devices, cultural norms, religious ritual, spatial arrangements and patterns of social organizations.

E. Walter Coward, 1976

(V. Surarerks, 1980: 2)

The urban Chiang Mai has never had drought in any dry season in the past. This is because of two reasons: first, the Waterworks Authority receives adequate water from the Mae Taeng Irrigation Project and second, the Mae Taeng Project also regularly supplies water for the City moat so that the underground water level is high and city dwellers have water for all-year round consumption.

Besides, the water from (all) irrigation projects is sufficient both in rainy and dry seasons, enabling farmers to do all-year farming and increase their income. Crime rates and other types of conflict are low, thus making Chiang Mai residents live happily and peacefully.

(Vanpen Surarerks, 1980: 137)

This paper attempts to illustrate the problems of water allocation in Thailand by examining four case studies from the Northern region of the country. The Northern region is the country's largest territory occupying 169,464 sq.km or 33 per cent of the total area of Thailand. In general, it has an abundant water supply due to large forests and adequate rainfall. During the past three decades, the state's major water development projects including the Bhumipol and Sirikit Dams were constructed to provide water supply for the main rice growing area of the central plains. The construction of six major dams: Bhumipol, Sirikit, Srinakarin, Khaolaem, Ubonrat, and Sirindhorn have led to the submergence of land and forest totalling 2,052 sq.km, equivalent to the territory of Bangkok and Nontaburi combined, as well as the evacuation of over 12,000 families.¹

Since the upper northern region is predominantly a mountainous area and the agricultural area is small, average farmers occupy a small piece of land (less than 10 rai per household) compared to other regions. In 1990, 30 per cent of farmers in the North have land problems. About 200,000 households are landless and 220,000 households do not have a large enough piece for production. At present, there are over 3,600 villages which make a living in reserved forests, comprising 30 per cent of all villages which have the problem of land ownership. It is obvious that when many people have these problems, some move to work in the city and others move to encroach upon the forest area.²

As many Northerners recall, two decades ago during the height of each rainy season around August and early September the rain fell endlessly for seven to ten days. In the past decade and a half, nothing like that was recorded in most parts of the region. The problem of water scarcity has become more severe. In 1993, Mr. Dusadee Sankasuwan, Director of the Bhumipol Dam, said that in 1994 the amount of water would be 1,200 million cubic meters or 12.45 per cent

¹ *"Who gains and who loses from dam construction?" Bangkok Business December 2, 1993 p. 2.*

² *Statistics of the Northern Region Development Center, 1990.*

of the reservable amount, the lowest in the past 30 years since the dam started operation in 1964. By late January 1994, what Mr. Dusadee predicted was correct. Furthermore, drought problems which affect many parts of the country this year are very likely to be the most serious in the past four decades.³

People's reactions towards this natural resource problem have varied. For one thing, every year hundreds of thousands of people leave for urban areas to seek employment. During the hot season of 1989, for example, 1.78 million of people in rural areas left their villages for work in town. In 1994, approximately 1 million people in rural areas will migrate to major cities.⁴ Many who remain will continue to do their agricultural work. Despite the government warning against rice planting in the hot season, many have refused to cooperate since they feel that it is better to take risk than to stay idle and have nothing to hope for.

Those who remain on their farms and attempt to grow a dry season crop have come into conflict over the use of water. The conflicts occur between urban and rural users, between farmers themselves, and between farmers and government officials. This study seeks to identify and analyze the nature of the conflicts over water allocation in upper northern Thailand, how it is conceived and responded by different groups, how it is resolved, and the consequences of those solutions.

This study is divided into four sections and an appendix. After this introduction, a literature review provides a sampling of the work on water resource conflict up to this study. Much of it was done in the 1980's in response to problems created by the introduction of large-scale government irrigation projects. The third section is the case studies themselves. Section four tries to draw conclusions from an analysis of the cases, and examines the larger socio-economic factors involved in the recent conflicts over water. The appendix provides a number of other cases where conflicts over water have occurred. These are described only briefly, and may provide the reader with a greater sense of the pervasiveness of the problem of water allocation in Northern Thailand.

³ In contrast, the rainy season of 1994 (May-November) was one of the wettest in recent history, with flooding in many areas of the North.

⁴ National Statistics Bureau, *Report on the Survey of Labor Movement in Rural Areas, 1989*, Bangkok, p. 12 and *Daily Matichon* January 17, 1994, p. 24.

2. Review of Literature

A work entitled, "Water Management Conflicts in Northern Thai Irrigation Systems" was a major research project undertaken in 1980 and headed by Vanpen Surarerks. Of all the writings which will be reviewed below, this work is the oldest and perhaps the first major research project by Thai scholars to study problems of water management conflicts in northern Thailand.⁵

The project was a comparison of the problems and conflict management of the government's irrigation projects and people's irrigation projects or *muang-fai*. The case studies included two government projects, namely the Mae Taeng and Mae Faek, Mae Taeng District, Chiang Mai, and two *muang-fai*, namely the Mae Sao and Mae Chaem, Mae Chaem District, Chiang Mai. Whereas the government's irrigation projects are government-run, large-scale, permanent, and cover a large cultivated area, the people's irrigation projects are initiated and run by villager-farmers, small-sized, and temporary.⁶

According to the findings, there are more problems with the government's irrigation projects than those with the people's. Generally, that is because the former is a large project involving many farmers, agencies, and districts. "The government's irrigation project is a new task with new technologies and is based on the bureaucracy which is bound by rules, whereas the people's irrigation project is much smaller."⁷

The research found that the Mae Taeng Irrigation Project, which is also one of the four case studies of this project, could not provide enough water for farmers in the lower part of the 70-kilometer canal. The poor performances of some irrigation officials, the limited number of officials, and a laden bureaucracy helped make the irrigation service overly complicated and slow to meet the demands of water users. The rules set by the government were hard for villagers to understand and accept, whereas the rules of the people's irrigation project which were set by

⁵ Vanpen Surarerks et al, *Water Management Conflicts in Northern Thai Irrigation Systems Research Paper submitted to the Ford Foundation, 1980.*

⁶ *Ibid.*, p. 103.

⁷ *Ibid.*, p. 454.

villagers were easy to understand and well accepted by villagers.⁸ At times conflicts occurred between villagers which irrigation department officials were unable to resolve.

In addition, water shortages in the lower part of the canal stemmed from the selfishness of some farmers who stole water in the upper part of the canal, or failed to help the project members clean up the canal, or failed to pay the canal fee, making the project lack sufficient amount of money, etc.⁹

The project made the following policy recommendations:

1. to make a reservoir at every headwater in order to control the quantity of water each year;
2. to improve the irrigation system;
3. to help improve the capacity of water users' association;
4. to revise the existing regulations on irrigation so that they are suitable to local conditions;
5. to increase the salary of irrigation officials so that the officials will better their service performances;
6. to redivide the area of responsibility for each irrigation project, based on the appropriate size of each project and the concept of strengthening community work;
7. to ensure that irrigation officials who work closely with farmers are either elected by or accepted by farmers;
8. to ensure that irrigation authorities be given duty and accordant authority so that the irrigation services will be well conducted;
9. to provide each irrigation project adequate budget;
10. to conduct workshops for irrigation officials and farmer leaders of every level in order to improve the irrigation work.¹⁰

⁸ *Ibid.*, p. 462.

⁹ *Ibid.*, pp. 486-487.

¹⁰ *Ibid.*, pp. 488-494.

Interestingly, however, the research concluded that socio-economic factors in Northern rural areas were not so critical in making the water management conflict such a serious problem for farmers. Thus in 1980, rural welfare was not critically affected by occurrences of water conflict. As we shall see from the cases presented in Section IV, this situation has changed dramatically.

In 1984, Uraivan Tankimyong published an article, "Social Organizations in Muang-fai Irrigation Systems and Resource Management: A Comparative Study of Highland and Lowland Communities in Northern Thailand." In this study, two case studies were conducted. The first was the Muang-fai Napae, the highland, and the other was the Muang Mai at Mae Klang River, the lowland, both in Chom Thong District, Chiang Mai. The Muang Mai Community was a large agricultural lowland area (5,000 rai) with 500 members who were able to plant three crops annually. The Napae (meaning ricefield on the hills) Muang-fai Community was smaller covering 400 rai, had 200 farmers, and was situated 500 metres above sea level.¹¹

In her study, Uraivan found that *muang-fai* organizations were able to adjust themselves both at lowland and highland levels amidst social changes. That was because such an organization, especially the one at lowland levels, was able to respond to the demands of farmers and was well accepted by its members. In many cases, it was able to stay away from the state control, whereas local management system of other types was put under state control. The author concluded that compromise, respect for rights and rules, and equal allocation of duties and resources by *muang-fai* members were keys to the success of *muang-fai* organizations.¹²

In 1987, a book entitled, Effective Linkage between the Irrigation Department and Muang-fai Irrigation Organization in Northern Thailand provided a recording of the workshop attended by people from three different fields; Royal Irrigation Department officials, farmers responsible for some *muang-fai*, and academics (mostly from Northern Thailand), held at

¹¹ Uraivan Tankimyong, *Social Organizations in Muang-fai Irrigation System: A Comparative Study of Highland and Lowland Communities in Northern Thailand* (Chiang Mai: Resource Management and Development Project, Chiang Mai University, printing year unknown), pp. 8-12.

¹² *Ibid.*, pp. 28-32.

Chulalongkorn University during July 24-26, 1987. The purpose of the meeting was to find ways to improve the water management system run by government officials and farmers.¹³

The workshop offered several major points: first, the water shortage was due to the forest destruction by people, especially businessmen from urban areas, and second, the increasing use of chemicals on the mountains was polluting the water supply in the lowlands.¹⁴ A village headman at the Li River areas in Lamphun, said that forest destruction has led to water shortage and a decreasing area of ricefields, especially in the past four years. Twenty years ago, he said that forests at Li River were all over and there was never a water shortage problem. Now, water shortage has even spread into the residential area. In the past, groundwater could be tapped by digging to a depth of only five to six meters, but it now requires going down nine to ten meters to get some water. Longan orchards in Banhong and Pasang Districts using water from the Li River have also been affected by this problem.¹⁵

Villagers asked about the policy of the Irrigation Department, and asked if the Irrigation Department could coordinate with the Forestry Department in saving trees at the headwaters to ensure an adequate water supply for future generations. However, the questions and concerns were not fully discussed. As an official of the Irrigation Department put it, it was difficult to solve the forest destruction problem since some government officials were the ones who destroyed forests. According to the same discussant, people would have to follow the Phrao District case. There, people of the whole village marched to petition to the District Chief and Police Chief and they tried to arrest those who felled trees. A similar example was to be found at Ban Huai-sai in

¹³ *Resources Management and Development Project, "Effective Linkage Between RID and Muang-fai Irrigation Organizations in Northern Thailand," Faculty of Social Sciences, Chiang Mai University, 1987.*

¹⁴ *The link between deforestation and decreased water supply is unclear, especially in the tropics. It is generally accepted, however, that deforestation actually helps to increase the amount of runoff from watershed, thus increasing the water supply. While there has been a correlation between a decrease in forest cover and a decrease in the water supply in Thailand, this does not necessarily indicate a causal relationship.*

¹⁵ *Resources Management and Development Project, "Effective Linkage Between RID and Muang-fai Irrigation Organizations in Northern Thailand," Faculty of Social Sciences, Chiang Mai University, 1987, pp. 19-20.*

Sankampaeng District, where the logging ban has been strictly observed by the villagers. Many discussants felt that it is possible to protect the forest if every village cooperates.¹⁶

The workshop concluded that the water management problems have become more complex due to several factors: forest destruction, the use of chemicals on the mountains, different levels of organizational work at different communities and clubs, lack of knowledge to manage water supply, weak organizational work, government's low budget and inadequate manpower, insufficient information in water management, and lack of understanding between *muang-fai* leaders and officials.¹⁷

A book from the workshop on People's Organization for Forest and Water Management, was published in 1989. This workshop, attended by *muang-fai* leaders, government officials, and academics in the North, was dominated by villagers from Mae Klang River areas. According to Ma Muenjai, deputy leader of Muang Mai, the Mae Klang Watershed Development Club was established in 1982 by all nine Tambon which controlled 15 *muang-fai*. The major problems during the past five to six years were first, the destruction of forests headwater areas; second, the decreased amount of water; third, the use of chemicals by hilltribes on the mountains leading to poisoned water in lowland areas; and fourth, lack of the responsibility by many government agencies in the area resulting in no practical solution to those problems.¹⁸

In the view of the *muang-fai* leaders, farmers on the lowland had limited access to water and were restricted by laws while hilltribes enjoyed great freedom in utilizing natural resources. The lowland people were of opinion that no one should be allowed to live in the headwater areas. The hilltribe people living in those areas should be evacuated to live on the lowland areas somewhere else. As one academic saw it, however, the conflict should not be between the lowland and highland peoples. Instead the government should look into the problem, consider it as an

¹⁶ *Ibid.*, pp. 20-21.

¹⁷ *Ibid.*, pp. 44-45.

¹⁸ Resources Management and Development Project, "People's Organizations of the Forest and Water Management," Faculty of Social Sciences, Chiang Mai University, August 1989.

urgent matter, and formulate a new policy to solve it as soon as possible.¹⁹ The continuing conflict between hilltribes and lowland farmers is described in the fourth case study in this paper.

In 1989, Uraivan Tankimyong and Vichit Jankaruhas in "People's Irrigation Organizations and the Management of Small-scale Reservoirs: Observations on the Post-construction Management" studied the Mae Than Reservoir, Lampang Province. The authors identified, from many cases of irrigational work, five common problems:

1. weakness of people's irrigation organizations;
2. little understanding of the bureaucracy among leaders in the people's irrigation organizations;
3. Irrigation Department officials do not consult with villagers or work closely with local people;
4. a lack of budget for organizational development and community's role in the irrigation system;
5. no continuing development projects.²⁰

The study found that the reservoir has not been fully utilized. For example, farmers who used to grow sugar cane and tapioca (which consume less water) continued to grow the same crops after the reservoir was completed. Officials who should give advice to the farmers did not work regularly with the latter.

In 1992, Resource Management in Lowland Areas by Sa-nguan Patamathamkul was a comparative study of water management in Northern and Northeastern Regions. In the North, the book covered two river areas: Mae Taeng and Mae Klang Rivers in Mae Taeng and Chom Tong Districts respectively.²¹

The study found that Chiang Mai urban growth has had both direct and indirect impacts on water management in Mae Taeng Irrigation System. The growth in the number of factories,

¹⁹ *Ibid.*, pp. 22-27, 43.

²⁰ Uraivan Tankimyong and Vichit Jankaruhas, "People's Irrigation Organizations and Small-Scale Reservoirs: Observations on the Post-Construction Reservoirs," 1989.

²¹ Sa-nguan Patamathamkul, *Resource Management in Lowland Areas Document No. 1, Thailand Research on Irrigation Management Network (TRIMNET), April 1992.*

resorts, hotels, condominiums, and government agencies has resulted in the increased use of water by the non-agricultural sector and at the same time the decreased use of water by farmers. The rapid growth of urban areas led to the limited supply of water for the non-agricultural sector by the irrigation system and thus groundwater has been drawn up for use.

Meanwhile, the water amount for agricultural production in Mae Klang River areas in the hot season has not been sufficient. The reduction of forest areas, soil erosion, and the use of chemicals in highland agricultural production have led to more problems for agricultural production and conflicts between highland and lowland farming.

The study proposed that the planning and water control agency should be combined and a provincial level or inter-provincial level water control agency should be established to deal with this issue effectively.

3. Four Case Studies from Upper Northern Thailand

In this section, four case studies of water conflict in Chiang Mai Province will be examined. The events occurred in Saraphi District, Doisaket District, Mae Taeng District, and Chom Thong District.

Case Study One: Saraphi District

● *General Information*

Saraphi District, the smallest in Chiang Mai Province, is the only district which is entirely in the lowlands. Therefore, unlike other bigger and more mountainous districts, almost every part of Saraphi is suitable for agricultural production. In this regard, Saraphi has always been an important agricultural area for Chiang Mai.

However, with the rapid growth of Chiang Mai city and of the non-agricultural sector in the past decade, Saraphi has become a major suburban area with increasingly varied forms of economic activities. It is the location of this district, close to the urban areas, which allows for such diversity. The district office is only 14 kilometers from downtown Chiang Mai and 20 kilometers

In the meantime, many villagers simply forgot that they belonged to a *muang-fai* organization. Not only had they given up farming in the hot season, they neither attended meetings of the *muang-fai*, nor cared to talk to *muang-fai* leaders about the water problem. Although they wanted some water from the *muang-fai*, they would not do anything to make the *muang-fai* organization function.

3) Canal Maintenance

The third problem has been the build up of mud and other waste in the Ban Chang Kerng and Ban Pakgong areas at the lower end of the canal. In general, with the cooperation of villagers, the canal is cleaned every year. But since the Fai Phya Kham organization has not been fully operational for over twenty years, the cleaning of the canal has been sporadic. Few leaders or groups of farmers wanted to shoulder the task, and leadership in the organization has been weak. According to one person, villagers demanded water from the *muang-fai* head, but they refused to cooperate in cleaning the muang. "They wanted to have water, but they just complained at home. No one wanted to take any action. Now, some villagers don't even know where the canal is."

In 1993, the newly-elected vice-chairman of Fai Phya Kham and village head of Ban Chang Kerng, asked for assistance from a Saraphi Provincial Councilor (PC) who also was the Vice-Chairman of the Chiang Mai Provincial Administrative Organization (PAO). Later that year, some money from the provincial office was allocated to clean the lower part of Fai Phya Kham on the condition that villagers provided their own labor. The village head, apart from spending 40,000 Baht of his own money to support the project, organized villagers to clean the canal. In March 1994, when this study was conducted, water was running smoothly throughout the long canal. However, whereas many villagers were happy with the return of water in the hot season, the village head met with many complaints and criticisms as well.

As the village head led his villagers to clean the canal, the Chief of Subdistrict did not help him because of his relationship with a Member of Parliament from Chiang Mai municipality and a member of the New Aspiration Party (NAP). The village head meanwhile has been close to the above mentioned PC who is a leading member of the Democrat Party in Chiang Mai. The Democrat and New Aspiration Parties were rivals in the 1992 general elections. The Democrats now lead the current coalition government. It was thus understandable when rival party members

opposed the role of the PC and village head in the water problem. And it was easy to understand the ability of the village head to have received some budget from the province and PAO to clean the canal, since the PC is the Vice-chairman of the Chiang Mai PAO.²³

Interestingly enough, the rivals of the Democrats in opposing the cleaning-up project found support in some villagers whose land bordered the canal bank. The canal, which had fallen into disuse, was without water and was covered with mud and waste. Some villagers with abutting land hoped to take over the canal area and thus expand their properties. The clean up operation in 1993 not only pulled out all the mud and waste from the canal but also widened the canal banks and cleared the public bank areas where they used to be. The village head was also trying to construct a road along the canal bank, which further enraged some villagers who did not want to lose any land.

During the field study in March 1994, it was learned that about 3,000 rai owned by the current Minister of Finance (a Democrat) and a member of one of the wealthiest families in Chiang Mai, was located near the canal. According to the village head, neither contact nor a plea for financial assistance was made with the Minister. However, immediately after the canal was cleaned, at least eight sub-canals on the Minister's land which had had no water became functional, providing water for agricultural production. The Minister may or may not have known of the situation in the canal, and he may or may not have played a role in its clean-up. The fact remains that power gives access to water, with or without the knowledge of the power owner.

4) Farmers vs. Businessmen

Due to the rapid urbanization of Chiang Mai City, the change of land ownership in the past five to six years has greatly affected suburban areas including Saraphi District.

The problems occurred when non-farmers came to the area and started using water from the canal, paying no attention to the rules set by the *muang-fai* organization. For instance, a retired government official came to buy a piece of land in Subdistrict Nongphung, grew longan fruits, and blocked the canal in order to use water for his own longan orchard. He became furious when a member of the *muang-fai* organization asked him to remove the blockade. The dispute was

²³ Interview with Subin Arunsiroj, member of Provincial Council, in March 1994.

resolved after leaders of the *muang-fai* came to talk to him and explained how water from the muang has been shared by villagers and the rules set by the *muang-fai* organization.

Another incident involved a businessman in Bangkok who bought a piece of land, started growing longan trees, used water from the *muang-fai*, and afterwards hired an employee to care for the orchard. When the *muang-fai* organization asked for a contribution from the water user, the employee said that he was not the owner and his boss did not tell him to do anything else. Obviously, neither the retired government official nor the businessman thought that water could be used by anyone without charge. They may or may not have known about the specific regulations concerning water allocation or did not care much about them. However, the problems of these two cases indicate the limitations of the regulatory framework for water use in these areas. Can one imagine how much trouble would occur if more outsiders came to these villages?

In the past five to six years, several major business projects have come to Saraphi and affected the water allocation problem. In 1986, the Chinda Real Estate Project, located in the upper part of Fai Phya Kham, arrived. To attract potential customers, the developers constructed a large pond, taking water from the *muang-fai*. The water from the pond was used for fishing, watering plants, and other activities. However, the real estate management company never talked to the *muang-fai* organization or did anything to support it.

Also in 1986 the Nangnual (Seagull) Restaurant at Subdistrict Nonghoi erected a building blocking the waterway of the Fai Phya Kham in Subdistrict Nongphung. Hundreds of villagers appointed representatives to talk to the restaurant management several times, but nothing was accomplished. Later, they marched to the Saraphi District Office and complained about the damage. The district officer said he could not do anything but had to report to the provincial office. According to some officials, the provincial office told the restaurant to remove the building or face arrest. Finally, the restaurant removed the building. The dispute lasted several years before the restaurant management yielded to the demand.

A third incident involved the filling up of a sub-canal by the Seksurin Real Estate Project during 1989-1991. Villagers who could no longer receive water from the canal asked the project management to clear the canal. The management said the owner was a close relative of a powerful police general and paid no heed to the villagers' plea despite four demonstrations by villagers from

three Subdistricts in Saraphi. In the end, the villagers filed the case in court, which ordered the Seksurin Project to clear and maintain the sub-canal which runs through its area.

A fourth case took place in 1992 when the Lanna Palace Real Estate Project bought a piece of land in Ban Chiang Noi, Subdistrict Nong Phung and filled up a sub-canal. Villagers went to ask the project management to build a bridge across the sub-canal, but the management refused. So, the villagers sought justice from the district chief. The district officers stepped in and asked the project to clean the sub-canal or take the case to court. The project management later agreed to build a bridge and clean up the *muang-fai*.

During late 1993 and early 1994, a fifth conflict occurred between a construction firm owned by Somchai Sae Jeng and villagers of Ban Kudaeng, Subdistrict Nongfaek. The Somchai Construction Company bought over 50 rai of land and used the soil as landfill to level the ground of a real estate project nearby. The firm dug up soil until the surface level below that of nearby wells, and water in the villagers' wells dried up. Villagers felt that the massive and deep digging by the firm had affected the amount of water in their wells. They therefore asked the firm to stop digging. The firm agreed, but continued to dig up soil at night. Two hundred villagers thus marched to meet the district chief and provincial councilor, Subin Arunsiroj, and demanded the firm move out of the area immediately. The firm asked to be given two days in which to move out, but the villagers refused. Fearful of the angry demonstrators, the firm left the area within a short time.

These examples and many others illustrate the problem of weak property rights in the face of intrusion by outsiders. The *muang-fai* system has not been able to handle the changing situation, nor the disregard of its traditional methods of water allocation. It has neither the political nor legal power to confront intruders, nor has it the flexibility to adapt and include new users with different demands and water needs.

Case Study Two: Doisaket District

• General Information

Doisaket District is 16 kilometers east of the Chiang Mai City. To its east lies the Phi Pan Nam Mountain Range, in which the headwaters of the Mae Kuang River are located. The Phi Pan

Nam Mountain Range separates Chiang Mai and Chiang Rai Provinces. The Mae Kuang runs through Doisaket, Sankampaeng District, and Muang District of Lamphun Province before it joins the Mae Ping River.

In 1954, the 60,000 rai Pa Taek *muang-fai* project was completed to control the yearly flooding and to provide irrigation to land in the Sansai, Doisaket, and Sankampaeng Districts. In 1976, the Mae Kuang Dam Project was initiated. It was designed to cover 175,000 rai of land in the above four districts as well as Ban Thi District, Lamphun, providing water for agricultural production, household consumption, industry (such as the Lamphun Industrial Estate), and power generation. The construction was completed in 1991.

● *Problems of Water Allocation*

By the time the Mae Kuang Dam dam was completed in 1991 the country was facing severe water shortages. That year marked the initiation of the program to restrict agricultural production areas during the hot season. The ongoing water shortage problem has necessitated the continuation of the program every year since.

Targeted and Actual Production Areas

	<i>Targeted Production Area</i>	<i>Actual Production Area</i>
1991/1992	12,000 rai	11,000 rai
1992/1993	7,125	6,897
1993/1994	5,500	6,000

The discrepancy between the originally planned area of 175,000 rai and the targeted area of only 12,000 rai (hot season) in 1991 is a clear indication of the severity of the water shortage problem. The Mae Kuang Dam was built to store 263 million cubic meters of water. On April 4, 1994, however, the only 28 million cubic meters were in the reservoir. By April 25 of the same year, the level dropped to 27.1 million cubic meters.

According to officials at the Mae Kuang Dam Project, the water shortage problem stems from at least two factors: first, and more importantly, is the destruction of forests in the headwater areas; second is the use of water by villagers who live above the dam area.

In the past five to six years, the water shortage problem has resulted in two conflicts: between villagers and RID officials and among villagers themselves.

The first conflict involved farmers who planted different crops which required different amounts of water and at different times. After the campaign was launched to restrict production areas during the hot season, RID officials at the Mae Kuang Dam Project set up a special committee consisting of the district chief, an RID worker at the Subdistrict level, the Kamnan, the village chief, a water zoneman, a *muang-fai* representative, farmers, and other water users. This committee was to determine what kind of and how many crops should be planted in each hot season and also the time table for watersharing. In practice, however, farmers rarely followed the plans and neither the special committee nor any other agency has done anything about it.

During each hot season, although farmers in general agreed to limit their production area, they planted crops at their own discretion and experience or based on the advice of other people. Because different crops need water at different times, for example, red chili needs water every seven days and soybeans need water every 15 days, conflicts occur every year over the irrigational work. A farmer who planted chilis living downstream from a farmer who planted soybeans may find that his water is cut off after the chili farmer has received the seven days of water he needs.

Take the case of Promma Bunchoom, a farmer from Moo 4, Subdistrict Luang Nua, Doisaket, who planted red chili and needed water for his crop. Farmers closer to the canal who had planted soybeans were harvesting their crops and needed no more water. So they asked RID officials to stop irrigating. Promma went to the Dam Project and complained that RID officials stopped irrigating without investigating the area or seeking advice from the *muang-fai* head. RID officials argued that they would be ready to stop providing water whenever farmers asked them to do so because it matched the policy of RID in each hot season. In fact, Promma should have first complained about the incident to his *muang-fai* head. Meanwhile, RID officials should have consulted the *muang-fai* head before they decided to do something which would affect the entire production area.

According to Promma, the conflict over water allocation in his subdistrict has occurred every year since the water shortage problem began. He had to go to complain to RID every hot season and it took days or weeks before water was sent to rescue his red chili again. Asked why

he did not ask the *muang-fai* head to solve this conflict with RID and other farmers, he said that he already talked to the *muang-fai* chief and was told to take the case to RID by himself. The *muang-fai* head in fact has not done his duty but has let farmers resolve the conflict among themselves.

The second conflict occurred among villager-water users. Due to the limited amount of water from the Mae Kuang Dam over the past 4-5 hot seasons in Subdistricts Mae Pong and Papong, Doisaket, the stealing of water by some farmers takes place every year. However, since most farmers are relatives or have been neighbors since they were young, they have been able to reach a peaceful solution. According to Kampan Tajan, *muang-fai* head of Ban Parnaidaeng, Subdistrict Papong, apart from peaceful solutions to conflict over water allocation in their village, two other alternatives were employed: either some farmers turned to using water pumps to find underground water or some decided against planting crops in hot season and left for work in urban Chiang Mai.

Case Study Three: Mae Taeng District

• General Information

The construction of the Mae Taeng Irrigation Project began in 1963 and was completed a decade later. The project headquarters were at Subdistrict Mae Taeng, Mae Taeng District, approximately 24 kilometers north from Chiang Mai downtown. This project was launched in order to support agricultural production in five districts of Chiang Mai: Mae Taeng, Mae Rim, Muang, Hangdong, and Sanpatong during the hot and rainy seasons and to provide water for the Umong Waterworks Authority, Muang District. The irrigation canal is 74.56 kilometers long covering 174,000 rai and has 23 sub-canals. The project has assigned 15 zonemen; each is responsible for 10,000 rai. The zonemen take care of the allocation of water into each sub-canal. Villagers then have their own people's group or *muang-fai* organizations to oversee the allocation of water from the sub-canals into the ricefields. The Mae Taeng Project is government-run. It was established to replace the *muang-fai* system which was created and run by villagers for many centuries.

● *Water Situation of the Project*

Thirty to forty years ago the headquarter area and the Mae Taeng forests were full of large trees and the water level in each river was always high. In the past two to three decades, however, forest destruction has been widespread and there have been more people living above the headquarter areas, particularly those working for royal projects in the mountains. The results were the decreased amount of downstream water in hot seasons and excessive water flow during and after each rainfall.

The Mae Taeng Irrigation Project is the longest and most important waterway system in Chiang Mai for it covers the largest production area which belongs to the powerful and wealthy districts of the province. The length of the canal and limited water supply during the hot season have caused tensions between villagers in the lower part of the canal and those in the upper part. Lower canal villagers have accused upper canal villagers of stealing the lower canal allocation of water. This is not a new phenomenon. The study of Dr. Vanpen and her research team in 1980 also showed a great deal of reported water theft.

According to an agreement, guards will be assigned to monitor water allocation. However, due to the great demand for water in the upper canal areas, Mae Taeng and Mae Rim Districts, water has been designated for use there. Most complaints have come from villagers of the sub-canal no. 23 at Ban Nambawluong, Sanpatong District. Because the guard system has not been effective in these areas, villagers from Hangdong and Sanpatong have gone to meet with the Mae Taeng Irrigation Project officials directly in the past three to four years. Some villagers are investigating the water theft at the canal sites themselves.

On March 15, 1994, the day when the water supply was scheduled to be diverted to the lower canal areas, some villagers from the Sanpatong District went up to Mae Taeng Project headquarters to make sure that water would be coming. When it was determined that no water would be coming that first day, more villagers from the same district went up. Some slept by the sub-canal gate in order to take water if and when the supply began to flow to the lower canal areas. However, very little water came that day. On the same day, the villagers from Sanpatong found that water has been stolen at the sub-canal no. 7 in Mae Rim District, where water was often stolen

in the past. So, they asked Mae Taeng Project officials to come and take a look at the evidence and closed the watergate of the sub-canal no. 7.

After they reported the water theft at the sub-canal no. 7 to Mae Taeng Project officials, nothing was done to the perpetrators. The Sanpatong villagers complained to the Irrigation Division Office which is responsible for the irrigation work in the Upper Northern Region. The villagers thought that the violation of the agreement and the failure of the guard system were clear indicators of the poor performance of the irrigation officials. In the past three years, some villagers have often said to the officials that, "since you cannot provide water to farmers, why don't you just resign from work?"²⁴ Furthermore there have been some reports of zonemen accepting bribes for diverting more water to given areas. Zonemen have also been accused of nepotism because their families are located in the Mae Taeng Project area.

The villagers from Sanpatong said that they have submitted letters to the Mae Taeng Irrigation Project many times in the past. They did not know where else they could go to register their complaints. Some villagers have attempted to monitor the water supply flow personally by going to the Irrigation Project headquarters whenever they were scheduled to receive water. Others have resorted to using water pumps or to abandoning the village and going to the city to find work. Urban employers have taken measures to make the village-city commute easier for laborers by providing transportation to and from the city. In the case of farmers in Subdistrict Tha Wangprao, Sanpatong, who are at the end of the sub-canal no. 23, the last sub-canal of the Mae Taeng Project, the whole village has given up agricultural production because there has been no water in the past five years. This study determined, however, that even with sufficient water supply the villagers of this Subdistrict would not return to farming because income from working in non-agricultural sector is higher. Most of these villagers are landless or own only about 1 or 2 rai of land and must rent land in order to farm. Rental fees make farming prohibitively expensive.

The third type of conflict, the one between villagers and city dwellers, reveals how the water allocation problem has been complicated by the growing urbanization in Chiang Mai. The survey along the canal banks in March 1994 found that over two hundreds of pipes were used to

²⁴ Interview with Worasin Kanthawanich, Mae Taeng Irrigation Project official, April 1994.

draw water from the canal, something which never appeared in the agreement when the canal was first put to use.²⁵ Because of extremely limited water supply during the hot season, sandbags were illegally piled up in many parts of the canal to block waterflow. Villagers from Sanpatong who surveyed the canal removed the sandbags by themselves.

In March 1994, the survey found that the urban area which draws water from the Mae Taeng Canal consists of not only the Umong Waterworks Authority, but also households and private firms, such as hotels, restaurants, condominiums, real estate projects, resorts, factories, golfcourses, and animal food firms, most of which are located along the canal banks. Moreover, many government agencies have been involved in using water of the canal, for example Chiang Mai University, the 41st Airflight Division, Nakorn Chiang Mai Hospital, the Queen Mother Public Park, the Chiang Mai Municipality Sports Stadium, and the SEA Games Stadium Construction Project.

The main purpose of the Mae Taeng Canal Project, argued Sanpatong villagers, was to provide water for agricultural production. "The irrigation project should therefore finish its priority work." Villagers also urged city dwellers and government agencies to economize on water consumption.

The fourth type of conflict, the one among villagers in each locality, is relatively minor. In the past five to six years since water shortage problem has specially troubled farmers in the lower part of the canal, the main form of conflict among villagers in a village has been water theft. However, since almost all farmers are relatives or neighbors, the solution to conflict has been peaceful. Through meetings, negotiations, and punishment, organized by *muang-fai* leaders, villagers have been able to settle the dispute by themselves. No bureaucratic agencies were needed to perform at this level.

²⁵ Interview with Nai Truat Na, Subdistrict Sanmahapon, Mae Taeng District.

Case Study Four: Chom Thong District

• General Information

Chom Thong District is the third largest district of Chiang Mai in terms of population (125,000 in 1992). Its district office is 58 kilometers south of the Chiang Mai urban area. This district is chosen for study because there have been disputes between farmers in the highland and lowland areas. In this study, two areas will be investigated: Ban Mae Tia, Subdistrict Don Kaew, and Ban Mae Soi, Subdistrict Mae Soi.

Many decades ago when the planting and sale of opium was legal, Hmong tribesmen on highland lived comfortably on the production and sale of that crop. The opium crop featured high sale prices, little consumption of water, no use of chemicals, and a small planting area. Since opium became illegal in the early 1960s, Hmong people have gradually switched to production of other crops. One of the new crops is cabbage which requires a great deal of water, a bigger planting area (around 10 times that of opium), and a large amount of chemicals.

In 1982, Hmong people in Ban Pa Kluai began to grow cabbage. The idea was taken from Mae Hong Son Province where cabbage was sold at rather good prices. In March 1983, leaders of Muang Mae Tia submitted a letter to Virapong Tansuhat, the provincial councilor, complaining about the forest destruction by Hmong people on the mountain. By 1985, Ban Sob Soi, the lowland area under Ban Pa Kluai was clearly affected by the cabbage crops on the mountain areas. For example, the Mae Soi River began to dry up completely in April, the last and hottest month of the dry season. In the next three years, farmers in the lowland area could not grow crops in the hot season because of the insufficient water supply, an unprecedented event in the history of the village.

As a result, leaders of six *muang-fai* organizations in Subdistrict Mae Soi which received water from Mae Soi River gathered and set up the Muang-fai Club for Headwater Conservation (MCHC). After the club submitted several letters to the district officials asking for the evacuation of people who encroached upon the forest and the government gave no response, villagers from eight of the eleven villages in Subdistrict Mae Soi went to the Mae Soi River headwater area and put a fence around it to prevent further deforestation in that area.²⁶

²⁶ Interview with Suvit Namthep, provincial councilor, March 18, 1994.

Prevented from utilizing the forest for cabbage crops in the Ban Pa Kluai area, Hmong people relocated to the Mae Tia River headwater area. Afterwards, the same negative impact from forest destruction and chemical-filled water was imposed upon villagers in the Mae Tia River area. On April 18, 1989 villagers from Subdistricts Mae Soi, Doi Kaew, and Khun Klang, which faced the same plight, set up the Chom Thong Headwater Conservation Club (CHCC), headed by provincial councilor Suvit Namthep. The CHCC members included the head of each *muang-fai* organization, every *Kamnan*, and every village head of Chom Thong District.

The main task of the CHCC was to organize villagers to guard and monitor the encroachment upon the headwater areas, control forest fires, and launch an afforestation project in some areas in cooperation with some government agencies. In addition, the CHCC submitted letters to the district office, provincial office, Prime Minister's Office, Ministry of Agriculture and Cooperatives, and the Prime Minister asking for the evacuation of hilltribe people from the mountains.²⁷

At the time Chom Thong villagers were campaigning for headwater conservation and evacuation of Hmong people several government projects funded by foreign organizations have been started in that area. The construction of roads to the mountains have enabled some people in these areas to move themselves and their produce around more easily, resulting in forest destruction, lesser amount of water in lowland areas, more production of cabbage, and polluted water in lowland areas. Lowland villagers have been unhappy with this development. They also felt that government agencies' officials were not doing enough in telling Hmong people about the negative effects of chemicals use in agricultural production.

4. Case Study Analysis

The above four case studies highlight problems with the allocation regime in Chiang Mai. The disputes, especially those between farmers and non-farmers, indicate systemic lack of authority over water rights and water access which is the legacy of the breakdown in the traditional *muang-*

²⁷ *Ibid.*

fai organizations and a vacuum in the legal and administrative framework supporting individual and communal rights to water.

The resulting situation can be likened to a free-for-all, with winners and losers in the battle for water determined by one's relative wealth and power. What was once a coherent system that guaranteed its members access to an essential resource has evolved into a morass of conflicts, each settled differently, each with different conclusions.

The slow erosion of *muang-fai* organizations as viable resource allocation agencies stems from three main causes: 1) the introduction of government-run irrigation systems, 2) the rapid development of the industrial and urban sector, and; 3) the failure of the *muang-fai* organization to provide and maintain a steady supply of water to its members. The first cause has been discussed extensively in the literature.²⁸

Thailand's phenomenal economic growth over the past two decades has been industrially based, forcing a shift away from the agricultural sector. Government policies have encouraged and favored industry at the expense of agriculture, creating large disparities between rural and urban incomes. Wages in the city have gone up while returns to agriculture have remained steady. As a result, many farmers, especially in the dry season when the water supply is irregular, have taken to working in the cities.

As one would expect, it is those farmers whose land receives a less consistent supply of water who are the first to abandon farming. Such is the case in the Fai Phya Kham in Saraphi District, where farmers at the lower end of the canal have by and large given up trying to grow rice during the dry season. These marginalized farmers thus have less of a stake in the smooth operation of the *muang-fai*, and subsequently put little or no effort into maintaining canals, attending meetings, or paying dues.

At the upper end of the canal, expansion of the urban area in Chiang Mai has meant an increase in land prices and the development of some real estate projects, hotels and restaurants. All of these compete with the farmers for water, a situation which has led to some of the conflicts mentioned in the case studies. Because of the direction of the water flow in Saraphi (north to

²⁸ See Section 2 for references.

south), it is the farmers closest to the urban areas who receive a more consistent supply and who still have much to lose by disruptions to their water supply. In the Saraphi case, it was farmers from the upper part of the canal who organized and took action on their own behalf.

The incapacity of the *muang-fai* organization to maintain and provide water for the lower part of the canal or to exclude non-members from taking water is indicative of problems both within and external to the organization. Externally, the *muang-fai* executive committee has in fact no control over who should obtain water from the *muang-fai*. In the past, these people's organizations, set up decades or a hundred years ago, were instrumental in allocating water for all villagers. As Chiang Mai City grew and outsiders entered the *muang-fai* territory to settle down or do business, questions of who should have authority to set the rules and punish those who do not observe the rules were neither raised nor answered. Neither was the question of the relationship between *muang-fai* leaders and government officials and their responsibility over the water allocation problem addressed. Many incidents have shown that neither *muang-fai* organizations nor government offices are able to cope with the rapidly changing situation.

Internally, as farmers have felt less of a stake in its operation, the leadership and operation of the *muang-fai* has broken down. Unlike previously, when villagers had no option other than farming, it is now possible to abandon one's farm and work in the urban areas. The farmers from sub-canal 23 of the Mae Taeng Irrigation Project are a perfect example.

In fact, in a recent newspaper article, Prime Minister Chuan Leekpai is quoted as saying that the only way to narrow Thailand's widening income gap is to reduce the number of farmers from the current 60 percent of the workforce to five or six percent, and to encourage the rest to enter the industrial sector.²⁹ While achieving such a ratio may take decades, the shift, and the strong incentives to do so, are evident in the conflicts over water.

The failure of the *muang-fai* to maintain its members' support has meant financial instability as well. According to the vice-chairman of the Fai Phya Kham, the fees collected from farmers-water users now total only around 1,500 baht per year. With two assistants who should also be paid for their work, vice-chairman ended up receiving less than 1,000 baht for twelve

²⁹ Bangkok Post, "Cut in farmers needed for fairer society," December 28, 1994, p. 3.

months of work. Other members of the *muang-fai* leadership also have met with the same financial situation. In other words, there is little financial incentive for those who work for or get elected to the *muang-fai* leadership.³⁰

Muang-fai leaders performed differently in different areas. Some, for example in Subdistrict Luang Nua, let *muang-fai* members solve their problems by going to Mae Kuang Dam officials by themselves. *Muang-fai* leaders in Subdistricts Papong and Mae Pong were active in leading members to clean the canals and allocate water. However, they, like most villagers, accepted whatever was given to them by Mae Kuang Dam.

Villagers in general accepted the fact that water has been very limited. Those in Subdistricts Luang Nua and Chongdoi, not far from the Dam Project site, have agreed to limit their production areas in the hot season. The farmers in Subdistricts Papong and Mae Pong, farther from the Dam site, wait calmly every year for their turn when the water comes. The farmers in Sankampaeng District went to meet one of their two provincial councilors who actively led the farmers to ask for water from the Dam.

As for the role of government officials, a leader of the *muang-fai* organization said clearly that district officers including Kamnan and village head played no role in water management. According to Somboon who is both leader of a *muang-fai* and a village head, the workload of a *muang-fai* leader is much heavier than the one of village head. It involves many types of work to help farmers deal with the irrigation and requires so much time to work with each farmer, whereas the work of village head deals with paper work, ceremonial work, and coordination with the district office. District officers, especially Kamnan, village head and the police would come only when serious disputes broke out.

The role of elected officials is unclear as well, and seems to depend largely upon the individual politician. Saraphi District has two provincial councilors (PCs) and three MPs. Whereas one PC has been working actively in the water problem, the other has not done anything to work with farmers or anyone the district because he is too busy with his own business in the city area.³¹

³⁰ Interview with Somboon Boonchu, vice-chairman of Fai Phya Kham, March 1994.

³¹ Personal interview, March 1994.

In the meantime, MPs have hardly played a role in this problem. One can see from the case of Saraphi that the relationships between villagers and politicians and the role of certain politicians have been important to bring about some fortune for villagers. One can also see that political participation by villagers was limited. Even though most elected politicians have hardly helped the villagers on the water problem, villagers did not question their political role.

It is interesting to note that farmers in Doisaket never thought of asking for help from their provincial councilors and farmers in Lamphun gave up hope of waiting for water from Mae Kuang Dam because, they thought, it was too far, while farmers in Sankampaeng always turned to one of the local politicians. "Water is afraid of PCs," quipped village leaders in Subdistrict Mae Pong in reference to a PC from Sankampaeng leading his people to ask for water from the Mae Kuang Dam. "But we don't have that kind of PCs in our district," said the same people when they were talking about the water problem and the role of PCs in their own area. Above all, some villagers from all of these villages have left to seek employment in urban areas. They never seriously questioned why the water amount has been limited, instead tried their best to look for work in the city to earn a living.

In the meantime, this study has found no groups of farmers who sought help from the Members of Parliament. In their view, the MPs have nothing to do with the water issue. In fact, most villagers said that the MPs already helped them by giving materials and equipment to each village, for example, tents for local religious ceremonies, garments for housewives club, ice cubes and soft drink for cremation ceremony, and some money for village leaders and canvassers including communication equipment.

RID officials at Mae Kuang Dam Project proposed that the major cause of the water shortage problem was deforestation and that it was the responsibility of the police and Forestry Department officials to arrest those who engaged in illegal logging activities. Second, they acknowledged that the water shortage problem is becoming increasingly serious and in the near future the restriction of the production area in even the rainy season would be necessary. In addition, water users will have to pay fees for water in the future. Third, in the past three measures have been employed: one, to limit production area in hot seasons; two, to promote the planting of crops which need less water; and three, to make an artificial rain.

The second group is government officials including forestry officials, police, Kamnan, and village heads. Most district officials said that the water problem should be solved by the RID and that they had nothing to do with it. Forestry officials and the police had little to say about the deforestation problem saying that it is difficult to stop tree-felling. Kamnan and village heads, however, mostly cooperated well with *muang-fai* heads in organizing villagers to clean up canals.

Conflict between government agencies adds to the general confusion. The Chom Thong case provides an example where government seemed to be working at cross purposes with itself. While the RID was calling for decreased water use in the lowlands, the highland development commission was encouraging hilltribe villagers to increase their use of irrigated agriculture.

More importantly, some of the royal projects were trying to encourage the Hmong people to give up shifting agriculture and settle down, while lowland villagers were calling for the evacuation of people on the mountains. Villagers have been disappointed because the government has never responded to their call. Inconsistent policy on the settlement of highland areas by hilltribes confuses both the lowlanders and the highlanders.

So, there has been a gap between government officials and villagers. Some villagers feel that they are treated as second-class citizens because they think that government agencies have been helping people on the mountain while allowing lowland people to suffer and solve their own problems. One can see that in putting up fences around the headwater areas so that Hmong people could not plant crops on that territory lowland villagers have done what Chai-anan Samudavanija terms, "the bypassing of the state," meaning that people have not abided by the state law or that people created the rule and enforced it by themselves.³²

The strong actions taken by the villagers are perhaps indicative of their distance from the urban areas of Chiang Mai. Chom Thom district is about 80 kilometers from the city, making a commute to a wage paying job much more difficult. Thus they rely much more heavily on their income from farming, and are more quick to organize and take action on their own behalf when their water supply is threatened.

³² Chai-anan Samudavanija, *Bypassing of the State Bangkok: Manager Press, forthcoming.*

Conclusion

The system of water allocation in the North of Thailand is chaotic. With traditional systems breaking down and a lack of government intervention to take their place, people are left to take matters into their own hands. The conflicts that ensue are generally resolved by the use of influence and power. Those who have it, the wealthy, the politicians, and the organized villagers can ensure a stable supply of water for themselves. It is the individual farmers who lose out in this struggle.

As the economy continues to develop and shift away from its dependence on agriculture, more and more farmers will enter the industrial workforce. Farmland will convert to urban or suburban land, or will become more concentrated in larger plots as small-scale farming becomes less viable. The task at hand, it seems, is to ease this transition for the individual farmer. With a fair and just system of water allocation and conflict resolution, farmers will not be forced to abandon their livelihoods until they are ready.

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Appendix

Examples of Water Conflicts and Conflict Resolution

Following are some of the events in Northern Thailand which illustrate the nature of water conflicts and how conflicts were viewed by different groups and resolved in the past. The purposes of discussing these events are twofold: one, to be aware of the water conflict- related events put forward by local newspapers in the past; and two, to provide these events as background and comparative study for the four case studies. It should be noted that these events are not reported in great detail. However, the macro-level presentation of who, what, where, when, and how should be useful to an understanding of the case studies.

The Sand Sucking Business in Chiang Mai and Lamphun Provinces, 1980-1993

In mid-1993, villagers of Ban Wangsakaeng, Subdistrict Nong-gong, Pasang District, Lamphun, assembled in front of the Pasang District Office and later moved to the Lamphun Provincial Office and asked officials to end all sand sucking businesses along the Ping River in Pasang. The protestors said that the sand businesses had damaged the river banks, the roads along the banks, and also the water woodblocks built by villagers. More importantly, the businesses had reduced the amount of water the protestors used for their daily life and longan tree growing, forcing the protestors to dig deeper into the ground to get water.

The protest, which lasted over a month, led the Lamphun governor to reject four new applications for sand sucking concessions and discontinued the concessions approved earlier. It was not clear, however, whether or not the sand sucking business was halted despite the governor's disapproval.

During the late 1970s, the sand sucking business was first allowed in the Ping River in the area of Subdistrict Sanpisua, Muang District, Chiang Mai, and spread into Mae Rim and Sansai Districts due to growing demand for sand to be used in the construction sector. By the early 1980s, villagers in the area began to protest against such businesses. No solution was found as the sand supply became more and more limited. Also partly in order to move away from the protest, the sand-sucking businessmen moved southward to Pasang, a famous district for longan tree growing, and Chom Thong District of Chiang Mai. Protestors in Mae Rim had accused district and provincial officials of collaborating with the businessmen because they felt that the authorities acted very slowly in punishing the businessmen which violated the law. They said that the sand sucking business which lasted for a long time had damaged the river banks, changed the river direction, and reduced the amount of water for consumption in their area.³³

Conflict over the Li River, Lamphun, 1980-1993

In August 1993, a large group of villagers and monks in Li District, Lamphun, gathered and submitted a letter to government officials at the district and provincial levels demanding that the canal project at the Li River be ended. In the meantime, related private groups supported the call for the villagers. The letter was signed by 1,223 people in the district. During the same period, members of some non-governmental organizations (NGOs) gathered and formed a group called the Lamphun Seminar Group in order to help conserve local natural resources, especially forest and water.

Over the past three decades, the densely-forested headwater of the Li River has lost a great number of trees owing to many forest concessions granted to businessmen. The forest destruction went on until 1989 when the government ordered forests all over the country closed.

In 1978, the National Energy Office discovered lignite near the Li River in Li District and granted a concession to a private mining firm, Ban Pu Mining Company. This led to the degradation of water quality and the bank erosion. In 1988, the banks of the Li River near the

³³ *Daily Northern Phujudkarn* February 24, 1993, p. 4 and *Thai News* February 26, 1993 p. 3.

mining site tumbled, damaging several roads and canals and also turning two mines into large reservoirs.

In 1991, the Governor of Lamphun approved a canal project of the Ban Pu Mining Company. The new canal would be constructed along the mines and the water would be used for the company production. It was 1993 when villagers found out that the canal project was in fact intended to divert the direction of the Li River because a large quantity of lignite was discovered under the water. Such a project was owned by a leading politician in Phrae Province, who was very close to a former cabinet member who remained politically active in that province.³⁴

Conflict in Kampaengpet Province, 1987

Over 500 villagers in Kampaengpet Province gathered with all kinds of weapons and marched to the irrigation site, trying to open the irrigation canal gate. The protesting villagers were unhappy with the situation in which more water was sent to Nakorn Sawan Province, a bigger and wealthier neighboring province south of Kampaengpet. The confrontation ended with over 300 villagers arrested for destroying government properties. Unfortunately, there was no further report by newspapers.

Controversy of the Mae Lamaluang Dam Project, Mae Hong Son Province, 1992-1993

After the Electricity Generating Authority of Thailand (EGAT) submitted the Mae Lamaluang Dam Project in March 1992 for approval to the Ministry of Interior in order to generate electricity, villagers from four villages in Mae Hong Son voiced their disagreement. EGAT said the project would greatly benefit villagers and ensured that villagers would receive full compensation for moving out. District officials supported the EGAT position and said the dam would enable villagers to have more jobs and receive higher income. The villagers, however, did not think so.

³⁴ Matichon "The Lamphun Seminar Group Fights to Protect Local Resources," March 23, 1992 p. 32 and "The Li River: Death of a Community Culture," Northern Daily Phujudkarn October 30-31, 1993 p. Special.

In September 1992, EGAT workers, private firms, and individuals began to move in to fell the trees. In October, 500 protestors from nine villagers, insisting on their original stance, asked the Environment Committee of the House of Representatives to look into the conflict. In late December, the demonstrations intensified because the district officer did not conduct meetings with village headmen such that village headmen and district officials were able to provide clear answers to the villagers. Moreover, the demonstrators were furious because their posters were destroyed by district officials who said that the posters were illegal.³⁵

By early 1994, both sides had failed to reach an agreement. Whereas EGAT with support from the Ministry of Interior said it would start the project in 1994, villagers remained opposed to the dam project.³⁶

Conflict over the Kok River, Chiang Rai Province, 1993-1994

The drying up of the Mae Kok River beginning in late 1993 has resulted in water shortages in the lower part of Muang District, Chiang Rai, and four other districts. This was due to the setting up of a canal in early 1993 eight kilometers south of the downtown area. The canal was erected in order to convey water from Tha Ton, Fang District in Chiang Mai, to downtown Chiang Rai so that tourists can enjoy boatrides on this part of the river.

According to villagers of Pa Yangmon, Muang District, the Kok River has never dried up like this in February. This year, however, the villagers had to search for water underground and could no longer go fishing in the river. They think that the canal should not have been built. Meetings are being conducted in order to organize a rally to make a petition to the provincial authorities over the canal issue. Meanwhile, Mr. Cherdchai Kerdporn, owner of a boatride firm, is very satisfied with the canal project. He said the canal should be kept until the next rainy season in order to promote tourism in Chiang Rai. He also said that many tourists will come to Chiang Rai in April and wish to go on a boatride in the Kok River.³⁷

³⁵ Yuthichai Virawong, "What happened at the Mae Lamaluang, Sobmoei Sub-District," *Siam Rath Weekly Review* January 9-15, 1994, pp. 13-15.

³⁶ *Bangkok Business* December 27, 1993, Northern section, p. 2 and *Daily Phujudkarn* January 28, 1994.

³⁷ *Siam News* February 4, 1994, pp. 1, 16.

While the controversy over the use of water from the Kok River has not been solved, in early March of 1994 the mass media began to report two more problems concerning the Kok River. The first was the polluting of the river mostly by hotels and restaurants situated by the river banks. The second was the encroachment upon the river banks by both government agencies and private firms.³⁸

As a report by the Chiang Rai governor-appointed Kok River and Other Rivers Development Committee indicated, the survey of the rivers since March 1994 found that over fifty hotels and restaurants have encroached upon and polluted the Kok River banks. In addition, there were sand-sucking business firms and over 100 houses which have encroached the river banks in different forms. Some, for example, put up fences or posts in order to show that the public land on the river banks is in fact their own land.

Mr. Wathi Sutuktis, member of the Environmental and Cultural Conservation Committee, said that the pollution of the Kok River has been around for several years but there was no problem before 1994 because there was no canal to block the disposal. The problem has occurred because government agencies, including the Chiang Rai Municipality, did nothing to solve the problem until the problem became serious. The business firms, meanwhile, took advantage of the lack of legal implementation. "In many cases, the passivity of the government agency side is due to a close cooperation between itself and the private sector."³⁹

³⁸ *Bangkok Business (Northern Region Section)*, March 16, 1994 pp. 1-2.

³⁹ *Bangkok Business (Northern Region Section)*, April 16, 1994, p. 2.

Water Use Conflicts Management in the Northeast: Case Studies of Nam Siaw and Nam Pong

Amnat Wongbandit

Part One: Water Use Conflicts in the Nam Siaw Basin

1. Physical Features

Nam Siaw Basin is in the Northeast of Thailand, generally known as Khorat Plateau which covers approximately 106 million rai (16.3 million hectares) or 33% of the country. The Khorat Plateau is separated from the rest of the country by Petchaboon and Dong Phraya Yen Mountain Ranges in the west and San Kampaeng and Phnom Dong-rak Mountain Ranges in the south with a mean elevation ranging from two hundred to one thousand meters above sea level. The Plateau has in general an undulating terrain with a mean elevation ranging from one hundred to two hundred meters above sea level.¹ Most rivers in this region have their origin in mountains in the west and the south and flow easterly to the Mekong.² (See Annex I)

Within the Plateau, lie two basins, Khorat Basin in the west and south and Sakon Nakhon Basin in the Northeast which is divided by the Phu Phan Mountain Range. A large part of this area

¹ Pichai Wichaidit, *Distribution of Salt Affected Soils in the Northeast Region*, paper distributed by Land Development Department, Ministry of Agriculture and Cooperatives, 1 (unspecified date of printing).

² Abhisak Som-in, *Study of Impacts of Saline Water from the Nam Siaw*, 1, 1989.

is underlain by rock salt beds with an average depth of 200-400 meters below the ground,³ since it was once, according to a geological study, under the sea. The uplift of the Phu Phan Mountain Range and other factors distorted some part of the rock salt to form dome shapes near the ground with a depth of less than 100 meters.⁴

It was estimated by the Department of Mineral Resources that the Khorat and Sakon Nakhon Basins have 4,700 million tons of rock salt reserve mainly in the following areas:

1. Chaiyaphum Reserve, covering 1,550 square kilometers with 1,500 million tons.
2. Talad Khae (Nakhon Ratchasima) Reserve, covering 1,100 square kilometers with more than 200 million tons.
3. Mahasarakham Reserve, covering 740 square kilometers with more than 700 million tons.
4. Kularonghai Reserve and Bamnet Norong Reserve with unknown quantity.
5. Ubon Ratchathani Reserve, covering 250 square kilometers with more than 300 million tons.
6. Nong Khai Reserve, covering 1,800 square kilometers with 2,000 tons.⁵

The large amount of rock salt reserves in the Northeast causes soil salinity problem in some areas. It was reported that the total saline soil accounts for 36 million rai or approximately 33.8% of the Khorat Plateau. In the low land area, 1.5 million rai are severely affected as salt crystal are be found on and below the surface; 3.7 million rai are moderately affected as salt can be found one meter below the surface; and the least-affected area of 12.7 million rai with no salt on or below the surface but is found in its water sources. In the high land area, 18.1 million rai are underlain by rock salt, which from time to time dissolve and seep to lower land areas consequently increases its salinity.⁶

³ Normally, not deeper than 1,000 meters. (Somchai Wongswas, Director of Groundwater Division, Department of Mineral Resources, *Northeastern Rock Salt: Forbidden Treasure*, 4, 1991.)

⁴ *Id.*

⁵ Abhisak Som-in, *supra* note 2, *id.*, at 2. See also Sathit Manassurakul, *Saltpan: Who gains? Who loses?*, 5, 1992.

⁶ *Main Plan of the King's Projects for Northeast Development*, 3, 1987-1992.

The Nam Siaw River is one of the Mun River's tributaries in the Khorat Basin. It originates in Mahasarakham, flowing through Roi Et and joining the Mun at Si Saket with a total stretch of 225 kilometers covering the drainage area of 8 districts in 3 provinces. (See Annex I)

As in other parts of the Northeast, people in the Nam Siaw Basin earn their living mostly from agriculture such as; rice, cassava, hemp and cotton farming, or livestock and silkworm raising. Yields from agriculture in the Northeast is relatively quite low when compared with those in other parts of the country due to insufficient water resources and soil infertility which exacerbates the salinity problem.⁷ Because of the unsuitability of soil for agriculture and an abundance of rock salt, some people in the Nam Siaw Basin invested their labor and money in rock salt mining⁸ which earns them more money. This new occupation caused severe conflicts among large groups of people and also inflicted damage on the environment in the region.

2. Rock Salt Mining Problems

Rock Salt Mining Methods

Before going into the details of rock salt mining history and its effects in the Nam Siaw Basin, methods of rock salt mining should be briefly addressed. It is done by either one of the following ways;

1. In areas where salt crystals are found on the ground, soil may be collected and dissolved in water then drained through a hand-made filter. The saline water would then be boiled down until salt can be collected. This is a traditional method to produce salt, particularly on a small scale.
2. Brine may be pumped from underground sources.

⁷ Pichai Wichaidit, *supra* note 1, *id.*

⁸ Rock salt mining could be found not only in the Nam Siaw Basin but also in other places of the Northeast such as Nakhon Ratchasima, Sakon Nakhon, Nong Khai, Udon Thani, Chaiyaphum and Ubon Ratchathani. Sathit Manassurakul, *supra* note 5, *id.*, at 6.

3. Water may be injected underground to dissolve rock salt and the saline water would then be pumped up. This method is usually applied by large corporations due to high costs of investment.⁹
4. Rock salt may be directly extracted from the ground like other kinds of hard minerals. This method is believed to cause the least adverse affects to the environment¹⁰ but it is in an experimental stage for commercial application by some big corporations.¹¹

The brine extracted from underground by the second or third method would be boiled down or brought to a saltpan¹² to be dried in the sun. In salt production process, some wastewater is discharged from the saltpan.

Overview of Rock Salt Mining in Nam Siaw Basin

Rock salt mining which led to conflicts in Nam Siaw Basin is located in Nong Bor, a natural lagoon in Borabu District, Mahasarakham and also headwaters of the Nam Siaw River. Nong Bor with area of 1,085 rai lies on the top of a large salt dome¹³ which makes this area perfect for rock salt mining since the rock salt exists near the ground surface. It is believed that Nong Bor was formed by the subsidence of land under which rock salt was dissolved by underground water and seeped to other places.¹⁴ Rock salt mining around Nong Bor, like other parts of the Northeast, started long time ago with traditional method¹⁵ which did not substantially increase salinity in the water. In 1951 people from three villages surrounding Nong Bor asked the

⁹ An interview given by Somchai Wongswas, Director of Groundwater Division, Department of Mineral Resources, 15 February 1994.

¹⁰ Somphan Techa-athic, *Saline Soil and Environmental Impacts, Summary of Seminar on Saline Soil and Environmental Impacts, 15-16 December 1989, at Srinakarintrawirote University, Mahasarakham, 12, 1990.*

¹¹ Somchai Wongswas, *supra* note 9.

¹² There are two kinds of saltpan: one with pact soil surface, and the other with concrete surface. Saline water can seep through the former surface easier and cause more adverse effects on the environment than the latter.

¹³ Abhisak Som-in, *supra* note 2, *id.*, at 2.

¹⁴ Somchai Wongswas, *supra* note 9.

¹⁵ Watanasan Panpet, *Economic and Social Changes During Commercial Rock Salt Mining Period, 1971 - Present: Case Study of Ban Klua, Borabu District, Mahasarakham, thesis for Master Degree, Srinakarintrawirote University (Mahasarakham), 50 and 54-55, 1993.*

government to develop this natural lagoon into a reservoir under the legal regime of People's Irrigation¹⁶ for Domestic Consumption and Agriculture. Later in 1955 the Nong Bor Reservoir was under the control of the Royal Irrigation Department, and in 1960 it was consequently declared as the so-called Irrigation Watercourse, Classes 1 and 4¹⁷ under the Royal Irrigation Act, 1942. At the same time, rock salt mining became more commercialized and widespread¹⁸ which led to the increase of salinity in Nong Bor to the point that the water was no longer fit for agriculture. The Royal Irrigation Department therefore stopped delivering water from Nong Bor to the irrigated land in 1971. Because damage inflicted by saline water upon plants, animals and rice farms surrounding Nong Bor, its legal status as Irrigation Watercourse was revoked in 1977 and it was no longer under the control of the Royal Irrigation. It became an area for common use under the supervision of the Mahasarakham provincial authority.¹⁹

Due to its widespread damage in Borabu and Wapi Pathum Districts in Mahasarakham; Pathum Rat, Kaset Wisai, Suwannaphum and Phon Sai Districts in Roi Et; and Rasi Sarai District in Si Saket; rock salt mining from 1971 onwards has drawn strong protest from large group of affected people, particularly rice farmers living around Nong Bor and those living downstream along the river. They kept making their complaints to both local officials and the government and this issue was debated in the House of Representatives in 1976. Finally the Prime Minister Order No. 4/1980 was issued by the Prem government to stop rock salt mining in the Nam Siaw Basin in 1980.²⁰

¹⁶ *People's Irrigation is one of three types of irrigation systems allowed under the Private Irrigation Act, 1939. This scheme is jointly organized and managed by the government and local people for local agriculture.*

¹⁷ *Once a particular river is declared as "Irrigation Watercourse" under the Royal Irrigation Act, 1942, the use of this river is strictly controlled and managed by the Royal Irrigation Department.*

¹⁸ *In 1971, brine beneath Nong Bor was incidentally found by a wood supplier who at first intended to pump underground water for household consumption of his workers but it turned out to be very salty. He then secretly started producing salt from underground brine. Not before long was this news released to others around Nong Bor which led to widespread rock salt mining later in the same year. Watanasan Panpet, supra note 15, id., at 57.*

¹⁹ *Abhisak Som-in, supra note 2, id., at 3 and 4.*

²⁰ *Abhisak Som-in, supra note 2, id., at 4-6.*

Rock salt mining almost totally disappeared between 1980 and 1982. It however reappeared from 1983 to 1988 because of rising demand of salt in the market which could no longer be sufficiently supplied by the saltpan owners along the coast who were switching to more prosperous business, prawn farming.²¹ Damage from the mining at this time became more serious than before and drew a lot of attention from the media as well as protest from the rice farmers. The ineffectiveness of the Prime Minister Order No. 4/1980 prompted the government to issue the new one, No. 3/1989, in 1989 to prohibit mining again in the salt-affected area. The latest Order also seemed to be ineffective which led to demonstrations of rice farmers in Mahasarakham who threatened to block a road if their demands were not met. The farmers later were crushed in 1990 by policemen²² and some of their leaders were arrested and later released. The government in the same year promised to strictly enforce the Prime Minister Order No. 3/1989. Laws concerning rock salt mining were later regulated by two acts of the Parliament. Although no conflict between rock salt miners and rice farmers has been reported lately by the media, it does not mean that the problem is totally solved by the new legal laws. Instead, it could re-occur as shown by its early history.

Damage from Rock Salt Mining

Rock salt mining in the area of 2,000 rai around Nong Bor at one time caused, due to the discharge or seepage of wastewater from salt pans or flooding in the wet season, major adverse effects upon the Nam Siaw Basin as follows:

1. Water in certain parts of the Nam Siaw River is no longer fit for human and animal consumption²³ or for agriculture use because salinity is too high, sometimes higher than that of sea water.²⁴

²¹ Environmental Geology Division, Department of Mineral Resources, *Impacts from Rock Salt Mining in the Nam Siaw Yai Basin, in Information for Solving Rock Salt Mining Problems in the Nam Siaw Yai Basin and the Northeast of Thailand of the Committee for Considering Resolutions for Environmental Quality Problems in the Nam Siaw Yai Basin*, 2, 1990.

²² Somphan Techa-athic, *Nam Siaw River; Analysis and Resolutions, in Resources Utilizations and Social Conflicts: Dynamics of Being a Newly-Industrialized Country and Alternative Development*, 96-99, 1992.

²³ It was reported that water buffaloes, usually fond of water, refused to cross a saline watercourse in the Nam Siaw Basin. Somphan Techa-athic, *id.*, at 103.

2. Consequently the ecological system of the Nam Siaw, particularly fish, was almost totally destroyed.
3. The area of salt-affected soil²⁵ became larger which greatly reduced the area of land suitable for agriculture.
4. Yields from agriculture, especially rice production, inevitably was lower than normal.²⁶ Saline water or soil caused rice to have unusual transparent and thin grains some of which wilted later.²⁷
5. Most part of the forested land surrounding the rock salt mining area was denuded since trees were used as firewood for boiling brine to produce salt.²⁸
6. The careless over-extraction of underground saturated brine or rock salt caused land subsidence in several areas.²⁹
7. Social effects were also be noticed as rock salt mining caused migration of laborers from one sector to another and from one place to another. Moreover, some parts of land around Nong Bor was bought by rock salt miners to secure their production base which caused land prices to skyrocket.³⁰

Damage as mentioned above occurred not only within the Nam Siaw Basin but also in other locations where rock salt mining existed. The same kind of damage will re-occur unless mistakes in the past are be prevented.

²⁴ An interview given by Vinai Pratipavanich, Chief of Nam Siaw Yai Development Project, Royal Irrigation Development, 18 March 1994. See also Boonyong Piyasirinun and Vinai Pratipavanich, *Environmental Problems in the Nam Siaw Basin from Rock Salt Mining*, in *Trimnet, Thailand Research on Irrigation Management Network*, 182, 1992.

²⁵ The Chairman of People Group for Solving the Salinity of the Nam Siaw claimed that the cultivated area damaged by rock salt mining was 318,750 rai. *Thai Rat*, daily newspaper, 12 October 1989.

²⁶ During 1986-1989 rice production in Ban Can was approximately five Tangs or twenty liters per rai which was extremely low. An interview given by Camnak Wangdong, Chief of Ban Can, Can Sub-district, Wapi Pathum District, Mahasarakham, one of the former key leaders of rice farmers suffering from rock salt mining, 1 April 1994.

²⁷ Mongkol Danthanin, *Study Report of Problems from Rock Salt Mining at Nong Bor, Borabu District, Mahasarakham*, 8, 1990.

²⁸ It was estimated that rock salt mining, particularly by the traditional method, caused the loss of approximately 200,000 rai of forested land. Somphan Techa-athic, *supra* note 22, *id.*, at 103.

²⁹ *Id.*, at 102.

³⁰ Mongkol Danthanin, *supra* note 27, *id.*, at 11.

3. Conflicts Management

Rock salt mining around Nong Bor caused fierce conflicts among people in the Nam Siaw Basin, between the miners (the polluters) and other water users, especially rice farmers, for two decades. The effects of the conflicts were felt not only at the local but also at the national level, the government finally intervened. It is therefore quite interesting to examine how the conflicts has been managed by the following groups of key participants;

1. Government and its officials
2. Miners
3. Affected people
4. Other participants such as non-government organizations, academic institutions including students, media, etc.

Governments

• No Real Intervention at Early Stage

It could be assumed that the government in fact knew for a long time that rock salt mining was carried out around the Nong Bor area, since as mentioned earlier it joined with local people in developing this natural lagoon in 1951 into a reservoir for agriculture and household use and later in 1955 took control of it and in 1960 designated it as an "Irrigation Watercourse", which is totally under the control and management of the Royal Irrigation Department. But it is quite surprising that no clear evidence up to 1977 indicated that the government attempted to take any concrete measures to prevent or mitigate adverse effects caused by rock salt mining upon the environment even when the salinity in the Nong Bor reservoir was so high that the water was no longer fit for agriculture use. The only resolution to the problem was to stop delivering water by the Royal Irrigation Department from the reservoir to the farmers in 1971. This agency did not want to regulate the reservoir further and therefore released it to the Mahasarakham authority to look after in 1977.

Why did the government at that time allowed rock salt mining to cause problems for several years without effective resolutions despite its control of the reservoir. Evidence on this issue is rather sketchy, some possible answers to the question are as follows: First, because, at the beginning, damage from rock salt mining might not be clearly noticeable and might be limited only to a small group of rice farmers, no one including the government paid any serious attention to it.

Secondly, public awareness for environmental protection was minimal as this concept was first found in the 1974 constitution which has been repealed, and the first piece of legislation laying down legal framework for environmental protection was passed by the Parliament a year later.

Thirdly, probably there was no law governing rock salt mining and the government therefore was not able to make an intervention until a needed legislation was enacted.³¹

Finally, government agencies responsible for the protection and management of the reservoir might lack adequate manpower to do the job.³²

It was not reasonable for the government to solve the saline water problem only by stopping the water supply to the rice farmers. Instead it should have attempted to stop the miners, who were polluting the reservoir, and at the same time introducing a rehabilitation program to the affected area. However, it took some years for the government to finally get the right target.

● **Prime Minister Order No. 4/1980**

When the increase of salinity in the Nong Bor reservoir reached a critical point, the number of complaints which had been made to local officials for several years increased (since 1971) but officials were inactive on this matter. Due to the expansion of the area adversely affected by salinity, the group of protesters against rock salt mining became larger and kept making complaints to the government and the public. In 1976 a motion on rock salt mining at Nong Bor was

³¹ One explanation why the government, especially the Royal Irrigation Department, was not able to take any action to prevent the Nong Bor reservoir from being polluted by rock salt mining at its early stage is the fact that mining had been carried out within private land around Nong Bor.

View expressed by Prapan Kantong at a meeting for presentation of this study at Research and Development Institute, Khon Kaen University, 23 May 1994.

³² Up to 1977 only low-ranking officials or employees of Royal Irrigation Department were posted at Nong Bor. Since most of these people had little education, they did not understand or were not aware of harmful effect from rock salt mining. An interview given by Prapan Kantong, an official of Nam Siaw Yai Development Project, Royal Irrigation Department, 20 March 1994.

submitted four times to the House of Representatives by a Member of Parliament from Mahasarakham.³³

Pressure imposed by complaints from the rice farmers, politicians and the media for several years forced the government to deal seriously with the rock salt mining issue. The Prem government finally decided to stop rock salt mining to prevent further environmental damage through the issuance of the Prime Minister Order No. 4/1980 on 16 June 1980 which stipulated, among other things, that:

1. *Any person producing salt by extracting underground water and boiling it or drying it in the sun within the Nam Siaw Yai Basin shall stop carrying out such an activity from 1 July 1980.*
2. *The Nam Siaw Yai Basin shall cover the area of Borabu District, Wapi Pathum District, Mahasarakham Province; Pathum Rat District, Kaset Wisai District, Suwannaphum District, Roi Et Province; and Rasi Salai District, Si Saket Province.*

The Prime Minister Order No. 4/1980 was based on Section 20³⁴ of the already repealed Enhancement and Conservation of National Environmental Quality Act, 1975 which authorized the Prime Minister to issue an order, in an emergency case for the purpose of protecting the public or individuals from environmental damage or pollution, to prohibit any person from carrying any activity causing such damage or pollution. Despite the long overdue issuance of this Order, it substantially reduced the salinity level in the Nong Bor reservoir and the Nam Siaw River within a short period of time³⁵ since it was equipped with penal sanctions.³⁶ However, the effectiveness of the Prime Minister Order later seemed to diminish after the demand of salt in the market rapidly increased as will be discussed below.

³³ Somphan Techa-athic, *supra* note 22, *id.*, at 95-96.

³⁴ Similar to Section 9 of the Enhancement and Conservation of National Environmental Quality Act, 1992.

³⁵ In 1982 it was reported that the salinity in Nong Bor was lower than 3.2 grams per liter which was acceptable. Boonyong Piyasirinun, *supra* note 24, *id.*, at 180.

³⁶ Any person disobeying the Prime Minister Order in this case shall be imprisoned not exceeding 6 months or fined not more than 10,00 baht or both. And if he is the one who caused the damage, the imprisonment shall not exceed 5 years and the fine shall not be more than 500,000 baht or both. The Enhancement and Conservation of National Environmental Quality Act, 1975, Section 26.

The Prem government not only issued the Prime Minister Order to stop the salinity problem but also set up a plan to rehabilitate the Nong Bor reservoir within a month by constructing ditches and dikes around the area to prevent saline water from overflowing Nong Bor and the surrounding farmland. To facilitate the rehabilitation plan as well as to compensate those who no longer were able to carry out rock salt mining legally, the government by the Royal Irrigation Department offered to purchase some land around Nong Bor from the owners.³⁷ Some fertilizers and insecticides were also distributed by the government to farmers who were adversely affected by rock salt mining. It was wondered how insecticides could solve the salinity problem. Or was it only a symbolic relief given to the farmers by the government. A few months after the issuance of the Prime Minister Order, the Royal Irrigation Department reclaimed the Nong Bor reservoir as an "Irrigation Watercourse" under its control and management again.³⁸

• *Side Effects and Failure of Prime Minister Order No. 4/1980*

The total ban of rock salt mining in the Nam Siaw Basin by the Prime Minister Order No. 4/1980 was effective for a few years but later produced side effects and faced some obstacles in practice. After being silent for two years, illegal rock salt mining re-emerged in 1983 because the demand of salt in the market gradually arose but such mining was not wide spread. The severity of damage caused by rock salt mining at this period however seemed to reach its peak between 1987-1989 when many of salt producers along the coast switched their occupation to tiger shrimp farming which caused the salt price to soar. New technology had been applied in mining which certainly became more industrialized than before.³⁹ For those who did not want to have problems with the Prime Minister Order in the Nam Siaw Basin, moved their salt production sites to other places such as: Ban Dung District, Udon Thani; Ban Muang District, Sakon Nakhon; Kantharawichai District, Na Dun District, and Na Chuak District, Mahasarakham;⁴⁰ which caused environmental problems to the new areas where the laws governing rock salt mining were not clear or existing.

³⁷ Boonyong Piyasirinun, *supra* note 24, *id.*, at 180.

³⁸ Somphan Techa-athic, *supra* note 22, *id.*, at 96-97.

³⁹ Sometimes brine from underground was pumped and carried by a truck to sell at a place required by customers (salt producers). Somphan Techa-athic, *supra* note 22, *id.*, at 98.

⁴⁰ Boonyong Piyasirinun, *supra* note 24, *id.*, at 180-181.

Some rock salt miners also found a way to get around the Prime Minister Order which had a loophole. The Order prohibited only salt producers such as saltpan owners, not other people, from extracting brine from underground. It could be interpreted that such prohibition would not apply to persons who pumped brine from underground but they themselves did not produce salt. By similar reasoning, it would not apply to persons who produced salt but did not extract brine themselves. In other words, the Order was deemed to be violated only when two requirements were met; extraction of brine and production of salt were carried out by the same person. As a result, some people brought brine from Nong Bor to other places outside the Basin for salt production⁴¹ and government officials hesitated to make an arrest since they were not confident whether such transport of brine violated any law. In addition, the penalty for violating the Order was not harsh enough to deter potential offenders.⁴² Once a legal loophole was found, a large group of people certainly tried to make use of it which led to the severe degradation of the Nam Siaw Basin.

Economic incentives, at least in this case, forced people to disobey or evade the law if benefit from violating the law was much greater than penalty.

● *Committee for Coordinating Policy and Plans for Solving Problems from Rock Salt Mining*

After 1983, some miners moved their production bases to other provinces and caused environmental problems therein, especially in Ban Dung District, Udon Thani, and Ban Muang District, Sakon Nakhon. Being well aware of such impact, the National Environment Board made some recommendations⁴³ for the prevention and alleviation of environmental damage caused by

⁴¹ Boonyong Piyasirinun, *supra* note 24, *id.*, at 180.

⁴² In fact, a number of offenders were prosecuted but no one has ever been sentenced with imprisonment since fines instead were usually inflicted upon the offenders. Although sentence with imprisonment was sometime rendered, it was always suspended by the court. An interview given by Korkiat Thoaprayoon, Deputy Provincial Public Prosecutor, Mahasarakham, 19 April 1994. See also *infra* notes 118-119 and accompanying texts.

⁴³ Recommendations included;

1. To survey areas affected by rock salt mining and launch a rehabilitation program.
2. To allow rock salt mining only in designated areas.

rock salt mining in the Northeast to the government in 1987. One of the measures suggested by the Board was to use the Prime Minister power as conferred by Section 20 of the Enhancement and Conservation of National Environmental Quality Act 1975, to stop rock salt mining in the two provinces as in the Nam Siaw Basin case. The Council of Ministers approved the Board's recommendations with an observation that Section 20 would be applied only after Ministry of Interior, Ministry of Agriculture and Cooperatives, Ministry of Industry, and the then Office of the National Environment Board⁴⁴ worked together in setting up rules and regulations for preventing possible damage from mining, and also helping local people to find extra sources of income.⁴⁵ This was another perfect case of a slow response by the government to problems since it took about four years from 1983 before policy was issued, let alone its implementation.

In response to the resolution of the Council of Ministers, the Ministry of Interior created on 18 March 1987 the Committee for Coordinating Policy and Plans for Solving Problems from Rock Salt Mining, composed of Permanent Secretary of Ministry of Interior as chairman, provincial governors of Udon Thani, Sakon Nakhon and Mahasarakham, and other high-ranking officials from government agencies concerned as members. It should be noted that no member of the Committee came from people in the areas affected by rock salt mining.

So far the Committee seemed not to be able to effectively eradicate or even mitigate environmental problems from rock salt mining. Illegal rock salt mining became more widespread during the short-life of the Committee between 1987-1989 which was of course attributed to several factors some of which have already been discussed, particularly high demand of salt in the market and legal loopholes in the Prime Minister Order No. 4/1980. Another factor concerned an organizational problem, that the Committee lacked proper powers to carry out its mission.

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3. *Rock salt mining site would have to be outside the area suitable for agriculture or water sources reserved for household use.*
 4. *Not allow production of salt by boiling.*
 5. *Apply appropriate technology capable of controlling environmental damage.*
 6. *Enact law specifically governing rock salt mining.*

⁴⁴ This Office was replaced by the Office of Environmental Policy and Planning, Department of Environmental Quality Promotion, and Department of Pollution Control in 1992.

⁴⁵ Resolution of Council of Minister dated 10 February 1987.

First of all, members of the Committee, despite being high-ranking officials, were not real decision-makers since they were only civil servants who had to implement policies set up by their bosses, ministers. Each minister might simply ignore the decision of the Committee which contradicted his policy and in fact he was not obliged to comply with such decision unless it was approved by the Council of Ministers. Second, the Committee did not even have power to direct other government agencies responsible for rock salt mining to comply with or implement its decisions since such agencies did not account to the Ministry of Interior which created the Committee.

In practice, the Committee has been used mainly as a forum for discussion among the officials concerned with each government agency to report what it had done to solve rock salt mining problems in its jurisdiction. It usually described in the report that each agency and provincial authorities performed well in tackling the problem but in fact there still were complaints by local people that damage caused by rock salt mining had not gone away.

For example, according to the governor of Mahasarakham, between January and April 1988, eight cases of illegal rock salt mining were reported with ten alleged offenders arrested, some equipment confiscated, and 40 brine wells as well as ditches and dikes surrounding the area of 200 rai destroyed.⁴⁶ Environmental problems from such mining still exists which means that the problem had not been solved. This fact certainly leads one to question that there might have been something wrong at that time with law enforcement. It is tempted to conclude that had the local authorities seriously enforced the law, the degree of environmental damage would not have been that severe as rock salt mining and salt production could not have been secretly undertaken. For instance, to produce salt by using saltpan, one has to leave brine in the sun for three days before draining 15-20% of the brine from the salt pans. It additionally needs one more day for the water to evaporate and then salt can be collected.⁴⁷ Salt production therefore should be easily tracked. Moreover, local authorities certainly knew where rock salt mining site was.

⁴⁶ *Committee for Coordinating Policy and Plans for Solving Problems from Rock Salt Mining, Minutes of Meeting No. 1/1989, p. 23.*

⁴⁷ Boonyong Piyasirinun, *supra* note 24, *id.*, at 179.

In spite of its failure in controlling environmental damage caused by rock salt mining in the Northeast, the Committee had suggested some interesting ideas and remedies for the prevention and mitigation of such damage⁴⁸ which became the basis for other government agencies to work on.

**• Committee for Considering Resolutions
for Environmental Quality Problems in the Nam Siaw Yai Basin**

In the second half of 1989, damage caused by rock salt mining around Nong Bor seemed to reach its peak despite government's effort to solve the problem. It appeared on the front page of a newspaper, vast areas of farmland on both sides of the Nam Siaw River were damaged by its saline water flowing from Nong Bor, and more than one thousand rice farmers in Borabu District, Mahasarakham, demonstrated calling for a stop to rock salt mining.⁴⁹ The council of ministers after that, not clear whether or not to act on such a demonstration, created a Committee for Considering Resolutions for Environmental Quality Problems in the Nam Siaw Yai Basin (CCREQP) on 17 October 1989. The CCREQP, consisting of the Minister of Industry as a chairman and representatives of the ministries concerned as members with no participation from the private sector, particularly local people, was assigned to find solutions for environmental problems in the Basin with a two week time frame, and specific measures and methods for rock salt mining and storage with no harm to the environment.⁵⁰

To tackle the environmental problems in the Nam Siaw Basin, the CCREQP suggested two things needed to be done; one was to revise the Prime Minister Order No. 4/1980, the other was to set up a working group to specify the area where rock salt mining would be allowed and control measures.⁵¹

⁴⁸ The Committee drafted the Order of the Prime Minister to ban rock salt mining in Ban Dung District, Udon Thani, and Ban Muang District, Sakon Nakhon but it was not issued by the Prime Minister. The Committee also encouraged the Department of Mineral Resources to draft an amendment of the Minerals Act, 1967 to include the extraction of saline underground water as mining which was legally controlled by this Department.

⁴⁹ Matichon, daily newspaper, 13 October 1989, p.1.

⁵⁰ Order of the Office of the Prime Minister No. 182/1989 dated 17 October 1989.

⁵¹ Department of Mineral Resources, Problems from Rock Salt Mining in the Northeast, 1 Thorani Witaya Pararitas 53-54, 1991.

Prime Minister Order No. 3/1989

Due to its loopholes, the Prime Minister Order No. 4/1980 was not able to stop illegal rock salt mining in the Nam Siaw Basin. Prime Minister Order No. 3/1989 was issued by the Chatchai government on 22 November 1989 to rectify the defect in the old Order. It states, among other things, that;

1. *Repeal the Prime Minister Order No. 4/1980 dated 16 June 1980 concerning the specification of measures for protecting environmental quality in the Nam Siaw Yai Basin.*
2. *No one shall be allowed to carry out rock salt mining or salt production through extraction of underground water, which is later boiled or dried in the sun, in the areas of Borabu District, Wapi Pathum District, Mahasarakham; Pathum Rat District, Kaset Wisai District, Suwannaphum District, Roi Et; and Rasi Salai District, Si Saket, or to sell or use such brine for any purpose.*
3. *Within the areas prescribed by 2, no one shall be allowed to bring in brine from other places to boil or dry by the sun for salt production as well as to sell or use it for any purpose.*

In spite of its clear language, five months after its issuance, this Prime Minister Order could not stop rock salt mining in the designated areas. Instead the problems got even worse than before as rice farmers kept pushing the government to strictly enforce the law since their rice was continuously being destroyed by saline water.⁵² It was quite surprising that the government was not very serious with enforcing this law which caused negative repercussions. The rice farmer felt frustrated since their grievances were not being redressed properly which led to their demonstration and clash with police. In addition, ignorance of the problem by the government caused more rock salt miners to disrespect the law as they knew that no one would enforce it.⁵³

⁵² *Thai Rat*, daily newspaper, 1 January 1990, p. 1. See also *Matichon*, daily newspaper, 12 April 1990, p. 17.

⁵³ *The government practice seems to ignore an old saying that "law without enforcement is worse than no law".*

Why was the government not willing to enforce the Prime Minister Order under discussion? One reason seems to be that the government just did not want to take sides in this conflict since each side was composed of a large group of people. If the government had its choice, it would have preferred to delay its decision. Another reason could be the fact that some decision makers in the government have certain connections or vested interests in rock salt mining business as will be later discussed.

It was not until April of 1990 that the government decided to strictly enforce the Prime Minister Order NO. 3/1989 when the rice farmers organized a large demonstration against rock salt mining in Mahasarakham and threatened to block a provincial road unless their demands, particularly the suppression of illegal rock salt mining, were met.⁵⁴ After a week-long demonstration, the government decided to use police force to neutralize the mob, and some leaders of rice farmers including some student were arrested.⁵⁵ The government's harsh action caused an outcry in society, especially from the media which persistently attacked the government for using double standards in enforcing the law,⁵⁶ because those who called for law enforcement or justice ended up in jail. Shortly after that, the government, to improve its image, vowed to the people that illegal rock salt mining would be totally eradicated.⁵⁷

Rock Salt Mining Zones and Control Measures

Another mission assigned by the council of ministers to the CCREQP was to review policy of and control measures for rock salt mining in the Nam Siaw Basin, and possibly the whole Northeast. The CCREQP responsively set up a Working Group in November, 1989, consisting of government officials with no representative of the private sector or local people,⁵⁸ to do the job.⁵⁹

⁵⁴ *Thai Rat*, daily newspaper, 14 April 1990, p. 1 and 17, and *Matichon*, daily newspaper, 14 April 1990, p. 3. See also *Khao Phiset*, weekly magazine, 16-22 April 1990, p. 29.

⁵⁵ *Thai Rat*, daily newspaper, 17 April 1990, p. 1 and 20. See also *Matichon*, daily newspaper, 17 April 1990, p. 1 and 21.

⁵⁶ *Thai Rat*, daily newspaper, 18 April 1990, p. 1, 2 and 22. See also *Matichon*, daily newspaper, 18 April 1990, p. 1 and 24, and 19 April 1990, p. 3.

⁵⁷ Ministry of Interior was assigned by the council of ministers to enforce the law. See a resolution of council of minister dated 17 April 1990.

⁵⁸ See list of members of Working Group in the CCREQP Order No. 4/1990 dated 22 May 1990.

⁵⁹ The CCREQP Order No. 1/1989.

The Working Group suggested that rock salt mining should not be totally banned in the Nam Siaw Basin since it had large reserves of rock salt that were indispensable for country development. A resolution should be to legalize it and set up measures for prevention and mitigation of environmental damage arising. To achieve such objectives, an area allowed for rock salt mining and control measures would also have to be specified by taking the following purposes into account;

1. To be practical, prevent the expansion of environmental damage by rock salt mining from spreading into other areas.
2. To mitigate the salinity problem in state or common reservoirs caused by rock salt mining.
3. To mitigate salinity in soil of farmland caused by rock salt mining.
4. To mitigate land subsidence in densely populated areas or in a place where public properties or any structures are located.
5. To prevent deforestation caused by using firewood in salt production.
6. To preserve historic sites, tourist areas and the like.⁶⁰

The Working Group made a recommendation that rock salt mining in the Northeast must be prohibited except in the following areas; Ban Muang District, Wanon Niwat District, Sakon Nakhon; Chat Turat District, Chaiyaphum; Kham Taleso District, Non Thai District, Nakhon Ratchasima; Kantharawichai District, Si Suk District, Mahasarakham; Phon Phisai District, Sphisai District, Nong Khai; and Ban Dung District, Udon Thani.⁶¹ Note that all these areas are not in the Nam Siaw Basin which means that the Prime Minister Order No. 3/1989 is still applicable to this Basin. This might in part be the result of pressure from the rice farmers demonstration in April 1990 and public concern over the salinity problem in the Nam Siaw River.

The Working Group also provided measures for controlling the extraction of brine from underground as well as methods for salt production. For instance, an owner of a well for pumping underground brine would have to submit chart(s) of his pump station with some details to a

⁶⁰ *Department of Mineral Resources, supra note 51, id., at 54-55.*

⁶¹ *Id.* This recommendation was later implemented by Ministerial Notification of Ministry of Industry, 9 October 1991.

relevant authority. Pumped brine would not be allowed to be sold to people other than a licensed saltpan owner. Firewood could not be used to boil the brine. Moreover, the surface of the saltpan would have to be made of concrete to prevent seepage of saline water, and an area of at least 10% of the saltpan would be used as wastewater storage which would be surrounded by ditch and dike.⁶²

All the recommendations made by the Working Group have no legal binding force unless they were recognized by law. The Working Group suggested that the government, through the Minister of Industry, amend the Minerals Act, 1967 to govern all types of rock salt mining.⁶³ An attempt to amend the Minerals Act in fact had been initiated by the Department of Mineral Resources since 1987, but it took three years for the government to give an approval in principle. Had it not been for political pressure from rice farmers demonstration in Mahasarakham in April 1990, such an approval would not have been given by the government.

Being well aware of the long process of amending an act of Parliament, the Working Group also in 1990 proposed that the government issue a ministerial regulation to subject rock salt mining to the Factory Act, 1969 which was approved immediately by the council of ministers. Consequently most of the recommendations made by the Working Group were implemented by subordinate laws under the Factory Act, 1969⁶⁴ which was later replaced by the Factory Act, 1992.⁶⁵ All of the government's immediate actions to solve rock salt mining problems seems to be prompted again by political pressure from rice farmers and the public. The government, in fact could have applied the same method to regulate rock salt mining more than a decade ago, but it just did not have a political will to do so during that time.

⁶² *Id.*, at 56-57.

⁶³ *Id.*, at 54.

⁶⁴ *Id.*, at 55. *These recommendations were approved by the council of ministers on 9 July 1991, and have been implemented in part by requiring the obtainment of permit for rock salt mining. An interview given by Suchart Chanlawong, Industrial Works Department, 4 May 1994.*

⁶⁵ *According the Factory Act, 1992, any person desiring to do rock salt mining is required to have a permit from the Department of Industrial Works. He is obliged to comply with all conditions set up in that permit.*

The real intention of the Working Group, when making recommendations, was to rely on the Factory Act on a contemporary basis until the proposed amendment of the Minerals Act was enacted. The enactment of its amendment in 1991, the Minerals Act has never been used to control rock salt mining⁶⁶ since, according to some officials, the Factory Act, 1992 alone is able to handle problems from such mining.

Miners

In spite of knowledge of environmental damage caused by rock salt mining, and violation of the law, some miners in the Northeast, particularly those in the Nam Siaw Basin, were not willing to give up their occupation easily. The incentives or necessity behind this were the high economic return from rock salt mining when compared with other occupations, especially rice growing. Some of these areas lie on large reserves of rock salt, or sometimes on salt domes close to the surface soil. Besides the demand for salt in the market has steadily increased⁶⁷ as salt is used to produce basic substances for several kinds of industries, such as; soap, detergent, paper, glass, textiles, water treatment, plastics, and petrochemicals.⁶⁸

There are two groups of large companies dominating salt production and business in the Northeast; one is the Thai Asahi Group and the other is Sahasrichai Group, both of which were created by key members of the Char Thai Party,⁶⁹ who were also at one time the ministers responsible for conflicts between rock salt miners and rice farmers. Moreover, many influential politicians own companies operating rock salt mining business in the Northeast.⁷⁰ This fact of

⁶⁶ Although the amended Minerals Act was officially published in the Government Gazette, in practice it for the time being still cannot be applied to rock salt mining because subordinate laws such as ministerial regulation to specify a kind of brine to be controlled by the Act still has not been issued by the Minister of Industry. One high-ranking official from the Department of Mineral Resources responsible for this Act enforcement expressed his view that the Department was reluctant to get involved in the rock salt miners and rice farmers conflict. So they are pleased with the current status of the Minerals Act.

⁶⁷ Department of Mineral Resources, *supra* note 51, *id.*, at 57.

⁶⁸ Sathit Manassurakul, *supra* note 5, *id.*, at 8-9.

⁶⁹ For list of large companies mining rock salt or doing salt business in the Northeast as well as some names of their shareholders, see Sathit Manassurakul, *id.*, at 10-11, and Somphan Techa-athic, *supra* note 22, *id.*, at 105-106.

⁷⁰ Sathit Manassurakul, *id.*, at 11-13.

course makes most people understand why the government has been reluctant for more than a decade in suppressing illegal rock salt mining in the Northeast.

Although some companies in the Thai Asahi and Sahasrichai Groups have their mining sites outside the Nam Siaw Basin, their demand of salt certainly is much higher than what they themselves can produce. For instance in 1990 Thai Asahi Ltd., Co. demanded 152,900 tons of salt but the quantity of salt from its own mining was only 100,000 tons.⁷¹ It means that this company would have to buy 52,900 additional tons of salt from the market.

Because the salt market was still wide open, the miners felt encouraged to continue their activities. It was reported that each rai of land around Nong Bor was able to produce 200 tons of salt per year with a price ranging from 400 to 800 baht per ton.⁷² Large sums of money changed hands each year in this area.⁷³ There is no doubt that some people did not want to grow rice as they would have to face almost every year the problems of not only saline soil but also low rice prices.

After rock salt mining in the Nam Siaw Basin was totally banned by the Prime Minister Order No. 4/1980, some miners as mentioned earlier still continued their activities illicitly or adjusted their activities to get around such Order. At the same time, they from time to time made an appeal to the authorities concerned to review the Prime Minister Order No. 4/1980.⁷⁴ Sometime they submitted their requests, explained their necessities to the cabinet members who visited the affected area, and also made their grievance known to the public through the media by organizing demonstrations⁷⁵ as done by their rice farmers counterpart.

⁷¹ Department of Mineral Resources, *supra* note 51, *id.*, at 57.

⁷² Sathit Manassurakul, *supra* note 5, *id.*, at 6.

⁷³ Matichon, *daily newspaper*, 18 October 1989, p. 18

⁷⁴ After considering an appeal made by one of the rock salt miners' leaders, the Committee for Coordinating Policy and Plans for Solving Problems from Rock Salt Mining ruled against the appeal. Committee for Coordinating Policy and Plans for Solving Problems from Rock Salt Mining, *Minutes of Meeting No. 2/1989*, 23 August 1989.

⁷⁵ When the Deputy Industrial Minister with the Committee for Considering Resolutions for Environmental Quality Problems in the Nam Siaw Yai Basin visited Borabu District, Mahasarakham, to observe rock salt mining, he met with 2,500 rock salt miners calling for the adjustment of the government policy on rock salt mining. Matichon, *daily newspaper*, 30 October 1989, p. 32.

Realizing their legal disadvantages, rock salt miners in negotiating with the government in 1989 tried to convince the officials and the cabinet members that stopping rock salt mining in Borabu District, Mahasarakham would cause severe hardship to several large groups of people, particularly the poor; it would adversely affect at that time approximately 100 saltpan owners employing 3,000 laborers daily, and some other entrepreneurs in rock salt mining related business such as transportation and salt-packaging household industry.⁷⁶ In fact it was not wrong to state that the economic prosperity of Borabu District was at that time substantially attributed to rock salt mining.⁷⁷ This certainly would make it difficult for elected politicians to decide since no concrete resolution for the potential unemployed labor existed which consequently would cause social problems later.

The miners also proposed some suggestions for preventing environmental degradation if rock salt mining was legalized, and they would be willing to comply with measures issued by the government to mitigate and prevent environmental damage as applied to rock salt mining in Ban Muang District, Sakon Nakhon.⁷⁸

However, the rock salt miners' claim seemed to be questionable as attacked by their counterparts. Was it true that their appeal to the government was intended to help the local poor people or protect the interests of wealthy people, small group of local entrepreneurs and a few big corporations? Rock salt mining industry did not always utilize local labor but often employed it from other places.⁷⁹ Part of land around Nong Bor belonged to wealthy miners from other localities. For those local landowners (since many of them had not enough funds to invest in mining which required much more money than rice farming), had to borrow money for their investment or allow other investors to rent their land for mining.⁸⁰ As a result, it was concluded⁸¹ that the ban on rock salt mining would mainly affected the interests of wealthy people.

⁷⁶ *Id.*

⁷⁷ *An opinion expressed by Direk Ink-janin, a public prosecutor of Mahasarakham, 19 April 1994.*

⁷⁸ *Matichon, daily newspaper, 30 October 1989, p. 32.*

⁷⁹ *Mongkol Danthanin, supra note 27, id., at 11.*

⁸⁰ *Somchai Wongswas, supra note 9.*

⁸¹ *Opinion of representative of Second Army Area. Committee for Coordinating Policy and Plans for Solving Problems from Rock Salt Mining, supra note 74, id.*

Apart from all the facts mentioned above, rock salt miners bribed some officials⁸² to not enforce the law. At one time, 1,000 baht per rai was collected from the rock salt miners to pay the officials. They, for example offered on a monthly basis 200,000 baht to one of the former Mahasarakham Governors, 100,000 baht to one of the former Police Chiefs of Mahasarakham, and 40,000 baht to one of the officials of the Royal Irrigation Department in Mahasarakham. However, all these officials said that they did not accept such an offer. For those who tried to enforce the law seriously, they were usually threatened by the miners. Sometime restaurant owners and food vendors in Borabu whose income depended substantially upon rock salt mining would not sell food to officials from the Royal Irrigation Department who were relatively active in enforcing the law.⁸³

Despite all their efforts over several years to push the government to loosen its control over rock salt mining in the Nam Siaw Basin, rock salt miners' hope seemed to be diminished when the council of ministers in 1990 issued a policy to strictly enforce the Prime Minister Order No. 3/1989 and wanted the rock salt miners to move to designated zones. For the time being, no mining activities around Nong Bor could be seen.⁸⁴

Affected People

The group of people who were the hardest hit and suffered the most from rock salt mining in the Nong Bor area were the rice farmers having farmland surrounding Nong Bor or downstream along the banks of the Nam Siaw River. Since most of these people were poor and uneducated, they did not want to bring their dispute into the court where a lot of money and time were required.

⁸² The rock salt miners also offered money and some benefit to some key leaders of the rice farmers to soften their voice against the mining. One of the farmers leaders was asked by the farmers to reduce his role as he was suspected to accept money from the miners. Another farmers leader refused to accept 300,000 baht and a pickup truck from the miners with reason that the farmers would have still fought against rock salt mining without him anyway. Interviews given by key leaders of the rice farmers, Suchart Srisang, an Assemblyman of Mahasarakham, and Camnak Wangdong, Chief of Ban Can, Ban Can Sub-district, Wapi Pathum District, Mahasarakham, 1 April 1994.

⁸³ Vinai Pratipavanich, *supra* note 24.

⁸⁴ However, it is suspected that brine has been illicitly pumped from underground within certain enclosures since they are frequented by a number of oil trucks which might carry the brine therefrom to sell at other places.

In addition, as will be discussed later they also would have to face and overcome some other difficulties, it was not encouraging at all for them to go to court.

In the rural area, when there is conflict among villagers, the parties concerned usually go to ask the head of the village to settle the dispute, and if not settled, the conflict will normally be referred to higher authorities, for instance, head of sub-district, a sheriff and a provincial governor. The rice farmers in the Nong Bor area also utilized the same traditional dispute settlement method to relieve their grievance but it as already discussed was not really successful⁸⁵ which might be attributed to many factors. In the first place, the conflict involved large groups of people; it was not just between two individuals in the same village but rather between people from different villages, sub-districts, districts and provinces which sometime was beyond the capacity of local officials to handle. The conflict was very difficult to settle as it concerned a substantial source of income for some people, particularly those in the area where per capita income is the lowest in the country. Equally important was the unwillingness of local officials to solve the problem or actively enforce the law which in fact had sometime frustrated the rice farmers so much that they asked the government to transfer some high-ranking local officials to other provinces.

Realizing that local officials were not able to redress their grievances, the rice farmers tried to make their local conflict become a national one to call serious attention from the government. This strategy was first used with success prior to the issuance of the Prime Minister Order No. 4/1980, when demonstrations by rice farmers got the attention of the media and finally the government, the motion concerning the rock salt mining around Nong Bor was submitted to the House of Representatives four times in 1976.

Similar methods were also used again by the rice farmers from the Nam Siaw Basin to keep pressure on the government to issue the Prime Minister Order No. 3/1989. After the issuance of such an Order, illegal rock salt mining still appeared⁸⁶ which caused the rice farmers to form the so-called People Group for Solving Salinity Problem in the Nam Siaw (PGSSP) to put pressure on the government. On behalf of rice farmers, in January 1990 the PGSSP met the provincial governor of Mahasarakham and his staff to demand the full enforcement of the Prime Minister Order No.

⁸⁵ Mongkol Danthanin, *supra* note 27, *id.*, at 9.

⁸⁶ *Thai Rat*, daily newspaper, 1 January 1990, p. 1.

3/1989. It was agreed by the governor, that if the agreement could not be fulfilled within a month, he would voluntarily have himself transferred to another place. Illegal rock salt mining was still around a month later. This prompted the PGSSP in March, 1990 to make their complaints to government by demanding, among other things, full enforcement of the Prime Minister Order No. 3/1989, transfer of the Mahasarakham governor and some high-ranking policemen to other places, a special police force from Bangkok to suppress illegal rock salt mining, and rehabilitation of the Nam Siaw Basin.⁸⁷

Since none of the PGSSP's demands were met, rice farmers from the Nam Siaw Basin in April, 1990 gathered in front of the Wapi Pathum District's Office⁸⁸ and stayed there for almost a week. The government did not send its representative with decision-making power to negotiate with the farmers and as a result, the frustrated farmers decided to block a provincial road to call attention from the government who later used force to disperse the crowd and arrested some of their leaders.⁸⁹ The action of the government caused a negative response to itself, since the people calling for law enforcement were instead put in jail.

Partly to improvement its image, the government promised to adhere strictly to the Prime Minister Order No. 3/1989, decided to give 800 million baht to the Nam Siaw rehabilitation program,⁹⁰ and to also released the leaders of farmers and students. It is obvious that the rice farmers in the Nam Siaw Basin learned from their experience how to get the government into action.

⁸⁷ A letter from the PGSSP to the Interior Minister, dated 19 March 1990.

⁸⁸ One reason for the rice farmers to make a demonstration in Wapi Pathum District, instead of Bangkok as in the past, was that they were familiar with the place and well-equipped with supply. In Bangkok, they would have been easily neutralized. Suchart Srisang, *supra* note 80.

⁸⁹ Matichon, daily newspaper, 12 April 1990, p. 17, 13 April 1990, p. 21, and 17 April 1990, p. 1. See also Thai Rat, daily newspaper, 14 April 1990, p. 1, and 17 April 1990, p. 1 and 20.

⁹⁰ Matichon, daily newspaper, 15 May 1990, p. 24, and Thai Rat, daily newspaper, 25 June 1990, p. 3. To rehabilitate the Nam Siaw Basin, a number of reservoirs including Nong Bor, weirs, bridges, water control structures and embankments have been constructed and improved. At the same time, the saline water in Nong Bor has been gradually discharged downstream until the salinity in Nong Bor is reduced to the normal level. In addition, the Nam Siaw River has been dredged up to prevent flooding in the rainy season. Vinai Pratipavanich, *supra* note 24. So far works, under the rehabilitation program in the locality where the rice farmers are well organized, seem to be carried out more carefully than that in the area where the farmers are unorganized and passive. This reflects the fact that the government tends to respond to those with loud voices.

Other Participants in the Conflict

Another key participant in the rock salt mining conflict were students from Khon Kaen University and other academic institutions⁹¹ who worked with the rice farmers in keeping pressure upon the government. The reason why the students got involved in this conflict seemed to be the students' awareness, inspired by a number of studies conducted by Khon Kaen University and its students concerning rock salt mining, that the rice farmers had faced consistently the problem of salinity caused by mining. It was quite normal that many of students in most universities were not able to sit still when there was injustice occurring in the society, especially in the area close to them. Moreover, the rice farmers themselves probably had no one at that time to rely on in solving their problems as government officials had been unable to solve the rice farmers' grievance. The farmer therefore came to ask help from the students.

The students and the PGSSP worked together in submitting their demands to the Mahasarakham governor in January 1990, and later to the Interior Minister in March of the same year. In addition, the students helped the rice farmers to organize the demonstration in April with some students being arrested.

The students' involvement in the conflict helped to strengthen the rice farmers' position since they had better information and more experience than the farmers in negotiating with officials and organizing the demonstration. Apart from that, the students' involvement could make the government think twice in applying harsh measures against demonstrators because it would draw adverse reactions from students from across the country.

Besides the students, non-government organizations also played an important role in assisting the rice farmers in expressing their demands and concerns by providing some necessary information, but the organizations did not directly take part in organizing the farmers since they had organized themselves long before the involvement of the non-government organizations.⁹²

⁹¹ Besides Khon Kaen University, there were students from Ramkhamhaeng University, Srinakharinwirote University (Mahasarakham) and Thammasat University but those from Khon Kaen played a very eminent role. Camnak Wangdong, *supra* note 26.

⁹² An interview given by Saneh Wichaivong, Secretary of the NGO Coordinating Committee on Rural Development in the Northeast, 19 April 1994.

Another group of persons assisting the rice farmers during the demonstration at Wapi Pathum District were local politicians who wanted to win support from the farmers in future elections. In fact, after the April demonstration, one key leader of the farmers was elected as Assemblyman of Mahasarakham.⁹³

Observations

The Nam Siaw conflict required government intervention since a large group of people and vast areas of land were severely affected, and the injured people were so poor and uneducated that they did not have enough means and/or capacity to help themselves. The government in fact did intervene into this conflict but there are several points which deserve to be discussed here as they might be useful for the government in tackling similar problems in the future.

The government seems to have a slow response to the problem, for example, it took them nine years after the first occurrence of severe damage from rock salt mining in 1971 to issue the Prime Minister Order No. 4/1980, and another nine years for the Prime Minister Order No. 3/1989. It's slow response might be attributed to several factors. One of them was the inadequacy of knowledge on adverse effects from rock salt mining. In the early years when the damage started to appear on the rice farms, the government officials did not know what caused rice to wither, and sometime die. One of their assumptions was a kind of disease which consequently prompted them as already mentioned to distribute pesticides and insecticides to the rice farmers. It was the farmers themselves who discovered that their rice had been affected by saline water from rock salt mining since they noticed salt deposit left on both ground and rice stalks after the water in their land had gone.⁹⁴

Another cause of the government's slow response seemed to be bureaucracy. In general, a person seeking help from the government had to go through bureaucratic channels and the help quite often comes too late or sometimes not at all if a request for help gets lost on the way before reaching a decision-maker. This seems similar to the Nam Siaw case where the grievance of rice

⁹³ Suchart Srisang who claimed to spent about 40,000-50,000 baht in supporting the rice farmers during the demonstration was later elected as Assemblyman. Suchart Srisang, *supra* note 82.

⁹⁴ Camnak Wangdong, *supra* note 26.

farmers was redressed by the officials so slowly that the farmers decided to stage demonstration⁹⁵ to support their demands.

The issue of bureaucracy is related to that of centralization of power, of the government to local officials and finally to local people since bureaucracy is in part caused by centralization system. In the Nam Siaw conflict, the rice farmers sometime got frustrated by the fact that provincial officials including the governor were not able to give a satisfactory answer to the protesters. A typical response by the official to the demand(s) of rice farmers was to promise that such demands would be forwarded to their boss in Bangkok since they themselves had no decision-making power.

Whenever people who made a complaint to the government get no satisfactory answer or no answer at all, they try to find a way to get attention from the government. One way is to organize a demonstration and make the public know through the media what their grievance is. Once the media pays attention to that matter, the government usually follows suit as in the case of Nam Siaw.

After the government in the Nam Siaw case started paying attention to damage suffered by the farmers, it sent a cabinet member to visit the affected area to collect data and to improve the situation psychologically. At the same time, a committee was usually set up to study the problem and to suggest resolutions. It should be noted, that no representative of the private sector, particularly the local people, had ever been appointed as a member of such a committee. Some findings or recommendations suggested quite often were not accepted by the people concerned since they had no participation in that process. In other words, local people should be allowed to have part in decision-making process, particularly on local matters that effect them.

All the findings and recommendations by committees set up by the government, always suggested that rock salt in the Northeast was vital to the economic development of the country, should be exploited subject to proper control measures to prevent environmental degradation which led to the legalization of rock salt mining by passing some legislation. At the same time, the

⁹⁵ *It seemed that the local officials were not happy to see demonstrations by the rice farmers originating within their own jurisdiction and moving to Bangkok as they would be blamed for not able to control the protesters. This made the local officials try their best with all possible means to stop the demonstration and prevent it from coming into to Bangkok.*

rice farmers and their supporters took the opposite opinion that legalization of rock salt mining would not be able to prevent environmental damage, since they did not trust the government legal mechanism which according to their experience clung to those who were equipped with power and money as well as connection in the government. The farmers tried to put political pressure through demonstrations and the media upon relevant committees and the legislative bodies considering legalization of rock salt mining. As a result, a compromise was reached, that rock salt mining can be carried out under the law outside the Nam Siaw Basin. This implies that the government also responded to the demands of poor people provided that they were well organized and united.

Another point that should be added is that the findings and recommendations seemed to be based on the national perception that, to increase the national economic growth, industrial development would have to be promoted. However, economic growth and development at the expense of our environment and without fair income distribution should not be encouraged.

The Nam Siaw water use conflict demonstrated the failure of law enforcement.

4. Legal Remedy

What has been discussed above is to demonstrate how the water use conflict in the Nam Siaw Basin had been managed through an administrative procedure or settled outside the court. What would have happened if such a conflict had been brought into the court. Would the legal remedy be able to prevent, mitigate or even stop the environmental damage from rock salt mining?

In tackling the issue at hand, two types of legal remedy will be used as a basis of discussion; a criminal action and a civil action.⁹⁶

⁹⁶ For benefit of nonlawyers, it should be briefly described here that there are currently two types of cases in the Thai court, criminal cases and civil cases. One major reason for bringing a criminal action is to punish a State offender in the form of imprisonment and/or fines. In a civil case, a plaintiff requests compensation for loss and damage as well as an injunctive relief, (not an imprisonment or fine paid to the State). Some actions could be brought into both criminal and civil courts, and some pieces of legislation such as the Enhancement and Conservation of National Environmental Quality Act, 1992, contain some provisions with criminal sanctions and also address the issue of civil responsibilities.

Criminal Action

A criminal action could be brought into court to punish an offender to deter other people from committing the same offense. It could be initiated by a public prosecutor or any private person, natural or juristic, who is regarded by law as an "injured person".⁹⁷ In the Nam Siaw case, it is nevertheless questionable whether rock salt miners could be prosecuted for extracting brine or rock salt and polluting the river.

Before 1990 when environmental damage from rock salting mining reached its peak, there was no law specifically governing all kinds of activities for extracting rock salt and brine from underground. The Minerals Act 1967 at that time applied only to the "mining" of "rock salt", not "pumping" underground "brine". The Minerals Act therefore had no role in the Nam Siaw Basin where brine, not rock salt, was pumped to produce salt. One may wonder why the Underground Water Act, 1977 was not applicable to the extraction of brine by pump because according to the Act, anyone desiring to drill a well is required to have a license. Unfortunately, the scope of application of this Act is limited only to the Bangkok metropolitan area and its suburbs.⁹⁸

Since there were problems in controlling the extraction of brine, a way to prevent it from causing environmental damage would have to be found. Is there any law imposing a penalty upon the miners for polluting the river? Before getting to that point, however, the manner of how the damage occurs has to be clarified. The damage could happen in one or more of the following ways;

1. Sludge from rock salt mining left around Nong Bor was later carried away by flood during the rainy season which caused damage to the surrounding area and downstream along the banks of the Nam Siaw River.

⁹⁷ "Injured person" means one who is injured by any offense as well as those who can according to the law act on his behalf. Criminal Procedure Code, Section 2(4) It should be noted that an "injured person" in fact is not able to launch any kind of criminal action since his right does not cover an offense with only the State is regarded an "injured person" such as traffic offenses. This is a judicial interpretation which has been affirmed by the decisions of the Supreme Court in several cases such as Case Nos. 94-95/1969, 3232/1969 and 725/1970.

⁹⁸ In fact the area of its application could be expanded, if the government wants to do so through a ministerial announcement in the Government Gazette.

2. Saline water from sludge seeping into the river or the nearby area.
3. Sludge or wastewater being discharged directly into the river.

If damage had been caused in the first manner, especially on private land, it would be very difficult or impossible to find any law at that time or even now to be applicable to the case, since it could be interpreted in the Thai legal system, that the damage had been caused by force majeure or Act of God. The answer would be the same when damage was caused by seepage from sludge. This was and is a legal loophole which must be rectified promptly.

When the sludge or wastewater from rock salt mining or salt production was discharged intentionally into the river, the provisions of some legislation were violated. For example, the discharge violated the Navigation in Thai Waters Act, 1913,⁹⁹ the Royal Irrigation Act, 1942,¹⁰⁰ and the Fishery Act, 1947.¹⁰¹ None of the rock salt miners in the Nam Siaw Basin were prosecuted under such Acts. Why? It might be attributed to inadequate law enforcement as in the case of the Prime Minister Order Nos. 4/1980 and 3/1989 which should be examined deeper to search for the root cause of this problem. Another explanation might be technicality in proving in court the guilt of the miners since the accused would be found guilty only when he violated those laws "intentionally" which was of course very difficult.

It seems unwise to prevent environmental damage by relying only on those legislation, as they would come into play only after the damage was irreparably done. Preventive measures would have to be adopted by law so that any miner who does not comply with such measures could be prosecuted before any damage is done. This concept is embodied in the Factory Act, 1992, to tackle problems from rock salt mining. However, it will be very interesting to see whether in practice the Factory Act would be able to prevent water pollution from rock salt mining¹⁰²

⁹⁹ Sections 119 and 119 bis.

¹⁰⁰ Section 28. The Royal Irrigation Act would come into play only when pollutants were discharged into the so-called "Irrigation Watercourse" which in the Nam Siaw case includes only Nong Bor, not the Nam Siaw River. Some rock salt miners used this legal loophole to evade Section 28 of this Act by discharging wastewater to the Nam Siaw River, not Nong Bor, or to other watercourses which flowed to the Nam Siaw River.

¹⁰¹ Section 19.

¹⁰² The Factory Act now has no role in control rock salt mining in the Nam Siaw Basin since such activity has been totally banned by the Prime Minister Order No. 3/1989.

because it itself still has not been able to prove its effectiveness in other areas¹⁰³ such as Bangkok and its suburbs.

One defect in the Factory Act, 1992 is that it has not reflected the "polluter pays principle". Although it authorizes government officials to prescribe effluent or emission standards for factories to comply, factories are not required to pay any fee when discharging waste into the environment. Moreover, it could be interpreted that as long as the factories comply with such standards, they have "the right to pollute", despite severe damage inflicted upon the environment. It therefore should be suggested here that the factories must be required to pay for discharging waste in spite of their compliance with the standards.¹⁰⁴

Suppose we have all the needed legislation with proper penalties. It does not always mean that the environmental damage would be substantially mitigated if adequate law enforcement does not exist which is quite an important issue as demonstrated in the effectiveness of the Prime Minister Orders in 1980 and 1989. One way to solve this problem as suggested by the Draft Model Water Law of Thammasat University is to let people have the right to participate in law enforcement process. For example, a certain group of people may have the right to bring a criminal action against offenders¹⁰⁵ in an environmental case which is in part implemented by the Factory Act, 1992.¹⁰⁶ This would to a certain extent, solve the law enforcement problem.

Besides the Factory Act, 1992, the Minerals Act, 1967 as amended in 1991 would play a vital role in controlling rock salt mining as it requires a license for such mining. Unfortunately, it is technically not in effect.

¹⁰³ Amnat Wongbandit, *Laws Concerning Wastewater Treatment*, a research paper prepared for the National Research Council, 39-46, 1992.

¹⁰⁴ *Id.* at 68-70.

¹⁰⁵ Amnat Wongbandit et al., *Research Project on The Compilation and Revision of Water Resources Laws*, a research paper prepared for the Pollution Control Department, Ministry of Science, Technology and Environment, 104 and 120, 1993.

¹⁰⁶ Section 64 of the Factory Act, 1992 stipulates that; *In case where an offense is committed under this Act, a person residing near or adjacent to the factory in which the offense is committed or a person whose living is affected as a result of commission of the offense shall be deemed to be the injured person under the Criminal Procedure Code. It is quite clear that non-government organizations have no "standing to sue" on its own right when the Factory Act is violated by any factory unless conditions in Section 64 of the Act are met.*

Having kept in mind that the law in general would not be retroactively applied to cases occurring before its commencement date, another piece of legislation which may be used to control rock salt mining and prevent environmental damage arising is the Enhancement and Conservation of National Environmental Quality Act, 1992 which contains several preventive measures.

First, persons carrying out all sizes and kinds of mining under the Minerals Act, 1967, are currently required by the Ministerial Notification of Ministry of Science, Technology and Environment, dated 24 August 1992, issued under Section 46 of the Enhancement and Conservation of National Environmental Quality Act, 1992 to prepare the Environmental Impact Assessment before implementing such activities. This process would allow the government agency concerned to assess whether a particular mining project would cause any environmentally adverse affects, and if it does, proper preventive measures would have to be suggested, or a license for mining would not be issued by the Mineral Resources Department. The Enhancement and Conservation of National Environmental Quality Act, 1992 and the amended Minerals Act however, cannot be retroactively applied to the Nam Siaw conflict.

Second, effluent standards for wastewater from rock salt mining may be set up by the Minister of Science, Technology and Environment with a recommendation of the Pollution Control Committee and approval of the National Environment Board under Sections 55 and 69 of the Enhancement and Conservation of National Environmental Quality Act. If such standards are more stringent than that issued by either Mineral Resources Department or Department of Industrial Works, the latter two Departments would have to adjust their standards accordingly. If there is no adjustment, the matter shall be referred to the National Environment Board to decide which would bind all the Departments concerned as described by Section 56 of the Act.

Third, a rock salt mining area, particularly in the Nong Bor area which is the headwaters of the Nam Siaw, could be designated as the "Environmentally Protected Area" by Ministerial Regulation of the Ministry of Science, Technology and Environment under Sections 43 and 44 of the Act. Within this Area, the Ministerial Regulation may, among other things, specify types of land use, prohibit activities causing or likely to cause adverse impacts upon ecosystem, require the preparation of environmental impact assessment report from certain projects, and prescribed other proper control measures. In other words, the authorities concerned would be equipped with

proper power to manage rock salt mining activities. Any person violating measures in the Ministerial Regulation would be subject to prosecution.

Fourth, an area affected by rock salt mining could be designated as the "Pollution Control Area" by the National Environment Board according to Section 59 of the Act for control, alleviation and removal of pollution problems. In this Area, local authorities concerned with assistance from Pollution Control Officials from the central government are assigned to prepare an action plan for reduction and removal of pollution which would specify budget needed from the government or the Environmental Fund. This action plan would be incorporated in a "Provincial Environmental Quality Management Action Plan". The adoption of this approach would give access to local people for participating in local environmental quality management. Unless public awareness of environmental protection really exists, it is doubted that the sole application of Pollution Control Area concept would be able to effectively tackle pollution problems as occurred in the Nam Siaw since local authorities were unable to handle environmental damage covering several jurisdictions and involving large groups of people.

Finally, in case of emergency, the Prime Minister may render according to Section 9 of the Act an Order prohibiting the execution of certain activities which would cause severe loss and damage to the environment, man and animals. This provision comes from Section 20 of the already-repealed Enhancement and Conservation of National Environmental Quality Act, 1975 which came into play twice during the Nam Siaw crisis.

Civil Action

Apart from the criminal action, civil action may be utilized by an injured person to ask for compensation from rock salt miners. Since damage downstream along the Nam Siaw River could be caused by the over withdrawal of water from Nong Bor and the River itself or the discharge of waste from mining, these two causes will be separately examined.

● *Over Withdrawal of Water*

According to Section 1355 of the Thai Civil and Commercial Code, a riparian landowner is entitled to withdraw water passing through his land in the amount necessary for its need in such a manner as not to cause injury to other riparian landowners downstream. Superficially, the principle

sounds fair enough but, when being carefully considered, it nowadays is not able to solve properly the problem of water use conflict. For example when a large number of people in the upstream Nam Siaw separately extract the water at the same time, the river is exhausted, and the people downstream suffer damage, the upstream people will be held responsible for compensation only when it is proved that each individual withdrawal of water caused damage downstream on its own which is extremely difficult. To remove such a problem, the system of permit system with implication of water charge should be introduced as suggested by the proposed Draft Model Water Law of Thammasat University¹⁰⁷ since each water user would be allowed to use water not more than the amount specified in his water permit. Nevertheless the full application of this concept without exemption would do more harm than good since water users in certain areas or sectors may be too poor to pay for water use. It therefore should be very careful in implementing the concept of water permit.

The introduction of permit system in the Nong Bor area might not be that urgent if the Royal Irrigation Act, 1942 is strictly enforced since Nong Bor is declared as the "Irrigation Watercourse" from which the withdrawal of water will have to get permission from the authority concerned. It means that the government can manage and control the use of water in Nong Bor if it wishes to do so but in practice that's not done. This is a law enforcement again.

● *Damage from Waste Discharge*

Wastewater from rock salt mining caused damage to some groups of people in the Nam Siaw Basin, particularly the rice farmers, fishermen and those who could no longer use the water for household consumption. It is quite interesting to examine what would have happened if these injured persons had brought their complaints to the court for compensation. To analyze this question, the same three hypotheses of how the damage had been caused will be used again.

¹⁰⁷ Amnat Wongbandit, *supra* note 105, *id.*, at 15-19, 80-85 and 107-112. However, the concept of water permit as suggested by the Draft Model Water Law of the National Research Council should be applied only in an exceptional case such as during the drought period. It is doubted that this approach would be able to systematically manage, develop and conserve water resources of the country. For more detail, see Draft Model Water Law, Sections 38-46. National Research Council, *Report of Seminar on the Preparation of Water Resources Utilization and Conservation Law*, 264-265, 1993.

If the damage had been caused by sludge carried away by flood to inflict damage upon the surrounding area, the court would have likely interpreted that the miners were not liable since the damage had been caused by force majeure. Reliance on legal remedy in this situation seems not to be very helpful for the injured persons. The introduction of preventive measures by the government should be preferred as adopted by the Factory Act, 1992 and its subordinate laws that the site and methods of mining must be controlled. Non-compliance with such measures would mean that the miners would be responsible for damage even caused by flooding as the damage is preventable.

With a view to damage caused by seepage from sludge or salt left on the ground, before 1992 it was very difficult to hold miners responsible since the injured person(s) would have to prove in court that the damage was caused by intention or negligence on the part of the miners which was not that easy. However the enactment of the Enhancement and Conservation of National Environmental Quality Act, 1992 is able to ease the burden of the injured by adopting the concept of "strict liability" which means that a polluter will be held responsible unless he is able to prove that the damage was not attributed to him.¹⁰⁸

By the same token, the concept of strict liability in the Enhancement and Conservation of National Environmental Quality Act is applicable to the case where damage is caused by discharging waste into the river. However, the rock salt mining problem occurred before the enactment of this Act. The injured persons at that time would therefore have to prove the intention or negligence of the miners which is not promising at all.

Once it is settled that the miners, according to the existing laws,¹⁰⁹ were liable for the damage(s), the next question is who are able to sue for the damage. The rice farmers of course were able to claim for damage and loss on their rice production as long as they could prove the linkage between cause and effect. The fishermen nevertheless seemed not to be able to recover for the loss of their normal catch since fish, free in water for common use according to Section 1320 of the Civil and Commercial Code, belongs to no one. The loss of opportunity like the fishermen in this case is not actionable in the Thai law. When the right of water users for domestic consumption

¹⁰⁸ *The Enhancement and Conservation of National Environmental Quality Act, 1992, Section 96.*

¹⁰⁹ *In practice, the law generally is not applied retroactively.*

is considered, it is questionable whether they were able to claim compensation for losing an opportunity to use such water because other people including the miners also had the same right. However it would be another matter if such water users were riparian landowners whose right to use water is specifically protected under Section 1355 of the Civil and Commercial Code as discussed earlier.

Rock salt mining inflicted damage not only upon private individuals and their property but also on the whole ecological system of the Nam Siaw Basin. When the catastrophe happened, there was no law clearly specifying who was going to pay for the clean-up costs and the replenishment of some species lost.¹¹⁰ As a result, all the polluters were free. At present this problem does not exist as the Enhancement and Conservation of National Environmental Quality Act, 1992¹¹¹ stipulates that the owner or possessor of pollution source causing damage to the environment shall be responsible for clean-up costs incurred by the government, and the value of natural resources damaged.¹¹² However, in practice, there is the problem of assessing of the value of natural resources because this concept is relatively new in the Thai legal system and consequently no clear guidelines on the assessment exists. The matter will be left to the court. In deciding the case, the court however may seek help from a relevant expert such as ecologist or fishery biologist to assess the value of killed fish or aquaculture but the final decision is up to the judge.

The previous paragraph seems to suggest that the enactment of the Enhancement and Conservation of National Environmental Quality Act, 1992 is able to remove the problem of "externalities" as it holds a person causing environmental damage to common goods responsible for clean-up costs. However, this Act, would be applicable only when the damage is apparent or material. Being more specific, a polluter would not be responsible for the accumulation of toxic substances or pollutants in water as long as real loss and damage do not occur. For example, a

¹¹⁰ One solution to the problem was at that time to launch a criminal action against a polluter by the government but the damaged environment might not be able to recover rapidly as the government might lack fund for rehabilitating an affected area.

¹¹¹ See also the Navigation in the Thai Waters Act, 1913 as amended in 1992, Sections 119 and 119 bis.

¹¹² The Enhancement and Conservation of the National Environmental Quality Act, 1992, Sections 96 and 97.

man with accumulated lead in his body is not able to bring an action against lead-producing polluters while he does not have any illness. This is implied that the problem of "externalities" is not totally removed.

Another relating interesting point is whether the Act strictly adheres to the principle of "polluter pays principle". What has been discussed in the previous two paragraphs obviously indicates that this principle has its place in the Act but nowhere in this piece of legislation is it clearly stated, that a polluter discharging waste into the environment with compliance with effluent or emission standards is, generally speaking, required to pay any fee.¹¹³ Such a polluter would be responsible for pollution only when he caused actual loss or damage to other persons or the environment. It is therefore not wrong to conclude that the Act partially adopts the concept of "polluter pays principle".

Legal Stumbling Blocks

Reliance on legal remedy in the Nam Siaw conflict seemed to face not only the absence of law specifically governing the issue at stake but also some other obstacles which up until now are still around despite all the enactment of needed legislation in the last few years. One of those obstacle is the question of causation or the linkage between cause and effect.¹¹⁴ In a civil case, a defendant will be held responsible for damage only if a clear linkage between his action or omission and the damage can be established. This is the preliminary requirement by law which must be fulfilled by an injured party or the plaintiff. In the Nam Siaw case, it was very difficult, if not impossible, for each injured rice farmer to prove that the decrease of yield from his rice field in a particular year had been caused by a particular rock salt miner because there were several miners upstream who discharged the same kind of waste. When carefully considered, this problem became even more complicated as salinity in the plaintiff's rice field could be caused naturally or artificially by other factors such as seepage of brine from rock salt there under or from another

¹¹³ In fact, the *Enhancement and Conservation of National Environmental Quality Act* does not even have a provision which allows a government agency to charge fees from polluters for discharging waste into the environment except the case of having wastewater treated at a central wastewater treatment plant. The *Enhancement and Conservation of National Environmental Quality Act*, 1992, Sections 88 and 89.

¹¹⁴ This should not be confused with the concept of strict liability since they are separate issues. The strict liability concept does not require a plaintiff to prove fault on the part of defendant but it certainly requires the plaintiff to prove the linkage between cause (pollution) and effect (damage).

adjoining land. It therefore was a tremendous task to prove the cause and effect by the plaintiff in this case, let alone the problem of chasing fugitive miners who secretly carried out their activities. This problem could not be resolved through the enactment of the Enhancement and Conservation of National Environmental Quality Act, 1992 either.

One way to remove this problem is to change the burden of proof of causation in a case where a group of several polluters located in the same area cause damage by the same kind of pollution. In this situation, the injured person should be required to prove only that damage was caused by a group of polluters, not necessarily a particular polluter, and then any of the polluters wishing to exonerate himself from responsibility would have to duly prove that the damage was not attributed to him.¹¹⁵ This proposed change would help to protect to a certain extent the environment.

Another weak point of relying on a legal remedy is the so-called "transaction costs". When considered as a whole, the damage caused by rock salt mining in the Nam Siaw Basin was quite high since vast cultivated areas and a large number of rice farmers were affected by salt but it seemed that the amount of damage sustained by each farmer was relatively low. This fact could discourage the rice farmers from bringing their claims for compensation into the court as it would be really difficult to persuade all of them to launch law suits together, and would certainly cost a lot of money and time in organizing them, as well as collecting data before going to the court. Moreover, there would be some free riders. The transaction costs therefore would be pretty high indeed.

The Enhancement and Conservation of National Environmental Quality Act, 1992 is able to remove the transaction costs problem since a public prosecutor on behalf of the government or public is allowed to bring an action suit against a polluter who caused damage to the environment in general as earlier mentioned. This assumption is partially correct, as the public prosecutor is still unable to claim for damage inflicted upon each individual. Each injured individual is legally required to launch an action against polluters by himself or herself, no matter how insignificant the injury is. The problem of transaction costs is still around.

¹¹⁵ *Amnat Wongbandit, supra note 105, id., at 99 and 118.*

Apart from the two principal stumbling blocks mentioned, other factors also could possibly deter the rice farmers from resorting to the legal remedy. They might consider it would not be worthwhile since compensation, if any, awarded by court to each rice farmer would be based on a real injury, not on a punishment purpose, and could be less than what each of them would have to pay his lawyer. Besides, going into court is time consuming and subject to some uncertainty. It therefore would be unlikely for the rice farmers to go to court.

Law Enforcement

The Nam Siaw water use conflict incident demonstrates the failure of law enforcement mechanism since the illegal rock salt mining was wide spread for several years despite the existence of the Prime Minister's order to ban such activity. What were the causes of such failure. This study finds that the inadequacy of law enforcement appeared to be due to several factors.

Firstly, the fact that some ministers, particularly those who were responsible for rock salt mining, had vested interests in the salt industry could in one way or another prevent the enforcement of the law. The more salt produced, the cheaper its price became which of course was beneficial to the industry buying or consuming the large quantity of salt. This kind of conflict of interests could be found not only among the ministers but also among local officials who enforced the law. For example, more than half of the policemen at the Borabu District Police Station at one time owed some plots of land used in mining around Nong Bor. Certain rock salt miners always knew in advance when the police would come to arrest them at Nong Bor.¹¹⁶

Secondly, bribes among government officials were so widespread that it crippled the law enforcement mechanism in Mahasarakham. Including low-ranking officials and policemen as well as some top officials and policemen of this province. One former Police Chief of the Borabu Police Station even admitted, that it did not make any difference for his police career in accepting or not accepting money from the miners, since his career could be ruined anyway by political pressure inserted by either the miners or the rice farmers. He therefore chose to accept the bribe with reason that if his career had to be ruined, he still would have money. At one time, in order to prevent the

¹¹⁶ An interview given by an employee of the Office of the Nam Siaw Yai Development Project who did not want to disclose his identity, 20 March 1994.

problem of close connection between local law enforcement officers and the miners, there was an attempt to use soldiers from other areas to suppress the illicit mining but these soldiers were tamed quickly by the miners with varieties of offers.¹¹⁷

Thirdly, the number of offenders was so large, particularly during the night, that it could not be handled by the local officials or policemen. Sometimes death threats were given to such officials. Assistance from the Army was also rendered to the law enforcement process but without success as previously mentioned.

Fourthly, penalties inflicted upon the offenders were too low to deter illegal rock salt mining as has been mentioned earlier.¹¹⁸ Besides, the persons who were prosecuted were only workers, not the owners of saltpan or mining business. After such workers were arrested, they usually pleaded guilty in order to be fined and quite often the fines were paid by the owners of such saltpan or business.¹¹⁹

Fifthly, threats to the future career of officials were also used by the miners and their supporters to interfere with law enforcement. For instance, before starting the plan of operation to arrest the rock salt miners around Nong Bor in 1989, the Chief of the Nam Siaw Yai Development Project asked one minister whether there were his men or relatives carrying out mining in the area. Since the answer was negative, the operation began and incidentally the brother of the minister's wife was also arrested. The minister asked the Chief to transfer himself from the Nam Siaw basin within 48 hours.¹²⁰ This of course discouraged officers from enforcing the law.¹²¹

Finally, the attitudes of law enforcement officers towards government policy concerning rock salt mining to a certain extent affected the effectiveness of law enforcement. Many government officials in Mahasarakham disagreed with the government policy in banning rock salt mining in the Nam Siaw Basin since natural resources should be exploited, instead of being idle. It

¹¹⁷ *Id.*

¹¹⁸ See *supra* note 42 and accompanying texts.

¹¹⁹ Korkiat Thoaprayoon, *supra* 42.

¹²⁰ Vinai Pratipavanich, *supra* note 24.

¹²¹ One of the former Mahasarakham Governors released an offender before trial after learning that such offender sold salt to the wife of the minister at that time responsible for rock salt mining. An interview given by a public prosecutor of Mahasarakham who did not want his identity to be disclosed, 19 April 1994.

seemed, according to these officials, unfair to miners around Nong Bor as the ban was applicable only to mining in the Nam Siaw Basin. Why not applicable to the whole Northeast or the country? Most officials did not regard the miners as criminals who committed a violent crime,¹²² and some of the offenders were only wage earners. With this perception in mind, some officials were reluctant to actively enforce the law.

Law enforcement is as equally important as the contents of the law itself. The sole revision of law concerning rock salt mining without the improvement of law enforcement will never render a satisfactory result in controlling rock salt mining activities or the protection of environment as learnt from the Nam Siaw case. The government therefore should pay more attention to the problem of law enforcement.

5. Conclusions

The Nam Siaw case was the conflict of use over the limited water resources principally between rock salt miners and rice farmers. It started with the high demand of salt in the market which forced certain groups of people to unscrupulously mine rock salt in the Northeast by taking advantage of unclarity or absence of law in this matter. Since the area of cultivated land damaged by the mining was large, and the adverse affects upon the ecological system of the Basin was severe, the government decided to make an intervention, including among other things, the immediate ban of rock salt mining, creation of a committee to study the case and propose resolutions, revision of the law, and introduction of a rehabilitation program.

The government's intervention, although good for the public, was not quite effective as it should have been, and sometimes aggravated the problem. The then government mechanism was not able to facilitate properly, conflict management or settlement due to bureaucracy and lack of adequate decentralization of power. Local people who were at risk at that time did not have an opportunity to participate in a decision-making process. In order to get help, they had to go through bureaucratic channels, which frustrated the rice farmers who had waited for the government, for two decades, to seriously solve the problem. Besides, the government's hesitation seemed in part to cause the public, especially the rice farmers, to believe that the government might

¹²² Korkiat Thoaprayoon, *supra* note 42.

support the miners' stance as it appeared that some ministers responsible for this matter and members of their families were share-holders in certain corporations in the rock salt mining industry. All these factors made the rice farmers realize that they had to resort to an unconventional method to express their grievances, a demonstration which was finally able to get the government's attention.

The suppression of illegal rock salt mining in the Nam Siaw Basin caused some miners to move their mine sites to other provinces in the Northeast which have already been subject to the control of the Mineral Act, 1967, the Factory Act, 1992, and the Enhancement and Conservation of National Environmental Quality Act, 1992. Although a variety of measures for preventing environmental damage could be issued, it is not clear at this moment whether these Acts in practice can effectively prevent and control the environmental damage from the mining as the latter two Acts have just come into effect only in the last two years. In addition, the price of salt in the market has fallen so much that rock salt mining is no longer a very lucrative business.

The conflict of water use could be managed through the administrative process or settled in court. No one in the Nam Siaw case however went to court because of several factors. One important issue is the ambiguity of law concerning the rights of injured persons which made it hard to predict the outcome of a court decision. Another primary factor was the transaction costs in organizing a large group of people to go to court coupled with the possible small amount of compensation awarded which might not be in proportion with lawyer's fee. In other words, going to court seems to be wealthy people's business. The poor and uneducated rice farmers in the Nam Siaw Basin would therefore hardly think of settling the conflict in court. This is a substantial problem to be solved.

In order to effectively manage or settle the conflicting use of water in the Northeast, it needs, among other things, to review relevant government mechanism and decision-making process concerning local matters, and to revise some laws pertaining to the utilization and conservation of water resources as well as to improve law enforcement which was a failure in the Nam Siaw case.

Part Two: Water Use Conflicts in Nam Pong Basin

1. Physical Features

The Nam Pong Basin is located in the Northeast of Thailand. It has its headwaters in the Phetchaboon Mountain Ranges west of the Khorat Plateau covering Phetchaboon, Loei, Chaiyaphum and Khon Kaen in Si Chomphu, Phu Wiang, Nong Rua and Chumphae Districts. All water in this upper basin flows to the Ubon Rat Dam which is a multi-purposes project with a large reservoir in Ubon Ratana District.¹²³ From that point the Nam Pong reaches its lower basin by passing Muang District of Khon Kaen before meeting the Chi River in Kosumpisai District, Mahasarakham. The Chi then flows through Roi Et and Yaso Thon, and joins the Mun River in Ubon Ratchathani before emptying into the Mekong in Khong Chiam District. The total length of the Nam Pong from its sources to the point where it meets the Chi is approximately 230 kilometers.¹²⁴ (See Annex I)

In the Nam Pong Upper Basin, most people earn their incomes from agriculture, mainly from rice with secondary crops during the dry season particularly soybean and green bean. In certain areas, upland crops such as corn and sugar cane are grown.¹²⁵ Those who live around the

¹²³ In 1957 the United Nation Economic Commission for Asia and the Far East, later changed to United Nations Economic and Social Commission for Asia and Pacific, recommended the four riparian States of the Lower Mekong Basin, Cambodian, Laos, Thailand and Vietnam to create an international river commission to govern the development of the Basin which later was implemented by the creation of the Committee for Coordination of Investigations of the Lower Mekong Basin in the same year. The Nam Pong Project was constructed under the aegis of this Committee between 1961 and 1966 with some international assistance.

Amnat Wongbandit, *Hydroelectric Development on an International River: the Lower Mekong Basin*, doctoral thesis, Osgoode Hall Law School, York University, Canada, 9-10, 1989.

See also Chutima Kookoo-smut, *The Studies of the Impacts of Manufactural and Agricultural Activities on the Qualities of Water in Lum Nam Pong (June 1986-1987) 1-3 and 1-4. 1988.*

¹²⁴ Chutima Kookoo-smut, *id.*

¹²⁵ Institute of Water Resources and Environment, Faculty of Engineering, Khon Kaen University, et al., *Khon Kaen Basins Development Plan, 1991-1996*, p. 28.

Ubon Rat Reservoir, they raise livestock but also catch fish, as their land was condemned for the construction of the Reservoir and most of them later become poor landless people.¹²⁶

The lower Basin consists of 11 sub-basins, with an undulating terrain covering Ubon Ratana, Khao Suan Kwang, Kranuan, Nam Pong, Muang and Ban Fang Districts. Similar to those living upstream, most people in the lower Basin earn their living from agriculture, especially rice and cash crops such as cassava and sugar cane which is mostly sold to a large sugar mill in Khon Kaen. Dairy farms have become more widespread as they have been promoted and supported financially and technologically by the government and some private investors.¹²⁷

2. Pollution Problems

Industrial Promotion Policy

With more than half of the registered factories located in densely populated Bangkok and its suburbs,¹²⁸ the government has tried to move the factories on a voluntary basis into other provinces by offering a variety of incentives and benefits¹²⁹ with hope that environmental degradation in and around Bangkok would be alleviated and at the same time the problem of distribution of income and migration of labor would be solved to a certain extent with an increase of family income in the countryside.¹³⁰ In the Northeast, Khon Kaen is one of a few provinces selected by the government as a center for the development of the region with one objective in mind, that it would be a place for trade and commerce with Indo-china.¹³¹

¹²⁶ *Organization for Conservation of Natural Resources and Environment of Nam Pong, Industrial Development in the Nam Pong Basin*, 3, 1992.

¹²⁷ *Institute of Water Resources and Environment*, *supra* note 3, *id.*, at 40-41.

¹²⁸ *Organization for Conservation of Natural Resources and Environment of Nam Pong*, *supra* note 4, *id.*, at 7.

¹²⁹ *For more detail, see the Investment Promotion Act*, 1977.

¹³⁰ *The Seventh National Economic and Social Development Plan, 1992-1996*, p. 125-132.

¹³¹ *Khon Kaen was selected as an target area for center of development in the Northeast since the sixth National Economic and Social Development Plan.*

The sixth National Economic and Social Development Plan, 1987-1991, p. 311.

So far, no Industrial Estate or Industrial Zone has been established but there are more than 800 factories registered with the relevant authority, most of which are in agro-industry due to an abundance of agricultural products. It should be noted that many are located along the Nam Pong and surrounding areas¹³² because of the following principal factors;

1. The Nam Pong Basin is an area suitable for agriculture which means that factories can quite easily find raw materials for their production.
2. Water needed for industrial production and cooling system is relatively abundant both in the wet and dry seasons since the flow of Nam Pong is regulated by the Ubon Rat Dam and its facilities.
3. Ubon Rat Dam is able to generate a large amount of cheap and clean energy necessary for industrial production process. Oil and natural gas reserves have been discovered and exploited in the Nam Pong District which prompted the Electricity Generating Authority of Thailand to construct two projects of thermal power plants to meet the expected increase of power demand from industry.
4. The Nam Pong Basin is easily accessible by any kind of transportation needed for industry and business.¹³³
5. Like other provinces in the Northeast, wages in the Nam Pong Basin is relatively low compared with that in Bangkok or other regions.

As a result, the number of factories in the Nam Pong Basin registered with the authority concerned is steadily increasing. This of course has from time to time caused environmental damage to the Nam Pong area and the people living along its banks.

Factories Along the Nam Pong

It is noted that there are some factories located along the Nam Pong which in one way or another could affect its natural area.

¹³² Chutima KooKoo-smut, *Impacts of Industrial Factories upon Environment*, 3, 1993.

See also *Organization for Conservation of Natural Resources and Environment of Nam Pong*, *supra* note 4, *id.*, at 11.

¹³³ *Organization for Conservation of Natural Resources and Environment of Nam Pong*, *id.*, at 12, 14, 15 and 19-20.

● *Phoenix Pulp & Paper Factory*

Phoenix Pulp & Paper Factory is located at 99 Moo 3 Kudnamsai Sub-district, Nam Pong District, 20 kilometers downstream from Ubon Rat Dam, 14 kilometers upstream from the Nongwai Weir.¹³⁴ The mill produces pulp from kenaf, bamboo and eucalyptus¹³⁵ with production capacity of 300-330 metric ton per day. It's daily use of water is approximately 57,000 cubic meters¹³⁶ from the Nam Pong and discharges approximately 40,000 in 1992 or 30,000 in 1993 cubic meters of wastewater into the Huay Chote Canal flowing into the Huay Chote Swamp which later joins the Nam Pong.¹³⁷ In 1992 and 1993 this factory was temporarily closed by the Ministry of Industry as the authority believed that its wastewater contributed in part to the pollution in the river. (See Annex II)

● *Mahasin Alcohol Distillery*

The Mahasin Alcohol Distillery is approximately 2.5 kilometers downstream from the Nongwai Weir. It uses molasses from a nearby sugar mill, and withdraws some 15,000 cubic meters of water daily from the Nam Pong for its production, office and household use with some

¹³⁴ To increase the efficiency water use for agriculture downstream of the Ubon Rat Dam, the Nongwai Weir was constructed to diverse water to some 200,000 rai of cultivated land along the banks of the river. The weir is under the control and management of the Royal Irrigation Department.

¹³⁵ Now the mill uses only bamboo and eucalyptus as raw materials since two years after the operation of the mill, kenaf was no longer extensively grown in the Northeast of Thailand.

An interview given by S.K. Mittal, director and General Manager (Technical) of Phoenix Pulp & Paper Co., Ltd., 30 March 1994.

See also S.K. Mittal, *Phoenix Temporary Closure Experiences*, a paper distributed at Seminar on Immediate Change in Pulp & Paper Industry Environment, The Imperial Hotel, Bangkok, 21 July 1993, p.1.

¹³⁶ Chutima Kookoo-smut, *supra* note 10, *id.*, at 3-4.

In 1994, the Phoenix Pulp & Paper Co., Ltd. claims that it uses only 27,000 cubic meters of water per day.

An interview given by Jittrakorn Tanapoomichai, Manager, Environment Department, 31 March 1994.

¹³⁷ Department of Industrial Works, Ministry of Industry, *Summary Report of Measures for Environmental Problems from Phoenix Pulp & Paper Co., Ltd.*, 21 July 1993, p.1 and 4.

The Phoenix Pulp & Paper Co., Ltd. claims that it currently discharges only 16,000-17,000 cubic meters of wastewater per day.

Jittrakorn Tanapoomichai, *supra* 14.

300 cubic meters wastewater being discharged.. It was temporarily closed by the government during the 1992 Nam Pong pollution crisis.¹³⁸

- *Sugar Mill*

The Sugar Mill is approximately 4.9 kilometers downstream from the Nongwai Weir and operates 4-5 months a year when sugar cane is available. Some 34,000 cubic meters of water from the Nam Pong are used daily mainly for cooling system and also cleaning raw materials, engines, floor and molasses storage tanks. Because of the pollution in the Nam Pong caused by the leakage of its molasses, the Mill was temporarily closed in 1992.¹³⁹

- *Other Factories*

Besides the factories mentioned above, others have also had a part in affecting to a certain extent the natural regime of Nam Pong. For example, water used to keep bagasse wet to prevent dust in a particle board factory, polluted the river because water absorbing sweetness from bagasse has a high biochemical oxygen demand. Sometime wastewater from a gravel and sand factory would adulterate water in the river.¹⁴⁰

Apart from the industrial source, pollution in the Nam Pong is also caused by wastes from agriculture, particularly the area downstream from the Sugar Mill to the meeting point between the Nam Pong and the Chi. Waste from pig farms is used to feed fish and later discharged into the Nam Pong. In addition, wastewater from rice fields bearing some fertilizers is also drained into the same river which causes algae bloom. To aggravate the situation, wastewater from communities is not at a treatment plant of municipalities but is discharged directly into the Nam Pong.¹⁴¹

¹³⁸ Chutima Kookoo-smut, *supra* note 10, *id.*, at 4-5.

See also Working Group for Solving Pollution Problems in the Nam Pong, Khon Kaen University, *Tragedy of Nam Pong: Human Catastrophe, Chronicles from Newspapers*, 4-5 and 8, 1993.

¹³⁹ Chutima Kookoo-smut, *id.*, at 5. See also Working Group for Solving Pollution Problems in the Nam Pong, *id.*, at 5.

¹⁴⁰ Chutima Kookoo-smut, *id.*

¹⁴¹ Water Quality Management Division, Department of Pollution Control, Ministry of Science, Technology and Environment, *Summary Report: Pollution Problems in Nam Pong*, Khon Kaen, 2, 1993.

Pollution Problem in 1992

On 15 March 1992, villagers from Kudpangcrua Village, Ta Kraserm Sub-district, Nam Pong District, made a complaint to their Sheriff that a large number of fish were found dead in the Nam Pong, and the water had a bad odor which interrupted the village water supply service system. The Governor of Khon Kaen informed the press four days later that the Provincial Waterworks Authority would have to temporarily stop supplying water to users due to pollution in the river, and at the same time a request for the release of water from the Ubon Rat Dam upstream to push the polluted water downstream was sent to the Electricity Generating Authority of Thailand.¹⁴²

It was not until 23 March, 1992 that the cause of the pollution reported by the Provincial Industrial Officer was the water used to extinguish a fire at the M.D.F. Particle Board Factory on the thirteenth of the same month.¹⁴³ Later it was found that the real cause of the pollution was the discharge of approximately 5,600 cubic meters of molasses from the Sugar Mill into the river prior to the occurrence of fire at the M.D.F. Particle Board Factory.¹⁴⁴

The result of the mass pollution of water with approximately 30 kilometers in length was devastating, wherever it passed most of the fish and some species in the Nam Pong and Chi including part of the Mun were wiped out.¹⁴⁵ In Mahasarakham, villagers along the rivers at first were excited in fishing since fish affected by polluted water came up to the surface water and swam so slowly that it was easy to catch but after the death of 30,000 kilos of fish they became worried about what was happening in the river. In Roi Et, the Governor reported that 270,000 kilos of fish were killed with the extinction of 38 species.¹⁴⁶ It would take several years in restoring the natural conditions of the Nam Pong, Chi and Mun affected by the pollution.¹⁴⁷

¹⁴² Working Group for Solving Pollution Problems in the Nam Pong, *supra* note 16, *id.*, at 7.

¹⁴³ *Id.*

¹⁴⁴ Department of Pollution Control, Ministry of Science, Technology and Environment, *Report of Polluted Water Situation in Nam Pong-Chi-Mun*, 1, 11 and 17, 1992.

¹⁴⁵ It was estimated by the Department of Fishery that 400 tons of fish and other species were killed. *Id.*, at 7.

¹⁴⁶ *Thai Rat*, daily newspaper, 3 April 1992.

¹⁴⁷ *Matichon*, daily newspaper, 29 March, 1992.

The Nam Pong pollution caused not only environmentally adverse effects but also property damage as well as other side effects. It interrupted the supply of water for municipal use carried out by the Provincial Waterworks Authority as its water delivery system was damaged and needed cleaning.¹⁴⁸ The polluted water also damaged some crops along the river banks.¹⁴⁹ The 180 days closure of the Sugar Mill by the provincial authority caused the sugar cane farmers to protest in front of the Khon Kaen Provincial Hall. This gathering was dissolved later as sugar mills in other provinces promised to purchase such sugar cane.¹⁵⁰

Pollution caused by the Sugar Mill seemed to make the officials concerned and the public alert on the condition of the Nam Pong. Some villagers living along the Huay Chote, a tributary of the Nam Pong, complained to the authorities that wastewater from the Phoenix Pulp & Paper Factory was being discharged into the Huay Chote and probably causing damage upon fish and plants which would later degrade the water quality of the Nam Pong.¹⁵¹ The Governor of Khon Kaen, after considering the report of his staff's visit to the Huay Chote Canal and Swamp gave an order to the Factory to stop discharging its wastewater for 60 days automatically closing it.¹⁵² It was later re-opened which led to the reoccurrence of the pollution problem a year later.

Pollution Problem in 1993

Pollution in Nam Pong occurred again on 17 May 1993, when some academics from Khon Kaen University noticed that the tap water had a light brown color to it. After being informed by villagers of the large number of dead fish found in the Nam Pong on the twenty first of the same month, those academics went to see the site and take samples of water. They concluded that

¹⁴⁸ *The Governor of the Provincial Waterworks Authority at that time claimed that damage and loss suffered by his organization were approximately 264.38 million baht.*

Matichon, daily newspaper, 29 March and 31 December 1992.

¹⁴⁹ *Thai Rat, daily newspaper, 3 April 1992.*

See also Samphan Techa-athic, Survey Research on Impacts of Pollution in Nam Pong-Chi-Mun upon Villagers, 1-7, 1992.

¹⁵⁰ *Thai Rat, daily newspaper, 8 April 1992.*

¹⁵¹ *Krungthep Thurakit, May, 1992. See also a letter No. 2535/305, April, 1992 from Prasom Prakunsueksapan, a Representative from Khon Kaen, to Science, Technology and Environment Minister.*

¹⁵² *Letter No. kk 0009/13449, 26 April 1992, from Governor of Khon Kaen to Phoenix Pulp & Paper Co., Ltd.*

water in the Nam Pong was severely polluted from the Huay Chote Swamp all the way down to the Nongwai Weir between 20-21 May 1993 as the dissolved oxygen in the water was between 1.0-1.7 milligrams per liter which was so low that it would harm some species in the water. This damage was caused by one of the following factors or their combination: first, small amounts of water released from the Ubon Rat Dam, second, the discharge of large quantities of pollutants, probably by the Phoenix Pulp & Paper Factory, into the Huay Chote Swamp, third, heavy rain on the night of the twentieth of May stirring up the accumulated pollutants deposited on the bed of the Huay Chote Swamp which was later released to the Nam Pong, and finally pollutants from communities upstream.¹⁵³ (See Annex II)

The academics from Khon Kaen University believed that the second factor was the real cause of pollution¹⁵⁴ because the quadruple increase of water released from the Ubon Rat Dam between 17-20 May 1993 still was not able to alleviate the pollution problem. Regarding the heavy rain, it was good for the Huay Chote Swamp and the Nam Pong since it was able to dilute the polluted water. Finally, the fourth factor was groundless as some chemicals relating to conductivity¹⁵⁵ detected from the polluted water could be found only in the wastewater from the pulp and paper factory, not wastewater from household use.¹⁵⁶ The factory rejected all of these assumptions claiming that it had never discharged any chemicals which could kill fish into the area.¹⁵⁷

At the beginning, some officials from the Industrial Works Department pointed out that the pollution problem was attributed to the heavy rain¹⁵⁸ but this standpoint seemed to be changed after the Director-General of this Department told the press that wastewater from the pulp and

¹⁵³ Working Group for Solving Pollution Problems in Nam Pong, Khon Kaen University, *Summary Report of Study on Causes of Nam Pong Pollution Between 20-21 May 1993*, p. 5-9.

¹⁵⁴ This position was similar to that of the Khon Kaen Freshwater Fishery Development Center.

See Letter No. Kor Sor 0524(6), dated 22 May 1993, from the Khon Kaen Freshwater Fishery Development Center to the Director of Freshwater Fishery Division, Fishery Department.

¹⁵⁵ It refers to the quality of water in conducting or transmitting electricity.

¹⁵⁶ Chutima Kookoo-smut, *Causes of Pollution in Nam Pong*, in *Summary Report of Study on Causes of Nam Pong Pollution*, *supra* note 31, *id.*, at 23-26.

¹⁵⁷ S.K. Mittal, *see supra* note 13, and *see also infra* notes 90-94 and accompanying texts.

¹⁵⁸ Department of Industrial Works, *supra* note 15, *id.* at 2-3.

paper factory had part in polluting the Nam Pong.¹⁵⁹ The factory later was closed for 30 days¹⁶⁰ pending the investigation of officials from the Industrial Works Department, and reopened in June of the same year.

The 1993 pollution in the Nam Pong inflicted damage upon the environment from Huay Chote to the Nongwai Weir. A study by the Fishery Department between 6 April and 24 May 1993 noted that while the total weight of species in the Nam Pong upstream of Huay Chote increased from 3.44 to 3.82 kilos per rai with the increase of 12 to 14 species, the total weight downstream from Huay Chote to the Nongwai Weir decreased from 12.04 to 0.67 kilos per rai with the diminution from 16 to 8 species. It was estimated that some 3,800 kilos of fish and other species were killed.¹⁶¹ Fish, as well as livestock were also affected. Water buffaloes refused to drink the water from the river or play therein as usual. People living along that section of the river were also not able to use the water for their household consumption as it had dark brown color, bad odor, and some of them felt itchy after cleaning their bodies in the river water.¹⁶²

3. Conflicts Management

Since the magnitude of damage caused by factories along the Nam Pong between 1992 and 1993 could be felt throughout the basin as well as some parts of the Chi and Mun, several groups of people and institutes became way or another involved in this tragedy. It would be beneficial to the management or settlement of similar conflicts of water use in the future if the actions or reaction of such people or institutes towards events are carefully analyzed, especially the role of the following groups of people in the conflict;

1. Government including its agencies and officials
2. Factories

¹⁵⁹ *Siam Rat*, daily newspaper, 26 May 1993.

¹⁶⁰ Letter No. Aor Kor 0401/5080, dated 24 May 1993, from Director-General of Department of Industrial Works to the Managing Director of the Phoenix Pulp & Paper Co., Ltd.

¹⁶¹ Prapas Chalokpanrat, *Summary of Impacts of Pollution upon Fishery in Nam Pong*, in *Summary Report of Study on Causes of Nam Pong Pollution*, *supra* note 31, *id.*, at 35-36.

¹⁶² Bancha Kaewsong, *Pollution Problem in Nam Pong: Impacts upon Communities*, in *Summary Report of Study on Causes of Nam Pong Pollution*, *supra* note 31, *id.*, at 40-41.

3. Affected people
4. Other groups of people or institutions such as academic institutions, students, non-government organizations, politicians, media, etc.

Government

In the Nam Pong pollution case, the government played a very eminent role in tackling the problem which would be examined into two periods; 1992 and 1993.

● Incident in 1992

1. No Preparation Plan for Potential Damage

It seemed that despite the major fire incident at the M.D.F. Particle Board Factory on 13 March 1992, the pollution problem in the Nam Pong was not noticed until the Khon Kaen Provincial Waterworks Authority (PWA) detected five days later at its pumping station along the river that the dissolved oxygen in water (DO) was zero, biochemical oxygen demand (BOD) and chemical oxygen demand (COD) were consecutively 450 and 745 milligrams per liter¹⁶³ which meant that the water was harmful to fish and other species therein, and unfit for municipality consumption.

After the shutdown of the PWA water supply service system for several days and the existence of widespread damage along the river, the cause of pollution still was not found. It took ten days before the Khon Kaen industrial officials informed their Governor that the pollution was caused by water used in extinguishing a fire at the M.D.F. Particle Board Factory.¹⁶⁴ However, this assumption was not really accurate as the degree of damage was so severe that it could not have been caused only by such water but might be attributed to molasses from the neighboring Sugar Mill. Several days later the Sugar Mill was inspected by officials from the Pollution Control Department, and was found that some 5,600 cubic meters of molasses leaked from its storage

¹⁶³ Department of Pollution Control, *supra* note 22, *id.*, at 6.

¹⁶⁴ Working Group for Solving Pollution Problem in Nam Pong, *supra* note 16, *id.*, at 7.

See also Department of Pollution Control, *supra* note 22, *id.*, at 11.

tanks,¹⁶⁵ combined with wastewater from the Particle Board Factory then flowed into the river which was the major cause of the pollution.

The fact that it took the government approximately half a month in finding out the cause of the pollution, implies that the government mechanism concerning this matter would have to be reviewed. It seemed that the local officials concerned were not aware of, or probably paid no attention to, what would be potential risks or harm posed by factories within their jurisdiction. To avoid repeating the same mistake, officials concerned should become more alert on this issue.

When it happened in the Northeast, the whole lower reach of the Nam Pong experienced a sudden death in fish, the government did not know how to solve the problem promptly. In the beginning, it was not known what was discharged into the water and how much,¹⁶⁶ which made it difficult for the government to alleviate or remove the damage. When the real cause was discovered, extensive damage had already been done and the government agencies did not know what would be a proper technique for removing pollutants from the river.

One method used by the government agencies during the crisis was the release of large amount of water from the Ubon Rat Dam to push the mass of polluted water further downstream. When such polluted water reached Roi Et, water from the Lam Pao Dam was released to do the same thing until the polluted water flowed to Ubon Ratchathani where the same method was also applied by the Sirinthorn Dam to empty the polluted water into the Mekong.¹⁶⁷ Although the release of water from the dams upstream could alleviate through dilution the severity of pollution to a certain extent, it at the same time caused the damage to expand downstream. The authorities concerned, if possible should have searched for a method to mitigate the pollution problem without inflicting damage elsewhere. For instance, the mass of polluted water could have been blocked upstream and withdrawn to some other place which might need such water for a particular purpose

¹⁶⁵ Letter No. Wor Por 0505/4349, dated 3 April 1992, from Department of Pollution Control to Permanent Secretary of Ministry of Science, Technology and Environment. See also Department of Pollution Control, *supra* note 22, *id.*, at 4,5 and 17.

¹⁶⁶ This was in part attributed to the fact that the Sugar Mill did not inform the provincial authority of leakage of molasses from its storage tanks. The same mistake could be prevented by requiring the factories capable of causing environmental damage on a large scale to report any incident to the authority concerned.

¹⁶⁷ Department of Pollution Control, *supra* note 22, *id.*, at 16.

such as for plantation.¹⁶⁸ The real cause of the pollution in such a case would have to be identified in proper time.

Another thing carried out by the government to minimize the damage along the river was to closely monitor the flow of polluted water. Samples from the mass were frequently taken to examine its quality.¹⁶⁹ The public was frequently informed by the media in advance where it was moving to in order that those living along the river would be able to prepare themselves. Some students and villagers downstream in Ubon Ratchathani had tried to move fish and some species from the Nam Pong to other safe places before they were killed by the polluted water.¹⁷⁰

2. *Factory Closure*

After the M.D.F. Particle Board Factory had used water, partly from its own and the Sugar Mill's wastewater¹⁷¹ on 13 March 1992, to extinguish the fire, the government took more than two weeks to respond to the source of the pollution by closing the Particle Board Factory for 30 days on the first of April in the same year.¹⁷² The closure seemed to be, mainly intended for punishment, not for mitigation of damage, because the deadly result of pollution already spread throughout the river. The government's reaction to this event was really slow despite its provincial industrial official's knowledge of the cause of the pollution on the twenty third of March.

On the same day that the Particle Board Factory was closed, a letter from the Industrial Works Department indicating that the leakage of molasses contributed to water pollution was sent to the Sugar Mill, requiring it to repair its molasses storage tanks and build concrete or earth dike with a height of at least 1.5 meter above the wastewater storage area between the Factory and the river within 30 days to prevent leakage in the future.¹⁷³ It was not closed immediately in spite of such knowledge by the government. Could this be related to the fact that the wife and children of

¹⁶⁸ An interview given by Nisakorn Kosit-rat, Director of Water Quality Management Division, Department of Pollution Control, 3 May 1994.

¹⁶⁹ Department of Pollution Control, *supra* note 22, *id.*, at 6-7.

¹⁷⁰ *Thai Rat*, daily newspaper, 3 and 8 April 1992.

¹⁷¹ The M.D.F. Particle Board Factory and the Sugar Mill belong to the same business group.

¹⁷² *Sethakit Praritas*, monthly magazine, April 1992.

¹⁷³ *Id.*

one of the former Director-Generals of this Department were shareholders of the Sugar Mill?¹⁷⁴ The Sugar Mill was later ordered closed on 8 April 1992 for 180 days to improve its system in preventing environmental damage.¹⁷⁵

Apart from the closure of the factories, relevant government agencies called for punishment of the polluters. The PWA launched a civil action in court to ask approximately 300 million baht as compensation for damages inflicted upon its water treatment system, pending the decision of the court.¹⁷⁶ With a view to criminal action, the Khon Kaen police investigated the leakage of molasses from the Sugar Mill and collected evidence for the public prosecutor to consider whether such an incident was an offense under the Fishery Act, 1947 as claimed by the Fishery Department. A year later, a Khon Kaen public prosecutor decided not to bring a criminal action into court since it was considered that such incident did not violate the Fishery Act.¹⁷⁷

3. Committee for Rehabilitation and Development of Environment of Nam Pong, Chi and Adjacent Areas

Prompted by the 1992 Nam Pong tragedy, the Ministry of Industry created the Committee for Rehabilitation and Development of Environment (CRDE) of Nam Pong, Chi and Adjacent Areas on 1 April 1992 to study, rehabilitate and develop the Nam Pong Basin and its contiguous areas. This Committee met a week later and set up the three following Sub-Committee;

- Sub-Committee for the Study of Impacts upon the Nam Pong, Chi and Mun Basins. The chairman of this Sub-Committee is the Director General of the Industrial Works Department. With funding of 6 million baht, it requested Khon Kaen University to prepare a study between 1992 -1994 of the impact from the 1992 pollution incident upon the Nam Pong, Chi and Mun Basins as well as measures for their environmental

¹⁷⁴ For the names of such persons and number of their shares of the Sugar Mill, see *Siam Rat Sabda Wijan*, weekly magazine, No. 45, 1992.

¹⁷⁵ *Matichon*, daily newspaper, 31 December 1992.

¹⁷⁶ *Krungthep Thurakit*, daily newspaper, 25 June 1993.

¹⁷⁷ *Matichon*, daily newspaper, 21 June 1993. For further discussion, see *infra* notes 127-129 and accompanying texts.

rehabilitation¹⁷⁸ which could be later implemented by the Industrial Works Department.¹⁷⁹

- Sub-Committee for Ecological Rehabilitation of Nam Pong, Chi and Mun having the Director General of Fishery Department as chairman. It co-operates with the Fishery Department in preparing a rehabilitation plan and an assistance program for people affected by the pollution.¹⁸⁰ So far, the Fishery Department has released a large number of fish into the Nam Pong River,¹⁸¹ and also encouraged and assisted villagers living along the river to do small scale fish-farming by raising fish in cages as their source of protein and a secondary source of family income during the dry season.¹⁸²
- Sub-Committee for Inspection and Monitoring Water Quality in Nam Pong, Chi and Mun having the Director General as chairman. It has prepared both short-term and long-term plans for checking water quality by specifying points, frequency and parameter of inspection and monitoring along the rivers.¹⁸³

At the local level, the Governor of Khon Kaen set up an Ad Hoc Committee for Coordinating Actions for Solving Pollution Problem in the Nam Pong, Chi and Mun, to assist the Committee created by the Ministry of Industry in carrying out the latter's functions and duties. The Ad Hoc Committee is additionally assigned to inspect all the factories in Khon Kaen, the operation of which causes an impact upon the environment, assess the damage, and suggest a rehabilitation plan. It has the Governor as chairman and local officials including the Provincial Assemblymen and heads of sub-districts concerned as members. The President of Thai Industry Federation was

¹⁷⁸ Department of Pollution Control, *supra* note 22, *id.*, at 8.

¹⁷⁹ Department of Industrial Works, *supra* note 15, *id.*, at 5.

This study was expected to be completed by the end of April 1994. An interview given by Wanpen Wirote-goot, Coordinator of the study project, 6 April 1994.

¹⁸⁰ Department of Pollution Control, *supra* note 22, *id.*, at 8.

¹⁸¹ Fishery Department Newsletter, 14-16 May 1992.

¹⁸² An interview given by Renu Sirimongkonthaworn, Fishery Biologist, Khon Kaen Freshwater Fishery Development Center, 31 March 1994.

¹⁸³ This Sub-Committee currently is not active since most of its assigned works have already been carried out by the Department of Pollution Control.

Nisakorn Kosit-rat, *supra* note 46. See also Department of Pollution Control, *supra* note 22, *id.*, at 8.

appointed as a member of this Committee.¹⁸⁴ This implied that the provincial authority recognized input from the private sector which could help the Committee to work more effectively. It seemed to ignore the role of the people affected by the pollution including representatives of non-government organizations as well as academics who were keen on the issue at stake. Since the Committee so far has played a significant role in assisting the Governor in making a decision, additional members from other sectors should be included.

4. Closure of Phoenix Pulp & Paper Factory

Shortly after the destruction of fish in the Nam Pong, Chi and Mun by molasses in the second half of March and the first half of April, villagers complained to the local authorities that wastewater discharged from the Phoenix Pulp & Paper Factory polluted the water and caused damage to the surrounding environment. The Khon Kaen Governor, after reports by his officials who visited the affected areas, ordered the Factory not to discharge its waste into the Huay Chote Canal and Swamp.¹⁸⁵ This automatically and technically forced the Factory to stop its operation although it was not ordered to do so. The prompt decision of the Governor seemed to respond to a certain extent to public opinion (at that time) against factories as principal polluters.¹⁸⁶

After the closure of the Factory, the government agencies concerned started working on details on how to mitigate pollution in Nam Pong. The CRDE met and approved both short and long term plans to tackle the problem as proposed by Pollution Control Department and the Office of National Environmental Policy and Planning. It decided to inspect the Factory every Monday.¹⁸⁷ Two weeks later, the Department of Industrial Works ordered the Factory to improve its wastewater treatment system; control and decrease the use of chemicals and suspended particles in

¹⁸⁴ Khon Kaen Provincial Order No. 1546/2535, dated 24 April 1992.

¹⁸⁵ Letter Khor Kor 0009/13449, dated 26 April 1992, from the Governor of Khon Kaen to the Phoenix Pulp & Paper Co., Ltd.

¹⁸⁶ Shortly after the closure of the Phoenix Pulp & Paper Factory, the Khon Kaen Governor ordered five more factories along the Nam Pong to close; Sand and Gravel Factory, Mahasin Alcohol Distillery, Thai Charoen Ad Man Met Factory and Khon Kaen Peut Pon Factory.

Matichon, daily newspaper, 4 May 1992.

¹⁸⁷ Report of the CRDE meeting of 1 May 1992.

wastewater, increase the dredging of the Huay Chote canal, acceleration of project to use part of the treated wastewater for agriculture, and supply water to villagers in the affected areas.¹⁸⁸

Although it appeared that all the government agencies concerned cooperated and coordinated with each other very well, representatives of certain agencies responsible for environmental protection suspected that some local officials directly responsible for factories, had connection with the Factory as they were not serious with law enforcement and unwillingly assisted officials from Bangkok in collecting samples and other things.¹⁸⁹ This is another example of a pitfall, for vesting both power to promote industry and to protect the environment in the same agency.

A month after its closure, the Phoenix Pulp & Paper Co., Ltd. requested permission from the Khon Kaen Governor to reopen its factory with reason that it already had complied with the government requirements in improving its wastewater treatment system.¹⁹⁰ In response, the Governor promptly appointed the Working Group for Inspection of the Improvement of Wastewater Treatment System of the Phoenix Pulp & Paper Co., Ltd.¹⁹¹ to assist him in deciding the appeal at hand. This was a correct decision by the Governor to assign the Working Group consisting of people from different disciplines and departments to find facts and suggest solutions since it could convince both the public and the pulp company that his decision was fair, well advised and based on correct information. It would have been even better if representatives from the private sector or the effected people had been appointed as members of the Working Group.

The Working Group started inspecting the operation of wastewater treatment system of the Factory and reported the result to the CRDE which had an opinion that wastewater from the Factory still did not meet the official effluent standard and required further improvement.¹⁹² The

¹⁸⁸ Letter No. Or Kor 0410/(por.3)6586, dated 15 May 1992, from the Department of Industrial Works to the Phoenix Pulp & Paper Co., Ltd.

¹⁸⁹ An internal letter from an official in the Office of National Environmental Policy and Planning to its Secretary General, dated 7 May 1992.

¹⁹⁰ Letter No. 0216/2535, dated 1 June 1992, from the Phoenix Pulp & Paper Co., Ltd. to the Khon Kaen Governor.

¹⁹¹ Provincial Order of Khon Kaen No. 2082/2535, dated 5 June 1992.

¹⁹² Letter No. Wor Wor 0804/2396, dated 22 July 1992, for Office of National Environmental Policy and Planning to Department of Pollution Control.

Factory, after re-inspection by the Working Group, was able to satisfy CRDE's demands and was re-opened in early August 1992.

Even though the Factory was able to produce pulp again, its operation seemed to become more tightly regulated. When it applied for renewal of its license and permission to increase its production capacity, it was required to, among other things, improve its wastewater, to meet higher effluent standards, and report to the authorities concerned the result of the study project for utilizing part of its wastewater for agriculture.¹⁹³

In spite of all kinds of measures for preventing pollution in Nam Pong proposed by the government agencies concerned, the Factory still had problems with environmental protection issues.

● *Incident in 1993*

The pollution problem reoccurred in Nam Pong just upstream from the Nongwai Weir during 20-21 May 1993. The cause of the pollution at this time was quite controversial among government agencies' officials. Khon Kaen University with Pollution Control Department and some other agencies was convinced that the pollution could be traced to waste from the Pulp and Paper Factory,¹⁹⁴ the Provincial Ministry of Industry Officer believed that heavy rain stirred up the pollutants deposited on the bed of the Huay Chote Canal and Swamp which led to the pollution.¹⁹⁵ The Factory denied all these assumption. When the Minister of Science, Technology and Environment supervising the Pollution Control Department visited the Factory, he asked it to close on a voluntary basis.¹⁹⁶ A few days later, the Director General of Industrial Works Department ordered the Factory to close for 30 days with some minor adjustments of its wastewater treatment system.¹⁹⁷ It should be noticed that the government agencies concerned seemed to respond to the

¹⁹³ Letter No. Wor Wor 0804/4511, dated 16 October 1992, from the Office of Environmental Policy and Planning to the Department of Industrial Works.

¹⁹⁴ Working Group for Solving Pollution Problems in Nam Pong, *supra* note 31, *id.*

¹⁹⁵ Matichon, daily newspaper, 26 May 1993. See also Department of Industrial Works, *supra* note 15, *id.*, at 3.

¹⁹⁶ Khao Sod, daily newspaper, 14 June 1993. See also Department of Industrial Works, *supra* note 15, *id.*, at 3.

¹⁹⁷ Letter No. Or Kor 0401/5080, dated 24 May 1993, from Industrial Works Department to the Phoenix Pulp & Paper Co. Ltd.

problem faster than what was done in the Sugar Mill incident in 1992, which can be attributed to the fact that public was interested in this issue.

To convince the public that all decisions concerning the Pulp and Paper Factory would be rendered properly, the Industrial Works Department set up an Ad Hoc Working Group Considering the Improvement of the Phoenix Pulp & Paper Factory, to assist its Director General on this matter. It was composed of officials from several government agencies including the Department of Pollution Control but no representative of people in the affected area was appointed.¹⁹⁸ The Ad Hoc Working Group recommended, among other things, that, pending the final resolution for pollution problem, the operation of the Factory should be allowed to continue under close monitoring by the Ad Hoc Working Group.¹⁹⁹

The interim measures suggested were disagreed on by the Department of Pollution Control which required no discharge of wastewater into the Huay Chote Canal because it could be seriously polluted despite compliance with effluent standards by the Factory due to the large quantity of wastewater. In addition, a study on the existence of dioxin²⁰⁰ in the wastewater as well as the Nam Pong should be conducted.²⁰¹ This difference was not unusual since one agency was supposed to promote industry and the other wanted to protect the environment.

Since the Factory was under the direct control of the Industrial Works Department, its Director General decided to allow the Factory to operate again²⁰² under certain conditions which seemed to be a compromise between its standpoint and that of the Pollution Control Department. For example, the Factory would have to reduce the quantity of wastewater discharged into Huay Chote Canal, use oxygen, not chlorine, in pulp bleaching to prevent dioxin from forming in the

¹⁹⁸ Order of Industrial Works Department No. 62/2536, dated 11 June 1993.

¹⁹⁹ Internal Report of the Water Quality Management Division, concerning the meeting of the Ad Hoc Working Group on 17 June 1993, presented to the Director General of Pollution Control Department, dated 21 June 1993.

²⁰⁰ An agent believed to cause cancer.

²⁰¹ Letter No. Wor Wor 0302/2362, dated 28 June 1993, from Pollution Control Department to Industrial Works Department.

²⁰² Matichon Sud Subda, weekly magazine, 18 June 1993.

wastewater, and to monitor the water quality of Huay Chote Swamp and Nam Pong which would be daily reported to the Industrial Works Department.²⁰³

The pollution problem in the Nam Pong re-emerged again on 5 October 1993 when a large number of fish were found dead in the river upstream from Huay Chote Swamp where wastewater from the Factory was discharged. At first glance, this seemed to support the Factory's stance that the incident indicated that pollution in the river so far had not been caused by its wastewater.²⁰⁴ However, this assumption could not convince the Pollution Control Department since it argued that such a problem still was attributed to the Factory's operation. The Department stated that pollution occurred in the area where water was withdrawn by large pumps of the Factory which stirred up sludge on the bed of the river. The sludge was mainly composed of organic materials which was digested by some kinds of bacteria that consumed or even exhausted oxygen in the water. When the DO in the water decreased to a certain level, the fish died.²⁰⁵ Another explanation for the death of fish upstream rendered by the Chief of Nongwai Irrigation Project is that after a large quantity of wastewater had been discharged from the Factory, it flowed downstream until it hit the Nongwai Weir. To adjust the water level, such polluted water flowed back a certain distance upstream which probably caused the fish to die.²⁰⁶ The Factory did not accept these explanations by arguing that they were "man-made stories".²⁰⁷ Although the Factory claimed that this incident was not caused by its wastewater, it informed the Khon Kaen Governor and the Pollution Control Department that it would stop operating until the water quality recovered.²⁰⁸ The Factory now become more careful with respect to its operation.

²⁰³ Department of Industrial Works, *supra* note 15, *id.*, at 5.

²⁰⁴ Letter No. PPP 1092/2536, dated 6 October 1993, from the Phoenix Pulp & Paper Company Limited to the Governor of Khon Kaen.

²⁰⁵ Letter No. Wor Wor 0302/4888, dated 13 October 1993, from Department of Pollution Control to the Minister of Science, Technology and Environment.

²⁰⁶ An interview given by Samran Thammanultri, Chief of the Nongwai Irrigation Project, 30 March 1994.

²⁰⁷ S.K. Mittal, *supra* note 13.

²⁰⁸ See *supra* note 82.

In handling the pollution in 1993, the problem on the government side was the disagreement between a ministry or department assigned to promote industry and those concerning the protection of the environment. The former seemed to be more lenient than the latter to factories on the issue of environmental degradation.

Factories

After the occurrence of pollution in Nam Pong during 1992 and 1993, the factories involved in the incident had done several things to mitigate the environmental degradation and at the same time improve their image and protect themselves from legal responsibilities. The two key factories, Sugar Mill and Phoenix Pulp & Paper Factory, will be separately discussed.

• *Sugar Mill*

Since the M.D.F. Particle Board Factory and Sugar Mill are sister factories, they will be discussed at the same time. After the occurrences of fire and pollution, both did not disclose the whole facts to the authority. This might make the officials concerned misunderstand that pollution caused by water used to put out a fire could justify the M.D.F. Factory's action. It took more than two weeks before the officials found out the truth which crippled the government's efforts in handling the problem. The officials found that one of the seven molasses storage tanks was repainted and repaired.²⁰⁹ There should have been penalties for not disclosing the facts relating to damage inflicted upon the public.

However the Sugar Mill, a few days after being closed, concluded a memorandum of understanding with the Industrial Works Department which offered 50 million baht for rehabilitation of Nam Pong. Due to the fact that the Department of Fishery brought approximately 300 million baht lawsuit against the Sugar Mill, its lawyer stated that the payment of 50 million baht would have to be postponed since such a payment might have some legal effects upon the ongoing lawsuit.²¹⁰ The Sugar Mill seems to be afraid that the payment would be tantamount to accepting in the ongoing lawsuit that the pollution was caused by its fault. This apprehension is unreasonable as the payment is in fact intended to rehabilitate the river, not to yield to any demand

²⁰⁹ *Department of Pollution Control, supra note 22, id., at 1 and 4.*

²¹⁰ *Matichon, daily newspaper, 26 June 1993*

or claim of the PWA in court. If the Sugar Mill really wants to express its responsibility over the environment, it should make such payment without waiting for the outcome of the case in court. It is interesting to see how and when this amount of money would actually be paid.

It seemed that the owner of the Mill avoided appearing before the media but spoke through his lawyer and one of the Members of the House of Representatives from Khon Kaen who was the owner's advisor. They thought the Sugar Mill should not be the only one to blame since there were nine factories polluting the Nam Pong.²¹¹ It appeared that the Sugar Mill had tried to improve its image and at the same time to allocate responsibility for pollution to other polluters.

● *Phoenix Pulp & Paper Factory*

The Phoenix Pulp & Paper Factory so far had been ordered to close twice in 1992 and 1993. It applied several methods in improving its image, defending its position, asking leniency from the government etc. The question whether or not those methods worked would be seen below.

First of all, the Factory never admitted that it was the real cause of pollution in the Nam Pong. It only agreed that its 1992 closure was due to non-compliance with effluent standards²¹² which in fact the authorities concerned should have not demanded such a closure since they had acknowledged for a decade that wastewater from the Factory did not meet the effluent standards. Besides, the Factory had followed official's instructions to improve its wastewater quality and substantial improvement had actually been made. Moreover, fish had never been killed by its wastewater.²¹³ With regard to the 1993 incident, it claimed that its wastewater discharge to Huay Chote Canal met all the effluent standards set up by the Ministry of Industry. It therefore felt that it had not done anything wrong since it obeyed the law. There were also, according to the Factory, other sources of pollution along the river.²¹⁴ It should not be the only one responsible for this

²¹¹ *Id.* See also *Krungthep Thurakit*, daily newspaper, 25 June 1993.

²¹² *Siam Rat*, daily newspaper, 2 June 1993.

²¹³ *S.K. Mittal*, *supra* note 13.

²¹⁴ *Chairman of the Board of Directors, the Phoenix Pulp & Paper Company Limited*, *Krungthep Thurakit*, daily newspaper, 21 June 1993.

For details of defenses by the Phoenix Pulp & Paper Company Limited, see letter No. 02152536, dated 9 June 1993, from its Managing Director to the Industrial Works Department.

problems. The Factory felt that it was discriminated against by the public²¹⁵ since nobody seemed to pay attention to the State owned paper factory at Bang Pa-in, Ayutthaya, the wastewater quality of which was even worse than that of this factory.²¹⁶

The attitude of the Factory is similar to that of most industrialists that once their wastewater meets effluent standards, they have the right to discharge (pollute) regardless of any consequence arising therefrom. In fact, the intrinsic purpose of issuing effluent standards is to prevent possible damage upon the environment since we should not wait until the occurrence of damage which may be irreparable. If the damage does occur despite compliance with effluent standards, polluters should be still held accountable.

Another point defended by the Factory was the existence of dioxin in its wastewater. As it was not required by law to control dioxin level in wastewater, the Factory took a position that it had no legal obligation to test and control the amount of such substance.²¹⁷ After Khon Kaen University announced that the level of dioxin from pulp bleaching was so high that it could harm people after a certain period of accumulation, the Factory argued that the test referred to by Khon Kaen University was not reliable and claimed that the dioxin generated from its bleaching process was, according to test results in Finland, lower than that found in pulp mills in the United States.²¹⁸ This difference prompted the Factory and the authorities concerned to send samples of water near the Factory for analysis again to France, Finland and the United States, and it was disclosed that the level of dioxin in the water did not pose any harm.²¹⁹

Apart from the denial of being a cause of pollution, the Factory protected its operation by convincing the government that the closure of the Factory would severely produce a number of economic impacts upon several sectors in society. After its first closure in 1992, the Factory asked

²¹⁵ *The Factory side believes that the public might try to find a scapegoat for the holocaust of fish in the Nam Pong in 1992 which so far no one has been prosecuted or held liable.*

S.K. Mittal, supra note 13.

²¹⁶ *Siam Rat, daily newspaper, 2 June 1993.*

²¹⁷ *Id.*

²¹⁸ *Letter No. 0337/2536, dated 20 September 1993, from the Phoenix Pulp & Paper Company Limited to Department of Pollution Control.*

²¹⁹ *S.K. Mittal, supra 13. See also Nisakorn Kosit-rat, supra note 46.*

for assistance from the Pulp and Paper Association of Thailand which promptly sent a letter to the Minister of Industry explaining that such closure would force automatically at least ten paper factories to close down due to shortage of pulp in market which would certainly drive up the price of paper. The Factory therefore, according to the letter, should be allowed to continue its operation.²²⁰ This request did not seem to get a proper respond since the public opinion against factories after the Sugar Mill incident was still strong.

With the shortage of pulp in the market, the Factory pointed out that its closure would also affect other groups of people such as those who could no longer sell bamboo, kenaf or eucalyptus to the Factory. In addition, they claimed that it had helped to increase the income of more than 200,000 families in the countryside.²²¹ 1250 persons are employed by the Factory; 300 skilled workers and 950 unskilled workers. Approximately 400 unskilled workers are local people living in five villages around the Factory.²²² After demonstrating its significant contribution to a large group of people, it adopted a rather hard position that it might move out from Thailand,²²³ if the regulations became so tight, which of course could cause the government to hesitate in applying a harsh measure against the Factory, as Thailand still needs foreign investment.

To avoid environmental problems, particularly in the Nam Pong which has been closely watched by the public at large, the Factory has attempted to reduce its wastewater discharge to zero, if possible, through the introduction of so-called "Project Green" which invited the landowners and farmers around the Factory to use its treated wastewater conveyed by pipeline to their land for growing eucalyptus. In return for joining Project Green, the landowners would be paid annually 500 baht per rai for the first four years, and when the eucalyptus is ready for cutting at the fifth year, its purchase price and minimum yield are guaranteed by the Factory.²²⁴ The Factory expects Project Green to be able to remove its conflict with people living along the Nam

²²⁰ *Tansethakit, daily newspaper, 10 May 1992.*

²²¹ *Krungthep Thurakit, daily newspaper, 21 June 1993.*

²²² *S.K. Mittal, supra note 13.*

²²³ *The Nation, daily newspaper, 5 May 1992.*

²²⁴ *So far approximately 1,000 rai of land have joined the Project while 2,500 rai are needed for its full operation.*

S.K. Mittal, supra note 13.

Pong and the authorities concerned, and at the same time to save costs for wastewater treatment as well as to secure a raw material production base.

However, some conflicts between landowners joining the Project and the Factory have arisen. It is not clear how much and how frequent wastewater should be discharged to the eucalyptus plantations, and who has the right to open or close the tap at the end of each wastewater pipeline.²²⁵ The farmers want to open the tap only when they need water but the Factory wants to open it all the time.²²⁶ Another problem is the effect of wastewater upon crops and trees on the land. Some farmers complain that their bamboo do not grow healthily after receiving wastewater from the Factory.²²⁷ This kind of complaint has caused some farmers to hesitate to use wastewater on their land.

Project Green has also cause conflict between the Factory and the farmers who did not join the Project, as wastewater from the Factory seeps from the land in the Project to neighboring land. The owners of the lower land are afraid that such seepage might contain some hazardous or poisonous chemicals and some other things which damage may their land and crops.²²⁸ The Factory has attempted to solve this problem by persuading such landowners to join the Project, and sometime even offering to purchase their land²²⁹ but so far no substantial progress has been made.

Apart from the protection of its interests and the mitigation of environmental degradation mentioned above, the Factory has also tried to improve its image to the public by carrying out a number of activities to prove that it had some concerns over the well-being of communities surrounding it as well as the society at large. For example, after its second closure, it held a Seminar on Immediate Change in Pulp & Paper Industry Environment.²³⁰ Moreover, it sometimes

²²⁵ Jittrakorn Tanapoomichai, *supra* note 14.

²²⁶ An interview given by Buapan, Chief of Ban Nongbua Noi, Kudnamsai Sub-district, Nam Pong District, Khon Kaen, 19 March 1994.

²²⁷ An interview given by Chuang Nusri-an, Chief of Ban Noen Udom, Kudnamsai Sub-district, Nam Pong District, Khon Kaen, 5 April 1994.

²²⁸ An interview given by Sa, a villager of Ban Nongbua Noi, Kudnamsai Sub-district, Nam Pong District, Khon Kaen, 5 April 1994.

²²⁹ Jittrakorn Tanapoomichai, *supra* note 14.

²³⁰ Held at The Imperial Hotel, 21 July 1993, Bangkok.

voluntarily closed its operation as a good will gesture when it was asked privately²³¹ or officially by officials to do so or when the water quality in Nam Pong became worse. The Factory also employs a number of local people from surrounding villages to show that it wants to bring economic prosperity to its neighborhood, and also to tone down negative voices against it. It should be noted that a number of villagers who used to speak strongly against the Factory now are working with the Factory.²³² A school building for the surrounding villages was constructed and drinking water is periodically provided free of charge to two villages by the Factory²³³ as its contribution to society.

One thing that did not help to improve its image at all, was a threat to bring a law suit into court against the Rector of Khon Kaen University who had stated, after the completion of study on causes of pollution in Nam Pong, that pollution was caused by wastewater from the Factory.²³⁴ Such a threat would be opposed to public opinion which sincerely believes that statement by the Rector was based on the Khon Kaen University's research, not on personal bias.

Affected People

Although a large number of people were adversely affected by pollution in Nam Pong between 1992 and 1993, there seemed to be no strong formation of affected people to consistently put pressure upon the government and sources of pollution to remove or mitigate the problem promptly. This could be ascribed to the following factors. Firstly, the damage did not consistently happen but it was rather considered to be an accident which in part lessened the concern of affected people. It is different from the Nam Siaw case where the damage had been inflicted upon rice

²³¹ *Daily News*, daily newspaper, 27 May 1993.

The Factory is currently asked by the authorities concerned to discharge its wastewater in proportion to the amount of water released upstream from the Ubon Rat Dam. If the rate of water released from the Dam is lower than one million cubic meters per day, wastewater discharged to the Huay Chote Canal will be reduced 50%, and if the released water is lower than half a million cubic meters per day, there will be no wastewater discharge.

S.K. Mittal, *supra* note 13.

²³² An interview given by Saneh Wichaivong, Secretary of NGO Coordinating Committee on Rural Development in the Northeast, 19 April 1994.

²³³ S.K. Mittal, *supra* note 13.

²³⁴ *Matichon*, daily newspaper, 21 June 1993.

farmers for more than two decades. Secondly, the duration that people severely suffered the damage was not relatively long which did not affect seriously their living, except in the case of fishermen and the problem of air pollution. For example, riparian landowners might not be able to utilize polluted water for a few days. Thirdly, the fishermen who seemed to be the most affected group of people were not in the position to press for their claims both in or outside the court because most of them were poor and uneducated. Fourthly, a large number of people relied financially on the operations of factories which have a part in polluting the river. They therefore did not want such factories to stop their operation. In case of Phoenix Pulp & Paper Factory, some neighboring villagers and their chiefs made a number of requests from the Factory such as, provisions of electricity and water, the improvement of roads, and employment opportunity in return for not complaining against the Factory's activities.²³⁵ Finally, the affected people had not really been frustrated by the government because their grievances seemed to get prompt attention,²³⁶ and the media also focusing on this issue made the water pollution problem as subject of national discussion.

One method used by the affected people to redress their grievances was to make complaints to officials and sometime politicians.²³⁷ Most of the time, government officials were first informed of pollution by fishermen or villagers living along the river who would notice certain abnormalities in the water. The government agencies concerned then sent their officials to investigate and take some samples from the sites which were usually followed by some measures against sources of polluters as discussed earlier.

Due to the active response to the problem by the government, the affected people would not have to organize demonstration to press for their demand. However, there were some minor demonstrations when the Nam Pong was polluted by molasses from the Sugar Mill since those demonstrators wanted the authorities concerned to push the polluted water away as soon as possible from their villages, requested water for their consumption, and to punished the polluter.

²³⁵ *Chuang Nusri-an, supra note 105.*

²³⁶ *If compare the Nam Pong case to the Nam Siaw case, the government in the former one appeared to tackle the problem more seriously and timely than in the latter.*

²³⁷ *See letter No. 2535/305, April 1992, from Prasom Prakunsueksapan, Representative of Khon Kaen, to the Minister of Science, Technology and Environment.*

The villagers later went back to their villages after the officials agreed to relay the villagers' messages to the authorities concerned.²³⁸

Other Participants

The Nam Pong incidents in 1992 and 1993 drew attention from various groups of people, organizations and academic institutions as well as mass media. In the case of pollution caused by molasses, mass media played a very eminent role among those who were not related directly to the incident. This pattern was resumed in the 1993 pollution problem but at this time Khon Kaen University also emerged as a key participant in suggesting policy and measures for implementation in handling the pollution problem which deserves to be briefly discussed below.

After the report of a large number of fish found dead in the Nam Pong and the closure of the Phoenix Pulp & Paper Factory, Khon Kaen University set up the Working Group for Solving Pollution Problems in the Nam Pong, to collect, collate, study and disseminate all the facts concerning the pollution problem in this river including proposes measures for preventing and solving the problem in short and long terms. The Working Group consisted of the University's academics who were interested or actively involved in water pollution and environmental problems, and assisted by an advisory board, most of its members were from government agencies responsible for water resources and environmental issues.²³⁹ The Working Group focused its study and findings on the pollution in the river between 20-21 May 1993.

As already discussed earlier, the Working Group concluded that pollution was attributed to the discharge of wastewater from the Phoenix Pulp & Paper Factory which of course categorically rejected that conclusion. The Working Group further concluded, among other things, that water resources in the Ubon Rat Dam, the Huay Chote Canal and Swamp and Nam Pong had been over utilized by the industrial sector so much so that it inflicted environmental damage upon the public at large. This problem occurred again and again without proper measure including legal mechanism to solve the problem.²⁴⁰

²³⁸ *Matichon*, daily newspaper, 29 March 1992.

²³⁹ *Order of Khon Kaen University No. 1371/2536, dated 27 May 1993.*

²⁴⁰ *Working Group for Solving Pollution Problems in Nam Pong, supra note 31, id., at 10.*

The Working Group proposed to review the policy on the Nam Pong pollution. It suggested, *inter alia*, the creation of a committee consisting of government officials, academics, representatives of non-government organizations, and villagers to inspect the wastewater treatment system of the Phoenix Pulp & Paper Factory, designation of Nam Pong downstream of Ubon Rat Dam to the Nongwai Weir as the "Pollution Control Area", study the amount of dioxin in the Factory's wastewater, lawsuits for compensation to injured persons, improvement of the Factory's wastewater treatment system, monitoring of the Nam Pong by people organization, plan for Nam Pong conservation which could be used as model for other river basins, and revision of relevant laws.²⁴¹

It was an admiring effort by Khon Kaen University to conduct a study on the Nam Pong pollution problem²⁴² since it as an academic institution with no vested interest in the issue at stake, coupled with the availability of its experts, was in the position to render a rather neutral opinion in the public eye. Moreover, due to the non-existence of a proper organization well equipped with manpower, information, technology and money to act on public's behalf to monitor and inspect all kinds of activities harmful to the people, Khon Kaen University for the time being should carry out this role, particularly in the poorest region of the country.

In advocating the protection of the Nam Pong, Khon Kaen University's effort has been in one way or another assisted by some non-government organizations. These organizations work as watchdog on the environmental issues. They try to raise public awareness among villagers living around factories and along the banks of Nam Pong of environmental concerns and conservation. At the same time they also sometime organize villagers to present the villagers' grievances to officials or factories.²⁴³

²⁴¹ *Id.*, at 11-12.

²⁴² After the completion the study, Khon Kaen University held a seminar on "Who polluted the Nam Pong, and Who Suffered?" on 24 July 1993. A representative of the Phoenix Pulp & Paper Factory also attended the seminar.

²⁴³ In case of the Phoenix Pulp & Paper Factory, the non-government organizations help to raise public awareness concerning Nam Pong pollution problems not only among villagers around the Factory but also among teachers who would later educate their students in school.

Saneh Wichaivong, *supra* note 110.

Observations

From the Nam Pong case, it seemed that Thailand was in a dilemma, whether to go for economic prosperity regardless of its environmental consequence or to protect the environment by reducing the economic growth rate. As other countries, a compromise way was chosen; industrial development was encouraged under some control measures for the protection of the environment. However when this policy was implemented, a question arose whether these two concepts could really be balanced.

It appeared that the ministers responsible for industrial development and their high-ranking officials had been very cautious in imposing any measure upon factories for the protection of the environment for fear that it would deterred foreign investors from Thailand.²⁴⁴ This mentality might in part cause such ministers and officials to jump into the factory side without considering all the facts.²⁴⁵ For instance, several days after the leakage of molasses to the Nam Pong, one official responsible for factories stated that the pollution was not caused by molasses but rather by water used by the M.D.F. Particle Board Factory which should not be blamed as it was an accident and the Factory already lost a large sum of money in the fire.²⁴⁶

The attitude mentioned sometimes led the officials, from agencies responsible for the protection of environment, to think that officials responsible for industry were too lenient on factories and some of them might even be closely connected to factory owners as some members of the officials' families were shareholders in a company which owned a factory polluting a river. This fact also created doubt among people as to whether the law concerning factories would be sincerely enforced.

However, the pollution problem by at large had been handled by the government properly except in the 1992 incident in which whole species of fish in the Nam Pong and parts of the Chi and Mun were wiped out before the government could do anything. With regard to the Pulp and Paper Factory incident in 1993, the government responded to the problem timely which seemed to be the

²⁴⁴ Major General Snan Khajornprasart, Minister of Industry, *Matichon*, daily newspaper, 31 May 1993.

²⁴⁵ For an example of premature conclusion, see *Matichon*, daily newspaper, 25 May 1993.

²⁴⁶ *Matichon*, daily newspaper, 29 March 1992.

result of public concern over pollution in the river since 1992 as no action had been taken against the Factory before 1992 despite the officials' knowledge of its non-compliance with the effluent standards for a decade.

Although the public, especially the media, paid a great deal of attention to the pollution in 1993, it seemed that no prominent group of local people had actively struggled for the protection of the river as in the Nam Siaw case. This might imply that the number of people seriously hit by the pollution was not that large, or they might not know that their health were at risk as some kinds of chemicals accumulated in their bodies. Most villagers tended to be worried only by the property loss and damage as well as the apparent physical injury or illness while in Nam Pong pollution case damage did not strongly affect the substantial source of income of the villagers and their day-to-day life as in the case of Nam Siaw rice farmers. In addition, because some groups of people benefited from the operation of the Pulp and Paper Factory, there was no point for them to protest against the factory. The immediate problem of most villagers seemed to be how to survive tomorrow, not how to live in a nice and clean environment. The fight for protection of the environment was rather the wealthy or middle class people's business.

The statement in the previous paragraph reflects that when a large part of the people in society still have to fight for their survival, it is difficult, if not impossible, to expect them to vehemently champion the concept of environmental protection. The government or any other organizations or institutions should take up this role and at the same time train those people to be able to rely on themselves.²⁴⁷ This suggestion seemed to be followed by Khon Kaen University in the 1993 Nam Pong pollution problem by preparing the study and setting up a forum for discussion and formulation of policy.

It should be observed here the position taken by the factories discharging wastewater into the Nam Pong that once their wastewater complied with effluent standards, they could discharge and also would be free from all kinds of liability. The implementation of this concept would not be

²⁴⁷ Mongkol Danthanin, *Solutions for Social Problems through Participation and Human Resources Development; a Case Study of Pollution Problem in Nam Pong*, in *Summary Report Study on Causes of Nam Pong Pollution*, *supra* note 31, *id.*, at 71-74.

able to remove the pollution problem as happened in the Nam Pong since the river was no longer able to absorb the waste²⁴⁸ despite its compliance with effluent standards. This must be changed.

4. Legal Remedy

The 1992 and 1993 disasters in the Nam Pong, Chi and Mun made a lot of people question the effectiveness of the legal mechanism. This section of the study will examine whether the discharge of wastewater into the river was an offense and the persons injured would therefore be able to ask for compensation. In other words, the legal remedy in court will be discussed with respect to the Sugar Mill and the Phoenix Pulp & Paper Factory.

Sugar Mill

• Criminal Action

When the Nam Pong was polluted by molasses from the Sugar Mill, many people wondered whether the owner of the Mill would be subject to prosecution since the Navigation in Thai Water Act, 1913, the Royal Irrigation Act, 1942, and the Fishery Act, 1947 prohibit any person from causing pollution to watercourses. However, the scope of their application is quite limited as for example they will come into play only when pollution is caused by intention, not by negligence,²⁴⁹ which must be proved by the plaintiff. This was a major obstacle encountered by the public prosecutor in the Sugar Mill case. A Khon Kaen public prosecutor decided not to prosecute the owner of the Sugar Mill²⁵⁰ since he believed that the leakage of molasses was not intentionally caused by the Mill but rather an accident. It did not matter whether or not such an accident was caused by negligence.²⁵¹ The law sometime did not render an outcome which the

²⁴⁸ Director General of Industrial Works Department, Matichon, daily newspaper, 31 May 1993.

²⁴⁹ It has been a legal interpretation that a person shall be subject to criminal sanctions only when he commits an offense on intention. However he may be punished for an offense committed by his negligence only when it is clearly stated by law.

²⁵⁰ Matichon, daily newspaper, 18 and 21 June 1993.

²⁵¹ Once it was found that the offense was not intentionally committed, the accused had to be released. One reason which convinced the Khon Kaen public prosecutor not to prosecute the owner of the Sugar Mill was that there was no reason for the Sugar Mill to dump its molasses into the Nam Pong because the molasses in each storage tank was valued at approximately nine million baht.

An interview given by Bhee-rat Cuansonthi, a public prosecutor of Khon Kaen, 31 March 1994.

public would like to see. If the occurrence of environmental damage on a large scale is to be prevented, penalties will have to be inflicted upon the offender who violates the law even by his own negligence.

Criminal sanctions would be resorted to only after the occurrence of the offense, which means that some severe or even irreparable damage has already been done to the environment. This is certainly not what is needed. Instead, adequate preventive measures should have been introduced as could be found in the Enhancement and Conservation of National Environmental Quality Act, 1992.²⁵² Unfortunately, the Act cannot be applied retroactively to the Sugar Mill case.

• *Civil Action*

Although the owner of the Sugar Mill was not prosecuted for the leakage of molasses, he might be subject to certain civil liabilities for damage suffered by people living along the river. Due to the ongoing 300 million baht lawsuit in court brought by the PWA against the Sugar Mill's owner, as prohibited by law, is not going to discuss or predict the outcome of this case. However, it may be interesting to examine a hypothetical case; what would be the result if a riparian landowner whose fish farm was damaged by polluted water ever brought this case into court.

In the hypothetical case, the riparian landowner would be entitled to compensation for his property damage such as the destruction of the fish farm if he could prove in court that the molasses was leaked by intention or negligence on the part of the Sugar Mill's owner.²⁵³ The outcome of the case would be different if he claimed for losing an opportunity to catch other fish in the river since, as discussed in the Nam Siaw case, fish in the river belongs to no one as long as it is not caught.²⁵⁴

²⁵² For details of preventive measures in the Enhancement and Conservation of National Environmental Quality Act, 1992, see Part Two of this study, 37-38.

²⁵³ Civil and Commercial Code, Section 420.

It should be noticed that if the Enhancement and Conservation of National Environmental Quality Act, 1992 is applied to a similar case, a plaintiff is not required to prove the intention or negligence of defendant or polluter.

²⁵⁴ *Id.*, Section 1320

With regard to the clean-up costs of the river, it was not recoverable since the Enhancement and Conservation of National Environmental Quality Act, 1992 was not effective when the disaster occurred. The Fishery Department and other government agencies which incurred expenses in for example replenishing fish in the river could not ask for compensation.²⁵⁵ This is different from the case of property damage.

As a good will gesture for environmental protection, the Sugar Mill as mentioned before concluded a memorandum of understanding (MOU) with the Department of Industrial Works offering 50 million baht for the rehabilitation of the Nam Pong. It should be noted here that the MOU had no legal binding force since it was considered only as an *ex gratia* payment.²⁵⁶

As already mentioned, it appears that when the 1992 incident occurred, there was no law which held the owner of the Sugar Mill accountable for the environmental disaster in the Nam Pong. Nevertheless, the legal mechanism has improved as seen in the Phoenix Pulp & Paper Factory case where the Enhancement and Conservation of National Environmental Quality Act, 1992 comes into operation.

Phoenix Pulp & Paper Factory

• Criminal Action

The 1992 and 1993 closures of the Phoenix Pulp & Paper Factory by the government was due to pollution in the Nam Pong according to several government agencies and the public, caused by wastewater discharged from the Factory. The Factory claimed that the quality of its wastewater met the effluent standards and they could not be held responsible for any later consequence arising. The Factory also denied the linkage between the pollution in the river and its wastewater discharge.²⁵⁷ It is necessary to examine whether the discharge of wastewater by the Factory violated any criminal law.

²⁵⁵ This interpretation is similar to that of the Office of Attorney General given to Ministry of Public Health.

Office of Attorney General, Pollution in the Nam Pong, Chi and Mun, Advisory No. 47/2535, 1992.

²⁵⁶ For the payment of 50 million baht by the Sugar Mill, see *supra* note 88 and accompanying texts.

²⁵⁷ Krungthep Thurakit, daily newspaper, 21 June 1993.

It was the discharge of wastewater in 1992 by the Factory that violated the Factory Act, 1992 and other relevant laws, that its wastewater did not meet the effluent standards and the Factory was ordered by the court to pay a 10,000 baht fine.²⁵⁸ This penalty would not have any substantial impact upon the operation of the Factory since the fine was relatively low compared with the size of the Factory.

When the 1993 closure of the Factory is considered, a controversy arises whether the Factory could be prosecuted for polluting the river since the Factory indicated that its wastewater quality met the effluent standards set up by the Industrial Works Department. Suppose that the Factory's claim was true. It explains only that the Factory did not violate the Factory Act but it could, violate the provisions of other laws since a particular offense under a particular law is composed of specific elements. It could be prosecuted under the Navigation in Thai Waters Act, 1913, the Royal Irrigation Act, 1942 and the Fishery Act, 1947 because all these Acts prohibit discharge of pollutants to a certain extent into the water. The Royal Irrigation Department,²⁵⁹ Fishery Department and the Khon Kaen provincial authority have already asked the police to investigate this case and collect evidence for the public prosecutor to carry out possibly prosecution.²⁶⁰

When the Navigation in Thai Waters Act and the Royal Irrigation Act are closely considered, it is not clear whether they are applicable to the discharge of wastewater from the Phoenix Pulp & Paper Factory into the Huay Chote Canal for two reasons. One reason is the fact that the Huay Chote Canal as a small non-navigable watercourse might not be subject to the application of the Navigation in Thai Waters Act. The other is that the Huay Chote Canal is not an "Irrigation Watercourse" under the Royal Irrigation Act into which no one is allowed to discharge pollutants. Although pollutants discharged into the Huay Chote Canal will certainly flow to Huay Chote Swamp and later to the Nam Pong which are "Irrigation Watercourses", such pollutants are not deemed legal, as being directly discharged into an "Irrigation Watercourse". As a result, the Royal Irrigation Act would not come into play in this case.

²⁵⁸ *Matichon*, daily newspaper, 27 May 1993.

²⁵⁹ *Samran Thammanultri*, *supra* note 84.

²⁶⁰ *Matichon*, daily newspaper, 27 May and 1 June 1993.

One more point regarding the environmental protection legislation which should be noted, is that most industrialists, including the Phoenix Pulp & Paper Factory are not pleased with the fact that they have to comply with several effluent standards set up by a number of government agencies under different legislation. This problem should be rectified through unifying all such standards if bureaucracy is to be eliminated. In revising the effluent standards, the standards should be based on the capacity of a specific locality to absorb the wastes products should vary according to the surrounding environment.²⁶¹ As a result, the standards in the area still capable of absorbing large amounts of pollutants should be lower than that in the area with less capacity. The application of this concept would be able to handle the situation where environmental problems exists despite compliance with the law by the factories.

● *Civil Action*

In the potential civil lawsuit, the Phoenix Pulp & Paper Factory would seem to raise its defenses as used in the criminal action case, that since its discharge of wastewater complied with the effluent standards set up by the Industrial Works Department, they were not liable for any damage caused by such discharge. This argument did not sound persuasive since earlier compliance with the effluent standard did not exonerate the Factory from responsibility. Instead, the Enhancement and Conservation of National Environmental Quality Act, 1992²⁶² states that the owner or possessor of source of pollution is responsible for any damage caused by such pollution regardless of how it happened with certain exemptions.

To hold the Factory responsible for damages in the Nam Pong, especially in 1993, would seem to be the burden of the plaintiff to prove that the damage could be linked to wastewater from the Factory, and not from any other sources along the river. According to Khon Kaen University, this could be proven while the Factory argued that such proof was unreliable.

If obstacles could be overcome. Another issue to consider is, who is/are entitled to compensation and how much? The answer to this question would be similar to what had been analyzed in the Nam Siaw case. First of all, those who suffered property damage or physical injury

²⁶¹ Amnat Wongbandit, *Laws Concerning Treatment of Wastewater from Factories*, research prepared for the National Research Council, 45-46, 1992.

²⁶² Sections 96 and 97.

could bring their claims against the Factory. With regard to fishermen, their claims for losing opportunity to earn their income from fishing are not feasible. The third group of injured persons are the government agencies which incurred expenses in cleaning up and rehabilitating the river.

Well aware of its rights recognized by law, the government through the Ministry of Science, Technology and Environment set up the Working Group for Collecting Evidence for Enforcing the Enhancement and Conservation of National Environmental Quality Act, 1992.²⁶³ The Working Group, having the Director General of Pollution Control Department as chairman and representatives from government agencies and a State-owned enterprise as its members, is assigned to prepare all the evidence concerning the 1993 Nam Pong disaster for the purpose of enforcing Sections 96 and 97 of this Act, as well as co-operate with other government agencies and State-owned enterprises in causing the Phoenix Pulp & Paper Company Limited to pay the government compensation, if any.

The Working Group so far has concluded that the Fishery Department incurred 5,299,245 baht for rehabilitating the Nam Pong, the Chi and the Mun, and the Electricity Generating Authority of Thailand suffered damage through the release of water from the Ubon Rat Dam to dilute the polluted water with the equivalent of 373,068 baht. The Royal Irrigation Department informed the Working Group that it suffered no damage for the time being since the Phoenix Pulp & Paper Company Limited agrees, according to the contract between these two parties, to dredge up and improve the Huay Chote Swamp which is under the control of this Department.²⁶⁴ The government now is in the process of asking the company to pay the compensation.²⁶⁵

²⁶³ *The Ministry of Science, Technology and Environment Order No. 35/2536, dated 27 July 1993.*

²⁶⁴ *Draft of Working Group Report, November 1993.*

²⁶⁵ *For the time being the Working Group is also waiting for legal opinions on certain issues from the Office of Attorney General.*

An interview given by Somnuk Rubthong, Director of Legal Division, Pollution Control Department, 23 August 1994.

Legal Stumbling Blocks

The court had been utilized particularly by government agencies more often in the Nam Pong case than in the Nam Siaw case, which could be attributed to the fact of the enactment of certain legislation, especially the Enhancement and Conservation of National Environmental Quality Act, 1992, that rectified some legal loopholes and conferred rights to more people and government agencies in suing for compensation in court. Despite revision of some provisions of the law, some legal obstacles as encountered in the Nam Siaw case still exist.

One common way of bringing a lawsuit into court in the Nam Pong case was the basic requirement that the plaintiff had to prove that the damage it sustained was caused by wastewater from the Pulp and Paper Factory. Although such burden of proof in the Nam Pong case was not as difficult as in the Nam Siaw case where there were a large number of rock salt miners, it is still beyond the capacity of poor riparian landowners or fishermen to fulfill this requirement as funds and technology are needed. Only the government agencies, big corporations and wealthy people can do that. The poor, who were injured in the Nam Pong incident as well as in other cases, have been left unprotected.

One alternative to alleviate this hardship is to create a fund²⁶⁶ to render preliminary help, despite inability to identify a polluter or prove linkage between cause and effect, to people suffering from environmental damage in the Nam Pong Basin, and at the same time bear part of the clean-up costs of the river. The proposed fund should be supported by fees charged from those who cause potential extensive damage to the river basin.

Apart from the problem of linkage between cause and effect, the poor would be barred from the court by the transaction costs as in the Nam Siaw case. Economic return for the injured people might receive in court could be a little bit higher or sometime even lower than what they would have to pay in fighting a legal battle. It is not feasible at all for the poor to protect their rights in court. The government would have to apply some kinds of measure to cope with this problem.

²⁶⁶ In fact, the so-called "Environmental Fund" is set up under the Enhancement and Conservation of National Environmental Quality Act, 1992 but most of its money has been used for wastewater treatment plants or waste disposal facilities, not for people suffering from environmental damage.

Law Enforcement

Law enforcement seems not to be a major problem for water use conflict in the Nam Pong case. Even though the authorities concerned did not strictly enforce the law in case of the Phoenix Pulp & Paper Factory's non-compliance with effluent standards before 1992, serious water pollution at that time did not occur as the river was able to absorb all the wastewater from the Factory, or the public at large probably was not aware of the potential harm inflicted upon the river. After the major pollution in 1992, most government officials started tightening law enforcement for the protection of the environment but there were some obstacles to overcome. The government might not have had adequate manpower to do the job since the number of factories is too large for the officials to monitor their operation. Another problem of law enforcement was the so-called "inter-dependence" between officials and the owners of factories. It is a widespread practice that, whenever a government agency controlling or supervising the operation of factories needs financial support for some of its programs or activities, it usually asks for assistance from the owners of factories who rarely deny such a request. This kind of relationship certainly causes officials from such a government agency to hesitate to strictly enforce the law against their "donors". This symbiotic relation between officials and business owners has long been used in the Thai culture, and it would surely take a lot of time to change this concept.

5. Conclusions

The Nam Pong, the Chi and Mun pollution problem seems to be one of consequences arising from the government's policy of income distribution and regional development through industrial relocation to the countryside. A number of large factories have operated along the Nam Pong in Khon Kaen where power and water from the Ubon Rat Dam as well as cheap labor are rather abundant.

The first major environmental disaster started in 1992 when wastewater used in extinguishing a fire at the Particle Board Factory and molasses from the Sugar Mill wiped out all the species in the Nam Pong and some parts of the Chi and Mun which required several years to recover. Since the government was not prepared for this type of extensive damage, it could only

release water from the dam upstream to dilute the polluted water and inform the people downstream in advance. Both factories were later closed temporarily.

The severe damage done to the Nam Pong, the Chi and the Mun substantially raised public concern over water quality of the Nam Pong, which prompted the government to react more quickly than to other environmental problems. The government later in the same year closed the Phoenix Pulp & Paper Factory and other factories which discharged wastewater into the river.

The pollution problem emerged again in 1993 when a large number of fish were found dead along the river which was caused, according to the Khon Kaen University and some government agencies, by wastewater from the Phoenix Pulp & Paper Factory (who rejected this assumption). The government closed the Factory again temporarily.

In handling the immediate problem, the government temporarily closed the factories causing the pollution. After that committees were created to inquire into the problem(s) and suggest measures to prevent further environmental damage. During this process, a different attitude towards industry between those responsible for environmental protection and those from the Ministry of Industry could be seen. The outcome was usually a compromise which allowed the factories to discharge wastewater into the river but the effluent standards would have to be complied with and the amount of discharge reduced.

When the role of factories involved in pollution is considered, it was found that they used the need for foreign investment by Thailand and the economic and social impacts from the closure of their factories as leverage in asking leniency from the government in factory control and environmental protection. At the same time, they tried to improve their image by carrying out certain activities such as; offering funds for rehabilitating the polluted river, supplying water to villagers affected by water pollution, and voluntarily stopping the operation of the factories when water quality in the river deteriorated. But they always maintained their legal position that since they complied with the effluent standards, they were not liable for environmental damage in the river.

With regard to people affected by pollution, they were not well organized in pressing for their demands. This could be attributed to the relatively short duration of damage, unawareness of some risks, and lack of information, money and education. This group of people therefore need help from the government or other institutions and organizations to protect their rights.

Khon Kaen University in fact did help those people as well as the public at large by making an inquiry of the causes of pollution in 1993 and disseminating it to the public. At the same time it set up a forum for public debate on this issue and proposed a review of policy to fight pollution in the Nam Pong.

Conflicts arising from the utilization of the Nam Pong could be managed or settled not only by the methods mentioned but also by legal means. It seemed that the government agencies resorted more often to the use of court in the Nam Pong case than in the Nam Siaw case since some legislation such as: the Minerals Act, 1967; the Factory Act, 1992; and the Enhancement and Conservation of National Environmental Quality Act, 1992 were revised and enacted. However, certain legal impediments and technical problems in bringing lawsuits into court still exist. The point is: how to give all people, rich or poor alike, an equal access to the justice system?

Part Three: Conclusions

The study of water use conflicts in the Nam Siaw and Nam Pong Basins reflect that the available water resources in the Northeast can hardly satisfy the demands of various sectors, as the quantity of water and the capacity to absorb wastewater are quite limited, while the amount of water used and discharged is steadily increasing. Major water use conflicts occur between the industrial sector and water users in other sectors such as agriculture, household and municipal use.

When a major water use conflict occurs, as in the Nam Siaw and Nam Pong cases, government intervention was needed since it covered a large group of water users in a vast areas. Sometimes severe environmental damage occurred which takes years to recover. These problems cannot be solved solely through the existing legal system since the bargaining power of each group of water users was not equal. In the current situation, rich people and large corporations easily find

legal loopholes to over-utilize water resources and inflict damage upon the environmental and the public at large.

The government has been involved in managing the water use conflicts in both Nam Siaw and Nam Pong cases. Its usual first step was to stop the activities or the operation of factories causing pollution if severe damage had already been done. Then some measures for the improvement of wastewater treatment system were recommended to the factories in order to prevent future damage and at the same time, the government prepared a plan to rehabilitate the affected areas such as the replenishment of fish stock in the Nam Pong. People living in the Nam Siaw Basin were trained how to rehabilitate the salt affected land and how to find secondary occupation(s) to increase their income. Factories or groups of people causing pollution were advised, or probably forced, by the government to move their production sites to other areas unless the relocation would lead to undesirable social and economic repercussions.

In principle, government intervention seemed to be interested in and in fact should have been able to effectively manage the conflict, but in practice it sometimes produced side effects, particularly when the intervention was long overdue or based on the protection of small groups of people. This slow and ineffective response to the problem was caused by certain factors. The government was often concerned with its image among foreign investors if harsh measures for environmental protection were imposed upon factories. Moreover, closure of large factories would certainly increase the unemployment rate which would lead to social and economic chaos. In some cases, ministers and some high-ranking officials had vested interests in the factories or activities polluting the environment and they used all means to protect their interests. To worsen the situation, bribery was widespread among law enforcement officials as found in the Nam Siaw case. Another factor contributing to the ineffectiveness of government intervention appeared to be bureaucracy which was in part attributed to the lack of decentralization of power by the government to local officials and people. Most high-ranking officials responsible for environmental protection, factory control and law enforcement were not accountable to the local people as they were career officials appointed by their boss in Bangkok. This affected one way or another their performance in protecting the environment.

To tackle environmental problem(s) which was strongly interested in by the public, the government usually set up a committee to study the problem and make recommendations with expectation that any decision rendered by the committee would be fair and thoroughly scrutinized as it was composed of people from several disciplines and agencies. This concept was admirable in principle but when it was implemented, local people affected by the problem(s) were not included. As a result, local people perceived the decision of the committee as not responsive to their needs but rather to those who had connections with the government or members of the committee.

When the reaction of local people to water use conflict is considered, it was found that they usually made their complaints to government officials first. If their grievances were ignored or not properly addressed, they would organize demonstration(s) to get attention from the government which sometimes led to physical injury as happened in the Nam Siaw case. This method was not utilized in the Nam Pong case because damage sustained by each individual was not the same as that in the Nam Siaw Basin and the Nam Pong problem was closely followed by several groups of people and institutions as well as the media. It seemed that demonstration(s) was resorted to by people with grievance much more often than a legal remedy in court since the latter method of dispute and settlement needed time and money.

With a view to the status of the polluters in the water use conflict, they were relatively in a more favorable position than the local people affected by pollution due to the former group's strong bargaining power. The owners of factories had money and quite often connection(s) in the government which to a certain extent adjusted the government's policy to their benefit. This is the reason why it is necessary to have organizations or institutions to act on the behalf of the public to counter the industrial sector's power.

It should be noticed that a few cases were brought into court with respect to the settlement of water use conflicts in both Nam Siaw and Nam Pong cases. One principal reason for this seemed to be the fact that the concept of water rights is not clear in the Thai legal system. Each water user does not know exactly how much water he or she can withdraw from a river and nobody is required to pay for the water used. Once the right to use water is not clear, it is very difficult to rely on the court to decide the issue since the outcome of the case is uncertain. Under this circumstance, the rich seem to benefit the most because their capability of exploiting water

resources is much greater than that of the poor. The same rationale also applies to the discharge of wastewater into a river without paying any fee to the government or any public entity.

To solve the unsystematic utilization of limited water resources, the concept of a water permit should be implemented by law as proposed by Thammasat University since under such a proposed system, each water permit holder would know exactly how much water could be used by them. If they would like to use more water, they would have to buy it from other water users. By the same token, each polluter would be able to discharge wastewater to the extent allowed by his license. Some fee would be applied which would be able to alleviate the problem, which for the time being is not being effectively tackled by the Enhancement and Conservation of National Environmental Quality Act, 1992. This concept would force people to use water economically, efficiently and discharge waste into the water as little as possible.

Generally speaking, if the environment, particular water resources, is to be properly protected, certain organizations and law including its enforcement would have to be revised.

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Water Allocation Conflicts in Central, Thailand

Thitinan Pongsudhirak

Introduction

Since the onset of the 1990s, Thailand has been facing a deepening water crisis. Water scarcity, to be sure, has long been a problem, and not just in Thailand. But the water problem has become increasingly salient as Thailand continues to rake in remarkable economic growth rates. The Thai economy during 1988-90 chalked up double-digit growth rates in annual gross domestic product, and has since managed to roll on impressively at more than 7 percent yearly.¹ With the sustained phenomenal growth, the Thai economy has rapidly industrialized at the expense of the traditional agricultural sector.² The ongoing structural transformation of the country's productivity from agriculture to industry provides the backdrop for the present study on water allocation conflicts in the Central plain.

¹ The Thai economy swelled 13.2 percent, 12.2 percent and 10 percent respectively during 1988-90. In 1991, it grew 8.2 percent, 7.5 percent in 1992 and an estimated 7.4 percent in 1993. See *Thai Economy and Foreign Trade Statistics*, Department of Foreign Trade, Ministry of Commerce.

² The industrial sector now accounts for more than 40 percent of gross domestic product, whereas agriculture takes up 11 percent, with the balance made up by services. More than 60 percent of the labor force is employed in the agricultural sector, however. See Peter G. Warr, "The Thai Economy" in Warr, Peter G., ed., *The Thai Economy in Transition*. Cambridge: Cambridge University Press, 1993, pp. 58-62.

The multiplying demands for water use of all varieties --domestic, agriculture, industry, and services -- are looming as potential sources of social conflicts in Thailand. The conflicting quests for increased access among the water user groups are likely to intensify as water supply and other natural resources continue to grow more scarce relative to the growth in the population and the economy. And because much of the industrialization process has thus far taken place in the provinces constituting the Bangkok Metropolitan Region (BMR), the water problem appears most acute in the areas surrounding the capital. The crux of the problem is accounted for by the rice farming located in the Central plain near Bangkok. Irrigated farming has vied for water availability with other sectoral users. Hence there have already been cases of conflict with varying degrees of intensity over water allocation between the farmers and industrial and urban users of Bangkok.

To meet the growing demands for water, the Central region has depended upon water from the Bhumibol and Sirikit dams, the country's two largest.³ As the water needs of the Northern and Central regions have multiplied, a decreasing amount of water has been flowing into the two dams. In fact, the aggregate water availability in the two dams is at its lowest in the last 30 years.

This spells a host of problems for the Central region. Because it harbours the mouth of the Chao Phraya river which is connected to the salty Gulf of Thailand, the Bangkok region needs a significant amount of water from the Bhumibol and Sirikit dams to keep out saline water. As a result, the RID requires some 2.5 bcm yearly to flush out the waste and saline water creeping up the Chao Phraya.⁴ In fact, resisting salt water has become a crisis in itself. Given the woeful situation in the Bhumibol and Sirikit dams in the early 1990s, not enough fresh water has been flowing down the Chao Phraya to chase away salt water. Suvit Futrakul, governor of the Metropolitan Waterworks Authority (MWA), suggested that water rationing in the capital has become a distinct possibility because of the need to flush out saline water which would be destructive to vegetable crops and fruit orchards. Put another way, some of Bangkok's potential tap water will have to be sacrificed to keep out salt water.⁵

³ *The Bhumibol and Sirikit dams are located at the border of the Northern and Central regions, collecting water from the Ping, Wang, Yom, and Nan river basins, the North's four main natural water tanks.*

⁴ *Christensen and Boon-long, p. 3.*

⁵ *The Nation, 9 February 1994, p. 1.*

Apart from keeping out salt water, fresh water from the dams is also needed for power generation by the Electricity Generating Authority of Thailand (EGAT), the state-owned enterprise. Demand for hydropower generation has skyrocketed along with the country's high economic growth rates and the structural transformation in its economy. By the year 2000, it is estimated to be more than twice the amount of hydropower used in 1980. Furthermore, water is required for inland navigation in the Central plain, employing the Chao Phraya, Mae Klong, Tha Chin and Bang Pakong rivers.⁶ Three of these are used directly by Central plain farmers. Thus the deepening scarcity of water has stifled waterway transport. The squeeze on inland water transport is significant because the Chao Phraya river in the past has provided a convenient and cheap downward stream on which commerce and transport were conducted. "During the dry seasons, when river discharges are low and large quantity of water is drawn for agricultural use, vessels have difficulty in navigation at some locations due to insufficient depths," noted an assessment of inland navigation,⁷ concluding "in absence of a proper water regulation the navigation suffers in dry seasons, curtailing the navigable length."

This study attempts to illuminate the water allocation conflicts that occur among sectors during the dry season between November and May⁸ when rice production must compete fiercely with the BMR's water needs. The research and data below are channeled into three case studies. The first tackles the most obvious and daunting issue of interbasin water transfer in which rapid urbanization and industrialization of the Greater Bangkok Area is the underlying cause. This case examines an inter-basin water conflict which pits the users of the Chao Phraya river basin, who are located in the BMR region and who want to quench their needs by diverting water from nearby areas, against users of the Tha Chin and Mae Klong basins. The second case is concerned with the

⁶ *United Nations*, 1991, p. 46. Ironically, in some cases the problems of inland navigation were solved by the problems of sea water encroachment. In the lower Chao Phraya river, the lack of fresh water required for inland shipping was made up by sea water coming up from the Gulf of Thailand. See *Poojadkarn Daily* (in Thai), 22 December 1993, p. 5.

⁷ *The United Nations*, 1991, p. 46.

⁸ The rainy season ends around October and summer begins in earnest by early March, lasting through May before the rain begins another cycle. Hence the dry-season period is used here to describe the period between November and May. Other experts on water issues, including Secretary to the Prime Minister, Dr. Tawat Wichaidit, see the water problem occurring mainly between January and June. See an interview he gave to *Prachachart Turakij* (in Thai), 19 December 2536, p. 28.

allocation of irrigated water for upstream and downstream users. This case looks at a recent water conflict that has arisen in a typical Central plain area, dissecting the conflict into various components to see the institutional framework in which it was resolved. The last case deals with competition among users of groundwater, analyzing the institutional mechanisms and perceptions of officials and users regarding property rights. It is posited that, unless an effective institution is created to deal with the rapidly increasing pumping of groundwater, unprecedented user conflicts will arise in this area.

Overall, the case studies were carried out with a focus on factors that have given rise to water allocation conflicts, such as water shortages, increase in industrial pollution, governmental deficiencies in law enforcement, and/or the absence of an effective regulatory framework for resolving water conflicts. Similarly, considerable attention was paid to how the various water user groups responded to these conflicts, and how such conflicts reached their resolution in the existing institutional framework, paying attention to some of the means for conflict resolutions, such as water hoarding, the lobbying of officials and politicians, legal prosecution, and reliance on village institutions and authorities, as well as other informal means of settlement. The conclusion briefly recapitulates the three cases, and offers a few observations and suggestions for future action in alleviating Thailand's water plight.

Case No. 1

Background of the case

The urban-rural conflict in the Central plain is manifested on a grand scale in the attempt to divert water from the Mae Klong and Tha Chin river basins to the Chao Phraya basin which feeds the urban areas in the Bangkok Metropolitan Region (BMR), where about half of the country's value-added in manufacturing originates.⁹

⁹ The Chao Phraya basin has a drainage area of 20,125.25 km², whereas the Mae Klong and the Tha Chin have drainage areas of 30,836.76 km² and 13,681.60 km², respectively. (The United Nations, 1991)

● *Nature of the Problem: Rural vs. Urban*

Water is but one natural resource that causes conflict between rural and urban inhabitants. Others, such as forests and land are also sources of disputes. But water has come to the fore partly because of its traditional role in Thai agriculture, which used to be the backbone of the country. And despite its receding contribution to national income, the agricultural sector still houses more than 60 percent of the work force.

Because the agricultural sector was predominant in the economy from the mid-1850s up through the 1960s when structural transformation began in earnest, the country's water allocation system was designed principally for agricultural users. When the Royal Irrigation Department was born in 1912 (then called the Canal Department), its purpose was mainly to systematize the water supply to allow more farmers to have more water -- free of charge. It was a service the state (then an absolute monarchy) bestowed upon the population.

The state was a grand provider for the people, and popular perception of the state was ingrained with a patron-client, paternalistic culture. This sense of the state as a provider and caretaker of the people still pervades much of Thai society. For many generations, farmers have operated under the principle that water is free. Until the pace of industrialization picked up in the 1960s, there had been more than enough water to go around.

Since 1912, as the state created more water agencies and invested more capital into the water infrastructure, a water regime began to entrench itself. The underlying foundation of this regime was free access to water, and yet the regime itself became the de facto owner of the water. When farmers complained about not having enough water during dry spells, the regime found ways to cope by finding new supplies or developing new reservoirs.

All that changed with the recent lopsided push toward rapid industrialization. The economic booms in the two decades of the 1970s and 80s imposed demands on the water allocation regime like never before. The rapid economic development was urban centered, and overwhelmingly located in the BMR, especially in the metropolis of Bangkok itself. The more the BMR grew, the more resources, not only water, were needed to keep the boom going. As a

consequence, the agricultural sector began to experience unprecedented shortages in natural resources.

Increasing volatility in world commodity prices and increasing returns to industrial goods did not help the situation. Because of higher wages in the industrial and service sectors, many agricultural workers began to leave their farms and head for the city, especially during the dry season.

Throughout this process, the water regime operated with basically the same principles as in pre-industrial times. Farmers received as much free water as they wanted. When world rice market dropped, the government would invariably step in with subsidies to keep prices buoyant, encouraging continued growing of the water-intensive paddy crops. Meanwhile, the demand for water in the burgeoning BMR region continued to grow unabated, while supplies were reaching their limit. In the end, something had to give.

The state wants the givers to be the rural sector. This partly underscores the economic might of Bangkok, home to the policy makers and national political leaders. The focus of national development has been Bangkok- and industry-biased. Thus when Bangkok needs water, it, through the Metropolitan Waterworks Authority, will "take" the water away from neighboring rural communities.¹⁰ The supply from the Chao Phraya river basin, which feeds Bangkok residents, has become insufficient, and the gap must be filled. The plan is to divert water from the Mae Klong and Tha Chin river basins.

Interestingly, the Chao Phraya-Mae Klong diversion plan dates as far back as 1985. An obscure study then concluded that the Chao Phraya basin would be able to satisfy the needs of Bangkok for 20 more years until 2005, but water should still have been piped in from the Mae Klong to ensure enough supply for the future.¹¹ As the diversion plan is now a reality, it is instructive to watch the language the MWA (as well as RID) officials use when talking about water

¹⁰ Currently, the MWA provides water to four provinces: Bangkok, Thonburi, Nonthaburi, and Samut Prakarn, covering 3,082 km² and 7.5 million users. Demands are growing so fast in this area that the MWA can guarantee provision only until 1997 unless new supplies come on stream.

¹¹ The author of the study was Thares Srisathit, a Chulalongkorn University researcher. Evidently, the phenomenal growth of Bangkok was not given its due weight.

acquisition. The word they have used is "ao" (literally "take"), suggesting that in their view they can simply take water from one place to another.

As it stands, the diversion plan envisages building linkage canals between the Chao Phraya and the Mae Klong and Tha Chin basins. When completed, this 106 km, four-year project is supposed to provide Bangkok with enough water until the year 2017.¹²

But the Mae Klong basin users are not willing givers. The provincial chambers of commerce from Kanchanaburi, Rajburi and Samut Songkram, provinces that draw their water from the Mae Klong basin, came out vehemently against the plan.¹³ The three chambers said that the supply of the Mae Klong itself has declined rapidly over the last ten years, and this is all the more reason why they cannot afford to lose their supply. One chamber official made the point that the MWA cannot guarantee against or offset the adverse consequences of the diversion. Other officials said that Bangkok bullied rural provinces when trying to solve its own problems.

The local residents of Kanchanaburi also organized a seminar to address the issue.¹⁴ The seminar was initiated by the provincial associations of village headmen and kamnans, the women's association of Kanchanaburi, the Kanchanaburi municipal office, the Kanchanaburi media association, and the association for nature and the environment of Kanchanaburi. The deputy permanent secretaries of the RID and the MWA were present, along with academics and representatives from non-governmental-organizations. (While the MWA would exploit the Mae Klong diversion, the RID is the agency tasked with bringing about the actual diversion itself.) The deputy permanent secretary of the MWA made an appeal by saying how Bangkok's population and industrial and service sectors have swelled enormously. The academics and NGO representatives were against the diversion on the grounds that Bangkok necessities and decisions should not be imposed on rural folks. One academic said that in principle it is possible for Bangkok to gain access to the Mae Klong, but only after the Mae Klong users have had sufficient supply.

¹² See, for example, *Phujadkarn Daily* (in Thai), 2 December 1993, p. 30.

¹³ See *Prachachart Turakij* (in Thai), 3 June 1993, p. 19.

¹⁴ See detailed report in *Siam Post* (in Thai), 3 June 1993, p. 19.

This, the academic said, would give local basin residents the control over their own resource. The deputy permanent secretary of the RID countered by saying that water is the resource of the kingdom (Thai word used was "phaendin"), just like petroleum or natural gas. He added that the Kanchanaburi residents would gain religious merits from the diversion because they are giving something to others and that even the famous gems of Kanchanaburi are sold throughout the country. When pressed on the analogy about "sold" gems and the attempted "free take" of Mae Klong water, the RID official said that the state undertakes the construction, and hence the state should manage all of the water.

Another senior official from the National Water Resources Committee suggested that water is a resource no one can claim property rights on. This official said that "if we cite rights over resources, we will have to partition the country." He thought natural resources must have overseers, which should be the elected government, and added that when cabinet ministers decide on something, the people have to accept it. "Otherwise we would have to change our governing system," he argued. As to the lack of information to the public, the senior RID official said that when a project gains cabinet approval, the approval itself is tantamount to public information. He said it would be too costly to announce cabinet approval of projects in newspapers or on the television and radio. Thus he said it is like a law whose existence cannot be denied by the people.

The above comments by the officials typify the perceptions of property rights from both the state and the people. When Bangkok needs conflict with those of the Mae Klong basin, no formal, well-defined legal procedures come into play. The conflict reaches resolution according to the perceptions of those wielding power -- the state authorities in this case. This gives rise to a dangerous situation in which the people may decide to empower themselves to protect what they perceive as theirs. Such self-empowerment has occurred occasionally in cases when rural farmers decided to march on Bangkok to demand higher rice prices or clamor for their land to be left undeveloped. Violence has flared in a few cases between law enforcers and rural people, but not yet on a great scale. If left unattended, however, the water conflicts could bring about more vividly violent conflicts.

Once again, the authorities are aware of the issues and dangers surrounding water conflicts. This is why they created a special task force to deal with water during this past dry season. But if one examines the task force and its performance, one can see further that solutions lie elsewhere. The task force is headed by Tawat Wichaidit, secretary of Prime Minister Chuan Leekpai. It is worthwhile to emphasize the supply-side terms in which Tawat framed the water problems. Considered the government's "key man" in the Task Force Committee¹⁵ on Solving Water Shortages, this is how Tawat viewed the situation,

*"Figures in the last 8-10 years indicate that rainfall has been abundant in Thailand, averaging around 800 bcm per year, but [the country] has not been able to keep and use all of it. Some flowed into the sea, some evaporated, some went to the rivers, and some seeped into the soils. About 600 bcm is not storable. We have only been able to keep 200 bcm. Our long-term plans must allow us to store an additional 100-plus bcm, which makes it inevitable for the construction of large dams, or even small dams which can be coordinated. In any case, we must be able to store another 160 bcm, and then we will never have water problems again. This is a long-term investment."*¹⁶

Faced with opposition from the Mae Klong basin residents, the water task force came up with an allocation plan for the Bhumibol and Sirikit dams. The MWA is to get 0.5 bcm for domestic use, and Central plain irrigation 0.8 bcm, with 0.3 bcm for flushing out salinity. This plan is designed for the 1994 dry season, January through June.¹⁷ In addition, the government openly resorted to groundwater pumping in the BMR region, restructured irrigated areas in the Chao Phraya basin, and prohibited use of irrigated water for golf courses. The government's stated top priority is to take care of the agricultural sector. To do this, farmers in the Central plain are encouraged to dig 50,000 shallow wells, using a governmental subsidy of Bt 500 million, Bt

¹⁵ The Water Task Force Committee is directed by Pramote Maiklad, a well-known RID official. The task force is to open 24 hours a day, with an advisory body comprising the deputy permanent secretaries of the Ministries of Interior, Industry, Science, Technology & Environment, and Agriculture & Cooperatives.

¹⁶ An interview Tawat Wichaidit gave to *Prachachart Turakij*, on 19 December 1993 (translated from its original Thai version).

¹⁷ *Ibid.*

10,000 per well. These shallow wells, geared for short-lived crops, are planned for the 11 Central plain provinces in the BMR region.

More specifically, the cabinet spelled out 7 measures to deal with the imminent water shortages. They are: 1) limit MWA water use to 0.5 bcm; 2) instruct the Interior Ministry to devise plans with concerned agencies to bring about water conservation and to aid domestic users; 3) request the Ministry of Science and Technology to designate areas where groundwater can be pumped for dry season agriculture; 4) request the Finance Ministry to create a plan to alleviate the plight of farmers during the dry season; 5) have the Labor Ministry set up job creation schemes for the dry season; 6) disburse Bt 500 million from the government's central budget for the construction of 50,000 shallow wells in drought-plagued areas; 7) instruct the Commerce and Agriculture & Cooperatives Ministries to guarantee the prices of rice-substituting crops.¹⁸

Except the first two measures, the government's water-solving devices appear to derive from a genuine supply-side mentality. Moreover, the seven measures are reflective of the ad hoc, divisive nature of governmental attempts to solve the problems. Without fully appreciating the meaning of scarcity, the effort has been to tackle the problems through supply-side methods.

However, true solutions to water problems seem to warrant a profound shift in Thai cultural attitudes toward water scarcity and the collective acceptance of the cost of water, a time-consuming process. In the Chao Phraya-Mae Klong case, residents of the Mae Klong need to be compensated financially for any leftover water they may hand over to Bangkok users. Meanwhile, Bangkok residents and policy makers should get used to the idea of managing their existing resources better before going out to look for new supplies, an argument made by a growing number of analysts.¹⁹ The government can start by making improvements in the two water legislation drafts, one arguing for the establishment of a Water Resources Ministry.²⁰ With regard

¹⁸ *Krungthep Turakij* (in Thai), 3 December 1993, p. 19.

¹⁹ Demand-side management is used interchangeably here with "demand-management," which Christensen and Boon-long have defined as the improvement of efficiency of existing systems.

²⁰ See Christensen and Boon-long for the deficiencies of these two legislative drafts. The authors argue that, instead of solving market failures in water scarcity, the government may worsen the situation by its intervention, resulting in government failures.

to the inter-basin conflict, this proposed ministry should give the highest autonomy to each of the 25 basins.

Case No. 2

Background of the case

• *Tambon Chaksi, Muang District, Singburi Province*

There are six districts in Singburi province, which is located in the Central plain along the Chao Phraya river basin. The Muang district has seven Tambons, of which Chaksi is one. Tambon Chaksi has seven villages, each village comprising approximately 100 households. This case study was conducted in Village No. 2 of Tambon Chaksi.

• *Nature of the Problem: Upstream vs. Downstream Conflict*

In December 1993, two farmers in Village No. 2 of Tambon Chaksi, who were planting a second rice crop, monopolized public water by blocking off the flow of water from RID's canal and diverted it for their own use. These individuals monopolized the water without seeking permission from the appropriate authorities. Their ability to divert the water for their sole use stemmed from the location of their farms upstream in relation to the canal flow. As water is released from larger channels into canals in the Village No. 2 area, which covered an irrigated area of 1,700 rai, the two upstream farmers simply put up aluminum barriers and diverted the water to their farms, which altogether accounted for less than 50 rai.

The diversion of water at the head of the stream deprived other farmers at the lower end of the canal of the essential resource. A group of downstream farmers, mainly women, went up the canal and protested to the two upstream farmers, who were both male. A heated argument ensued. No violent acts nor any physical confrontation took place. In the end, the monopolizing individuals upstream did not heed the request of the downstream protesters to remove the barriers to water flow. The protesters then decided to take the matter to the Village No. 2 headman (called "pooyaiban" in Thai).

As the leading local authority in daily village affairs, the headman was long accustomed to dealing with a wide variety of personal conflicts occurring in his domain. When he heard the complaints of the downstream protesters, the headman went with the protesters to examine the verity of the case. And when he saw the aluminum instruments blocking and diverting the flow of water, the headman promptly removed the obstacles. At that point, the monopolizing individuals were absent from the scene. The free flow of canal water was thus restored. Satisfied, the protesters went home to their downstream farms.

In the evening of the same day, after the national anthem was played over the loudspeaker atop his house, the headman made a public announcement pleading for the households in his village not to be selfish with water. The headman appealed to the villagers' fraternal spirit -- that they are all brothers and sisters related over generations through local kinship ties -- for them to be "krengjai" (courteous) toward one another and not to divert water like that again. He refrained from making any direct reference to personalities. His speech had a gentle, subtle tone, relying on existing social relationships in the village and his status as headman. A couple of days after the village headman made the loudspeaker speech, the upstream farmers came to him and apologized for hogging the water. They told the headman they had thought that the downstream farmers already had adequate water for their farms.

At this juncture, it is significant to note how the conflict reached resolution. Both sides of the conflict did not resort to the police or a court of law. The headman did it, acting as the judge and enforcer of his own judgment. The headman employed his status and the legitimacy therein to adjudicate on an ad hoc and informal basis. The disputants, on the other hand, treated the water conflict like any other -- such as a spousal quarrel, the failure of a household to repay a loan to another, or a household's inability to equip their schoolchild with proper school books. When faced with these problems, the villagers typically look to the headman for help. And in the past, the headman came through for them, often by asking other villagers to help out or by asking the village kamnan for assistance. But the water conflict case, which stemmed from the lack of well-defined upstream and downstream rights, caught the headman off guard. He said he was not used to adjudicating over water use. Hence, his capacity as headman, in the framework of Thailand's

administrative apparatus centered in Bangkok at the Interior Ministry, was clearly a mismatch for the water conflict that occurred.

While his resolution of the conflict was successful, the headman in Village No. 2 mentioned a nearby conflict which failed and turned violent. In Village No. 6 (of the same Tambon), a similar conflict arose in 1991 and ended up with one man stabbed to death with a machete. However, the headman noted that, while water conflict instigated and was a major cause of the physical confrontation, other issues were also disputed. And it was not clear how large a role the water conflict really assumed in that death. It is worth mentioning that the headman of Village No. 6, after trying to settle the quarrel over water use, did not make a public announcement pleading for cooperation from the villagers. The headman of Village No. 6 simply did not have a loudspeaker posted on his roof like his counterpart in Village 2. Hence, since the loudspeaker – an instrument of communications technology – was a highly effective communications tool for the Village 2 headman, and its role in resolving water conflict should be noted.

That episode was not the first for the headman of Village 2. He had heard of other incidents involving conflict over water use, and milder disputes over water ownership had occurred in his village. The headman added that conflicts will always arise because there will always be selfish persons, referring to the farmers who did not abide by the instruction not to grow second rice crops. He gave some suggestions to ameliorate the situation. His solutions relied mainly on the existing water regime, namely the RID. The headman believed the conflicts he saw would disappear when the RID pour a concrete lining into the canal system. Such a move would bring the village canal infrastructure directly into possession of the RID, thereby becoming "state property." Infringements on and damage of government property carry a stiff fine and/or jail terms. To divert water from the dirt-lined canal system, the prospective thief must put up a barrier or siphon the water through a water pump. In any event, the theft would involve tampering with the existing dirt lining. Apparently, to the villagers, encroaching on the dirt walls of the canal is perceived as something legal. After all, they say, the red dirt cannot possibly belong to anybody. As a corollary, the water within the dirt-lined canals is also free for the taking. (If no one owns the dirt-lined canals, how could anyone own the water inside them?)

Thus if all sides of the canal are lined with concrete, the concrete linings now belong to someone -- the state. Interestingly, this has been one main method of the state's acquisition of water resources. (As mentioned in the introduction, no one legally owns water in Thailand.) The villagers' perception of property would change at this point. While they knew they could get away with diverting water from dirt-lined canals, the villagers are aware of the adverse consequences of tampering with state-built concrete linings. It would be tantamount to destroying RID -- and hence the state -- property. The concrete linings would also plug the leakage problem where water seeps out of the canals into adjoining areas. The concrete layers would also equalize water levels throughout the canal system, thus making for a more equitable access. (The dirt canals vary considerably in depth.) And unlike red dirt, the hard concrete linings are much tougher to tamper with. Not surprisingly, to the headman of Village No. 2, a concrete lining is the panacea to all water-diversion problems.

Thus far the water problems besetting Village No. 2 have to do with the existing irrigation structure. To solve their water conflicts, the farmers in Village No. 2 resorted to the local authority and sought arbitration from the headman. Thus sophisticated water problems, which have been rife only recently must depend on an old, existing local power structure for resolution. The conflict in Village 2 did not gain expression in a legal framework involving a formal process of arbitration, as in a court of law for instance. Thus far the headman has done it all, listening to the plaintiffs, then acting as judge and enforcer. The headman, in turn, sought to solve the overall water conflicts in his village by looking to the higher authorities -- the RID. The implementation of the concrete lining throughout the canal system is the immediate cure-all as far as the headman is concerned. Asked what will happen if the concrete-lined canals do not have adequate water to offer -- a symptom of the worsening nationwide water crisis -- the headman replied: "That will be my next problem."

Case No. 3

Background of the case

• Tambon Chaksi, Muang District, Singburi Province

There are six districts in Singburi province, which is located in the Central Plains along the Chao Phraya River basin. The Muang district has seven Tambons, of which Chaksi is one. The Tambon Chaksi has seven villages, each village comprising approximately 100 households. This case study was conducted in Villages Nos. 1 and 2 of Tambon Chaksi.

• Nature of the Problem: Emerging Competition for Groundwater

To discourage second water-intensive rice crops in 1993-94, the RID authorities told farmers there would be no irrigated water available for a second rice planting. Farmers were told to switch to less water-intensive second crops such as tapioca, maize, green beans, cucumber, and sugar cane. Otherwise, they would run the risk of losing their second rice paddy. Growing the first rice crop would still be allowed, meaning the Central Plain irrigation would cover first rice crops. But even for the first planting, irrigated water has been utterly inadequate. Farmers complained about the inconsistent and lack of water supply. They said never in their and their parents' lifetime had the drought situation been so severe.

As a consequence, many farmers in Singburi have switched to other crops as recommended by the authorities. These farmers do so grudgingly, only because they fear not having enough water for their rice crops and hence losing their financial investment. They lamented that rice fetches the best price and it is the crop they know how to grow best. It was clear that their first preference would be to grow a second rice crop. Despite the official warning that water would not be forthcoming for second crops, farmers were still planting second batches of rice, thus providing the backdrop for our third case study.

The RID's policy to discourage second crop growing is not a law; it is simply that -- a policy. At most it is a "strong" policy because a lot of resources have been expended, including advertisements and official instructions, to make it work. Local officials, for example, are instructed to get the word out to farmers not to grow second rice crops. Major newspapers carry

numerous stories about the need to switch crops away from water-intensive rice. But in the end the policy is not enforceable, and a sizable number of farmers go on planting second rice crops as they did in past years. Water may be scarce everywhere, especially within the RID's domain, but not on some farms. The planters of these farms have their own way of looking at things. In effect, these farmers have come to view the RID's real policy as one of "chuay tua-eng" ("self-help").

In reality, the farmers can grow whatever they want as long as they can come up with their own water. Hence "self-help" is what the RID told the farmers -- that "second rice crops are permitted if you can help yourselves and provide your own water." So officially, the authorities told farmers not to grow second rice crops because the water in the two major dams is insufficient to support second planting of rice in the Central plain. But at the same time, the RID officials turned a blind eye to groundwater pumping. The upshot is that this practice by the authorities creates an open access mentality among the farmers. Basically, the message the RID has been sending to farmers is this: "We can't help you with irrigated water, but the groundwater is free. Feel free to pump as much as you want."

But in a way the groundwater is not totally free. Unlike irrigated water, groundwater necessitates a lump sum of cash needed for the initial capital investment to get the proper pumping devices in place. Once these devices are in operation, however, farmers can pump as much as they want. For at least the last two years, pumping water from underground reservoirs has become the main outlet to all farmers in Singburi province, especially as the supply of irrigated water becomes more unreliable. During this period, there has been an adequate supply of groundwater, both to flood rice farms and for domestic use. One household typically would have a well in the back of the house dug about 8 meters deep. The groundwater supply for domestic use, which is drawn from a more shallow water table than for farm use, has been sufficient. Households did not complain about their groundwater pumps running dry.

The situation in the farm is starkly different, however. Farmers are increasingly alarmed because more and more of their wells are drying up, and they must dig deeper and deeper to find a steady supply of groundwater. Virtually all farmers planting a second rice crop -- and many of those that were planting alternative crops -- were employing groundwater pumps. Unlike the past, the open access to groundwater is facing mounting difficulties. For the first time, a growing

number of farmers has realized that their wells are running dry precisely because too many of their peers are doing the same thing they are doing -- tapping the same underground reservoirs. A zero-sum mentality has set in. Farmers in Villages Nos. 1 and 2 now know that the groundwater is limited. They realized that not all of them can pump as much as he/she always did in the past. The farmers are aware that they cumulatively take out a much larger amount than is being replenished by rainfall.

The rapid depletion levels and the consequent drying up of underground wells in a growing number of areas are a very recent phenomenon. Hence the farmers have not had to think about this new problem. They complained resoundingly that their "deep" wells are drying up, and something must be done. A few farmers suggested that they would be willing to trade in their free access to some measures of regulation. They emphasized the need to have a "consistent steady" supply, so that they know what to expect and can then plan their investment accordingly. In fact, according to regulations, groundwater is supposed to cost money, according to the Groundwater Act of 1977, which introduced a charge of one baht per cubic meter of groundwater.²¹

But in Singburi, mechanisms for charging for groundwater use were completely absent. It seemed like the further away from Bangkok, the less likelihood of the success in implementing official water fees, at least in the case of groundwater. Part of the problem is because the RID and the Department of Mineral Resources (DMR) have conflicting jurisdictions. The RID, which belongs to the Ministry of Agriculture & Cooperatives, is in charge of irrigated, surface water. When it does not have enough of this to dish out, it effectively encouraged the farmers to tap groundwater. But groundwater is under the authority of the DMR, which has been indifferent to the massive groundwater utilization in Singburi. The official charges are imposed mainly on the BMR region.²² That imposition is carried out by another agency, the Groundwater Division of the Industry Ministry.

²¹ The official charges on groundwater based on the 1977 Act represent a mockery of Thai law. The Act stipulates that groundwater should cost about the same as tap water, which is six baht per cubic meter. But the current price of groundwater is only one baht per cubic meter. The head of the Industry Ministry's Groundwater Division recently hinted that this rate may soon go up to 3.5 baht.

²² In the BMR areas, groundwater is charged only in Samut Prakan, Samut Sakhon, Nonthaburi, Pathum Thani, Ayutthaya, and Bangkok. The Industry Ministry's Groundwater Division only recently began to contemplate charging groundwater use in major provincial cities, including as Had Yai, Chiang Mai, Chiang Rai, and Lampang. The rest of the country are effectively excluded.

One Singburi farmer suggested that the village headman keep tabs on all the pumps in his village, thereby bringing about a regulation on groundwater pumping. This particular farmer suggested that the village headman knows all his villagers and thus would be able to determine with certainty how many pumps are in operation. The farmer believed the pumping of water needed to be carry some sort of fee, to be monitored and collected by the headman. The farmer was less clear on where he thought the collected money should go. His point was that a system of monitoring groundwater pumping involving financial instruments should be erected. This farmer recognized that, if his peers drew less water from the underground basin, more would be available to him. But he also recognized the opposite, that others would get more if he drew less. In effect, farmers are faced with a prisoner's dilemma which, without jurisdiction, is being left to deteriorate.

While there is little supervision over access to groundwater, the authorities are actively involved in other ways. Chiefly, the authorities from the DMR helped dig the wells for the farmers. Not only does this encourage further unlimited pumping and hence second rice crops, but it has also given rise to inequitable access to groundwater. The official regulation is that farmers with more than 4 rai of land are entitled to a free well 20-wah (40 meters) in depth. In fact, very few of the eligible farmers who sign up for the free wells actually get them. If they cannot handle the indefinite waiting period, these farmers must pay the private cost of Bt 30,000 per well. However, the farmers with bigger lots tend to be able to afford the private cost of digging the well. Consequently, the farmers of smaller lands are bitter about the official policy which they believed favored the richer farmers. Poorer farmers thought they should be the ones the government should be trying to help the most, since they are more abundant and need help more than their richer peers. Several farmers criticized the fact that they had to then seek a loan from the Bank of Agriculture & Cooperatives, thereby having to go into debt to get the well set up.

In cases where the free wells are dug, the authorities would seek bids from sub-contractors. The authorities would pay the sub-contractor to dig only 20 wah (40 meters) deep at the price of Bt 10,000. Beyond this point, the farmers must take care of themselves. That is, if no water is available at 20 wah, the farmers must dig the extra length at their own expense. The usual occurrence is that the farmers would then negotiate with the sub-contractors to lower the price and dig the extra wah until groundwater is found. The farmers complained that throughout the day

they had to pamper and cater extravagantly to the sub-contractors, who hold the means to find water. Farmers were infuriated at having to serve the sub-contractors liquor, cigarettes, energy booster drinks (called "kratingdaeng" in Thai), among other things. The sub-contractors told the farmers these goods are a sacrifice to the spirits whose property they are digging up. As middlemen, the sub-contractors seem to extract maximum gains from both sides, the authorities and the farmers. From the farmers, the sub-contractors obtain additional income on top of that given them by the formal procurement.

In most cases interviewed, after the free digging of 20 wah, no adequate water supply was found. Where water is discovered at 20 wah, the farmers said it would run dry within 2-3 days. The minimum length, according to them, was 25 wah (50 meters) to reach ample groundwater. The average negotiated price is Bt 300 per wah after the given 20 wah. Hence farmers had to pay at least Bt 1,500 out of their own pocket to effect the DMR's policy of digging free wells for operators of 4-plus rai. They were very bitter about having to pay the extra money, which they often had to borrow from relatives and friends. They said that the bidding process and the government money should finance whatever depth sufficient to reach the water. The farmers said they should not have to pay anymore after the government pays.

Even at the 25 wah depth, some farmers complained their wells would run dry in a little over one month. It was clear that the 25 wah was an untenable depth for reaching groundwater. If the farmers wanted to go deeper, they had to cozy up to the sub-contractors again. It is probable, though not conclusively determined in this study, that one of the reasons the water is increasingly dry at that great depth is because more farmers than ever before are using wells which are tapped into the same water tables. It is theoretically possible that the wells could be dug deeper and deeper, thus eliminating the drying-up problem. But this would incur huge expenses on the part of farmers. Moreover, given the much slower rate of replenishment, the water tables are bound to disappear, bringing about eventual scarcity problems.

The headman of Village No. 1 was acutely aware of this alarming development. He commented that if all villages dig this deep, there will not be enough groundwater in the future. The assistant Kamnan (who heads the Tambon) overseeing government-financed wells suggested that the public money from various wells be pooled together for the digging of one large well about

50 wah (100 meters) in depth. This well would be located near the irrigation canals, and hence the pumped water would go right into the RID's canal system. The farmers would then have equal access, and enough ground water would flow out of that depth. Otherwise, he believed the various 25 wah wells will dry up soon, and they will just form "a cemetery of wells." Such aggregate digging and sharing may also allow for a mechanism to levy charges for the amount of groundwater used.

To conclude, the case studies provide examples of how an open access natural resource, when it becomes scarce, is appropriated by the powerful and the rich. In this case, water is available to Bangkokians and those with the money to dig deep wells. In the shift from an agriculture to an industrial based economy, the losers are the poorer of the farmers, who have not the land nor the money nor the social status to survive in the competition for this precious natural resource.

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